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Efficacy of mindfulness meditation for smoking cessation: A systematic review and meta-analysis

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HIGHLIGHTS

- This systematic review summarizes randomized controlled trials of mindfulness meditation for smoking cessation.
- Five databases were searched; ten trials met inclusion criteria.
- Study quality and intervention characteristics varied considerably; this reflects the preliminary state of research in this area.
- Overall, mindfulness meditation did not have significant effects on abstinence or cigarettes per day, relative to comparator groups.

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ABSTRACT

Background: Smokers increasingly seek alternative interventions to assist in cessation or reduction efforts. Mindfulness meditation, which facilitates detached observation and paying attention to the present moment with openness, curiosity, and acceptance, has recently been studied as a smoking cessation intervention.
Aims: This review synthesizes randomized controlled trials (RCTs) of mindfulness meditation (MM) interventions for smoking cessation.
Methods: Five electronic databases were searched from inception to October 2016 to identify English-language RCTs evaluating the efficacy and safety of MM interventions for smoking cessation, reduction, or a decrease in nicotine cravings. Two independent reviewers screened literature using predetermined eligibility criteria, abstracted study-level information, and assessed the quality of included studies. Meta-analyses used the Hartung-Knapp-Sidik-Jonkman method for random-effects models. The quality of evidence was assessed using the GRADE approach.
Findings: Ten RCTs of MM interventions for tobacco use met inclusion criteria. Intervention duration, intensity, and comparison conditions varied considerably. Studies used diverse comparators such as the American Lung Association's Freedom from Smoking (FFS) program, quitline counseling, interactive learning, or treatment as usual (TAU). Only one RCT was rated as good quality and reported power calculations indicating sufficient statistical power. Publication bias was detected. Overall, mindfulness meditation did not have significant effects on abstinence or cigarettes per day, relative to comparator groups. The small number of studies and heterogeneity in interventions, comparators, and outcomes precluded detecting systematic differences between adjunctive and monotherapy interventions. No serious adverse events were reported.
Conclusions: MM did not differ significantly from comparator interventions in their effects on tobacco use. Low-quality evidence, variability in study design among the small number of existing studies, and publication bias suggest that additional, high-quality adequately powered RCTs should be conducted.

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1. Introduction

1.1. Background

The most recent U.S. Public Health Service guidelines for smoking cessation interventions focus on counseling and medications, including nicotine replacement (U.S. Department of Health and Human Services, 2008). Individual, group, and telephone counseling are all effective, and effectiveness increases with intensity (Patnode et al., 2015). Nicotine replacement, bupropion SR (sustained release), and varenicline are recommended as first-line medications. Each of these interventions has consistently been found effective in many high-quality randomized controlled trials (RCTs), resulting in the highest rating for strength of evidence (U.S. Department of Health and Human Services, 2008). Since the publication of those guidelines, smoking cessation programs have increasingly incorporated complementary and alternative medicine modalities (Carim-Todd, Mitchell, & Oken, 2013). One such modality is mindfulness meditation, derived from a 2500-year-old Buddhist practice called Vipassana, or insight meditation. Mindfulness has been defined as "paying attention on purpose, in the present moment, and non-judgmentally, to the unfolding of experience moment to moment." (Kabat-Zinn, 1990) Individuals of any background can be trained to incorporate the practice systematically into daily life (UCLA Health, 2015). Clinical applications of mindfulness include stress reduction (Goyal, Singh, Sibinga, et al., 2014), treatment of substance abuse (Chiesa & Serretti, 2014), and chronic pain (Cramer, Haller, Lauche, & Dobos, 2012; Kozasa et al., 2012; Reiner, Tibi, & Lipsitz, 2013).

1.2. Purpose

A 2013 systematic review on yoga and meditation for smoking cessation (Carim-Todd et al., 2013) included three RCTs of mindfulness-based interventions; (Bowen & Marlatt, 2009; Brewer, Mallik, Babuscio, et al., 2011; Rogojanski, Vettese, & Antony, 2011) two of these found significant differences favoring the mindfulness interventions. A more recent review de Souza, de Barros, Gomide, et al. (2015) reported promising results; the authors did not conduct meta-analysis. That review included several studies that did not meet our definition of mindfulness meditation; we believe they also double counted two studies. Therefore, this review was undertaken to reassess the efficacy and safety of mindfulness meditation, as an adjunctive or monotherapeutic treatment for smoking cessation. Abstinence from smoking was the primary outcome; secondary outcomes included reduction in use, and cravings. The systematic review protocol is registered in PROSPERO, an international registry for systematic reviews.

2. Methods

2.1. Inclusion criteria

This systematic review was limited to RCTs of adults. Interventions that used mindfulness meditation, such as mindfulness-based stress reduction (MBSR), mindfulness-based cognitive therapy (MBCT), or brief mindfulness training, either as an adjunctive or monotherapy, were included. Studies evaluating other meditation interventions, such as yoga, tai chi, qigong, and transcendental meditation techniques, without reference to mindfulness meditation, were excluded. Inclusion was not limited by comparator: We included studies with treatment as usual (TAU) or "standard care," waitlist control, no treatment, or other active treatments as comparators. To be included, studies were required to report tobacco use cessation or reduction in use. Biological confirmation of cessation was not required for study inclusion.

2.2. Search strategy

In October 2016, we searched the electronic databases PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), PsycINFO, AMED (Allied and Complementary Health Database), and the Cochrane Central Register of Controlled Trials from database inception date for English-language RCTs. We combined terms representing smoking, tobacco use and terms for study design with the following mindfulness search terms: "mindfulness* or mindfulness-based or mbsr or mbct or m-bct or meditation or meditat* or Vipassana or Zen or Sudarshan or zazen or shambhala or buddhis* or satipatthana or anapanasati." All studies identified for inclusion were reference-mined; we also screened existing systematic reviews on the topic to ensure that all studies that met our inclusion criteria were identified.

2.3. Data abstraction

Two reviewers independently screened titles and abstracts of retrieved citations following a pilot session to ensure similar interpretation of the inclusion criteria. Citations judged as potentially eligible by one or both reviewers were obtained as full text. Each full-text publication was screened against the specified inclusion criteria by two independent literature reviewers; for expediency, two pairs of trained reviewers participated. Two reviewers each independently abstracted participant