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Long-Term Effects of Individual Mindfulness-Based Cognitive Therapy and Cognitive Behavior Therapy for Depressive Symptoms in Patients with Diabetes: A Randomized Trial

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Depressive symptoms are very common in patients with diabetes, and this comorbidity negatively influences the patients' medical outcomes and mortality [1]. The burden of depression is intensified by its chronic course trajectory, as a substantial number of patients show a relapse of their symptoms after having recovered [2]. These high relapse rates warrant identifying psychological treatments that reduce depressive symptoms not only directly after the intervention, but that also ensure the maintenance of well-being in the long term.

Mindfulness-based cognitive therapy (MBCT) is a potential effective psychological intervention for treating current depressive symptoms and also for relapse prevention treatment [3, 4]. Recent research has called for MBCT to be compared not only to passive control conditions but also to active treatments [5]. Hence, in a recent randomized controlled trial in patients with diabetes, we compared the direct effects of MBCT not only to a waiting list control condition, but also to cognitive behavior therapy (CBT), the most frequently applied and evidence-based treatment for depressive symptoms [6]. We found that both MBCT and CBT were effective in reducing the severity of depressive symptoms, anxiety and diabetes-related distress as well as in increasing well-being.

The current study focuses on the long-term effects of both treatments. We hypothesized that reductions in depressive symptoms achieved directly after MBCT and CBT would be sustained during the 9-month follow-up period.

The design and methods of the study have been discussed in detail elsewhere [6]. The original study included 94 adult patients with diabetes type 1 or 2 and comorbid depressive symptoms [i.e. Beck Depression Inventory II (BDI-II) score ≥14]. The patients were randomly assigned to either MBCT, CBT or a waiting list condition. After the waiting period, participants who still had depressive symptoms (n = 28) were again randomized to either MBCT or CBT and combined with the original sample, yielding the current sample size of 91, with 45 patients receiving MBCT and 46 CBT. Both MBCT and CBT were protocolized interventions delivered individually in 8 weekly sessions of approximately 60 min.

Assessments were held before and after the treatment and at 3 and 9 months after the treatment. The outcome measures are described in detail elsewhere [6]. The primary outcome measure, the severity of depressive symptoms, was measured with the BDI-II. Secondary outcomes were well-being, as assessed with the WHO-5 Well-Being Index; anxiety, as assessed with the Generalized Anxiety Disorder 7 questionnaire (GAD-7), and diabetes-related distress, as measured with the Problem Areas in Diabetes questionnaire (PAID). Finally, the glycemic control, indicated by glycated hemoglobin (HbA1c) values, was retrieved from the patients' records. As pretreatment value, the average of all assembled values of 0–6 months prior to the intervention was used, and as postmeasurement value we used the average of all values between 1 and 6 months after the intervention. For the HbA1c, we only used 1 follow-up measurement, averaging all values between 6 and 12 months after the intervention.

All analyses were carried out on an intention-to-treat basis, and missing values were imputed by means of multiple imputations. The longitudinal development of primary and secondary outcome measures was analyzed using linear mixed models.

Of the 91 patients who entered MBCT and CBT, 12 patients in each condition completed fewer than 6 of the 8 sessions and were considered dropouts. Six participants in the MBCT condition and 7 participants in the CBT condition did not fill out the questionnaire after the measurement. At the 3-month follow-up, 12 patients in the MBCT condition and 11 in the CBT condition failed to complete the measurements and 16 and 14 patients, respectively, at the 9-month follow-up. Missing observations did not significantly differ as a function of the treatment.

The results of the analyses are presented in table 1. For the primary outcome measure, the severity of depressive symptoms, there was a significant effect of time in both conditions. The results of post hoc tests indicated that depressive symptoms were significantly reduced from before the treatment to after the treatment (MBCT: $p < 0.001$; CBT: $p < 0.001$), but not from after the treatment to the 3- or 9-month follow-up (MBCT: $p = 0.27–0.46$; CBT: $p = 0.34–0.75$). For the secondary psychological outcomes, the analyses also showed a significant effect of MBCT and CBT over time, with an improvement from before the treatment to after the treatment that was sustained up to the last follow-up. In contrast, analyses showed no significant effect on HbA1c over time. For all primary and secondary outcome measures, no significant interactions between time and group were found.

