

Mindfulness-Based Programs for Eating Disorders: A Review of Effectiveness, Mechanisms, and Limitations

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Abstract. In recent years, mindfulness-based programs (MBPs) have made substantial progress in the field of mental health, particularly in the treatment of depression, anxiety, and addictive behaviors. However, the efficacy and limitations of MBPs in the treatment of eating disorders (EDs) have not yet been thoroughly reviewed. This paper examines recent studies on the use of Mindfulness-Based Cognitive Therapy (MBCT), Mindfulness-Based Stress Reduction (MBSR), and Mindfulness-Based Eating Awareness Training (MB-EAT) in treating eating disorders, emphasizing their effects on emotional regulation, self-compassion, and eating behaviors, along with the underlying mechanisms, effectiveness, and limitations. Two types of MBPs, besides MBSR, effectively treat Binge Eating Disorder (BED), reducing binge eating and improving self-awareness and emotional regulation. In treating Anorexia Nervosa (AN) and Bulimia Nervosa (BN), positive effects have been shown, but efficacy varies widely, with considerable heterogeneity across studies. Existing research on MBPs for eating disorders is limited by small sample sizes, few empirical studies and randomized controlled trials, inconsistent measurement standards, and cultural differences. Future research should examine the applicability of MBPs across diverse populations and cultures, while creating standardized criteria to assess efficacy.

Keywords: Mindfulness-Based Programs, Eating Disorders, Effectiveness, Clinical application

1. Introduction

As dietary habits become more diverse and the understanding of the link between physical and mental health deepens, eating disorders (EDs) such as Binge Eating Disorder (BED), Anorexia Nervosa (AN), and Bulimia Nervosa (BN) have garnered considerable attention in both research and clinical practice in recent years. And these disorders not only affect individuals' physical health but also often involve emotional and psychological issues. Mindfulness-based programs (MBPs) have gradually been applied in the treatment of eating disorders due to their proven effectiveness in addressing psychological issues such as depression, anxiety, and addictive behaviors. However, existing research has mainly focused on the application of mindfulness in other psychological disorders, with limited exploration of its specific effects and mechanisms in the treatment of eating disorders. Furthermore, research results often exhibit heterogeneity, affecting the generalizability and stability of the outcomes. Therefore, this study aims to review and synthesize the application of

MBPs in ED treatment, evaluate their influences on emotional regulation, self-compassion, and eating behaviors, and explore the mechanisms underlying these effects. By analyzing relevant literature, it presents new intervention strategies for treating eating disorders and supports further exploration of mindfulness therapy in this field. In practical applications, MBPs can enhance emotional regulation and self-awareness in patients, leading to improved treatment outcomes and a reduction in relapse rates.

2. Fundamentals of eating disorders and mindfulness-based programs

2.1. The prevalence and impact of eating disorders

EDs involve a variety of maladaptive behaviors and cognitions related to food. Extensive research has highlighted the harmful effects of ED on physical and mental health [1-3]. Physically, they can result in malnutrition, worsening cardiovascular conditions, digestive system damage, hormonal imbalances, as well as skeletal problems. Psychologically, these disorders are associated with anxiety, depression, social isolation, emotional instability, compulsive behaviors, diminished self-esteem, and addiction.

The primary types of EDs include AN, BN, BED, and Other Specified Feeding or Eating Disorder (OSFED). The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) defines AN as involving restrictive behaviors like limiting calorie intake, and other actions, to prevent weight gain, along with a distorted perception of body weight. BN is characterized by recurrent binge eating episodes followed by compensatory behaviors, such as purging or excessive exercise, whereas BED is diagnosed based on binge eating episodes accompanied by significant distress, without inappropriate compensatory behaviors [4]. And these disorders have a relatively high prevalence, particularly among women across different cultures. A literature review by Galniche, which included data from the UK and France between 2010-2018 and several cross-cultural studies, revealed that the average lifetime prevalence of eating disorders in women is around 8.4%, compared to 2.2% in men. The average 12-month prevalence is 2.2% for women and 0.7% for men [5]. In a more recent meta-analysis, Qian et al. found that while the situation regarding EDs appears to have improved in recent years, it remains a significant concern [6]. Given the harmful consequences of eating disorders and their relatively high prevalence, attention to and treatment of eating disorders are clearly of considerable importance.

2.2. The mechanism of mindfulness-based programs

The treatment model for MBPs is mainly based on the Emotion Regulation Model (ERM), which posits that many symptoms and behaviors associated with EDs are coping mechanisms. These behaviors serve as strategies to avoid negative emotions and provide temporary relief [7]. The mechanisms underlying the effectiveness of MBPs in treating ED, as highlighted in current research, can be summarized as influencing key factors such as mindfulness skills, emotional regulation, self-compassion, rumination, decentering, psychological flexibility, and interoceptive awareness (the ability to recognize hunger and fullness cues).

