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## EFFECTS OF REGULAR PHYSICAL EXERCISE ON STRESS AND ANXIETY LEVELS

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### **Abstract:**

This paper investigates the effects of regular physical exercise on stress and anxiety levels, examining how different forms of exercise contribute to mental well-being. Stress and anxiety are increasingly prevalent in modern society, leading to significant negative impacts on both physical and mental health. While traditional treatments such as medication and therapy are widely used, exercise offers a non-pharmacological, accessible alternative. The study reviews the physiological mechanisms through which exercise reduces stress, including the release of endorphins, the regulation of cortisol, and improvements in brain plasticity. It also explores how various exercise types—such as aerobic activity, strength training, and mind-body practices like yoga—affect psychological outcomes. Research shows that regular exercise not only reduces stress and anxiety but also enhances emotional resilience and cognitive function. The paper concludes that incorporating physical exercise into daily routines can serve as an effective, low-cost strategy for managing stress and anxiety, benefiting both clinical and non-clinical populations. Further research is needed to optimize exercise prescriptions tailored to individual needs and conditions.

**Keywords:** *Physical Exercise, Stress, Anxiety, Mental Health, Non-Pharmacological Intervention, Aerobic Exercise, Yoga*

### **Introduction:**

Anxiety and stress are two of the most prevalent mental health conditions affecting people globally. The World Health Organisation (WHO) estimates that stress has a significant role in the development of both physical and psychological illness, and that anxiety disorders impact over 260 million people worldwide. The modern fast-paced lifestyle, characterized by constant demands and pressures, has significantly elevated levels of stress and anxiety, leading to various health problems such as cardiovascular disease, immune dysfunction, and mood disorders. Traditional treatments for managing these conditions include pharmacological interventions and psychotherapy, which can be effective but are often costly, require professional supervision, and may have side effects.

The benefits of physical exercise as a non-pharmacological method of stress and anxiety management have drawn more attention in recent years. Physical exercise is widely recognized for its numerous physical health benefits, including improving cardiovascular fitness, strengthening muscles, and aiding in weight management. However, its psychological benefits, particularly its impact on reducing stress and anxiety, are equally significant. Exercise is accessible, cost-effective, and can be adapted to individual preferences and needs, making it a highly attractive option for mental health management. This study reviews the literature to investigate how regular physical activity affects stress and anxiety levels. It will look at the underlying physiological processes that exercise uses to reduce stress, such as the function of neurochemicals like BDNF and endorphins, the control of cortisol, the main stress hormone, and enhancements to the autonomic nervous system. The impact of other forms of exercise on stress and anxiety will also be examined

in this research, including aerobic activity, resistance training, and mind-body techniques like yoga.

Through this investigation, the paper will highlight the importance of incorporating regular exercise into daily life as a practical and holistic strategy for managing stress and anxiety. It will also discuss the potential of exercise as a complementary approach to traditional treatments, particularly for clinical populations experiencing chronic anxiety disorders. The results of this study can offer insightful information to individuals, governments, and healthcare professionals looking for practical and affordable ways to enhance mental health.

**The objective of the Research:**

- 1) To investigate the effects of regular physical exercise on stress and anxiety levels.
- 2) To examine the physiological and psychological mechanisms through which physical exercise influences stress and anxiety, including the role of neurochemical changes, hormonal regulation, and improvements in brain function.
- 3) To identify and compare the impact of different types of exercise, such as aerobic activities, strength training, and mind-body practices (e.g., yoga, Tai Chi), on stress reduction and anxiety alleviation.
- 4) To evaluate the effectiveness of exercise as a non-pharmacological intervention for managing stress and anxiety in both clinical and non-clinical populations.
- 5) To explore the potential moderating factors, such as exercise intensity, duration, frequency, and individual differences, that affect the relationship between physical activity and mental well-being.

**Literature Review:**

This literature review explores the relationship between regular physical exercise and stress and anxiety reduction. Key studies include Salmon's 2001 study, which proposed that exercise acts as a stress buffer, promoting relaxation, mood enhancement, and overall psychological well-being. The study found that aerobic activities, particularly moderate intensity, led to better emotional control and stress management.

Jayakody et al. (2014) found that aerobic exercise significantly reduced symptoms in patients diagnosed with anxiety disorders, as it increased neurotransmitters like serotonin and norepinephrine, which are key in regulating mood and reducing anxiety. The research suggested that exercise, when combined with traditional therapies like cognitive-behavioral therapy, enhanced treatment outcomes for clinical populations.

