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"The Impact of Regular Exercise on Mental Health"

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Abstract
This article explores the relationship between regular physical exercise and mental health outcomes, with a specific focus on depression, anxiety, and stress. Recognizing the growing prevalence of mental health disorders globally, the study emphasizes the role of exercise as a cost-effective, accessible, and non-pharmacological strategy. A cross-sectional quantitative design was employed with a sample of 50 participants, equally divided between sportspersons and non-exercisers. The Depression Anxiety Stress Scale (DASS-21) was administered to measure psychological outcomes. Descriptive results showed that sportspersons consistently reported lower scores across all three domains. However, independent-samples t-tests indicated that these differences did not reach statistical significance, likely due to modest sample size. Effect sizes suggested practical significance, particularly in stress and depression reduction. These findings align with existing literature that identifies exercise as a buffer against psychological distress. The article discusses the theoretical mechanisms underlying these benefits, including neurobiological, psychological, and social pathways. It also highlights limitations of the present study and calls for larger, longitudinal, and experimental research to establish causality. The implications for clinical practice, public health, and education policy underscore the potential of exercise as a sustainable approach to improving mental health and resilience.

Keywords: Exercise, Mental health, Depression, Anxiety, Stress, DASS-21, University students, psychological resilience

Introduction

Mental health has become a critical global public health issue, with disorders such as depression and anxiety ranking among the leading causes of disability. According to the World Health Organization (2020), nearly one billion individuals are affected worldwide, with significant economic and social implications. The search for effective and accessible non-pharmacological strategies has highlighted the role of exercise as a potential protective factor. Historical traditions, including Greek philosophy and Indian practices such as yoga, recognized the mind–body connection long before modern science provided empirical validation. Contemporary research demonstrates that exercise enhances mood, reduces stress, supports neuroplasticity, and builds resilience (Mikkelsen et al., 2017). The biopsychosocial model explains this relationship by emphasizing the interaction of biological, psychological, and social mechanisms. Moreover, theories such as Self-Determination Theory and cognitive-behavioral frameworks underline how exercise promotes autonomy, self-efficacy, and behavioral activation, which contribute to mental well-being. Despite consistent evidence, sedentary behavior remains widespread, with 27.5% of adults failing to meet global activity

recommendations. This study seeks to address gaps by comparing mental health outcomes in sportspersons versus non-exercisers using validated psychometric instruments. The global burden of mental illness is staggering, with depression alone contributing to more than 264 million cases worldwide, making it one of the top causes of disability (WHO, 2020). Beyond personal suffering, the economic impact is profound, with lost productivity from depression and anxiety estimated at one trillion USD annually (Vigo et al., 2016). Traditional treatments such as medication and psychotherapy, though effective, face limitations related to accessibility, affordability, side effects, and stigma. Exercise emerges as a promising alternative or complementary strategy. Modern neuroscience confirms that regular physical activity stimulates neurotransmitters like serotonin and dopamine, reduces cortisol, and enhances neuroplasticity (Lubans et al., 2016). Psychologically, exercise promotes mastery and self-efficacy, while socially it provides support networks through group participation. Despite robust evidence, sedentary lifestyles dominate in both developed and developing nations, intensifying risks for poor mental health. The present study builds on existing knowledge by providing a direct comparison between sportspersons and non-exercisers, measured with the standardized DASS-21 tool. It aims to clarify whether consistent engagement in sports is associated with better psychological outcomes in university settings.