For other psychological disorders, such as depression, the main mechanisms through which MBPs exert their influences are the reduction of rumination, the enhancement of trait mindfulness, and the fostering of self-compassion. Building on prior research, Vanzhula and Levinson summarized seven hypothetical mechanisms that could explain the therapeutic effects of MBPs on eating disorders. These mechanisms encompass the reduction of repetitive negative thinking,

enhancement of self-compassion, decentering, psychological flexibility, emotion regulation, as well as the improvement of interoceptive awareness regarding hunger and satiety cues [8]. However, these proposed mechanisms are primarily derived from existing theoretical frameworks and inferences drawn from the application of MBPs to other psychological disorders. The mechanisms are inferred based on the similarity between MBP symptoms and those of other disorders, without systematic empirical validation. Thus, further research is required to establish the specific connection between these mechanisms and eating disorders. Besides, another meta-analysis by Sala et al. included more studies on the link between these mechanisms and eating disorders [9], suggesting that existing evidence shows that reducing repetitive negative thinking, enhancing self-compassion, decentering, psychological flexibility, emotion regulation, and increasing interoceptive awareness of hunger and satiety cues can alleviate various symptoms of eating disorders.

2.3. The mindfulness-based programs in eating disorder treatment

The concept of mindfulness was originally introduced by Kabat-Zinn as part of the Mindfulness-Based Stress Reduction (MBSR) [10]. Subsequently, Bishop et al. conceptualized mindfulness through a two-dimensional model, defining it as the self-regulation of attention and the acceptance and awareness of one's experiences [11]. At present, mindfulness is commonly defined as paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally [12]. Mindfulness meditation entails observing and accepting one's thoughts, behaviors, and emotions non-judgmentally. In recent years, the rapid development of MBPs and their notable effectiveness in treating mental health issues, including depression and addictive behaviors, have led many researchers to investigate their potential application in ED treatment [13,14].

For example, Kabat-Zinn introduced MBSR to encourage the acceptance of negative body image, thoughts, and emotions, helping individuals take constructive actions with reduced stress [10]. This approach laid the theoretical groundwork for later treatments of EDs. Presently, the Mindfulness-Based Cognitive Therapy (MBCT), which is now more widely used than MBSR, was initially developed by Segal et al. to prevent the recurrence of depression. However, they discovered it to be highly effective in treating eating disorders, particularly BEDs, and expanded the original MBCT framework by adding sessions 8-10 and adapting the content to target BED, hence resulting in an ED-specific modification of MBCT [15]. This approach focuses on fostering non-judgmental and non-reactive awareness of bodily sensations, emotions, and cognition to enhance emotional regulation. Kristeller and Wolever developed Mindfulness-Based Eating Awareness Training (MB-EAT), a program specifically designed for eating disorders, building on the therapeutic logic of MBCT and MBSR [16]. This approach includes guided dietary meditation and training on hunger and satiety cues, aiming to increase patients' awareness of these cues, reduce automatic eating behaviors, and boost emotional regulation. MB-EAT emphasizes both increasing awareness of internal body signals and enhancing nutritional knowledge, encouraging healthier and more mindful eating behaviors.

3. The effectiveness of mindfulness-based programs in treating eating disorders

3.1. Evaluation indicators for treatment effects

In studies examining the effectiveness of MBPs for treating EDs, the evaluation indicators are typically classified into physiological and psychological measures. Physiological indicators primarily encompass compensatory behaviors, such as purging, excessive exercise, Body Mass

Index (BMI), emotional eating, impulsive eating, and fasting behaviors. These indicators reflect changes in ED symptoms, particularly improvements in eating behaviors and weight regulation. Psychological indicators include symptoms of anxiety and depression, weight self-efficacy, self-compassion, rumination, and emotional regulation abilities. These factors assess an individual's psychological well-being and their capacity to regulate eating behaviors, which are critical in managing eating disorders. For instance, anxiety and depression are common comorbidities in eating disorders, and reducing these symptoms can greatly alleviate the severity of the disorder. Weight self-efficacy, which refers to an individual's confidence in managing their weight, can encourage healthier eating behaviors.

3.2. Effectiveness of mindfulness-based programs for various eating disorders

MBPs are more effective than no treatment in treating various eating disorders and are comparable to other psychological therapies [13]. A meta-analysis by Turgon et al. evaluated the application of MBPs in treating BED and AN/BN patients, showing that MBP interventions had moderate to large effects on BMI, mindfulness skills, emotional regulation, impulsive eating, emotional eating, body dissatisfaction, negative emotions, and dietary restraint [17]. Nevertheless, the effectiveness of MBPs in treating other types of eating disorders is inconsistent. They highlighted significant variability in the effect sizes of MBPs for eating disorders other than BED, with half of the studies lacking clear control conditions [17]. Specifically, studies involving BED, BN, and AN found no significant diagnostic differences before and after intervention [18]. MBPs are most widely used and effective in treating BED, with slightly better outcomes for women than for men [17]. MBPs also show significant or moderate-to-large effects in treating BED, though with considerable study heterogeneity [19].

