



Neuropsychological effects of physical activity in people with depression

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Abstract

Depression, a mental pathology of high prevalence and impact on quality of life, demands complementary therapeutic approaches. The review emphasized the psychological benefits, notably the improvement of mood and self-esteem, resulting from the modulation of neurotransmitters such as serotonin, dopamine, and endorphins, associated with physical activity. Additionally, physical activity influences the endocrine axis, manifesting itself in reducing the production of stress hormones, exemplified by cortisol. However, it is noteworthy that physical activity should not be used as an isolated approach, but as a component of a broader treatment that encompasses psychotherapeutic interventions and eventually drug therapy with antidepressants. Parallel to mental health benefits, physical activity promotes improvements in physical health, contributing to the strengthening of muscles, increased resistance, and promotion of cardiovascular health. In this context, this study demonstrates significant relevance of physical activity as an adjunct in the treatment and prevention of depression, giving a positive impact on various aspects of the individual's global health.

Keywords: Depression; Physical Activity; Mental Health; Quality of Life; Serotonin.

1. Introduction

Depression, a mental disorder of complex and multifactorial etiology, presents a substantial load for global public health (Queel et al., 2021). With an expressive prevalence and devastating impact on quality of life, depression requires innovative and complementary therapeutic approaches to meet the needs not fully met by conventional strategies, such as pharmacological treatment and psychotherapy (Azevedo et al., 2016). Within this context, physical activity and exercise emerge as potentially effective interventions, driven by a growing basis of scientific evidence that endorses their usefulness in relieving depressive symptoms (Merege Filho et al., 2014).

The complex relationship between depression and physical activity is multifaceted, covering physiological, cardiovascular, pulmonary, hormonal, and psychological domains (Schuch et al., 2020). Scientific research has benefited from technological advances in neuroimaging, biochemistry, and epidemiology, allowing further investigation of the mechanisms underlying this complex interaction (FIRTH et al., 2020). This investigation intends to explore these domains with greater detail.

2. Neuropsychological effects of physical activity in people with depression

The relationship between physical activity and neuropsychology is a multidisciplinary research area that investigates the complex mechanisms involved in the interaction between the body and the brain during exercise. This interaction is critical to understanding how the nervous system, the endocrine system and cognitive processes are mutually influenced in response to physical activity (ABD el-kader and al-jiffri, 2016).

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During physical activity, the nervous system plays a significant role in coordinating the movements. The primary motor cortex is activated, sending electrical signals to skeletal muscles, resulting in coordinated muscle contractions. The nervous system is responsible for regulating balance, posture, and perception of the environment, all who play critical roles in the execution of physical and daily activities (Neves e Silva, 2019).

Physical activity has a direct impact on the endocrine system. During exercise, the hypothalamus detects increased body temperature and energy demand, stimulating the pituitary gland to release hormones such as growth hormone and adrenocorticotropic hormone. Adrenal glands also come into action, releasing adrenaline and cortisol in response to stress caused by exercise, preparing the body for intense physical activity (Miziara et al., 2023).

The effects of physical activity extend to the brain, affecting neurotransmitters. During exercise, chemicals are released in the brain, affecting the state of mood and cognitive function. Endorphins, often called "welfare hormones", are released, contributing to the feeling of euphoria after exercise. Subsequently, dopamine, a neurotransmitter associated with pleasure and reward, is released during exercise, increasing the motivation to continue physical activity (Silva and Ricardo, 2023).

A remarkable discovery is neural plasticity induced by physical activity. Neural plasticity refers to the brain's ability to adapt and reorganize in response to stimulus. Regular exercise can promote the growth of new neurons, especially in the hippocampus, a crucial region for memory and learning. In addition, neural plasticity resulting from exercise can improve connectivity between different areas of the brain, thus improving cognitive functions such as memory, learning and reasoning (Cochar-Soares et al., 2021).

The relationship between physical activity and neuropsychobiology also has significant implications for mental health. Studies indicate that regular physical activity can reduce the risk of disorders such as depression, anxiety, and stress (Junior, 2023). This association is related to changes in neurotransmitter levels, increased neural plasticity and reducing brain inflammation. Thus, it is understood that the relationship between physical activity and neuropsychobiology is a complex and bidirectional interaction. It involves the nervous system, the endocrine system, neurotransmitters, and neural plasticity. Understanding this relationship is essential for the development of mental health promotion strategies, improving cognitive performance and treatment of neuropsychiatric disorders (Silva and Ferreira, 2022).

3. Conclusion

In conclusion, this study highlights the importance of physical activity in the treatment and prevention of depression. The literature review shows that regular exercise improves mood, self-esteem, and well-being, playing a key role in combating depression. The mechanisms involved include the release of neurotransmitters such as serotonin and dopamine, and the reduction of cortisol levels, stress hormone. However, physical activity should not be used as an isolated treatment, but as part of an approach that includes psychotherapy and, in some cases, medications. The guidelines recommend at least 150 minutes of moderate activity per week, adapted to individual needs. In addition to the benefits for mental health, physical activity improves physical health, including muscle strength, resistance, and cardiovascular health. In short, physical activity plays a vital role in promoting holistic well-being and in the fight against depression.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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