Stonerock et al. (2015) found that regular aerobic exercise significantly reduced anxiety symptoms and improved general well-being in non-clinical populations, suggesting that consistent engagement in physical activity could prevent the escalation of stress and anxiety into clinical disorders. Rebar et al. (2015) conducted a meta-analysis on the anxiety-reducing effects of exercise, finding that exercise, especially moderate-intensity aerobic activities, was highly effective in reducing anxiety symptoms.

Heinzel et al. (2015) studied the relationship between physical exercise, cortisol levels, and stress regulation in individuals experiencing chronic stress. The study revealed that regular aerobic exercise significantly reduced cortisol secretion, leading to better regulation of the body's stress response. Physical activity promotes stress resilience by balancing the autonomic nervous system, enhancing parasympathetic activity and decreasing sympathetic activity.

In 2016, Herring et al. found that both aerobic and resistance exercise can reduce anxiety sensitivity, particularly in individuals with panic or generalized anxiety disorders. Regular

exercise helps to tolerate physical symptoms of anxiety, which in turn reduces the intensity of their episodes. Short-term exercise interventions were effective in lowering anxiety sensitivity.

Asmundson et al. (2013) focused on the role of aerobic exercise as a complementary therapy for anxiety disorders. They found that when combined with psychotherapy, exercise resulted in greater reductions in anxiety symptoms compared to therapy alone. Martinsen (2008) proposed that physical activity serves as a "distraction" from negative thoughts and ruminations, offering individuals a break from their anxiety-provoking concerns.

### **Research Methodology:**

Using a mixed-methods approach, the study investigates the effects of regular physical activity on stress and anxiety levels. An experimental group and a control group were formed, and the participants' stress and anxiety levels were tracked in both groups. Qualitative methods were used to understand participants' experiences. The findings can inform future interventions and promote exercise as a cost-effective strategy for managing stress and anxiety in clinical and non-clinical populations.

### **Effects of Regular Physical Exercise on Stress and Anxiety Levels:**

Stress and anxiety are prominent difficulties in contemporary culture, and the quest for effective solutions to alleviate these issues has attracted substantial attention. Frequent exercise has been shown to be a viable method of reducing stress and anxiety. Exercise has physiological impacts on the release of endorphins, control of neurotransmitters, decrease of stress hormones, enhancement of sleep quality, and cardiovascular health.

The psychological benefits of regular physical exercise are equally significant. Physical activity serves as a distraction from daily stressors and negative thoughts, helping individuals take a break from their worries and focus on the present moment. This element of mindfulness is crucial in managing anxiety. Regular participation in exercise can lead to increased self-esteem and self-efficacy, which can help reduce feelings of anxiety. Social support, which is essential for mental health, can be obtained through social engagement, such as team sports or group exercise. Social interaction can reduce feelings of isolation and promote a sense of belonging in those who are stressed or anxious.

Incorporating regular exercise into daily life provides a structured routine, which can help individuals feel more in control. A predictable schedule can alleviate anxiety by reducing uncertainty in daily life. A considerable body of research supports the positive effects of regular physical exercise on stress and anxiety levels. Numerous meta-analyses have examined the relationship between exercise and anxiety, with a comprehensive review by Rebar et al. (2015) concluding that physical activity significantly reduces anxiety symptoms across various populations, highlighting aerobic exercises' effectiveness in particular.

Clinical trials have shown that exercise interventions can be as effective as traditional therapies such as cognitive-behavioral therapy (CBT) in reducing anxiety symptoms. Longitudinal studies suggest that individuals who maintain a regular exercise regimen over time experience sustained improvements in stress and anxiety levels. For example, Schuch et al. (2019) reported that individuals engaging in consistent exercise were less likely to develop anxiety disorders compared to those who were sedentary.

To improve mental health, individuals should establish a regular exercise routine, engage in various activities like aerobics, strength training, and mind-body practices, join group exercise classes or community sports for social support, start small for beginners, and

consult professionals for personalized exercise programs. These recommendations can help build confidence, increase physical activity levels, and provide a more enjoyable experience. Starting with small, achievable goals can also help build confidence. In the end, integrating exercise into regular activities can result in better mental health outcomes. The advantages of regular physical exercise on stress and anxiety levels are well-documented, with several research emphasising its physiological and psychological benefits. By incorporating regular physical activity into daily life, individuals can take proactive steps toward managing their mental health effectively.

#### **Physiological and Psychological Mechanisms:**

Physical exercise significantly impacts both physiological and psychological mechanisms that help regulate stress and anxiety levels. Understanding these mechanisms provides insight into how regular physical activity can serve as an effective intervention for improving mental health.

