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Prevention Strategies for Addiction in Adults: An Updated Literature Review of Mindfulness and Exercise-Based Strategies

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ABSTRACT

Addiction and subsequent substance use disorders, represent a substantial and global public health challenge that requires novel interventions. Although many treatment strategies are available, these conditions are often underdiagnosed. Therefore, prevention strategies represent a more desirable approach for targeting addiction in adults. These interventions rely on behavioural changes that can often prove challenging to implement, particularly in those with recurring substance use disorders. Several effective treatment approaches have been devised that focus on altering these behaviours, including mindfulness-based interventions and cognitive behavioural therapies. However, the evidence concerning the long-term implications of these techniques is limited, with many studies noting that the beneficial outcomes observed in short-term investigations are often not replicated in the long term. Future research should, therefore, incorporate large scale randomised controlled trials to enhance our comprehension of the effectiveness of addiction prevention strategies, including mindfulness-based therapies and regular physical activity.

Keywords: addiction; substance use disorder; alcohol use disorder; prevention strategies; mindfulness; meditation; physical activity; exercise

INTRODUCTION

Addiction is associated with several medical issues, including mental health disorders and augmented rates of suicidal ideation [1, 2]. Substance use disorder, therefore, represents a substantial public health burden, accounting for an estimated 6% of worldwide deaths. The economic burden of addiction must also be considered, with figures estimating a collective cost of $700 billion in the United States [3]. In alcohol use disorder, especially, patients are often not diagnosed until symptoms of alcohol-associated liver disease arise, which require multidisciplinary care [4].

The symptoms of addiction differ depending on the substance used. In alcohol use disorder, the most identifiable symptoms include increased tolerance, withdrawal symptoms, consumption over a substantial period of time, persistent desire to drink, and not attending previous commitments to consume alcohol. In the United States, alcohol use disorder results in an estimated 2.5 million deaths annually and is the third leading cause of preventable death [5, 6].

Substance use disorder encompasses several different addictions, including opioids and cocaine, that collectively form a nationwide public health crisis. The opioid epidemic has increased significantly in recent decades, with a 64% increase in opioid-related hospitalizations observed between 2005 and 2014 [7]. Likewise, there has been a notable increase in cocaine-involved overdose mortality during the same time period [8].

Prompt recognition and management of addiction is crucial to appropriately manage symptoms. Prevention strategies may be adopted to avert the occurrence of relapse, as this represents a continuous challenge in the treatment of substance and alcohol use disorders. This challenge has resulted in a high occurrence of relapse irrespective of novel interventions [9]. We aim to provide an updated literature review of addiction prevention strategies, focusing on those aimed at alcohol and substance use disorders.

METHODS

The primary objective of this review was centred around identifying novel and established prevention strategies for addiction in adults, including alcoholism and substance use disorder. A Population Exposure Outcome (PEO) framework was devised to identify the key search terms that were incorporated into the search strategy, with the literature database PubMed being screened for relevant studies. An overview of the strategy can be found in Table 1. Publication dates were limited to the last ten years to ensure only the most recent interventions were included.

TABLE 1: PEO framework for use in the search strategy.

Population	Adults
Exposure	Prevention strategies
Outcome	Addiction, substance use disorder, alcohol abuse, substance abuse

DISCUSSION

The available evidence indicates several interventions for the prevention of addiction in adults, including mindfulness-based therapies and physical activity therapy.

Mindfulness-based therapies

Mindfulness-based interventions for substance use disorders represent a novel field of research, with current evidence suggesting that substance use disorders are underpinned by dysregulation of the neural processes that trigger reward learning and executive functioning [10]. The goal of mindfulness interventions is to target and rewire these neurocognitive mechanisms, yielding significant therapeutic outcomes and preventing the likelihood of relapse [11]. At present, these interventions are widely adopted in the management of psychiatric disorders [12].