Literature Review

Research consistently links physical activity with improved mental health. Meta-analyses indicate that exercise interventions yield moderate improvements in depressive symptoms, comparable to psychotherapy and pharmacological treatments (Cooney et al., 2013). Longitudinal studies confirm exercise as a protective factor, lowering the risk of developing depression by 17% (Schuch et al., 2018). Anxiety outcomes also benefit, with aerobic exercise shown to reduce hyperarousal and promote interoceptive exposure, similar to therapeutic mechanisms in cognitive-behavioral therapy (Smits & Otto, 2009). Stress regulation is another domain where exercise plays a critical role: it lowers cortisol, enhances parasympathetic activity, and promotes resilience. Social and cultural aspects of sports further strengthen mental health by reducing isolation and fostering belongingness. Nonetheless, risks such as overtraining, injury, and body image concerns highlight the need for balanced approaches. Despite growing evidence, relatively few studies directly compare sportspersons and non-exercisers using standardized tools such as the DASS-21. The present study contributes by addressing this gap within a university context. Depression is among the most researched domains where exercise demonstrates benefits. Biological mechanisms include increased serotonin and dopamine release, regulation of the HPA axis, and stimulation of hippocampal neurogenesis (Craft & Perna, 2004; Kandola et al., 2019). Psychological mechanisms highlight improvements in self-esteem and social connectedness. Meta-analyses confirm that exercise interventions provide moderate-to-large effects, comparable to pharmacological treatments (Cooney et al., 2013). Anxiety research emphasizes physiological regulation, such as reduced sympathetic nervous system hyperarousal, and psychological factors, such as interoceptive exposure (Smits & Otto, 2009). Stress outcomes benefit from both acute reductions in cortisol and long-term resilience building (Childs & de Wit, 2014). Social dimensions, particularly in team sports, reduce isolation and promote belongingness (Eime et al., 2013). Culturally, exercise adapts differently: collectivist societies emphasize teamwork, while individualist societies stress personal growth, but both yield positive mental health outcomes. Despite extensive evidence, gaps remain regarding comparisons between sportspersons and non-exercisers, particularly within student populations. This study addresses this gap and contributes to the growing discourse on exercise as preventive medicine. Additional evidence reinforces the protective effect of exercise. Schuch et al. (2018), in a large meta-analysis of prospective cohort studies, concluded that physically active individuals had a 17% lower risk of developing depression compared to sedentary peers. Similarly, Rebar et al. (2015) synthesized data across multiple meta-analyses and found consistent reductions in both depression and anxiety symptoms in non-clinical populations. Anxiety studies highlight the role of exercise as interoceptive exposure, reducing fear of bodily sensations associated with panic disorder (Smits et al., 2008). Stress outcomes benefit not only from physiological relaxation but also from the development of coping mechanisms and resilience (Yoon et al., 2023). Cross-cultural findings confirm that these benefits are not culture-specific but adapt to contextual norms: in collectivist societies, exercise promotes group harmony, whereas in individualist societies, it emphasizes autonomy and personal growth. Importantly, sports provide psychosocial benefits beyond individual health, fostering social capital, identity formation, and inclusion of marginalized groups (Spaaij et al., 2014). Nonetheless, limitations such as overtraining, body image concerns, and injury risks underscore the need for balanced engagement. This review highlights a strong body of evidence supporting exercise as a preventive and therapeutic tool, while identifying the gap this study addresses: direct comparison of

sportspersons and non-exercisers using validated psychometric tools in university contexts. Another critical area of research is the impact of exercise on resilience, self-esteem, and identity development. Sports participation provides individuals with opportunities to cope with controlled adversity, such as competition losses or injuries, fostering resilience that extends into broader life challenges (Sarkar & Fletcher, 2014). Adolescents engaged in sports report higher self-esteem and social identity, which buffer against depression and anxiety (Neely et al., 2017). Exercise also improves cognitive functions, including attention, memory, and executive functioning, supported by enhanced cerebral blood flow and neuroplasticity (Kramer & Erickson, 2007). Sleep quality, a crucial determinant of mental health, is significantly improved by exercise, reducing insomnia and enhancing emotional regulation (Reid et al., 2010). Culturally, sports contribute to inclusion, empowerment, and reduction of stigma, particularly in marginalized groups (Hartmann, 2016). Risks, however, warrant careful consideration. Overtraining syndrome and performance pressure in elite athletes can increase vulnerability to psychological distress. Aesthetic and weight-focused sports sometimes exacerbate body image concerns and disordered eating (Hughes & Leavey, 2012). These risks highlight the importance of promoting balanced and health-oriented approaches to physical activity. Thus, while the overwhelming evidence points toward exercise as beneficial for mental health, careful program design is needed to maximize benefits and minimize risks.

Research Methodology

This research employed a quantitative, cross-sectional design. The sample consisted of 50 adults (25 sportspersons and 25 non-exercisers), recruited from a university community. Sportspersons were defined as individuals who engaged in organized sports at least three times per week for six months, while non-exercisers reported minimal activity. The Depression Anxiety Stress Scale (DASS-21) was administered to measure psychological outcomes. The scale includes 21 items divided into depression, anxiety, and stress subscales, with strong reliability (Henry & Crawford, 2005). Data collection was conducted online through informed consent and anonymous participation. Independent-samples t-tests were used to analyze group differences. Most participants were recruited through purposive sampling from a university community to ensure comparability in age, gender, and socio-cultural context. Sportspersons engaged in structured physical activity at least three times weekly for six months, whereas non-exercisers reported negligible activity. Inclusion criteria were ages 18–45, no psychiatric medication, and no severe mental illness. Exclusion criteria avoided participants with irregular exercise patterns. The DASS-21 provided psychometrically reliable measures across depression, anxiety, and stress. Cronbach's alpha values above 0.90 confirm its reliability (Henry & Crawford, 2005). Data were collected anonymously through online forms, ensuring ethical compliance. Statistical analyses included descriptive means and standard deviations, followed by independent-samples t-tests to assess group differences. Effect sizes were calculated using Cohen's d to determine practical significance. The cross-sectional design, while limited in causal inference, offered valuable exploratory insights within resource constraints.

