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Research Article

The Effect of Mindfulness-Based Interventions on Adults' Substance Use: A Systematic Review*

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Abstract

The present systematic review aims to examine the effectiveness of mindfulness-based interventions on substance-use disorders; thus, PubMed, PsycInfo, Web of Science and EBSCOHost databases have been scanned for the following key terms: mindfulness-based therapy, mindfulness-based intervention, substance abuse, substance use, substance misuse, and addiction. Taking inclusion and exclusion criteria into consideration, 10 studies have been determined to be appropriate for the purpose of the study. The results of these studies on mindfulness-based interventions have been observed to be generally more effective than traditional therapy approaches; meanwhile, cognitive-behavioral therapy (CBT) has not been observed to differ in terms of efficacy compared with mindfulness-based therapy. The results from current studies have been summarized through the present research findings; these studies' strengths and weaknesses have also been discussed, as well as suggestions for future studies.

Keywords

Mindfulness-based intervention • Substance • Substance-abuse disorder • Efficacy • Systematic review

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Mindfulness is a practice that bases its foundations on Eastern meditation traditions and it aims to direct one's attention to what is actually happening at *present* without any judgment and in an acquiescent manner (Kabat-Zinn, 2005). Then mindfulness has been used frequently in psychotherapeutic interventions for various different physical and psychological disorders in recent years (Christensen & Marck, 2017; Miller, Fletcher, & Kabat-Zinn, 1995; Teasdale et al., 2000). It was used first by psychologist Alan Marlatt in the 1980s for the intreatment of substance addiction (Leigh, Bowen, & Marlatt, 2005).

An examination of the literature reveals there to be a plethora of mindfulness-based intervention methods. Among the most common relevant methods are Mindfulness-Based Stress Reduction (MBSR), Mindfulness-Based Cognitive Therapy (MBCT), and Mindfulness-Based Relapse Prevention (MBRP).

Mindfulness has positive effects on emotion-regulation (Hoppes, 2006), provides an improvement in emotional regulation (Coffey & Hartman, 2008; Roemer et al., 2008), and has a reducing effect on impulsivity associated with substance use problems (Murphy & Mackillop, 2012). Recent studies show that mindfulness-based interventions are used in the treatment of substance addiction and that effective results are obtained (Bowen et al., 2009, 2014; Imani et al., 2015; Mermelstein & Garske, 2015; Witkiewitz et al., 2013).

Substance use disorder (SUD) is a psychopathology for which treatment is not easily provided to or completed by patients or, in the event that a patient does complete treatment, where relapse is a frequent outcome. Although the effectiveness of CBT and traditional treatments (i.e., Treatment As Usual [TAU]) have been shown in many studies, relapse still remains a problem for this disorder (McLellan, Lewis, O'Brien, & Kleber, 2000). Mindfulness-based interventions have been one of frequently studied methods aimed at preventing relapse or at allowing adults suffering from substance use to benefit from treatment. Its efficacy has been compared with several treatment methods, such as CBT, and 12-step treatment programs. Taking all of these reasons into account, the present study aims to evaluate the effectiveness of empirical studies conducted thus far by systematically reviewing the interventions based on mindfulness in adults with substance use problems.

Method

Seeking to investigate the effectiveness of mindfulness-based treatment and interventions in individuals with SUDs, four databases, (i.e., EBSCOHost, PubMed, Web of Science, and PsycInfo) were scanned. Without any time limit being imposed, treatment methods were scanned using the following four terms: (i) *mindfulness-based therapy*, (ii) *mindfulness based therapy*, (iii) *mindfulness-based intervention* and (iv) *mindfulness based intervention* whereas SUD was scanned using for following four terms: (i) *substance abuse*, (ii) *substance use*, (iii) *substance misuse*, and (iv) *substance addiction*. Sixteen different combinations were used to search databases, one for treatment and one for diagnosis. The databases were scanned in November 2017. The inclusion criteria used for studies was that they should be conducted in English, be published in full text, be performed with only 18-year-old and older participants, and focus on mindfulness-based treatment and interventions in adults suffering from SUD. Studies conducted with adolescents were excluded because their tendency to partake in risky and impulsive behaviors was held to be a confounding factor.

Similarly, studies were not included in which whose subjects were diagnosed with other disorders in addition to SUD because they were considered to be confound the research. Additionally within the specified exclusion criteria, studies (i) that use mindfulness as a personality trait, component, or skill, (ii) that integrate mindfulness into a different treatment while treating SUD, and (iii) that use the mindfulness-based treatment to treat secondary symptoms of substance addiction that are thought to trigger relapse, such as stress and insomnia, were not included in the study.

