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Mindfulness-based cognitive therapy (MBCT) in patients with obsessive–compulsive disorder (OCD) and residual symptoms after cognitive behavioral therapy (CBT): a randomized controlled trial

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Abstract

Up to one-third of individuals with obsessive–compulsive disorder (OCD) do not benefit from evidence-based psychotherapy. We examined the efficacy of mindfulness-based cognitive therapy (MBCT) as a complementary treatment option. In a prospective, bicentric, assessor-blinded, randomized, and actively controlled clinical trial, 125 patients with OCD and residual symptoms after cognitive behavioral therapy (CBT) were randomized to either an MBCT group ($n = 61$) or to a psychoeducational group (OCD-EP; $n = 64$) as an active control condition. At post-treatment, there was no significant benefit of MBCT over OCD-EP with the Yale-Brown-Obsessive–Compulsive Scale (Y-BOCS) as the primary outcome measure, but with the Obsessive–Compulsive Inventory [OCI-R; $F(1, 101) = 5.679$, $p = .036$, effect size $\eta^2_{partial} = 0.053$]. Moreover, the response rate and the improvement on secondary outcomes such as obsessive beliefs and quality of life was significantly larger in the MBCT group. Non-completion rates were below 10%. At the 6-month follow-up, OC symptoms were further improved in both groups; group differences were no longer significant. Our findings suggest that MBCT, compared to a psychoeducational program, leads to accelerated improvement of self-reported OC symptoms and secondary outcomes, but not of clinician-rated OC symptoms. In the midterm, both interventions yield similar and stable, but small improvements, suggesting that additional treatment options may be necessary.

Keywords Obsessive–compulsive disorder · Psychoeducation · Psychotherapy · Mindfulness · Randomized controlled trial

Introduction

Obsessive–compulsive disorder (OCD) is one of the most debilitating and costly psychiatric conditions (for an overview, see [1]). It usually takes a chronic course if left untreated [2] and is accompanied by a significantly reduced quality of life, which was found to be in the 11th percentile compared to nonclinical norms [3–5]. Cognitive behavioral therapy (CBT) with exposure and response prevention (ERP) is the most efficacious treatment in OCD, with large overall controlled effect sizes of Hedge's $g = 1.39$ (for reviews, see [6, 7]). A sizeable percentage of patients (about 30%), however, do not respond to that treatment with a reduction of symptom severity of at least 35% [8].

More recently, efforts have been undertaken to enhance the effects of CBT in OCD patients, such as d-cycloserine augmentation of exposure training (for a review, see [9]) or the utilization of strategies based on inhibitory learning principles. These strategies include compound extinction,

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multiple context exposure, consolidation scheduling of learning trials, or affect labeling, which are based on laboratory findings related to fear extinction [10]. One important insight of inhibitory learning perspectives is that an open, accepting attitude towards adverse mental events might reduce distress more efficiently than attempts to fight or to control them [11]. Similarly, recent research suggests that the willingness to experience unpleasant thoughts, emotions and bodily sensations is associated with faster response to ERP [12]. In line with this, mindfulness-based interventions that focus on an open, non-judgemental awareness and acceptance of present-moment experience might reduce the need to escape from negative thoughts and to perform compulsive acts (e.g., [13, 14]). This is supported by the statement of Didonna [15, p. 190], who convincingly described OCD as a "state of mindlessness" and suggested combining existing therapeutic techniques with mindfulness-based approaches in order to increase their effectiveness.

MBCT [16] is a manualized program combining mindfulness exercises with elements of cognitive therapy. It comprises only eight weekly sessions and thus represents a rather economic intervention, both in terms of time- and cost-effectiveness. MBCT has been proven to be effective for relapse prevention in recurrent depression (for a review, see [17, 18]) and shows initially promising results in the treatment of active depression, anxiety disorders, and bipolar disorders [19, 20]. Systematic reviews report medium effect sizes for MBCT (e.g., [21]). However, when compared to an active control condition, MBCT has not always shown superiority (e.g., [22, 23]).

The empirical base of mindfulness based approaches in the treatment of OCD is currently limited by the small number of studies conducted in this area. In a study by Kumar et al. [24], 27 OCD patients with predominant obsessions profited from 16 double sessions of mindfulness-integrated CBT. Patient completion of a self-help treatment manual for mindfulness, however, was not associated with a change in OC symptoms [25]. So far, two waitlist-controlled studies have examined the effects of group programs using mindfulness interventions: one used a mindfulness group program [26], and the other evaluated MBCT as an augmentation of CBT [27]. Both studies showed a significant reduction in OC symptoms. However, the studies relied on small samples ($n = 12$ and $n = 18$, respectively). In sum, research on mindfulness-based treatments in OCD, particularly regarding manualized mindfulness group interventions such as MBCT, is still in its infancy. Randomized controlled studies on larger samples are especially lacking.

