

Effectiveness of Mindfulness Based Interventions on Symptom Reduction According to Y-BOCS and OCI-R in Adult Patients with Obsessive-Compulsive Disorder. A Systematic Review of Randomized Controlled Trials

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Abstract

Obsessive-compulsive disorder (OCD) is one of the most debilitating and costly mental health disorders. Mindfulness Based Interventions (MBIs) may decrease rumination and experiential avoidance, and improve meta-cognitive skills, and therefore, they could constitute a therapeutic option for this disorder. The aim of this systematic review was to sum up the current evidence from randomized control studies that examined the effectiveness of MBIs in the treatment of OCD. The Web of Science, PubMed and EMBASE databases

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were meticulously searched from commencement to May 2020. The primary outcome measure was symptom severity, which was assessed with Y-BOCS. Secondary outcomes were assessed with the BDI, OBQ-R, FFMQ, and quality of life scores. The initial search retrieved 1071 studies, of which only five randomized controlled trials met the selection criteria. Three out of five studies did not demonstrate a statistically significant reduction in OCD symptoms' severity according to Y-BOCS. With regards to secondary outcomes, studies reported an improvement in mindfulness, an amelioration of life quality and a reduction of obsessive beliefs, depressive symptoms and anxiety. Though most studies implementing MBIs did not show a significant improvement of OCD symptom severity, the review highlighted contradictory and inconclusive findings due to a limited number of research studies on each specific MBI, heterogeneity of the studies' populations and lack of RCTs of large numbers of participants.

Keywords

Obsessive-Compulsive Disorder, Y-BOCS, Mindfulness, Mindfulness-Based Interventions, OCD

1. Introduction

Patients who suffer from OCD demonstrate recurring and invasive thoughts, impulses, or mental images that lead to disturbing anxiety or distress levels (obsessions), and are usually followed by repetitive behaviors, aimed at reducing anxiety or neutralizing the obsessive content (APA, 2013). The lifetime prevalence of OCD is roughly 1% - 3% (Leckman et al., 2010) and is considered as one of the most exhausting and costly mental health disorders (Markarian et al., 2010). It usually initiates during the adolescent or early adulthood life span and often, if not treated, it can take a chronic course, resulting in significantly decreased quality of life (Coluccia et al., 2016; Macy et al., 2013). Compared to patients with general anxiety disorder or to those with unipolar disorder, patients with OCD are as well more often unemployed, and less often manage to maintain stable marital relations. The World Organization health care ranks OCD among the ten most disabling diseases in terms of impact on quality of life and loss of return (McKay et al., 2015).

Current first line treatment for OCD consists of the use of antidepressants that inhibit serotonin reuptake (SSRI) and behavior therapy exposure with response prevention (RPE), used separately or in combination (McKay et al., 2015). Specifically, the exposure and response prevention (ERP), accompanied by cognitive therapy or not, is an effective therapy for OCD (Abramowitz et al., 2002; Olatunji et al., 2013; Öst et al., 2015). As such, cognitive behavioral therapy (CBT) that relies primarily on ERP is endorsed as the first choice for treating this disorder (APA, 2013; NICE, 2006). Although research has shown a significant effect of ERP-based CBT on the disorder, about half of the OCD patients,

do not respond to this choice of treatment (Foa et al., 2005; Olatunji et al., 2013). In addition, about a third of the patients drop out prematurely for various reasons (Mancebo et al., 2012); main reported reason is fear of engaging in this type of therapy. Thus, alternative approaches such as mindfulness-based techniques have been considered either as stand-alone or as auxiliary treatments to CBT, potentially increasing CBT's effectiveness, acceptability or engagement.

Mindfulness can be defined as the process that leads to a nonjudgmental awareness (Kabat-Zinn, 1996). This awareness is being achieved by purposely focusing an individual's attention in a specific demeanor, to "here and now" (Kabat-Zinn, 1996).