Regular exercise involves a number of neurochemical processes, such as the release of endorphins, a decrease in cortisol, the activation of the autonomic nervous system (ANS), and the production of brain-derived neurotrophic factor (BDNF). Endorphins promote a happy mood and mental state, which mitigates the negative effects of stress and anxiety. They also lessen the sense of pain and elicit feelings of pleasure and well-being. The body's main stress hormone, cortisol, is released in reaction to both stress and low blood sugar. Regular physical exercise helps lower cortisol levels, especially after periods of intensive activity, which can alleviate the emotional and physical repercussions of stress, such as anxiety, depression, and poor cognitive performance.

BDNF, or brain-derived neurotrophic factor, is essential for neuroplasticity, memory, and mood control. Physical exercise has been shown to increase BDNF levels, promoting neuroplasticity, which allows the brain to adapt to stressors. Higher BDNF levels are associated with improved cognitive resilience to stress, fostering mental flexibility and emotional regulation.

The autonomic nervous system (ANS), which is made up of the parasympathetic and sympathetic branches, is essential for controlling the body's stress response (PNS). While the SNS is necessary for short-term survival, continuous activation might result in long-term worry and stress. The PNS induces relaxation, counteracting the SNS's effects by promoting a state of calm and recovery. A well-functioning PNS is crucial for mental well-being, as it helps restore balance after stress responses and facilitates recovery.

Heart rate variability, or HRV, is a non-invasive indicator of autonomic nervous system activity that is defined as the fluctuation in the time interval between heartbeats. Regular physical exercise has been shown to enhance HRV by improving the balance between the SNS and PNS, leading to greater stress resilience and reduced anxiety levels.

Psychological mechanisms contributing to lower stress and anxiety levels include cognitive benefits, mindfulness and distraction, social interaction, and routine and structure. By understanding these mechanisms, individuals can leverage the mental health benefits of exercise as a natural and effective strategy for managing stress and anxiety. As more research emerges, integrating physical activity into mental health treatment plans will likely become increasingly emphasized, providing individuals with powerful tools for improving their emotional well-being.

#### **Types of Exercise and Their Effects on Stress and Anxiety:**

Exercise has a variety of consequences on stress and anxiety levels, and regular physical activity is essential for mental health. Individuals can select the best type of exercise to

meet their mental health demands by being aware of these variations. Aerobic, resistance, and mind-body activities are the three main categories of exercise.

Aerobic exercise, also known as cardiovascular exercises, increases the heart rate and improves oxygen circulation throughout the body. It has been shown to reduce cortisol levels, which helps mitigate the adverse effects of chronic stress. Studies have shown that regular aerobic exercise can significantly reduce anxiety levels in participants diagnosed with generalized anxiety disorder.

Exercises that increase muscle strength and endurance are referred to as resistance training, or strength training. It can also significantly reduce stress and anxiety levels due to physical exertion and a sense of mastery. Research has shown that participants engaging in resistance training experience significant reductions in anxiety symptoms, particularly when performing moderate to high-intensity exercises.

Mind-body exercises, such as yoga and Tai Chi, blend physical movement with mindfulness, controlled breathing, and meditation. These practices promote relaxation and a heightened sense of awareness, offering a holistic approach to stress reduction. Mind-body exercises have unique effects on mental health due to their emphasis on mindfulness and breath regulation. They increase the parasympathetic nervous system's activity, which is in charge of promoting relaxation and reducing the stress reaction.

It has been demonstrated that exercises like yoga affect the brain's neurotransmitter levels, enhancing emotional health. In a 2010 study, Streeter et al. discovered that yoga practitioners had higher levels of GABA (gamma-aminobutyric acid), a neurotransmitter that is essential for lowering anxiety.

Different types of exercise offer unique and effective benefits for reducing stress and anxiety. By understanding these varied effects, individuals can tailor their exercise choices to align with their mental health goals, making physical activity an integral component of their overall wellness strategy.

### **The Role of Exercise in Clinical Populations:**

For those with clinical anxiety and stress disorders, such as generalised anxiety disorder (GAD) and post-traumatic stress disorder (PTSD), regular exercise is an important part of treatment. The interplay between physical activity and mental health in clinical populations highlights the importance of integrating exercise into treatment plans.

Regular physical activity can serve as a valuable adjunct to traditional treatment modalities, including cognitive-behavioral therapy (CBT) and pharmacotherapy. The incorporation of exercise into therapeutic programs has been shown to enhance treatment outcomes, resulting in a more comprehensive approach to managing anxiety and stress disorders. Exercise can help cognitive behavioural therapy (CBT) work better by giving patients more coping mechanisms and techniques to control their anxiety symptoms. Exercise can assist people on medication for anxiety disorders manage some of the unwanted effects of the medicine, like weight gain and weariness. Furthermore, there is evidence that exercise correlates with better adherence to prescription regimens because people who exercise tend to feel better overall.