This study was conducted under the guidance of PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) as an international standard in review studies (Figure 1.). Based on the previously mentioned inclusion and exclusion criteria, a total of 98 studies were examined by two researchers. After these studies were excluded, the remaining 10 studies were investigated.

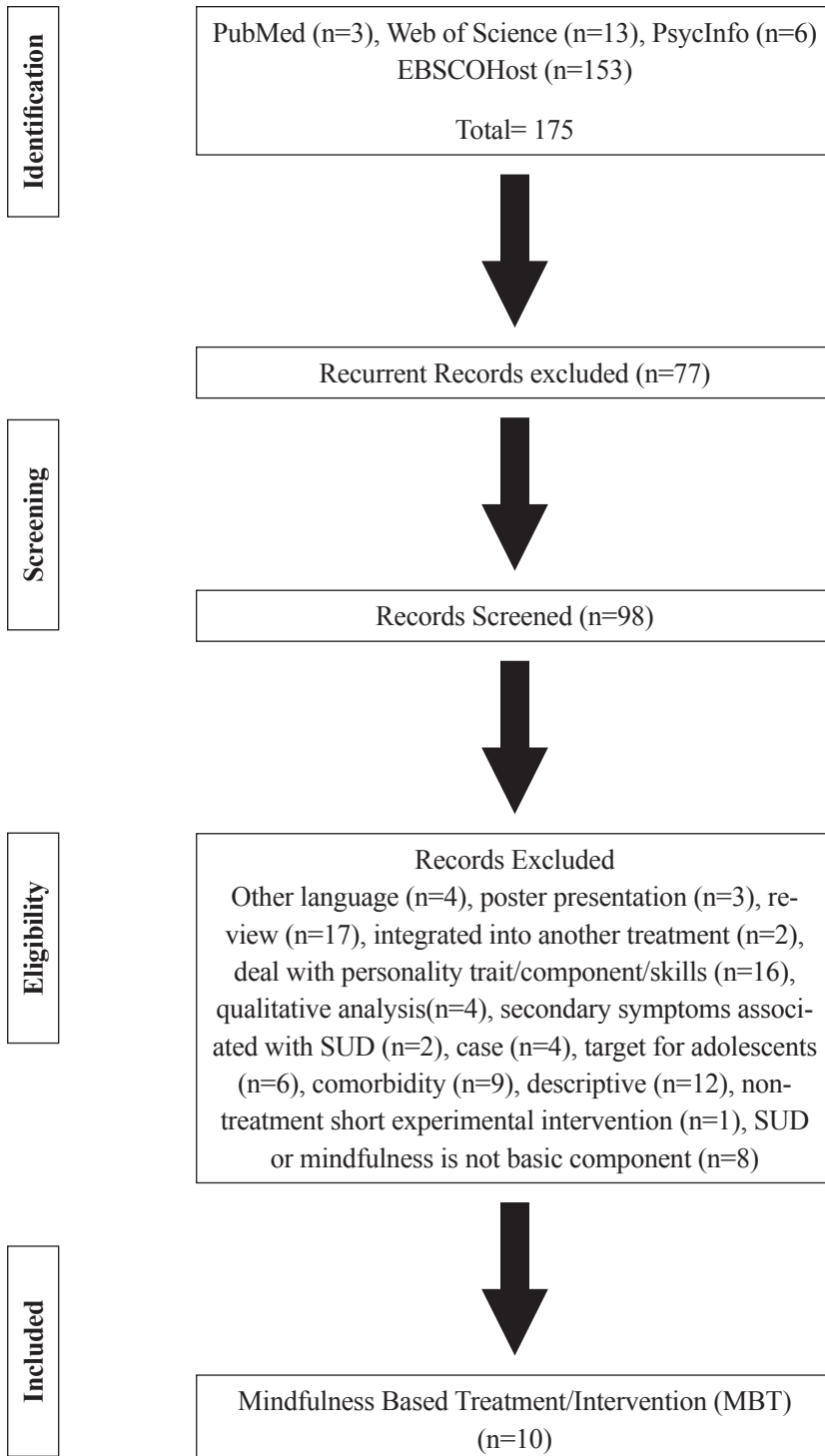


Figure 1. PRISMA flow chart.