This is the first study to examine and compare the long-term effects of MBCT and CBT as treatments for depressive symptoms in patients with diabetes. Our findings indicate that both MBCT and CBT have sustained beneficial effects on depressive symptoms and

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Table 1. Long-term effects for primary and secondary outcomes

Measure	Group	Before treatment	After treatment	3-month follow-up	9-month follow-up	Time			Time × group	
						F	p	d*	F	p
Depression	MBCT	24.2 (8.3)	17.6 (11.1)	15.9 (9.9)	16.8 (10.8)	18.1	<0.001	0.77 (0.34 – 1.19)	0.82	0.54
	CBT	24.7 (8.3)	17.2 (10.6)	17.0 (10.8)	18.7 (10.8)	13.4	<0.001	0.62 (0.19 – 1.04)		
Well-being	MBCT	31.7 (18.1)	48.0 (20.0)	47.5 (21.0)	49.7 (22.2)	21.5	<0.001	0.89 (0.45 – 1.31)	0.67	0.59
	CBT	27.2 (16.1)	46.2 (19.1)	44.4 (25.2)	42.9 (22.5)	15.9	<0.001	0.80 (0.37 – 1.22)		
Anxiety	MBCT	11.4 (5.5)	7.0 (4.5)	6.5 (4.9)	7.2 (5.1)	20.4	<0.001	0.78 (0.36 – 1.21)	1.12	0.38
	CBT	10.7 (5.0)	6.1 (4.6)	7.0 (4.4)	7.2 (3.9)	19.5	<0.001	0.78 (0.35 – 1.2)		
Diabetes distress	MBCT	37.7 (20.5)	32.7 (21.3)	31.6 (18.8)	30.7 (20.7)	4.7	0.008	0.34 (–0.07 to 0.75)	0.77	0.55
	CBT	39.8 (22.3)	32.4 (21.9)	29.7 (18.5)	32.2 (20.8)	7.0	0.002	0.35 (–0.07 to 0.76)		
HbA1c										
mmol/mol	MBCT	61.7 (9.8)	61.6 (10.8)		60.7 (10.1)	1.3	0.53	0.10 (–0.31 to 0.51)	0.42	0.74
%		7.8 (0.9)	7.8 (1.0)		7.7 (0.9)					
mmol/mol	CBT	64.3 (14.6)	63.6 (13.3)		62.4 (11.1)	1.1	0.38	0.15 (–0.27 to 0.56)		
%		8.0 (1.3)	8.0 (1.2)		7.9 (1.0)					

* The effect size was calculated from before the treatment to the 9-month follow-up change scores. Means are given with standard deviations in parentheses, and d is given with the 95% confidence interval in parentheses.

related symptomatology. These positive findings confirm those of previous studies investigating the long-term effects of either MBCT or CBT and extend earlier research comparing the effects of MBCT and CBT [7]. Thus, MBCT and CBT both seem to be effective treatments for depressive symptoms in a variety of populations.

In the current study, we found no long-term effect on the HbA1c values, neither for MBCT nor for CBT. This finding is concordant with the majority of previous studies [e.g. 8] and could be attributed to the low mean levels of the HbA1c values before the treatment which make floor effects likely. Future studies might want to focus on exploring the effects of psychological treatments in patients who show elevated levels of both depressive symptoms and glycemic control at baseline.

In our previous article [6], we discussed the main limitations of the randomized controlled trial. In addition, our study showed high rates of loss to follow-up which could have resulted in bias. Yet, our attrition rates were comparable to those in previous studies [9, 10]. Our study was originally designed to examine the effectiveness of MBCT and CBT in comparison to a waiting list condition. Consequently, we could only test differences between CBT and MBCT with the control condition in the short term and not in the long term. Furthermore, our trial was not sufficiently powered for an equivalence trial. Future studies, set up as noninferiority trials, are required to confirm our finding that neither MBCT nor CBT is superior over the other.

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