It is supported that distress tolerance can be enhanced by mindfulness-based interventions (Nila et al., 2015). Currently, the clinical use of Mindfulness Based Interventions (MBIs) is increasing, with Mindfulness Based Therapy (MBCT), and Mindfulness Based Stress Reduction (MBSR), having the most clinical support (Goldberg et al., 2018). MBIs have appeared to decrease rumination and experiential avoidance and improve meta-cognitive skills and emotional regulation strategies (Bishop et al., 2004; Chiesa et al., 2014; Sze et al., 2010). This suggests that MBIs could be efficient in OCD treating. OCD's clinical symptoms are maintained through negative reinforcement which derives from the avoidance of objects or events that cause fear (Abramowitz, 1996). In addition, OCD patients systematically misinterpret intrusive thoughts, leading to anxiety symptoms and an increased urge to demonstrate compulsive behaviors in order to avoid or forestall fearful consequences (Clark, 2004). Patients believing they are directly at fault for generating or preventing damage (Shafran & Rachman, 2004), thought action fusion (Salkovskis, 1989), and beliefs regarding the significance of thought control (Clark & Purdon, 1993), are common among OCD patients (Hale et al., 2013). Mindfulness, rather than avoiding or suppressing thoughts, encourages their observation in a non-judgmental way (Baer, 2003) possibly leading to habituation of intrusive thoughts (Hale et al., 2013). In other words, participants in mindfulness-based programs develop skills such as noticing internal and external events, labeling them without judgment, allowing them to come and go, and acting with full awareness (Liu et al., 2013). Moreover, the fact that mindfulness teaches that "thoughts are not facts", while at the same time advocates "letting go" of unwanted thoughts and emotions and bodily sensations, could reduce the urge to act compulsively (Hale et al., 2013; Hanstede et al., 2008).

Among the available instruments for the evaluation of OCD symptoms' severity and outcome of treatment, Y-BOCS and OCI-R are those most widely used. With respect to Y-BOCS, the instrument evaluates the obsessive and/or compulsive tendencies of an individual based on the ratings of 10 items from patient's self-report and the clinician observations (Goodman et al., 1989). Regarding OCI-R, it is a self-report measure, consisting of 18-items, evaluating 6 different dimensions of OCD symptomatology (Huppert et al., 2007).

Thereby, the aim of this review was to identify and appraise the existing scientific evidence on the effects of MBIs on OCD symptom reduction according to Y-BOCS scale and OCI-R.

2. Methods

The study was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Moher et al., 2010).

2.1. Selection Criteria

The standards for including or excluding a study were set according the PICOS components. With regards to *Population*, studies had to be conducted solely on adult subjects with a primary diagnosis of OCD and only according to a standard diagnostic system (i.e., the International Classification of Diseases [ICD] or the Diagnostic and Statistical Manual of Mental Disorders [DSM]). Regarding *Intervention*, MBT had to be 6 to 10 weeks interventions with weekly meetings, with formal mindfulness practices constituting the central therapeutic component. With respect to *Comparator*, all types of active (e.g. ERP) or inactive (e.g., treatment as usual or wait-list) comparators were included. As far as *Outcome* is concerned, the primary outcome was severity of OCD symptoms measured with the Y-BOCS (Goodman et al., 2006), Y-BOCS-SR (Baer, 1991) and OCI-R (Huppert et al., 2007), as the most established instruments in the field. Lastly, with regards to *Studies*, RCTs with a matched control group were sought. Identified research protocols that did not present satisfactory data were also excluded. Additionally, studies had to be published solely in the English language by journals with a peer-review process.

2.2. Search Strategy

The Web of Science, PubMed and EMBASE electronic databases were searched by two reviewing investigators from inception to 22th May 2020. Search terms used were the following: “*Meditation*” OR “*mindfulness-based*” OR “*mbsr*” OR “*mindfulness*” OR “*mbct*” OR “*mindfulness-based interventions*” AND “*obsessive-compulsive disorder*” OR “*ocd*” OR “*anxiety disorders*”. Terms were searched for in each title and abstract, and in the keywords of each study, and were adapted accordingly to each electronic database. The researchers separately searched introduction sections and reference lists of papers that were to be included for supplementary studies consistent with to the question of the review.

2.3. Data Extraction and Quality Evaluation

The data were collected independently by two researchers (M.M and I.D). Data incorporated each study’s origin with respect to the country, its sample size, participants’ sex and age, measuring instruments used, intervention content (i.e. type, duration etc), type of comparison, main results of each study and information required to assess risk of bias. Quality assessment of individual studies was

conducted according to the Cochrane Collaboration's tool for assessing risk of bias (Higgins et al., 2011) by two researchers (M.M. and I.D.).

