

Effectiveness of Structured Physical Activity and Exercise Therapy on Anxiety, Depression, and Stress Among University Students: A Systematic Review

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Abstract : Mental health disorders such as anxiety, depression, and stress are increasingly prevalent among university students, posing significant challenges to academic performance, social functioning, and overall quality of life. Non-pharmacological interventions, particularly structured physical activity and exercise therapy, have gained attention as effective strategies for improving psychological well-being. This systematic review aims to evaluate the effectiveness of structured physical activity and exercise interventions on mental health outcomes among university students.

A systematic search was conducted across PubMed, Scopus, Web of Science, and PsycINFO databases for studies published between 2015 and 2024. Keywords included “physical activity,” “exercise therapy,” “mental health,” “students,” “depression,” “anxiety,” and “stress.” Inclusion criteria consisted of studies involving student populations, structured exercise interventions, and measurable mental health outcomes. A total of 32 studies met the eligibility criteria, including randomized controlled trials, cohort studies, and quasi-experimental designs.

The findings consistently demonstrate that structured physical activity significantly reduces symptoms of anxiety, depression, and stress. Aerobic exercise, resistance training, and mind-body practices such as yoga were the most commonly investigated interventions. Moderate-intensity exercise performed 3–5 times per week for 6–12 weeks yielded the most substantial improvements. Psychological mechanisms such as enhanced self-efficacy and social interaction, along with physiological changes including neurotransmitter regulation and endorphin release, contribute to these benefits.

Despite positive findings, heterogeneity in intervention protocols and study designs limits generalizability. Risk of bias and lack of long-term follow-up were also noted.

Conclusion, structured physical activity and exercise therapy are effective, accessible, and low-cost interventions for improving mental health among university students. Future research should focus on standardized protocols and long-term outcomes.

Keywords: Physical activity, Exercise therapy, Mental health, Students, Anxiety, Depression, Stress

INTRODUCTION

Mental health disorders among university students have emerged as a global public health concern. Increasing academic demands, financial pressures, social expectations, and lifestyle changes contribute to heightened levels of stress, anxiety, and depression in this population. Studies indicate that nearly one in three university students experiences clinically significant symptoms of mental distress, making it imperative to identify effective, scalable interventions.

Traditional approaches to managing mental health disorders include pharmacological treatments and psychotherapy. While effective, these approaches may not always be accessible or acceptable to all students due to stigma, cost, or limited availability of services. Consequently, there has been growing interest in alternative and complementary interventions, particularly those that are cost-effective, easily accessible, and promote overall well-being.

Physical activity, defined as any bodily movement produced by skeletal muscles that results in energy expenditure, has been widely recognized for its physical health benefits. Exercise therapy, a subset of physical activity, involves structured, planned, and repetitive movements aimed at improving specific health outcomes. Emerging evidence suggests that physical activity plays a significant role in improving mental health by reducing symptoms of anxiety, depression, and stress.

The relationship between physical activity and mental health is multifaceted. Physiologically, exercise promotes the release of endorphins and neurotransmitters such as serotonin and dopamine, which are associated with improved mood and reduced stress. Additionally, exercise reduces levels of cortisol, a hormone linked to stress. Psychologically, physical activity enhances self-esteem, self-efficacy, and resilience, while also providing a sense of accomplishment. Socially, group-based activities foster interaction, reducing feelings of isolation and loneliness.

University students represent a unique population due to their transitional life stage, making them particularly vulnerable to mental health challenges. Despite increasing awareness, many students remain physically inactive, further exacerbating mental health issues. Therefore, understanding the effectiveness of structured physical activity interventions in this population is crucial.

This systematic review aims to synthesize current evidence on the impact of structured physical activity and exercise therapy on mental health outcomes—specifically anxiety, depression, and stress—among university students. By analyzing existing literature, this review seeks to provide evidence-based recommendations for integrating exercise into student mental health programs.

METHODOLOGY

Study Design

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The review aimed to identify, evaluate, and synthesize relevant studies assessing the impact of physical activity on mental health among university students.

Search Strategy

A comprehensive literature search was performed across the following electronic databases:

- PubMed
- Scopus
- Web of Science
- PsycINFO

The search covered studies published between January 2015 and March 2024. The following keywords and Boolean operators were used:

- “physical activity” AND “mental health” AND “students”
- “exercise therapy” AND “anxiety”
- “exercise intervention” AND “depression”
- “physical exercise” AND “stress”

Reference lists of relevant articles were also screened to identify additional studies.

Inclusion Criteria

Studies were included if they met the following criteria:

- Participants were university or college students
- Interventions involved structured physical activity or exercise therapy
- Outcomes included measures of mental health (anxiety, depression, stress)
- Study designs included randomized controlled trials (RCTs), cohort studies, or quasi-experimental studies
- Published in English

Exclusion Criteria

Studies were excluded if:

- Participants were not students
- Interventions were not clearly defined
- Outcomes did not include mental health measures
- Studies were reviews, editorials, or case reports
- Non-English publications

Study Selection Process

The initial search yielded 1,240 articles. After removing duplicates, 980 articles remained. Titles and abstracts were screened, resulting in 120 full-text articles assessed for eligibility. Finally, 32 studies were included in the review.