Several research groups and clinicians have adapted the original MBCT manual for other disorders [28], but no adaptation for OCD has been published so far. Our workgroup designed an adaptation of the MBCT program for patients with OCD [29] that closely follows the original manual by Segal, Williams, and Teasdale [30] and proved to be feasible and well accepted in our pilot study on 12 patients with residual OC symptoms after CBT [31, 32]. In order to control for unspecific group effects such as mutual support and validation of experiences, we compared results with the effects of a psychoeducational group program (OCD-EP) with the same number and duration of sessions as the MBCT program (for the study protocol, see [33]). Since CBT is the evidence-based first-line psychotherapeutic treatment of choice [34], we only included patients who were still symptomatic after CBT (i.e., Y-BOCS > 12 points as an established criterion of remission [35]).

The aim of the present study was to investigate, for the first time, the efficacy of mindfulness-based cognitive therapy in OCD patients in a large sample using a randomized controlled trial. We hypothesized that in patients with OCD who had not responded well to cognitive behavioral therapy, mindfulness-based cognitive therapy would produce a significantly stronger reduction of OC symptoms than a psychoeducational program.

Materials and methods

Design

In a prospective, bicentric, assessor-blinded, randomized, actively controlled clinical trial, 125 patients with OCD meeting DSM-5 criteria were randomly assigned to eight 2-h sessions of either MBCT or OCD-EP. Sample size was determined according to a formal power calculation using G*Power, with a resulting target sample size of $n = 64$ per study group for the detection of a medium effect between treatment groups. Randomization was stratified site-wise. At each trial site, patients were gathered in cohorts and randomly assigned to MBCT or OCD-EP by an independent allocator using a computerized random number generator. The study was approved by the local ethics committees and preregistered (DRKS00004525). In accordance with the Declaration of Helsinki, all participants were informed about the design and purpose of the study. Each participant was required to sign a written consent form and could withdraw consent and quit the study at any point in time.

Participants

Patients were recruited through referrals from primary care and mental health clinics as well as by newspaper advertisements. They were invited to participate if they met the following inclusion criteria: a primary diagnosis of OCD according to DSM-5 with clinically relevant OC symptoms (i.e., a Y-BOCS global score > 12 or subscore of ≥ 8 in either obsessions or compulsions), age ranging from 18

to 70 years; and completion of at least 20 sessions of CBT within the 3 years prior to study inclusion, with or without a temporary remission (<6 months) of OCD symptoms according to DSM-5 criteria. All participants were asked for the kind of previous treatment. Only those patients who had definitely undergone cognitive behavioral therapy were invited to participate.

Exclusion criteria were a history of psychosis, a current manic episode or a manic episode within 5 years of the beginning of the study, a current severe depressive episode, current substance use disorder, borderline personality disorder, Asperger syndrome assessed by the Autism Spectrum Quotient (AQ; [36]), acute suicidal tendencies according to the Suicidal Behaviors Questionnaire-Revised (SBQ-R; [37]), a severe neurological disorder, or an intelligence quotient < 70 as estimated by a vocabulary test (WST; [38]). To prevent confounding effects, patients who had begun or modified psychotherapeutic or pharmacological treatment within 12 weeks of the beginning of the assessment were excluded. Current psychotherapeutic or pharmacological treatment for more than 12 weeks or a change of dosage of the same drug was tolerated.

Both study centers, university clinic Freiburg (center A), and university clinic Hamburg (center B), recruited an approximately equal number of participants. Group sessions for patients recruited through center A took place in Freiburg (population: 230,000) and in Oldenburg (population:

165,000). Groups for patients recruited through center B took place in Hamburg solely (population: 1.7 million). Overall, eight MBCT and eight OCD-EP groups were conducted (three of each program in Freiburg; one in Oldenburg and four in Hamburg).

We enrolled and randomized 125 patients between September 2014 and February 2016 (see Fig. 1). There were no significant differences in terms of demographic characteristics, pre-treatment, or post-treatment scores between the patients who provided post-treatment and follow-up data (82.4%) and those who did not (17.6%).

Interventions

Both interventions consisted of eight sessions with a length of 120 min each, which were held at weekly intervals in an outpatient setting. For both groups, there was a booster session 3 and 6 months after the group program but before the follow-up assessment.