3. Results

3.1. Study Flow and Included Studies

Initial search yielded 1071 papers. The reviewing investigators concluded in 5 randomized control trials (Cludius et al., 2015; Strauss et al., 2018; Key et al., 2017; Külz et al., 2019; Serra-Blasco et al., 2019). The complete screening process is illustrated in **Figure 1**.

Four trials were conducted in Europe, while the remaining one in Canada. All studies were conducted in clinical populations with OCD symptoms. Among the five studies, 328 subjects were recruited in total, with 168 and 160 participating in the intervention and control groups respectively. Subjects' mean age and percentage of females was 37.7% and 63.9%, and 38.4% and 56.4% for the intervention and the control groups respectively, with only one study not clarifying the age and sex of participants. All interventions were based on 2-hour weekly sessions. Three of the studies applied 8-week MBCT programs (Key et al., 2017; Külz et al., 2019; Serra-Blasco et al., 2019), while one a 6-week Mindfulness

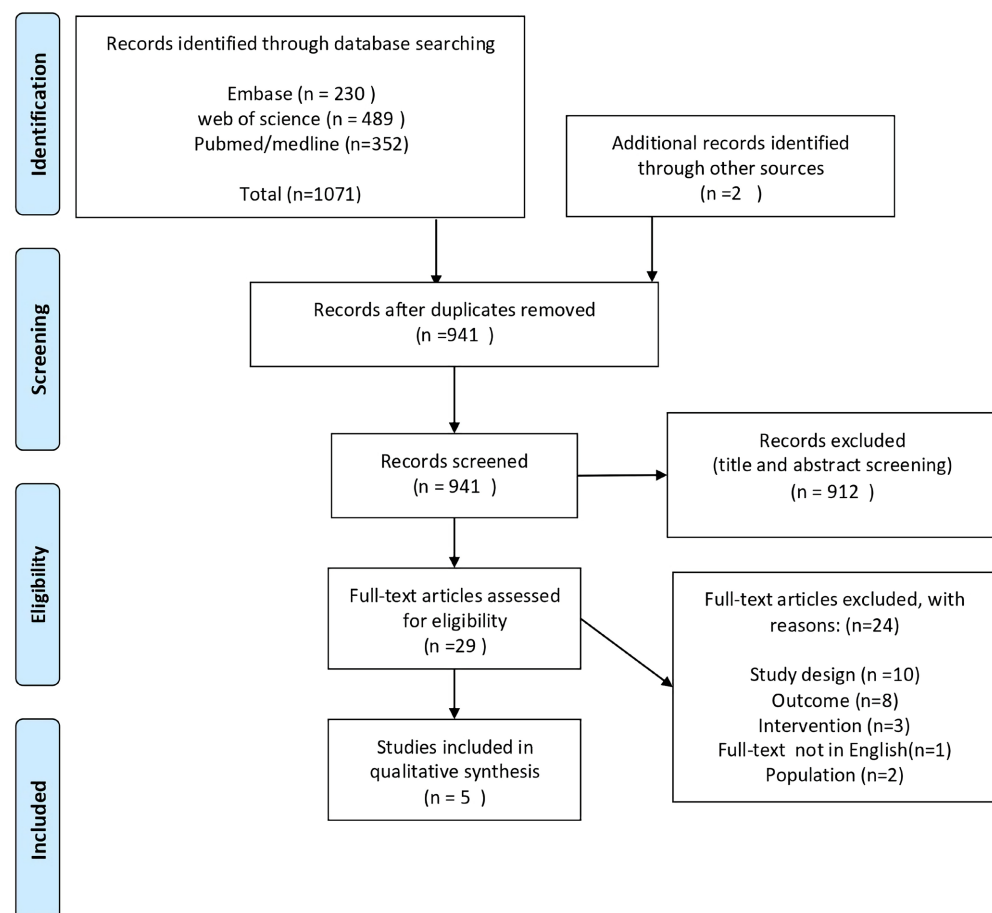


Figure 1. Flow chart of the included studies.

Training program (Cludius et al., 2015) and one a 10-week MB-ERP program (Strauss et al., 2018). Results revealed reduction of OCD symptoms based on Y-BOCS and OCI-R in two of the five studies, and no statistically significant distinction was noted among the comparing groups post-intervention. Detailed characteristics of each study are presented in **Table 1**.

