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Exercise as an Adjunctive Treatment for Substance Use Recovery

Commentary

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Historically, the access and maintenance of treatment for addiction and/or substance use disorders is subpar at best. This is, in part, due to the stigma that addiction is a moral failing as opposed to a disease. Due to misunderstandings of the nature of addiction, treatment has been siloed from both medical and mental healthcare (Substance Abuse and Mental Health Services Administration [SAMHSA][8]; this has resulted in several challenges, including access (e.g., identifying clients in need and getting them the appropriate level of care), maintenance of treatment, relapse prevention, and wrap-around care. The state of addiction treatment in the United States is lacking.

Further complicating matters is the recent pandemic, which saw a 54% increase in national sales of alcohol for the week ending March 21, 2020 compared with 1 year prior[7]. Specifically, the highest increase in problematic alcohol use was seen among women, young people, and non-Hispanic white people, citing a 41% increase in heavy drinking among women and a 39% increase in alcohol-related problems. In addition, the Centers for Disease Control and Prevention[3] reports increases in drug overdose deaths, with synthetic opioids being the principal substance. From June 2019 to May 2020, 81,000 people died from overdoses, which is the most yet documented in a 12-month period[3].Coupled with the traditional difficulties regarding treatment access and adherence, the social and economic changes caused by the pandemic are likely to worsen the state of drug and alcohol use in the US[6]. Therefore, the need for effective and long-term treatment for substance use disorder (SUD) is crucial.

Current Treatment Standards

In general, the treatment goals for alcohol or drug dependence are to 1) reduce the risk of death due to substance misuse, 2) reduce the risk of relapse, and 3) promote positive lifestyle changes for overall well-being and health. Addressing these goals often includes interventions outside the realm of traditional talk therapy as clients may struggle with issues related to health and financial stability. Integrative health approaches to substance use disorders show the most promise for recovery and overall health as they can address exacerbating physical and mental health conditions, as well as housing, food, and financial instabilities[8].

Medication-assisted treatment (MAT) is one example of an integrated health approach, involving physicians and mental health providers. The opioid epidemic, beginning in the 90's, continues to take lives, impacting families and

communities across the U.S. For opioid use, a common course of treatment includes the use of MAT and Narcan to reduce the risk of overdose deaths. While MAT has been identified as the "gold standard" treatment for opioid use disorder, availability and accessibility continue to be issues.

The historical separation of substance use treatment from all other forms of care has been an additional burden to marginalized populations. Across all treatment settings, white Americans are more likely than black Americans and Hispanics to complete treatment[11]. The intersection of multiple marginalized identities (i.e. being black, low income, no high school degree) leads to further disparities in treatment[11]. It should not be surprising that approaches only focused on treating the substance use disorder fail those with additional health and financial concerns. These issues can be addressed through a holistic, integrated care approach.

Efficacy of Exercise

An essential facet of integrative care is addressing overall physical and mental health. Despite the seclusion of addiction treatment, it is known that physical wellness impacts mental health and vice versa. In response to calls for increasing the availability of efficacious alternative and supplementary treatments for SUD recovery, exercise has shown promising results in the last decade. The body of literature includes affective and craving-related responses to single doses of exercise to the effects of longer-term interventions. Additionally, the existing body of literature has examined the efficacy of exercise as a supplementary treatment at various levels of care, from residential to outpatient. Perhaps most promising, are some studies that are prescriptive in nature, suggesting exercise that is biochemically based and dependent on the stage of drug use (e.g., active addiction versus treatment versus sobriety maintenance).

In the residential treatment setting, it has been demonstrated that among sedentary alcohol-dependent adults, a 12-week moderate intensity exercise intervention can substantially increase mood, decrease anxiety, and reduce incidence of alcohol cravings[2]. More specifically, the authors noted that after each 20-40-minute exercise session, participants rated their mood as increased and anxiety and cravings as decreased. Therefore, relapse risk may be reduced by way of single bouts of exercise at moderate intensity.

At the outpatient level, it is often challenging to maintain attendance for regularly-scheduled programming, not to mention the addition of special programming like exercise. However, Colledge et al.[4] found encouraging evidence for the efficacy of an exercise adjunct therapy in heroin-assisted treatment. Patients attending outpatient treatment were randomized into a condition of 12 weeks of exercise that occurred twice weekly or the control condition that provided a more typical behaviorally-based treatment. The findings of the pilot program found that 92.3% of the participants in the exercise condition were compliant, or semi-compliant, with the protocol, compared to just 54.6% of the participants in the comparison condition. This participation rate is unusually high, especially given the outpatient setting, and may signify a necessary departure from some of the traditional treatment options for outpatient SUD recovery.

Biologically speaking, the use of substances has a significant and powerful impact on the brain. Aside from the positive effects of drug and alcohol misuse, like euphoria or intensely positive experiences, with continued use, there are many negative consequences in the brain. Generally speaking, neural adaptations occur in the structure and function of the brain and "these neural adaptations compromise brain function and also drive the transition from controlled, occasional substance use to chronic misuse, which can be difficult to control"[8]. Through the use of MRI and PET technology, the study of exercise on brain function and SUD recovery can lead to specific prescription and intervention based on the progression of the disease.

Much of the literature on the use of exercise and brain-related adaptations has come from studies involving the use of rats. Like the Thanos et al.[9] study, that identified exercised rats as less likely to be susceptible to cocaine reinstatement as compared to sedentary rats. The authors suggest that the mechanism at work is the neuroplasticity and neurotransmission of the neurotransmitter dopamine (DA) that is implicated in both cocaine use and exercise. In this case, daily treadmill exercise was found to be a potential protective measure.

Overall, it has been demonstrated, through both animal and human intervention studies, that exercise is an efficacious adjunct treatment for substance use disorders. Most promising and leading-edge are those studies that have supported exercise as a treatment through the exploration of neurobiological mechanisms. As pointed out by leading researchers in the field, Zhang & Yuan[10], "exercise training modulates several neural networks and is a safe and effective way to relieve substance abuse."

Future Directions

The inclusion of exercise in substance use treatment shows promise and further supports the need for an integrated care approach that includes physical health. Especially given that individuals engaged in active recovery are engaged in health-seeking behaviors, it is necessary to build programming that will support the health goals of this population. As many as 95% of surveyed people in recovery have expressed interest in engaging in an exercise program that is specifically designed for those in substance use recovery and most of those people prefer that the program begin within the first three months of recovery[1]. The availability of such programming is scarce, mirroring the same dilemma that this population has in gaining access to treatment in the first place. While funding, point of access, and the new challenges as a result of the pandemic, continue to create barriers to adequate treatment for substance use, there are many areas to be explored in the development of tailored exercise prescription for recovery from addiction. Future studies may continue to explore neurobiological mechanisms of exercise and the interruption to the reward pathways that lead to drug-seeking behavior. Additionally, a major focus should be on the development of stage-dependent models that match traditional exercise prescription components (e.g., frequency, intensity, time, type, volume, progression) with stages of recovery (e.g., <30 days versus 1 year without substance) and even potentially with the drug of choice itself (different drugs activate different neurotransmitters). The ultimate goal is to provide individuals affected by substance use issues with physical health interventions that heal their brains and bodies and give them a better chance at living a full, thriving life.

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