The psychoeducational program was designed by the authors (BC and SL) and consisted of a presentation and education about the etiology, mechanisms, and maintaining factors of OC symptoms; metacognitive and neurobiological perspectives on OCD; information on existing pharmacotherapy, psychological treatments, and relapse prevention; as well as group sharing and discussion of
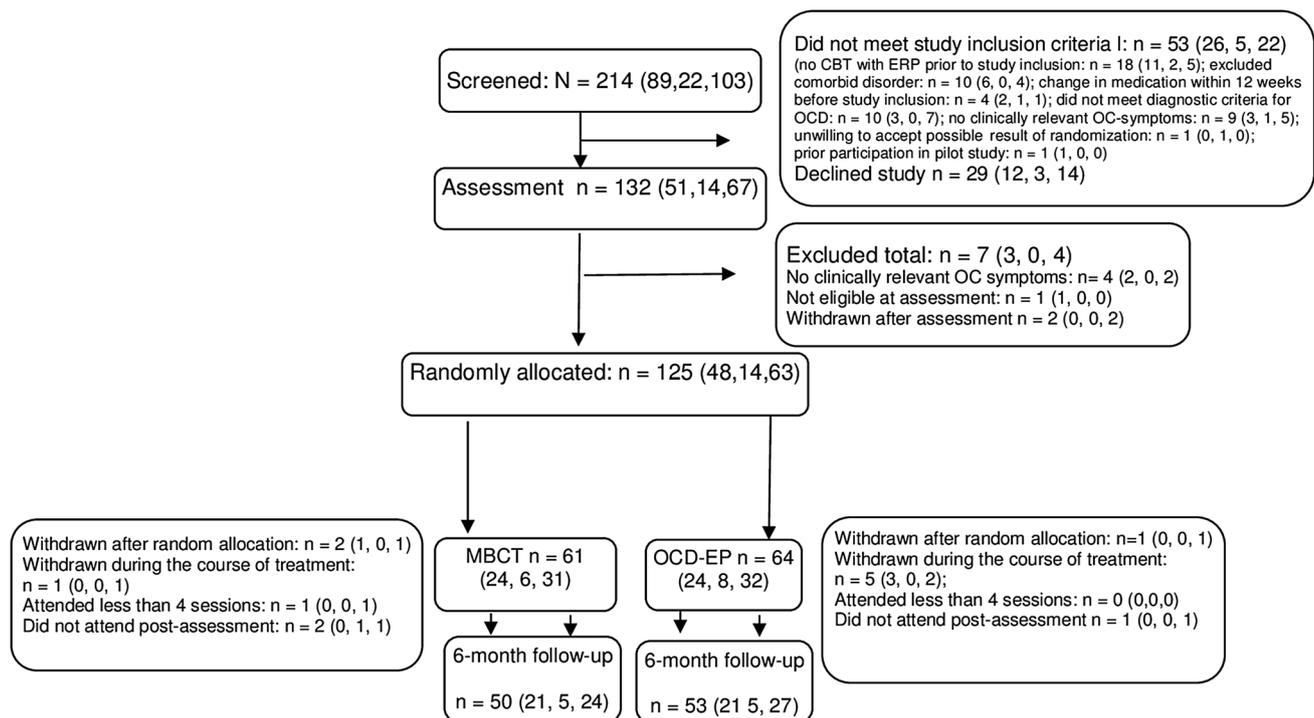

Fig. 1 Flow of participants through the study. Numbers in parentheses denote participants at Freiburg, Oldenburg, and Hamburg, in that order. *MBCT* mindfulness-based cognitive therapy, *OCD-EP* psychoeducational group

personal experiences with OC symptoms and helpful strategies for coping with the disorder.

Group sessions were videotaped, supervised, and checked for adherence. On average, every second session was supervised. Supervision for MBCT was provided by TH. Supervision for OCD-EP was provided by AK and LJ. All supervisors were experienced clinical psychologists and certified supervisors with at least 10 years of clinical experience. MBCT courses were conducted by certified MBCT or MBSR-therapists with a mean age of 43 years and 7 years of clinical experience with OCD patients on average. The OCD-EP courses were conducted by clinical psychologists with advanced or completed training in CBT, a mean age of 35 years and 4 years of clinical experience with OCD patients on average.

Assessment procedures

The primary outcome measure was the score on the Y-BOCS, a semi-structured clinical interview with a possible score ranging from 0 to 40 points, which is considered the gold standard for assessment of OCD severity ([39, 40]; for the German version, see [41]). Immediately before the start of the study, the assessors completed a rater training and achieved a high inter-rater reliability (Kendall's tau-b = 0.90) for a Y-BOCS interview presented on a video. For self-assessment of OC symptoms, the Obsessive–Compulsive Inventory Revised (OCI-R) was administered, which is a widely used self-rating scale with excellent psychometric properties (for the German version, see [42]).

Symptoms of depression were assessed by the Beck Depression Inventory-II (BDI-II), [43]. Subjective quality of life was measured by the World Health Organization Quality of Life–abbreviated (WHOQOL-BREF; [44]). For the assessment of general pathology, the Brief Symptom Inventory (BSI) was used [45]. Furthermore, the Distress Tolerance Scale (DTS; [46]) was administered. As a German version of the instrument is not yet available, the DTS was translated by our workgroup. Moreover, we assessed dispositional mindfulness with the Kentucky Inventory of Mindfulness Skills (KIMS; [47]) and self-compassion using the Self-Compassion-Scale (SCS; [48]). The Obsessive Beliefs Questionnaire (OBQ-44) was also administered to measure dysfunctional assumptions in OCD [49, 50]. Furthermore, the short form of the Metacognitions Questionnaire (MCQ-30) was applied [51]. Diagnoses were made by trained psychologists using the Mini International Neuropsychiatric Interview (M.I.N.I.; [52]). Finally, subjective treatment satisfaction was assessed by the ZUF-8, a German adaptation of the Client Satisfaction Questionnaire (CSQ; for the German version, see [53]).