3.2. Qualitative Evaluation of Studies

Figure 2 illustrates the results of the quality evaluation of the involved studies based on the Cochrane Collaboration's tool for assessing risk of bias (Higgins et al., 2011). Among the five included studies, two reported not using randomization for the allocation of the participants into the intervention and control

Table 1. Characteristics of the reported studies.

Study (author, year, origin)	Participants- OCD Group sample, mean age, females	Participants- Control Group sample, mean age, females	Intervention Condition	Control Condition	Outcome	Main Findings
Serra-Blasco, 2019, Spain	n = 21	n = 22	MBCT + 2 sessions of self compassion	TAU	Y-BOCS, BDI-II, ASI-3, FFMQ,	Statistically significant decrease of OCD symptoms ($p < 0.0001$)
Külz et al., 2019, Germany	n = 61, 37.6, 65.6%	n = 64, 39.5, 57.8%	8 2hr sessions of Mindfulness Based Cognitive Treatment (MBCT)	Psycho- education	Y-BOCS, OCI-R, BDI-II, WHOQOLBRE, OBQ-44, KIMS	No significant difference ($p = 0.42$) between the two treatments on Y-BOCS
Strauss et al., 2018, UK	n = 19, 33.0, 79%	n = 18, 27.0, 50%	10-session Mindfulness Based-Exposure/ Response Prevention (ERP)	ERP	Short Warwick- Edinburgh Mental Well Being Scale, BDI-II, FFMQSF, OBQ-44	Statistically insignificant difference pre- and post-intervention between groups. Insignificant importance of patient engagement
Key et al., 2017, Canada	n = 18, 40.5, 50%	n = 18, 46.0, 44.4%	MBCT	Waitlist Control Group	Y-BOCS, BDI-II, FFMQSF, OBQ-44	Significant decrease in OCD symptoms based on Y-BOCS compared to control group ($p =$ $0.001, p < 0.5$)
Cludius et al., 2015, Germany	n = 49, 39.88, 61.2%	n = 38, 41.37, 73.6%	MF	PMR	PCL, CES-D, OCI-R	No significant results on OCI-R. $p = 0.39$

ABBREVIATIONS: Y-BOCS = Yale-Brown Obsessive Compulsive Scale; OCI-R = Obsessive-Compulsive Inventory Revised; BDI-II = Beck Depression Inventory-II; WHOQOL-BREF = World Health Organization Quality of Life-Abbreviated; OBQ-44 = Obsessive Beliefs Questionnaire; KIMS = Kentucky Inventory of Mindfulness Skills; TAU = Treatment as Usual; PCL = Paranoia Checklist; CES-D = Center for Epidemiologic Studies-Depression Scale.