3.2.1. Efficacy of MBCT and MBSR

MBCT, one of the first MBPs applied in the treatment of eating disorders, has been widely validated for its effectiveness and broad applicability across diverse populations. However, the results across studies show some considerable heterogeneity, suggesting that the efficacy of MBCT can vary based on specific contexts or patient characteristics. In particular, research has made important distinctions between MBCT and other MBPs, such as MBSR, in terms of their specific therapeutic effects.

For example, Kristeller emphasized the effectiveness of MBCT in reducing emotional eating and rumination by fostering non-judgmental self-awareness and emotion regulation, with these effects demonstrated in a single case study [20]. Similarly, Gholamrezaie's study with high school students found that MBCT significantly reduced eating disorder symptoms and stress levels in the intervention group, as reflected in post-test evaluations [21]. In contrast, the research on MBSR for treating eating disorders is limited, and its effectiveness remains unclear. For instance, Kearney's intervention with 48 veterans, which was evaluated after four months, found no significant changes in emotional eating (EE) and uncontrolled eating (UE) behaviors among participants [22]. These findings highlight the need for more focused and rigorous research to clarify MBSR's role in treating eating disorders and to identify potential factors that may influence its effectiveness.

3.2.2. Efficacy of MB-EAT

Despite limited research data on MB-EAT, existing studies suggest its high potential in treating eating disorders. In a non-randomized baseline-follow-up study, 18 out of 20 participants completed

the study, with their average weekly binge eating decreasing from four times to around 1.5 times, and only four participants still met the criteria for BED at follow-up. Those who continued binge eating showed a significant reduction in the severity of their binge episodes [23]. Moreover, based on subsequent case studies and clinical research, Kristeller and Wolever summarized the value of MB-EAT in treating BED and proposed specific treatment methods [13]. They found that MB-EAT was highly effective in treating BED in children, adolescents, and adults, thereby significantly reducing binge eating behaviors, enhancing self-control, and alleviating depressive symptoms. Besides, the latest research by Zergani et al. shows that MB-EAT+ interventions, incorporating the implementation intention model, were more effective than MB-EAT alone [24].

4. Major challenges and future directions in clinical practice

4.1. Exploration of mechanisms and efficacy

Although research on the application of MBPs in treating EDs has increased in recent years, studies in this area remain limited, and the clinical use of MBPs is not yet widespread [15]. To enhance the ecological validity of research conclusions, future studies should focus on clinical interventions in real-world scenarios across diverse cultural contexts. Current evidence remains limited, making it difficult to establish a direct link between mindfulness practice and improvements in mindfulness skills and emotional regulation abilities [17]. In addition, many studies are non-randomized controlled trials or speculative applications of MBPs based on treatments for other mental disorders, lacking rigorous methodological support. Future research should focus on mediating variables that effectively enhance patients' skills and identify factors more closely linked to symptom relief in eating disorders, in order to improve intervention outcomes.

4.2. Operational challenges in clinical treatment

In the clinical application of MBPs, several operational challenges exist. Kristeller et al. identified two key issues: first demonstrating the unique therapeutic benefits of mindfulness compared to traditional dieting methods, and second, introducing mindfulness practices to patients in a non-intimidating way [20]. While meditation practice is widely acknowledged to induce relaxation, many patients may find it difficult to maintain regular practice. Moreover, patients need to be able to perform seated meditation independently, without reliance on guided sessions or audio recordings. A staged intervention approach, which begins by raising patients' awareness of mindfulness' effects before progressively implementing intervention strategies, may prove more effective. Integrating models like the Transtheoretical Model (TTM) and the Emotion Regulation Model (ERM) could help enhance the overall effectiveness of the intervention [14,25].

5. Conclusion

This study introduces the concept of EDs and highlights the importance of ED intervention through correlational research on symptoms and consequences, as well as prevalence data. It also reviews the concept of mindfulness and the development and application of MBPs. Research identifies multiple potential mechanisms through which MBPs may exert therapeutic effects on ED. Both MBCT, MB-EAT, and comprehensive MBPs have been demonstrated to have moderate to significant therapeutic effects in treating ED, while MBSR lacks conclusive evidence of its efficacy. Moreover, MBPs have demonstrated significant efficacy in treating BED but show inconsistent results in treating other types of ED. However, current research is plagued by issues such as high heterogeneity, lack of

randomized controlled trials and empirical studies, and a paucity of mediation analyses across different variables. Practical challenges include difficulties in patient acceptance and autonomous adherence to therapy, as well as reliance on mindfulness-guided tools. Future research should improve experimental design, enhance data homogeneity, adopt more empirical research standards and control methods to increase study reliability, and actively integrate new models or theories to update existing interventions.

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