Statistical analyses

The main analyses were computed by analyses of covariance following empirical investigations suggesting that controlling for the baseline score is superior to simple pre–post comparisons (e.g., [54]), as this accounts for baseline differences and regression to the mean. The independent variable was group allocation (MBCT vs. OCD-EP), and the baseline score was allocated as covariate.

In order to prevent distortions, multiple imputation (MI) [55] was adopted to estimate post-treatment and follow-up scores for non-completers (i.e., no data available at reassessment). The MI principle is considered to be the gold standard and is also superior to the last observation carried forward method (LOCF) [56].

The rates of patients achieving response or partial response were compared using Fisher's exact test. Rates of responders, partial responders, and nonresponders were calculated according to the recently published international consensus definitions for treatment efficacy in OCD, which are considered to be superior to previous efficacy estimates such as the criterion of Jacobson and Truax [57]. According to the international consensus definition, treatment response is defined as $\geq 35\%$ improvement in the Y-BOCS score in addition to a clinical global impression of 1 ("very much improved") or 2 ("much improved"). Partial response is defined as 25–35% improvement in the Y-BOCS-score plus a clinical global impression score of at least 3 ("minimally improved").

Results

Baseline characteristics

Table 1 shows the demographic characteristics of the two treatment groups. With regard to these variables, no significant differences between the groups were found. In spite of the randomization of the procedure, there were some baseline differences in OC symptoms between groups, with patients of the OCD-EP showing significantly higher baseline scores on the Y-BOCS, $t(123) = 2.78$, $p = .01$. There was no significant difference in OC symptoms on the OCI-R or in other psychometric variables between the two treatment conditions.

With respect to treatment centers, patients at center A had significantly fewer years of education than patients at center B (14.8 vs. 16.4 years; $t(123) = 2.74$, $p = .007$). Moreover, at center B, significantly more patients suffered from comorbid depression (8/62 vs. 19/63 patients; Fisher's exact test, two-tailed $p = .029$).

Table 1 Demographic description of the participants

	MBCT ($n = 61$)	OCD-EP ($n = 64$)	Total ($N = 125$)	Test
Age at enrollment				$t(123) = 0.926$, $p = .356$
Mean age (SD)	37.61 (10.62)	39.59 (13.11)	38.62 (12.0)	
Range	21–65	19–70	19–70	
Gender				$\chi^2(1) = 795$, $p = .372$
Female (%)	40 (65.6)	37 (57.8)	77 (61.6)	
Male (%)	21 (34.4)	27 (42.2)	48 (38.4)	
Marital status				$\chi^2(3) = 1.148$, $p = .765$
Single (%)	38 (62.3)	40 (62.5)	78 (62.4)	
Married (%)	20 (32.8)	19 (29.7)	39 (31.2)	
Divorced (%)	3 (4.9)	4 (6.3)	7 (5.6)	
Widowed (%)	0 (0)	1 (1.6)	1 (0.8)	
Education				$t(123) = 0.231$, $p = .818$
Total length in years including school, vocational training, university (SD)	15.01 (2.9)	15.14 (3.5)	15.08 (3.2)	
Employment				$\chi^2(4) = 1.301$, $p = .861$
Full time (%)	22 (36.1)	22 (34.4)	44 (35.2)	
Part time (%)	15 (24.6)	14 (21.9)	29 (23.2)	
Non-working (%) (pensioned. parental leave. sick leave)	11 (18.0)	14 (21.9)	25 (20.0)	
Unemployed (%)	5 (8.2)	8 (12.5)	13 (10.4)	
Student/intern (%)	8 (13.1)	6 (9.4)	14 (11.2)	
Current psychotherapy				$\chi^2(1) = 0.00$, $p = .988$
Yes (%)	39 (63.9)	41 (64.1)	80 (64.0)	
CBT (%)	37 (96.7)	42 (100)	78 (98.4)	
Other (%)	2 (3.3)	0 (0)	2 (1.6)	
No (%)	23 (37.1)	23 (35.9)	45 (36.0)	
Medication				$\chi^2(1) = 0.897$, $p = .344$
Yes	37 (60.7)	44 (68.8)	81 (64.8)	
SSRI	28 (45.9)	32 (50.0)	60 (48.0)	
SSNRI	4 (6.6)	6 (9.4)	10 (8.0)	
TCA	1 (1.6)	7 (10.9)	8 (6.4)	
Antipsychotic	9 (14.8)	14 (21.9)	23 (18.4)	
Other	14 (23.0)	8 (12.5)	22 (17.6)	
No/none	24 (39.3)	20 (31.3)	44 (35.2)	
Mean duration of illness in years	12.56 (10.3)	10.96 (9.4)	11.74 (9.9)	

SSRI selective serotonine reuptake inhibitors, *SSNRI* selective serotonine noradrenaline reuptake inhibitors, *TCA* tricyclic antidepressants

Treatment center effects

No significant center effects on the Y-BOCS post-treatment scores were found for either treatment condition [$F(1, 55) = 0.667$, $p = .42$ for MBCT; $F(1, 57) = 1.9$, $p = .17$ for OCD-EP]. There was also no treatment center effect for the sample as a whole [$F(1, 115) = 2.6$, $p = .11$].