Results

Table 1 General Features of the Studies		First-Last NoP	Age Range-Mean	Gender Distribution	Substance Type	Treatment Period	Follow-up Session	Assessments	Results	Limitations
Carroll and Lustyk, 2017 (USA)	MBRP (n=12)	n=34	18-70		Alcohol, Diverse substances	8 weeks	-	University of Houston Non-Exercise Test	No significant difference was found between the 3 groups related to a cognitive stressor.	Lack of follow-up and assessment.
	RP (n=12)		Mean: 43.4 25 W (73%)			8 sessions		State-Trait Anxiety Inventory	Low number of samples.	
	TAU (n=10)		9 M (27%)			-		A Visual Analogue Scale		
Imani et al., 2015 (Iranian)	MBRP TAU	n=30	18-40		Opiate	10 weeks	-	PASAI Five Facet Mindfulness Questionnaire (FFMQ)	In the MBRP group, the Addiction Severity Scale was significantly more pronounced in the drug sub-area and in weekly morphine urine tests than in the general treatment group.	Lack of follow-up and assessment.
	MBRP (n=13)		Mean: 37.4			8 sessions		Addiction Severity Index (ASI)	Low number of samples.	
	TAU (n=15)		96.6% M			120 minutes				
Bowen et al., 2014 (USA)	MBRP RP TAU	n=286	18-70		Alcohol, diverse substances	MBRP 8 weeks RP 8 sessions TAU 2 hours	3 6 12 months	Timeline Follow-Back Hamilton Depression Inventory Structured Clinical Interview for DSM-IV	MBRP and RP are more effective than TAU; In the MBRP group, the probability of substance use was significantly lower in the 12-month follow-up compared to the RP group.	The MBRP and RP were identical in terms of time and therapist tendencies, only intervention was different. TAU was not equivalent to other active therapies, including homework and therapist tendencies. Self-reporting based on substance use evaluation.
	MBRP (n=103/79)		Mean: 38.2			TAU: 12-step treatment program 1.5 hours				
	RP (n=88/64)		71.5% M			RP: 8 weeks 8 sessions 2 hours				
Witkiewitz et al., 2013 (USA)	MBRP RP	N=105	18-58 Mean: 34.1		Diverse substances	8 weeks	15h	Addiction Severity Index (ASI)	Addition severity index scores in the MBRP were significantly lower than those in RP	Small sample size. Only women were included.
	RP (n=50)	n=54	100% W			16 sessions 50 min	6 months		MBRP was found to be effective for ethnic and racial minority groups and the results were preserved.	

Table 1
General Features of the Studies

Studies (Country)	Treatment Group	First-Last NoP	Age Range-Mean	Substance Type	Treatment Period	Follow-up	Assessments	Results	Limitations
Witkiewitz and Bowen, 2010 (USA)	MBRP TAU	MBRP (n=93/72) TAU (n=75/51)	18-70 Mean: 40.45 63.7% M 36.3% W	Alcohol, cocaine METH, and other	8 sessions 2 hours	4 months	Timeline Follow-Back Penn Alcohol Craving Scale Beck Depression Inventory-II	MBRP may affect cognitive and behavioral responses to depressive symptoms and may partially explain the decrease in substance use after intervention in the MBRP group. The results based on self-report, obtained in the follow-up were confirmed. education of therapists in comparative groups, interventions performed at different times.	Short follow-up period, loss of data in follow-up evaluations, craving and alcohol-substance use
Bowen and Marlatt, 2009 (USA)	MBRP TAU	n=168	18-70 Mean: 40.5	Alcohol and Diverse substances	MBRP 8 weeks 2 hours TAU: 12 step 1.5 hour	2 m 4 m	Smoking and Quitting History Questionnaire Positive and Negative Affect Schedule (PANAS) Questionnaire of Smoking Urges (QSU) Fagerstrom Test for Nicotine Dependence	Significant improvements were found in MBRP versus traditional treatment, daily substance use, craving, awareness, and acceptance in participants. The follow-up found that reductions were not significantly different between groups	Additional methods such as urine toxicology testing will strengthen the validity of these reports. The shortness of follow-up limited long-term effects.
Vidrine et al., 2016 (USA)	MBAT CBT TAU	n=412 MBAT (n=154/37.7%) CBT (n=155/34.8%) TAU (n=103/53.4%)	18+ Mean: 48.7 54.9% W 46.1% M	Cigarettes	MBAT & CBT 8 sessions 2 hours TAU 4 sessions 5-10 min individual consulting	4th w 26th w	Heaviness of Smoking Index	No significant difference was found between the 3 groups in terms of cessation and recovery from a lapse. No difference was found between the groups in the follow-up assessment.	Conducting both interventions with the same therapist. The need for special training and manual use of MBAT was not satisfied.

