

Perspective

Frequent exercise: A healthy habit or a behavioral addiction?

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Abstract

It is well known that regular physical activity helps improve overall health and fitness and reduces the risk of many chronic diseases. However, excessive exercise might be harmful. Exercise addiction (EA) is a pattern of uncontrolled exercise that involves a craving for overwhelming exercise with addictive attributes. So far, little is known about this unique behavioral addiction. The aim of the current study is to introduce the diagnosis and assessment of EA, and to summarize several developing theoretical models. Eating disorders, body image disorder, low self-esteem, and high narcissism are related to high risk of EA. The paper also discusses the distinction between EA and highly involved physical activity.

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Keywords: Exercise addiction; Behavior addiction; Physical activity; Theoretical model

Introduction

Regular physical exercise has been proved to promote psychological and physical health and to improve quality of life.¹ However, indulging in uncontrollable excessive exercise may bring about adverse effects, increasing susceptibility to sport injuries or social-occupational dysfunction. For example, overtraining increases the risk of acute exercise injuries (nausea and emesis, hypoglycemia, apopsychia, chest distress, chest pain, arrhythmia, and even sudden death).² It can also cause chronic musculoskeletal pain and injury and lead to a

malfunction of the human immune system. This phenomenon is referred to as “exercise addiction (EA).” EA is conceptualized as a loss of control over one's exercise behavior, which further becomes a compulsion in which the symptoms of a classical addiction are manifested.^{3,4} In the 5th version of *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*, EA is recommended for classification under behavior addiction, but it is not listed as a mental dysfunction due to insufficient peer-reviewed evidence.⁵ Several other terms are also used for describing EA, for instance, exercise dependence,⁶ compulsive exercise,⁷ obligatory exercise,⁸ and exercise abuse.⁹ This paper discusses the diagnostic criteria and various theoretical models of EA. It also discusses the underlying drivers and co-occurring disorders in order to distinguish frequent recreational exercise and competitive sports from EA.

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Exercise as an addition: diagnosis, high-risk rate and assessment

The idea of EA was first introduced in 1970 by Baekeland,¹⁰ when he examined the effect of exercise deprivation on sleep. Subjects were paid to participate in the study, but they expressed a strong desire to continue the exercise even without further monetary compensation. Since then, much attention has been paid to describe this as an addictive behavior.

Researchers have defined EA using several different models. Based on the theoretical model of behavioral addictions, the following should be considered as key components of EA: (1) *salience*, considering exercise as the most important thing in life; (2) *mood modification*, regarding exercise as a coping strategy to unexpected events and to regulate emotions; (3) *tolerance*, individual increases the amount of exercise to reduce craving; (4) *withdrawal*, manifested by anhedonia, irritability, depression, and anxiety when the individual suddenly reduces or stops exercise; the person may also have difficulties in the performance of professional or social activities; (5) *relapse*, individual has the tendency to revert to earlier patterns of exercise.^{11–14} Similarly, Hausenblas and Downs^{15,16} defined EA based on the criteria of substance dependence in *DSM-IV-TR*, which is aligned with the core components of behavior addiction criteria. Accordingly, the key components were *tolerance*, *withdrawal*, *lack of control*, *intention effects*, *spending a lot of time exercising*, *reduction in other activities*, and *continuance*, that is, continuing to exercise despite knowing that it is causing physical, psychological, and/or social problems.¹⁷

Preliminary studies have found varying incidence of high risk for EA. It is relatively rare in the general population, ranging from 0.3–0.5% to 3%.^{18,19} However, the figure varies greatly among regular exercisers and professionals. Mónok et al¹⁸ found that the incidence of high risk for EA was 0.9–3.2%. Similarly, Szabo and Griffiths²⁰ estimated that 3.6% of habitual exercisers were at the risk of EA, while the figure was much higher among sport university students (6.9%). However, several other studies reported stunningly higher rates of exercisers being at risk of EA, namely 22–50%.^{21–23}

The highly inconsistent prevalence rates may be related to the heterogeneity of measurement tools. The most commonly used and well-validated assessment instruments are the Exercise Addiction Inventory (EAI)²⁴ and Exercise Dependence Scale (EDS).¹⁶ The varying results yielded in studies may be explained by their different frameworks: EAI is based on the

diagnosis of mental disorders (6 items) and EDS on addiction symptoms, that is, tolerance, withdrawal, intention effects, lack of control, time, reduction in other activities, and continuance (21 items).^{4,25} Although EAI and EDS are commonly used in clinics, they cannot be used to make a definite diagnosis for EA owing to lack of empirical research. Further, interpretations may differ across different genders and cultures.²⁵ Most importantly, an intense involvement in sports or exercise may influence either the interpretation or the scoring of the instruments utilized.²⁶ Over-estimation may be even more pertinent when the self-report instrument or qualitative interview is applied to individuals suffering from eating disorders.

Theoretical models: how exercise addiction develops

The lack of understanding of this exercise paradox calls for theoretical research. After exercising, individuals usually experience euphoric feelings. This may be due to the release of hormones and chemical reactions in the human body.²⁷ During exercise, endorphins released by the pituitary gland block the feeling of pain and induce pleasure. Physical activities also stimulate the production of dopamine, and an increased level of dopamine is associated with feelings of happiness and pleasure. In addition, the level of serotonin, a neurotransmitter accounting for euphoria and good appetite, is also increased during regular exercise.^{27,28} It also enhances energy levels and alertness. These “happiness hormones” may play a role in reducing stress levels and therefore may have an indirect connection to EA.

Several models have been proposed to explain EA. The *Sympathetic Arousal Hypothesis*²⁹ is a physiological model suggesting that an organism's adaptation to habitual exercise may lead to addiction. It states that regular exercise leads to a decreased sympathetic arousal at rest. When individuals feel physically lethargic and tired, and psychologically feel low and negative, they have an urge to increase their arousal levels, which leads to continuing exercise workout. However, this hypothesis does not explain why sympathetic adaptation to exercise is universal, and only a small percentage of exercisers become addicted.¹⁷

The second model proposed by Szabo,³⁰ the *Cognitive Appraisal Hypothesis*, views exercise as a means of coping with stress. Thus, reducing or stopping exercise also means losing coping mechanisms, and this leads to individuals being vulnerable to actual

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