The same was true for the OCI-R. Neither treatment condition yielded a significant center effect [$F(1, 47) = 0.29$, $p = .59$ for MBCT; $F(1, 53) = 2.6$, $p = .12$ for OCD-EP]. For the sample as a whole, there was also no center effect [$F(1, 103) = 1.12$, $p = .29$].

With regard to follow-up scores, there were also no significant center effects. Moreover, there was no significant difference between centers with respect to the proportion of patients who responded at least partially to treatment vs. the nonresponders in each treatment condition at post-treatment (MBCT: Fisher's exact test two-tailed yields $p = .11$; OCD-EP: Fisher's exact test yields $p = .18$) and at follow-up (MBCT: Fisher's exact test, two-tailed $p = .61$; OCD-EP: Fisher's exact test, $p = .27$). Finally, there was no significant difference regarding treatment satisfaction [$t(49) = 1.10$, $p = .28$ for MBCT; $t(56) = 0.78$, $p = .44$ for OCD-EP].

Intervention effects

Table 2 shows intervention effects in overall scores of outcome variables over time. For reasons of clarity, significant scores of subscales are only mentioned in the text.

Both ITT analyses and per protocol (PP) analyses yielded similar results. At post-treatment, there was no significant difference regarding the Y-BOCS total score (primary outcome) between the two groups. However, MBCT patients improved significantly more than patients in the OCD-EP

Table 2 Descriptive statistics (*M* and SD) for per protocol analyses (ANCOVAS) and ITT analyses

	MBCT			OCD-PE			Per protocol (ANCOVA)/ITT post	Per protocol (ANCOVA)/ITT follow-up
	Baseline	Post	Follow-up	Baseline	Post	Follow-up		
Y-BOCS total score	20.8 (6.5)	17.1 (7.4)	15.8 (7.8)	23.1 (5.8)	20.1 (7.7)	18.6 (7.4)	$F(1, 108) = 0.871$, $p = .353$, $\eta^2_{partial} = 0.008$ ($p = .572$)	$F(1, 95) = 1.268$, $p = .263$, $\eta^2_{partial} = 0.013$ ($p = .570$)
Obsessions	9.9 (3.4)	8.3 (3.8)	7.3 (4.3)	11.1 (3.1)	9.9 (4.2)	9.4 (4.0)	$F(1, 108) = 0.900$, $p = .345$, $\eta^2_{partial} = 0.008$ ($p = .579$)	$F(1, 95) = 3.590$, $p = .061$, $\eta^2_{partial} = 0.036$ ($p = .184$)
Compulsions	10.8 (3.8)	8.8 (4.1)	8.5 (4.1)	11.9 (3.2)	10.2 (3.9)	9.3 (4.0)	$F(1, 108) = 0.784$, $p = .378$, $\eta^2_{partial} = 0.007$ ($p = .592$)	$F(1, 95) = 0.027$, $p = .869$, $\eta^2_{partial} = 0.000$ ($p = .770$)
OCI-R	24.8 (10.1)	22.1 (10.4)	21.4 (12.9)	26.3 (13.0)	26.1 (13.7)	24.4 (12.6)	$F(1, 101) = 5.679$, $p = .019$, $\eta^2_{partial} = 0.053$ ($p = .036$))*	$F(1, 89) = 0.720$, $p = .398$, $\eta^2_{partial} = 0.008$ ($p = .391$)
BDI-II	19.3 (10.7)	14.2 (10.7)	16.7 (12.7)	20.2 (10.4)	17.8 (11.5)	18.0 (12.3)	$F(1 ,102) = 4.795$, $p = .031$, $\eta^2_{partial} = 0.045$ ($p = .098$)+	$F(1, 90) = 0.247$, $p = .620$, $\eta^2_{partial} = 0.003$ ($p = .525$)
BSI Global Severity Index	1.1 (0.6)	0.9 (0.6)	0.9 (0.7)	1.3 (0.7)	1.2 (0.6)	1.1 (0.6)	$F(1, 104) = 5.047$, $p = .027$, $\eta^2_{partial} = 0.046$ ($p = .155$)	$F(1, 91) = 0.223$, $p = .638$, $\eta^2_{partial} = 0.002$ ($p = .945$)
WHOQOL-BREF Global Score	46.0 (21.2)	56.5 (20.6)	57.2 (21.9)	46.9 (19.7)	48.5 (21.0)	52.3 (21.8)	$F(1, 104) = 6.931$, $p = .010$, $\eta^2_{partial} = 0.062$ ($p = .011$)*	$F(1, 92) = 3.808$, $p = .054$+, $\eta^2_{partial} = 0.040$ ($p = .321$)
KIMS-D total score	118.9 (18.4)	124.9 (17.2)	123.9 (20.6)	112.9 (14.3)	115.8 (14.0)	115.5 (15.0)	$F(1, 104) = 5.006$, $p = .027$, $\eta^2_{partial} = 0.046$ ($p = .019$)*	$F(1, 92) = 3.081$, $p = .083$, $\eta^2_{partial} = 0.032$ ($p = .091$)+
OBQ-44 total score	188.7 (51.4)	155.9 (57.6)	162.6 (64.1)	199.8 (44.7)	181.2 (45.9)	178.2 (50.1)	$F(1, 104) = 5.751$, $p = .018$, $\eta^2_{partial} = 0.052$ ($p = .024$)*	$F(1, 92) = 1.790$, $p = .184$, $\eta^2_{partial} = 0.019$ ($p = .561$)
MCQ-30 total score	73.5 (15.5)	64.4 (15.3)	65.0 (16.2)	74.4 (14.6)	69.8 (14.2)	68.7 (15.2)	$F(1, 104) = 5.457$, $p = .021$, $\eta^2_{partial} = 0.050$ ($p = .060$)+	$F(1, 92) = 2.610$, $p = .110$, $\eta^2_{partial} = 0.028$ ($p = .402$)
SCS total score	15.5 (3.4)	16.5 (3.8)	16.9 (3.9)	14.9 (3.9)0	15.2 (3.7)	15.9 (3.8)	$F(1, 103) = 3.461$, $p = .066$, $\eta^2_{partial} = 0.033$ ($p = .095$)	$F(1, 62) = 0.281$, $p = .598$, $\eta^2_{partial} = 0.005$ ($p = .600$)
DTS total score	3.3 (0.8)	3.3 (0.8)	3.3 (0.8)	2.9 (0.7)	2.9 (0.8)	2.9 (0.8)	$F(1, 104) = 0.742$, $p = .391$, $\eta^2_{partial} = 0.007$ ($p = .258$)	$F(1, 92) = 0.507$, $p = .478$, $\eta^2_{partial} = 0.005$ ($p = .389$)