Table 1
General Features of the Studies

(Country)	Treatment Group	First-Last NoP	Age Range-Mean	Substance Type	Treatment Period	Follow-up Session	Assessments	Results	Limitations
Amaro et al., 2014 (USA)	Moment-by-Moment in Women's Recovery/MBRP-W	n=318	20-40 Mean: 33.9	Alcohol and Diverse substances	9 weeks & 9 sessions 1.5-2 hours	6 months	Addiction Severity Index (ASI) Perceived Stress Scale (PSS) Posttraumatic Diagnostic Symptom Scale (PDS) Daily Drinking Questionnaire Rutgers Alcohol Problem Index Drinking Refusal Self-Efficacy Questionnaire Readiness to Change Questionnaire Five Facet Mindfulness Questionnaire	Decreases in alcohol and substance use severity and perceived stress level were found. Achievements in follow-up continued. In MG -less drinking episodes, -less negative consequences of alcohol use, -higher drinking refusal self-efficacy, Found higher mindfulness	Non-RCT, substance use information based on self-report, and lack of certain racial groups.
Mermelstein and Garske, 2015 (USA)	MG CG	n=76 MG=37 CG=36	18-23 Mean: 19 50% M	Alcohol	4 weeks 2 sessions practice 4 homework assignments 60 min.	-	Alcohol Timeline Follow-back Assessment Structural Clinical Interview for DSM-IV (SCID), Substance Use Calendar, Five Facet Mindfulness Questionnaire (FFMQ), Treatment Credibility Score (TCS) Differential Emotion Scale (DES)	No significantly difference were found between the MT group and the CBT group in terms of treatment, satisfaction with treatment, and frequency of substance use. When compared to CBT, less physical and psychological responses were observed during stress provocation.	Lack of follow-up assessment. Lack of comparison with other short interventions, such as cognitive skill-based or motivational-enhancing interventions.
Brewer et al., 2009 (ABD)	MT CBT	n=36 MT (n=21 /5) CBT (n=15 /9)	18+ Mean: 38.2 72%M 28%W	Alcohol or cocaine	9 week, 9 session 1 h BDT 12 week 12 session, 1h	-	Alcohol Timeline Follow-back Assessment Structural Clinical Interview for DSM-IV (SCID), Substance Use Calendar, Five Facet Mindfulness Questionnaire (FFMQ), Treatment Credibility Score (TCS) Differential Emotion Scale (DES)	No significantly difference were found between the MT group and the CBT group in terms of treatment, satisfaction with treatment, and frequency of substance use. When compared to CBT, less physical and psychological responses were observed during stress provocation.	Small sample size, outcome data were collected from the minority of individuals meeting both conditions and who completed treatment, lack of follow-up, low ecological validity due to being a heterogeneous group, different lengths of treatments, and the fact that both interventions were carried out separately with the same therapists, were problematic in terms of discrimination and fidelity.

M: Man, W: Women, NoP: Number of Participants, MBRP: Mindfulness Based Relaps Prevention, TAU: Treatment As Usual , RP: Relaps Prevention, CBT: Cognitive Behavior Therapy, MBAT: Mindfulness-Based Addiction Treatment, MT: Mindfulness Training, MBRP-W: Moment-by-Moment in Women's Recovery, RCT: Randomized Controlled Trials
MG: Mindfulness Group, CG: Control Group, METH: Metamfetamin, w: week h: hour, min: minute

Results and Discussion

When the results of studies reviewed in this article were compared, the researchers concluded that although MBRP was more effective than TAU or any other control group, there was no difference between the results in comparison with CBT in terms of efficacy. In most of the follow-up evaluations however, when MBRP was contrasted with Relapse Prevention (RP), which consists of both RP and CBT techniques, it is observed that the individuals in MBRP group retained their gains for a longer period. In sum, it is seen that mindfulness-based interventions are more effective than other interventions and that the gains obtained post-intervention are preserved in follow-up evaluations (min. 4 weeks, max. 12 months). This finding is consistent with the results of several other systematic review studies in the literature (Black, 2014; Chiesa & Serretti, 2014; Katz & Toner, 2013). There are, however, some limitations. It is noteworthy that follow-up evaluations are usually done very shortly after the intervention. Accordingly, this situation actually not only renders it a bit difficult to reach a conclusion concerning the long-term results of mindfulness-based interventions but also creates bias. Although the studies are quite similar in terms of their content and treatment duration, it is different to compare and generalize the findings due to studies' aims and the characteristics of their samples being somewhat different. Nevertheless, it should be stated that similar measurement tools were used in many of the studies included in our research. This fact contributes to the comparability of the results in this study. Similarly, since the interventions were performed by experienced therapists and followings the manuals, studies had become standard and so, and this also increased the comparability of the present results with future studies.

Considering the factors related to etiology, continuity, and relapse beyond the traditional approaches in problems related to substance use, we assert that stigmatization, exclusion from society, and adaptation constitute important factors. We therefore recommend an approach that teaches individuals to perceive internal and external sensations and experiences without judgement and that building awareness is a promising approach for individuals suffering from SUD. We also hold that a mindfulness-based approach focusing on individuals' internal and external sensations and experiences without judgement can be more effective at treating SUD.

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