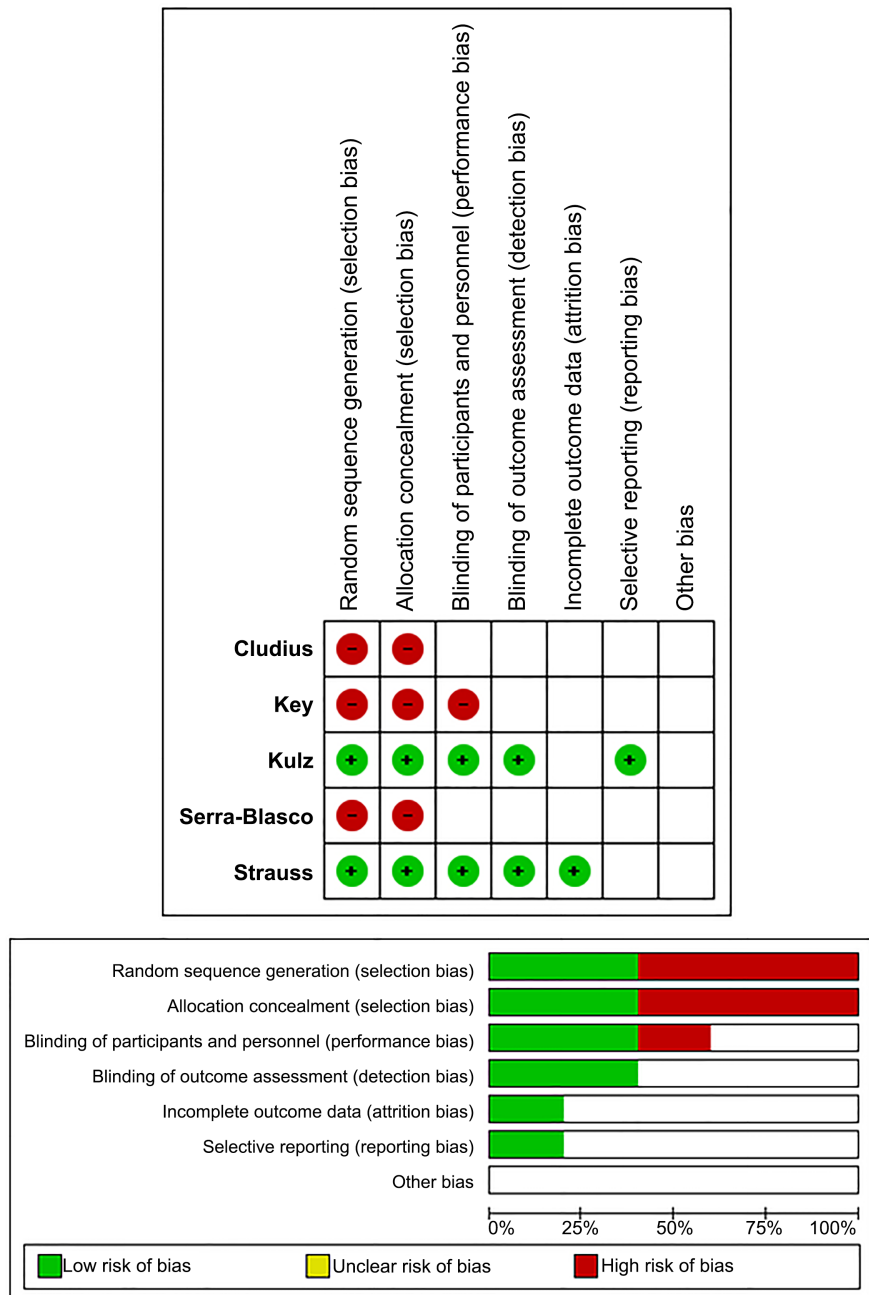


Figure 2. Quality assessment of included studies.

groups, fact which led to a high risk of selection bias. For the remaining three studies, the risk of selection bias was low, due to randomization regarding the sequence and distribution of participants. In half of the studies, blinding of the participants and research members with respect to the intervention signified a low risk of performance bias. In contrast, the risk of detection bias due to insufficient blinding of the evaluation results seems slightly low in two studies. The risk of attrition bias due to missing or excluded from analysis data was unclear for four of the studies. The reporting bias was assessed as unclear and considered as high in all of the studies.

3.3. Results of MBIs on OCD Symptoms

From the included studies, four evaluated the effect of MBIs on OCD severity with Y-BOCS, while the remaining one with OCI-R. OCD patients of the study by Key et al. reported a decrease in OCD symptomatology in comparison to the control group with a Cohen's effect size of $d = 1.38$ (Key et al., 2017). Positive, statistically significant effects ($p < 0.001$) were also reported by Serra-Blasco (Serra-Blasco et al., 2019). The remaining three studies stand on the opposite side; Strauss reported statistically insignificant improvement on OCD symptoms (Strauss et al., 2018). Similar insignificant results were found by Cludius et al. (2015) and Külz et al. (2019).

4. Discussion

Given the fact that OCD can impair the patient's general function and quality of life, different or supplementary to CBT therapeutic approaches have been applied aiming at reducing the disorder's symptoms. Scientific interest has been recently drawn to the effect of interventions based on mindfulness techniques on OCD symptom severity (Hale et al., 2013). Accordingly, the current systematic review attempted to evaluate the existing data from randomized control trials concerning mindfulness-based interventions on OCD. To the authors' knowledge, no other review on the subject has yet been conducted.