Two primary practices are focused on during these interventions, specifically focused attention and open monitoring. Focused attention involves fixating on an object, whether that be the sensation of breathing, a part of the body, or visual stimuli, whilst actively letting go of distractions. This form of meditation is defined as self-awareness, self-regulation, and self-transcendence [13]. Open monitoring techniques, on the other hand, focus on the maintenance of a metacognitive stance. In this approach, the patient is to maintain awareness of both internal and external stimuli without fixating on a specific object [13]. The majority of mindfulness-based interventions combine these practices in a single session.

A 2021 study assessed the effectiveness of mindfulness-based interventions on substance use and relapse among women, specifically those in residential treatment. This study adopted a randomised controlled trial design with an 8.85-month follow-up period. One hundred participants were randomised to receive either the standard of care or the mindfulness training program alongside standard of care ($P<0.05$). The results indicated that the study intervention significantly delayed the time to relapse and provides substantial evidence that mindfulness interventions may offer superior protective effects against addiction and relapse in vulnerable populations [14]. A more recent clinical trial (NCT02326363) is investigating the adoption of mindfulness-based interventions to prevent the relapse of substance use disorders in veterans, with the results due to be published late 2022 [15].

We must also consider the limitations of this intervention, with the available literature primarily including small or specific populations. Additionally, mindfulness-based interventions are often used as a short-term therapy, with the evidence not demonstrating any long-term benefits. Future interventions, therefore, should focus on devising and evolving mindfulness-based approaches that extend beyond a time-limited intervention [16].

Exercise Interventions

Physical activity for the prevention of disease is a widely established paradigm and has long been adopted as an adjunctive treatment for substance use disorders. The available evidence substantiates that regular exercise training is effective at preventing addiction formation, suppressing drug-seeking behaviours, and ceasing previous addictions [17].

The Fit for Change trial aimed to compare the impact of aerobic exercise, yoga, and phone-based support on alcohol consumption in adults with alcohol use disorder that did not want to seek treatment. A three-group (exercise, yoga, or phone-based support) randomised controlled trial of 140 physically inactive adults with an alcohol addiction were included. The findings demonstrated a significant decrease in alcohol consumption in all three groups ($P<0.001$), with the greatest reduction in weekly consumption observed in the yoga arm of this trial [18]. This observation is mirrored in several other studies, with yoga proposed as a promising intervention for substance use disorder. A 2021 systematic review explored the outcomes of yoga for substance use disorder exclusively in women. The majority of included literature supported the use of various types of yoga, primarily Hatha yoga, with favourable outcomes observed for substance use prevention [19].

The intensity of physical activity for addiction prevention is not defined. A 2020 study suggests that substance use disorder may be managed through a walking/running training program. Although not presenting quantitative data, the evidence gathered concerned participant perceptions of supervised exercise programs, including boot camp workouts, walking and running practice, and race events, alongside standard treatment for substance use disorder. Three core themes were identified in the cohort of 109 patients: pushing forward recovery through running, gaining a sense of achievement, and building a sense of belonging. Collectively, these perceptions address the altered neurocognitive mechanisms observed in patients with addiction, assisting in their recovery and preventing future addiction [20].

As highlighted throughout the available literature, substantial additional research is necessitated to establish the sex-specific efficacy of exercise as an addiction prevention strategy. Evidence obtained from larger samples is also required. Beyond this, the exercise conditions that yield the most beneficial risk-to-reward ratio should be determined [21].

CONCLUSION

Addiction prevention strategies rely on behavioural changes that can often prove challenging to implement, particularly in those with recurring substance use disorders. Several effective treatment approaches have been devised that focus on altering these behaviours, including mindfulness-based interventions and cognitive behavioural therapies. However, the evidence concerning the long-term implications of these techniques is limited, with many studies noting that the beneficial outcomes observed in short-term investigations are often not replicated in the long term. Future research should, therefore, incorporate large scale randomised controlled trials to enhance our comprehension of the effectiveness of addiction prevention strategies, including mindfulness-based therapies and regular physical activity.

Additionally, further evidence is warranted to determine the impact of these prevention strategies in specific settings, patient populations, and substance of use.

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