+$p < .1$, *$p < .05$,

group on the OCI-R, a self-rating questionnaire for OCD symptoms.

In addition, patients in the MBCT group also achieved a significantly greater reduction in obsessive beliefs on the OBQ-44. The same was true for improvement of metacognitive beliefs (MCQ); whereas improvement in the overall score was significant only for the PP analyses and bordered significance in the ITT analyses, improvement in the subscore regarding negative beliefs about thoughts concerning uncontrollability and danger was highly significant in both the PP and ITT analyses in favor of MBCT, with a large effect [$F(1, 104) = 11.658$, $p = .001$, $\eta^2_{partial} = 0.101$ ($p = .001$)]. Patients in the MBCT group also demonstrated a significantly larger improvement in quality of life on the WHOQOL-BREF. There was also a greater improvement in depression symptoms in the MBCT group as measured by the BDI-II, which, however, only was significant in the PP analyses.

At follow-up, the scores of OC symptoms in both groups had further improved. Improvement of OC-scores was slightly more pronounced in the OCD-EP-group compared to the MBCT group. The obsessing subscale on the OCI-R bordered significance in favor of the MBCT group [$F(1, 89) = 3.709$, $p = .057$, $\eta^2_{partial} = 0.040$ ($p = .070$)]. Apart from this, only the subscale on the KIMS ("Describing") [$F(1, 92) = 4.912$, $p = .029$, $\eta^2_{partial} = 0.051$ ($p = .036$)] yielded significantly greater improvement in the MBCT patients, whereas the difference for the subscale regarding negative beliefs about thoughts concerning uncontrollability and danger on the MCQ became significant only in the PP analyses [$F(1, 92) = 4.380$, $p = .039$, $\eta^2_{partial} = 0.045$ ($p = .067$)]. There were no longer significant differences between total scores of secondary outcomes.

Treatment response

As shown in Table 3, significantly more patients in the MBCT group reached partial response or full response (for criteria, see above) at post-treatment (Fisher's exact test, one-tailed $p = .02$). The difference was no longer statistically

Table 3 Frequency and percentage (in parentheses) of responders, partial responders, and nonresponders according to the consensus definitions for OCD [57] at post-treatment and follow-up (FU) assessments

	MBCT post	OCD-EP post	MBCT FU	OCD-EP FU
Response	13 (21.3)	8 (12.5)	19 (31.2)	15 (23.4)
Partial response	8 (13.1)	3 (4.7)	6 (9.8)	6 (9.4)
Nonresponse	40 (65.6)	53 (82.8)	36 (59.0)	43 (67.2)

significant at follow-up (Fisher's exact test, one-tailed $p = .22$).