4.1. Effectiveness of MBIs on OCD Symptoms

As aforementioned, this study came to contradictory results with respect to the efficacy of this type of interventions. Two of the studies revealed a positive effect of mindfulness on OCD symptomatology for the intervention group compared to the controls. Key et al. (2017) primarily aimed at evaluating the auxiliary effect of MBCT on cognitive behavioral group therapy with ERP to patients partially responsive to CBT. Though positive, the change on the Y-BOCS-Sscale's scores could not be characterized as important. A plausible explanation for the moderate positive results could be the fact that the subjects had priorly undergone a course of CBT treatment; therefore they had already experienced a decrease of the symptoms. Serra-Blasco et al. (2019) concluded in similar but stronger results; authors resulted in a significant decline of OCD symptoms based on the Y-BOCS scale. Though both studies showed the positive effect of MBIs on OCD symptomatology, they both suffer from similar limitations; they lacked of an active control group and the sample sizes used for these studies were small, making the results relatively unfounded. Contrary to the studies mentioned insofar, the remaining three included studies failed to support MBIs as an effective psychotherapeutic treatment option for reducing OCD symptomatology in a clinically meaningful manner according to Y-BOCS. These RCTs included an active comparator group. Külz et al. (2019) compared the effectiveness of MBCT with a psycho-educational program (OCD-EP) on OCD patients who had received CBT in the past, yet remained symptomatic. The study was

sufficiently powered to identify medium effects among treatment groups; post treatment, there were statistically insignificant differences among groups on symptomatology severity according to clinician rated Y-BOCS scale. However, according to OCI-R self-rating scale there was a significantly greater decrease of OCD symptomatology in the MBCT group compared to the OCD-EP group. [Michalak et al. \(2015\)](#) who compared the effect of MBCT for recurring depression with TAU treatment as usual, found a slight improvement for the MBCT subjects when assessed by self-report scales, but no improvement when assessed by a clinical interview. A plausible explanation for the different results between self-report and clinical assessment instruments could be given by the common disadvantages of self-report scales; when using this method of assessment, issues of credibility rise as responses can be influenced by the subject's self-deception or effort for self-enhancement ([Paulhus & Vasire, 2007](#)). In contrast, when subjects' OC symptomatology was assessed with a self-reporting scale (OCI-R), patients who underwent the MBCT program demonstrated significant improvement compared to the those in the OCD-EP group. Additionally, a significant larger proportion of the subjects in the MBCT condition were responsive or partially responsive compared to those in the OCD-EP condition. No response to applied treatment was associated with greater severity of OC symptomatology in the OCD-EP [Külz et al. \(2019\)](#). Certain limitations of this study should be taken into consideration. Patients who were under psychotropic medication or psychotherapeutic treatment were not excluded from this study at the time of recruitment. Thus, the reducing effects of MBCT on OCD symptom severity could have possibly been overshadowed by the effects of the aforementioned treatments. Moreover, the slight superiority of MBCT could be attributed to an active therapeutic process other than mindfulness per se. A paradigm is the study by [Williams et al. \(2014\)](#), who reported that psychological education structured on MBCT can yield analogous effects in preventing a recurrence of a depressive episode when mingled with mindfulness meditation. In the study of [Strauss et al. \(2018\)](#) Exposure and Response Prevention (ERP) augmented with a brief Mindfulness practice (MB-ERP) was compared to ERP alone. Although both groups demonstrated an improvement in OCD symptom severity, it was not clinically important for the MB-ERP group when compared to the ERP group at post intervention. Nevertheless, it is worth noting that the time spent to cultivate mindfulness in this study in the MB-ERP group was significantly less than the time spent in standard MBCT, thus theoretically the negative results could be partly explained by insufficient mindfulness acquisition. What should be taken into account is the under power of the study, forbidding the detection of effects that are statistically significant. The least significant important disparity on the severity of the OCD clinical symptomatology was not included in 95% confidence intervals for the between-group effect difference, and thereby conclusions could still be drawn. Furthermore, a bias account of effects is possible since retention at follow up was 65%, a percentage that was lower than expected. Lastly, [Cludius et al. \(2015\)](#) compared mindfulness training delivered through an on-line self-help

manual with progressive muscle relaxation (PMR) that was delivered in the same manner on patients with OCD symptomatology. No differences were found between groups at post assessment on OCD symptom severity reduction according to Obsessive-Compulsive Inventory-Revised (Foa et al., 2002). However, it is noteworthy that the mindfulness training phase of this research's intervention was only 6-week long and not 8-week long as in the MBCT and MBSR protocols. Additionally, the treatment implementation through a self-help manual could possibly hinder its effectiveness. An additional constraining condition of the study is that the data collection was done online and was not subsequently evaluated by a clinician. Additionally, even though low engagement is expected when therapeutic interventions are held on line (Herbst et al., 2012), one-third of the participants did not perform the instructed exercises in a regular manner and this might have affected the weight of results.