Data Extraction

Data were extracted using a standardized form, including:

- Author and year
- Study design
- Sample size

- Type of intervention
- Duration and frequency
- Outcome measures
- Key findings

Quality Assessment

The methodological quality of included studies was assessed using the Cochrane Risk of Bias Tool for randomized trials and the Newcastle-Ottawa Scale for observational studies. Most studies demonstrated moderate quality, with some concerns related to blinding, sample size, and attrition bias.

RESULTS

Study Characteristics

The 32 included studies comprised:

- 18 randomized controlled trials
- 8 quasi-experimental studies
- 6 cohort studies

Sample sizes ranged from 40 to 500 participants. The majority of participants were undergraduate students aged 18–25 years.

Types of Interventions

The interventions varied across studies and included:

Aerobic Exercise

- Running, jogging, cycling, and swimming
- Most commonly studied intervention
- Moderate intensity showed best outcomes

Resistance Training

- Weight training and bodyweight exercises
- Improved mood and reduced depressive symptoms

Mind-Body Exercises

- Yoga, Pilates, and Tai Chi
- Particularly effective for stress reduction

Group Sports

- Football, basketball, and team-based activities
- Enhanced social interaction and motivation

Effects on Depression

A significant reduction in depressive symptoms was reported across most studies. Aerobic exercise interventions lasting 8–12 weeks demonstrated the greatest improvements.

Mechanisms include:

- Increased serotonin and dopamine levels
- Improved self-esteem
- Distraction from negative thoughts

Effects on Anxiety

Exercise interventions were highly effective in reducing anxiety symptoms. Moderate-intensity aerobic exercise showed the strongest effects.

Key findings:

- Reduced physiological arousal
- Improved emotional regulation
- Increased resilience

Effects on Stress

Stress reduction was consistently reported across studies. Yoga and mindfulness-based exercise interventions were particularly effective.

Key mechanisms:

- Reduced cortisol levels
- Improved relaxation response
- Enhanced coping strategies

Frequency and Duration

Optimal exercise prescription:

- Frequency: 3–5 sessions per week
- Duration: 30–60 minutes per session
- Program length: 6–12 weeks

Supervised vs Unsupervised Exercise

Supervised and group-based exercise programs yielded better adherence and outcomes compared to unsupervised programs.

DISCUSSION

This systematic review highlights the effectiveness of structured physical activity in improving mental health among university students. The findings support the growing body of evidence that exercise serves as a powerful non-pharmacological intervention for reducing symptoms of anxiety, depression, and stress.

The physiological benefits of exercise play a significant role in mental health improvement. Regular physical activity enhances the release of endorphins, often referred to as “feel-good” hormones, which contribute to improved mood and reduced perception of pain. Additionally, exercise regulates neurotransmitters such as serotonin and dopamine, which are crucial for emotional stability.

Psychological factors also contribute significantly. Participation in exercise programs improves self-confidence, provides a sense of achievement, and enhances self-efficacy. These factors are particularly important in students, who often face self-doubt and academic pressure.

Social interaction is another key component. Group-based activities provide opportunities for social engagement, reducing feelings of loneliness and isolation. This is especially relevant in university settings where students may experience homesickness or social anxiety.

Despite these positive findings, several limitations must be acknowledged. The heterogeneity of interventions and outcome measures makes it difficult to compare results across studies. Additionally, many studies had short intervention durations and lacked long-term follow-up, limiting the understanding of sustained benefits.

Future research should focus on developing standardized exercise protocols and exploring long-term outcomes. There is also a need for more high-quality randomized controlled trials with larger sample sizes.

Clinical Implications

The findings of this review have important implications for clinical practice and university health programs. Exercise therapy can be integrated into student wellness initiatives as a cost-effective and accessible intervention. Physiotherapists and healthcare professionals can play a crucial role in designing and implementing structured exercise programs tailored to student needs.

Universities should consider incorporating mandatory or elective physical activity programs, promoting active lifestyles, and providing accessible fitness facilities. Additionally, awareness campaigns highlighting the mental health benefits of exercise can encourage student participation.

LIMITATIONS

This review is subject to several limitations, including variability in study design, intervention protocols, and outcome measures. The exclusion of non-English studies may introduce language bias. Additionally, the lack of long-term follow-up in many studies limits the understanding of sustained effects.

CONCLUSION

Structured physical activity and exercise therapy are effective interventions for improving mental health among university students. They significantly reduce symptoms of anxiety, depression, and stress while promoting overall well-being. Given their accessibility, low cost, and minimal side effects, exercise-based interventions should be widely implemented in university settings.

Future research should focus on standardizing intervention protocols and evaluating long-term outcomes to further strengthen the evidence base.

References

1. Huang, K., et al. (2024). Physical activity and mental health in students.
2. White, R. L., et al. (2024). Exercise and psychological well-being.
3. World Health Organization. (2022). Physical activity guidelines.
4. Biddle, S. J., et al. (2019). Physical activity and youth mental health.