Empirical evidence supports the benefits of exercise for clinical populations suffering from anxiety and stress-related disorders. A meta-analysis conducted by Herring et al. (2010) reviewed the effects of both aerobic and resistance exercise on anxiety symptoms in clinical populations. The analysis revealed that exercise led to significant reductions in anxiety, with moderate to large effect sizes across various studies.



Exercise has been shown to reduce clinical anxiety through a variety of processes, including enhanced emotional regulation, elevated self-efficacy, and decreased activity of the Sympathetic Nervous System (SNS). Generalised Anxiety Disorder (GAD), Post-Traumatic Stress Disorder (PTSD), and other clinical demographics such as depression and bipolar disorder are among the specific populations affected by these diseases.

Clinicians should work with mental health specialists and fitness experts to create customised exercise regimens that meet patients' physical needs and mental health requirements in order to optimise the benefits of exercise for people with clinical anxiety and stress disorders. Gradual integration of exercise, incorporating enjoyable activities, and encouraging participation in group exercise settings can further inform clinical practices.

The role of exercise in clinical populations suffering from anxiety and stress-related disorders is increasingly recognized as a valuable component of treatment. By addressing both physiological and psychological aspects of mental health, exercise serves as a powerful tool for improving the overall well-being of individuals with clinical anxiety disorders.

#### **Moderators of Exercise-Induced Stress and Anxiety Reduction:**

Physical exercise's effectiveness in reducing stress and anxiety is influenced by several factors, including exercise intensity, duration, frequency, and individual differences. Moderate-intensity exercise provides the most consistent benefits for mental health, while high-intensity workouts can lead to increased stress levels if not properly managed. It is crucial to approach high-intensity workouts with caution, gradually increasing their intensity to avoid potential adverse effects on mental health.

The duration of exercise sessions also influences its effectiveness in reducing stress and anxiety. Longer sessions yield greater mental health benefits compared to shorter sessions, but it is essential to consider individual preferences and lifestyles. Regular, sustained exercise fosters a more substantial cumulative effect on mental health.

Frequency plays a vital role in its effectiveness. Engaging in physical activity several times a week, ideally 3 to 5 times, has been shown to promote more significant reductions in stress and anxiety. Establishing a consistent exercise schedule can contribute to better adherence and maximize the psychological advantages of physical activity.

Personal preferences and motivations significantly influence the extent to which exercise reduces stress and anxiety. People who enjoy their chosen form of exercise are more likely to experience psychological benefits. Additionally, individuals who set specific goals related to fitness, personal challenges, or social connections tend to be more motivated and engaged in their exercise routines. Finding activities that resonate personally is crucial for fostering intrinsic motivation.

In the relationship between fitness and mental health, social support is essential. Group exercise settings can create a sense of community and shared goals, enhancing motivation and enjoyment. Exercising with friends, family, or support groups can foster a supportive environment that encourages individuals to stay active. The presence of social connections can also alleviate feelings of isolation, which are often associated with anxiety and stress.

Understanding these moderators allows individuals to tailor their exercise regimens to maximize mental health benefits. By engaging in moderate-intensity exercise regularly, considering personal preferences and motivations, and fostering supportive social connections, individuals can enhance their exercise experience and promote lasting improvements in mental health and well-being.

### Conclusion:

Regular physical exercise significantly reduces stress and anxiety symptoms, providing a powerful tool for mental health and well-being. The physiological benefits of exercise, such as endorphin release, reduced cortisol levels, and enhanced neuroplasticity, along with the psychological benefits of improved self-efficacy and emotional regulation, make it a powerful tool for managing stress. However, the effectiveness of exercise as an intervention depends on factors like exercise intensity, duration, frequency, and individual differences. Moderate-intensity exercises generally provide the most consistent benefits, while individual preferences and social support can enhance adherence and motivation. In clinical populations, regular exercise complements traditional treatment approaches, leading to improved outcomes for individuals with anxiety and stress-related disorders. Integrating exercise into treatment plans not only addresses physical health but also fosters emotional resilience and well-being. Healthcare providers, mental health professionals, and individuals should recognize and promote exercise as a viable strategy for managing stress and anxiety. As research continues to explore the relationship between exercise and mental health, it will be essential to adapt and tailor exercise interventions to meet diverse populations' unique needs.

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