4.2. Secondary Outcomes of This Review

While investigating the effect of MBIs on OCD symptom severity, secondary outcomes on obsessive beliefs, depression, anxiety, quality of life and mindfulness skill acquisition of individual studies were also discovered. Key et al. (2017) reported that the participating patients reported a decrease of depression and anxiety symptoms, with the use of DBI-II and BAI instruments. This fact comes in accordance with a preceding study trying to investigate the effect of MBSR on anxiety disorders and comparing the outcomes of the implemented intervention with the conventional CBT practice; though Arch et al. (2013) did not report any statistically important discrepancy among the comparing groups, MBSR was proven to have equally positive results on broader symptoms, such as depression. Kulz et al. found a significant difference in the reduction of obsessive thoughts assessed with the Obsessive Beliefs Questionnaire-OBQ-44 (Anholt et al., 2010) as well as a significantly positive effect in quality of life on the WHOQOL-BREF (Skevington et al., 2004) in the MBCT condition compared with wait-list control condition. The positive effects of the intervention on life quality of these participants agrees with the meta-analytic report of Chiesa and Serretti (2011) which resulted in a significant effect of MBCT on the subjects' life quality, as measured with standard scales, on patients who suffer from depressive or anxiety disorders. The remaining three studies did not report any statistical significant difference of the MBIs on any of the secondary outcomes with the exception of mindfulness skill acquisition. Interestingly, Strauss et al. (2018) reported that the secondary outcome measures on wellbeing, depressive symptomatology and OCD-related beliefs, and ERP was in advantage when compared to MB-ERP. These findings initially strike as surprising and contradicting with the aforementioned studies of Külz et al. (2019) and Key et al. (2017), as well as with the accumulated evidence that support the effectiveness of MBIs in depressive disorders' treatment (Kuyken et al., 2016); yet, they are less surprising when examined in context. For example, these findings are similar with those reported by the study of Farb et al. (2018) who concluded that MBIs, when compared with other evidence-based

treatments that share an equivalent amount of therapeutic sessions such as CBT, may not be quite efficient in depression's treatment. As far as the secondary outcome of mindfulness skill acquisition is concerned, Key et al. reported that the MBCT group compared to the wait list condition experienced a significant increase in mindfulness as measured by the Five Facet Mindfulness Questionnaire (Baer et al., 2006). Specifically, the strongest gains were observed in the non-judgment and non-reactivity facets. Similarly, Strauss et al. (2018) who compared MB-ERP and ERP groups, found amelioration in mindfulness for MB-ERP group. However, for both studies the increase in mindfulness did not result in a significant reduction in OCD symptomatology according to Y-BOCS scale. These results challenge the theoretical rationale that propose that a non-judgmental stance of obsessive thinking and bodily sensations as well as non-reactivity to those same thoughts and sensations would lead to a decrease in OCD symptom severity (Strauss et al., 2015).

4.3. Limitations

This systematic review bears certain limitations. Firstly, an apparent lack of studies evaluating the effects of the MBIs on OCD symptom severity, and lack of rigorous conducted RCTs exist. In addition the majority of the studies included small sample sizes; among the studies, the different recruited control groups, and the observed high risk of overall bias constitute important limitations of this review. Therefore, these restrictive factors make the analysis of the results at a quantitative level not achievable.

5. Conclusion

The effectiveness of mindfulness-based interventions on OCD symptomatology was investigated in this review. The findings highlighted the substantial lack of quality evidence on the subject. Though most studies did not show a significant improvement of OCD symptom severity post-implementation of MBIs, the review resulted in mixed and inconclusive findings, due to the lack of original papers and mostly due to the absence of well-designed randomized control trials. This review's findings showed the wide area for improvement that exists, with respect to this research field. Further exploration of whether this treatment could be beneficial with respect to symptom severity is suggested. It is important to underline that until studies with more reliable results are conducted, treatment guidelines for OCD, namely ERP with or without cognitive therapy, should be followed by the clinicians. However, given that a proportion of individuals refuse to participate in ERP, mindfulness based interventions may offer an alternative approach. Overall, this study supports the usefulness of conducting further randomized controlled studies to test the effectiveness of this treatment program for this challenging mental disorder.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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