Utilization of psychotherapy and pharmacotherapy

At post-treatment, 40 patients (71.43%) in the MBCT group were in psychotherapy compared to 37 patients (68.52%) in the OCD-EP group. Furthermore, 40 patients (67.8%) in the MBCT group vs. 44 patients (73.33%) in the OCD-EP group were receiving psychopharmacological treatment. At follow-up, 26 patients (54.17%) in the MBCT group and 29 patients (54.72%) in the OCD-EP group were undergoing concurrent psychotherapy. In both groups, 35 patients (61.4% and 60.34%, respectively) were medicated. None of the differences were significant.

Treatment compliance and treatment satisfaction

MBCT patients attended a mean of 6.5 of the 8 treatment sessions, compared with 5.3 for the OCD-EP patients [$t(123) = 0.914$, $p = .36$]. Dropout rates were low, overall: four patients (6.6%) in the MBCT sample and six patients (9.4%) in the OCD-EP sample did not complete the treatment, attended less than four sessions, or did not attend the post-treatment assessment.

Regarding treatment satisfaction, there were no significant differences for the ZUF-8 total score (range 0–32 points) between treatment conditions ($M = 23.75$, SD $= 4.99$ for MBCT vs. $M = 22.35$, SD $= 4.69$ for OCD-EP; $t(103.3) = 1.50$, $p = .14$). Four out of five patients were satisfied or largely satisfied with the intervention as rated by item 7 of the ZUF-8 (82.4% in the MBCT group, 78.6% in the OCD-EP group).

Adherence to treatment

Adherence to the MBCT manual was rated using the MBCT Adherence Scale [58], scale range 0–2) by TH. Adherence was confirmed by a score of 1.81 for center A and of 1.82 for center B. Competence of delivery of MBCT was evaluated using the Mindfulness-Based Interventions-Teaching Assessment Criteria [59]; scale range 1–6) by TH. Therapists achieved scores of 5.1 (center A) and of 5.3 (center B).

Adherence to the OCD-EP manual and competence of delivery of OCD-EP were rated by trained staff using adaptations of the MBCT rating scale [58] and of the Teaching Assessment Criteria [59] which were tailored to the specific contents of the OCD-EP. The inter-rater reliability for the OCD-EP ratings was good as raters achieved 70% agreement on the adherence scale and 85% agreement on the competence scale in two randomly chosen sessions. Adherence to the OCD-EP manual was 1.86 at both centers and

competence of delivery of the OCD-EP program was 5.9 at center A and 5.8 at center B.

Explorative analyses

To further interpret the data, several additional analyses were undertaken. In a first step, multinomial logistic regression analyses (forward selection; criterion $\leq .05$) were performed to predict the probabilities of treatment response with respect to a set of factors that were selected based upon theoretical considerations and previous studies (e.g., [60, 61]). The independent variables included in the model were: (1) age of onset of OC symptoms ($< 16 =$ early, $\geq 16 =$ late); (2) number of years living with the disorder; (3) presence of an episode of major depressive disorder; (4) presence of another psychiatric comorbidity; (5) current psychotherapeutic treatment, and (6) scores on the OCI-R; (7) scores on the Y-BOCS obsessions subscale, and (8) scores on the Y-BOCS compulsions subscale at the time of study inclusion.

For the MBCT group, parameter estimates suggested a significant increase in the chance of being a nonresponder at post-treatment as baseline Y-BOCS obsessions subscale scores increased [$\beta = 0.200$, $W(1) = 4.041$, $p = .044$].

For the OCD-EP group, parameter estimates suggested a significant increase in the chance of being a nonresponder at post-treatment as baseline OCI-R scores increased [$\beta = 0.067$, $W(1) = 3.940$, $p = .047$]. Moreover, parameter estimates suggested a significant increase in the chance of being a responder or partial responder at follow-up, if the patient was receiving psychotherapeutic treatment [$\beta = 1.398$, $W(1) = 3.860$, $p = .049$] at the time of study inclusion.

Further exploratory analyses with respect to number of attended sessions, medication or psychotherapy at time of study inclusion, demographic variables, and psychometric questionnaires as independent variables revealed no significant results.

In addition, comparisons of extreme values (highest vs. lowest quartile of percentage symptom reduction on the Y-BOCS) revealed no difference on any psychometric and demographic variable at baseline.

Discussion

The aim of our randomized controlled trial was to compare MBCT with a psychoeducational program (OCD-EP) as a treatment option for OCD patients who do not sufficiently benefit from CBT. To the best of our knowledge, this is the first study to investigate the efficacy of MBCT in OCD compared to an active psychological treatment.

After treatment, there were no significant differences between groups in symptom severity rated by clinicians (Y-BOCS) as the primary outcome variable. However, patients in the MBCT program improved significantly more than patients in the OCD-EP group on a self-rating scale of OC symptoms (OCI-R) and on several secondary outcomes. And, there was a significantly larger proportion of responders and partial responders in the MBCT condition compared with the OCD-EP condition. Nonresponse to treatment was associated with more severe OC symptoms in the OCD-EP group and with severity of obsessions in the MBCT group.

MBCT as well as OCD-EP seemed highly acceptable for the participants. The non-completion rates of 6.6% (MBCT) and 9.4% (OCD-EP) during treatment are below the mean dropout rates of 21 randomized controlled trial studies on ERP in OCD (14.7%) [61] and far below the mean dropout rates of 115 studies on CBT in general (26.2%) [62].

Overall, however, symptom reduction was moderate, even taking into account the fact that the average duration of illness at study inclusion was above 10 years and that all patients had previously undergone proper CBT as the gold standard treatment of OCD. The results on the Y-BOCS as the primary outcome variable indicate that MBCT did not have a clinically significant augmentation effect for CBT. The amount of improvement on the Y-BOCS for the MBCT group accords to the results of Key et al. [27], who evaluated the effects on 18 OCD patients of MBCT as an augmentation treatment following CBT.

Interestingly, the difference between the groups became significant only in the self-rating of OC symptoms and not in the Y-BOCS interview. This is in line with the findings of Michalak et al. [63] who found a slight superiority of MBCT for chronic depression compared with treatment as usual by self-report, but not by interview, in secondary analyses. Maybe sensitivity to changes in personal coping and individual struggling with symptoms beyond external criteria is higher in self-rating questionnaires. Regarding our self–report instrument (OCI-R), each item focuses on the extent to which a certain experience has individually distressed or bothered patients, whereas distress is covered in only two of the 10 Y-BOCS-items. It is conceivable, that MBCT promoted a shift from being distressed by futile *attempts* to "get rid of OC symptoms" to accepting unwanted thoughts and difficult emotions, which is more easily detected by the OCI-R and by the OBQ than by the Y-BOCS-interview. Moreover, in spite of the randomization procedure, patients of the educational program showed higher baseline scores on the Y-BOCS than MBCT patients. Therefore, statistical phenomena such as regression to the mean cannot be excluded.

For both the OBQ and the MCQ, the most pronounced improvement emerged on subscales concerning danger and controllability of thoughts. As pointed out by Cairns and Murray [64], taking control through understanding, awareness, and acceptance is one of the key experiences of MBCT

participants. One might hypothesize that the need for control in OCD, which is reflected in self-reported claims of suppressing difficult thoughts and in time-consuming rituals, might paradoxically be met by self-permission to give up control over mental events.

At follow-up, about 41% of MBCT patients reached at least partial response compared to 33% of OCD-EP patients. However, differences between groups regarding primary and secondary outcomes were no longer significant. The psychoeducation group represented a very active control condition as it conveys therapeutic contents along with information about OCD. One might assume that the OCD-EP program might have enabled patients to successively reactivate and extend cognitive behavioral strategies developed in previous or actual therapies during the follow-up period. In line with this, unlike in MBCT, current psychotherapeutic treatment was a predictor of improved outcome in the OCD-EP program. MBCT, in contrast, might have promoted a complementary way of relating to OC symptoms, providing slight but accelerated improvement within several weeks.

Finally, the outcomes should also be viewed within the limitations of our study. In order to improve external validity, we had deliberately decided not to exclude patients who were undergoing psychopharmacological or psychotherapeutic treatment at the time of inclusion. One advantage is that results can be generalized to routine clinical practice. However, the different efficacies of MBCT and OCD-EP might thus have become less visible due to the effects of other treatment modalities. Moreover, participants of our study had to be experienced with at least 20 sessions of CBT, but we did not control for the number or quality of previous exposure exercises and cognitive interventions. Furthermore, our aim was to control for the effects of group support and psychoeducation by the inclusion of an active comparison group. Nevertheless, we cannot say with certainty that the slight superiority of MBCT is due to the practice of mindfulness and not caused by other active ingredients such as the specific psychoeducational elements of MBCT. As shown, for example, by Williams and colleagues [22], psychological education modeled on MBCT can have a similar effectiveness in preventing relapse of a depressive disorder when combined with training in mindfulness meditation. Finally, we did not control for the amount of homework done, even though there is evidence of a small but significant association between the extent of self-reported home practice and positive outcomes of mindfulness-based interventions [65].

In sum, results suggest that MBCT as an 8-week group program is not a panacea for patients with OCD, but it enables previously unsuccessfully treated patients to moderately reduce their OCD symptoms as measured by self-report, to modify their dysfunctional beliefs, and to achieve appreciable gains in quality of life. In view of the fact that effects on the Y-BOCS interview were quite small, there is a need for comparison studies involving other new treatment options such as metacognitive therapy (MCT) or acceptance- and commitment-therapy (ACT), especially for patients with more severe obsessions.

Compliance with ethical standards

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