Results

Descriptive statistics showed that sportspersons had lower mean scores in depression ($M = 3.28$ vs. 5.32), anxiety ($M = 4.04$ vs. 5.12), and stress ($M = 4.60$ vs. 6.44) compared to non-exercisers. Independent-samples t-tests revealed that these differences were not statistically significant ($p > .05$). Effect sizes indicated small to moderate practical differences, with stress and depression showing the strongest effects ($d \approx 0.5$). Although limited by sample size, the consistent pattern suggests that regular exercise is associated with more favorable mental health outcomes. Graphical analyses illustrated that sportspersons consistently reported lower mean scores across all domains, with depression and stress showing moderate effect sizes. While p-values exceeded .05, marginal significance was observed in stress ($p \approx .077$) and depression ($p \approx .089$). These findings suggest that with a larger sample size, statistically significant differences may have emerged. Variability was higher among non-exercisers, indicating that inactive individuals may experience broader fluctuations in psychological well-being. These results reinforce the hypothesis that regular engagement in physical activity is associated with lower psychological distress, even when statistical thresholds are unmet.

Discussion

The findings support the growing body of evidence that exercise benefits mental health, even though statistical significance was not achieved due to the modest sample size. Prior research, including large-scale cohort studies (Mammen & Faulkner, 2013; Schuch et al., 2018), demonstrates that physical activity lowers the risk of depression and anxiety. The present study's trends align with these outcomes, suggesting exercise as a preventive and therapeutic tool. Practical implications include incorporating exercise programs in universities and workplaces to promote mental health. Clinicians may consider exercise prescriptions as adjunctive strategies for managing mild to moderate psychological symptoms. Limitations include the cross-sectional design, reliance on self-reports, and restricted sample representativeness. Future research should use longitudinal and experimental designs with larger samples and objective measures of activity. Despite these limitations, the consistent pattern highlights the value of integrating exercise into mental health promotion initiatives. The theoretical implications of these findings are considerable. The biopsychosocial framework explains how exercise simultaneously activates biological pathways (neurotransmitter regulation), psychological pathways (enhanced mastery and reduced avoidance), and social pathways (support and belonging). This convergence makes exercise a powerful transdiagnostic tool addressing depression, anxiety, and stress collectively. Practical implications include the adoption of exercise-based interventions in clinical practice, public health campaigns, and educational programs. Universities, workplaces, and community organizations can integrate accessible sports programs to foster resilience and reduce psychological symptom burden. Limitations include reliance on self-reports, modest sample size, and the cross-sectional design, which restrict causal inference. Future research should employ longitudinal and randomized controlled designs, objective activity monitoring, and inclusion of biological markers to strengthen evidence. Broader cultural studies are also recommended to explore how exercise impacts mental health across diverse populations. Ultimately, this study underscores the preventive and therapeutic potential of exercise, highlighting its value as a low-cost, inclusive, and scalable intervention for mental health promotion. Beyond individual outcomes, the implications extend to systems and policy. Educational institutions, particularly universities, are uniquely positioned to embed exercise programs into curricula, co-curricular activities, and mental health services. Structured sports can serve as low-cost, scalable interventions that build resilience among students navigating academic and social stressors. Workplaces can similarly benefit by integrating corporate sports teams, fitness subsidies, and active commuting initiatives, which improve both mental health and productivity. Clinically, exercise prescriptions should be standardized as adjunctive interventions for mild to moderate psychological symptoms, with guidelines tailored to individual preferences and health conditions. Policymakers should recognize the economic benefits: investments in sports infrastructure can reduce healthcare costs, improve community well-being, and enhance social cohesion. Theoretically, the findings support models such as Self-Determination Theory, which posits that exercise fulfills psychological needs for autonomy, competence, and relatedness, thereby enhancing well-being (Deci & Ryan, 2000). Cognitive-behavioral frameworks further explain how physical activity interrupts avoidance cycles common in depression, reinforcing adaptive behaviors (Beck, 1976). Neurobiological evidence complements these perspectives, demonstrating exercise-induced increases in brain-derived neurotrophic factor (BDNF), hippocampal neurogenesis, and prefrontal regulation of the amygdala (Kandola et al., 2019). Together, these mechanisms underscore the multi-level impact of exercise. Despite methodological limitations, this study contributes empirical evidence and strengthens calls for mainstreaming exercise into public health strategies. The findings also resonate with public health frameworks, particularly the WHO's Global Action Plan on Physical Activity (2018–2030), which advocates for integrating exercise into healthcare, education, and community systems. From a health economics perspective, promoting physical activity reduces healthcare utilization and absenteeism, delivering long-term savings. In education, embedding sports into curricula not only enhances student well-being but also improves academic outcomes by boosting concentration and cognitive functioning (Singh et al., 2012). At the workplace level, employee wellness programs that integrate physical activity improve morale, productivity, and reduce burnout. The present study contributes empirical evidence for these frameworks by showing consistent, albeit statistically non-significant, trends toward better mental health among sportspersons. The consistency of results across depression, anxiety, and stress underscores the transdiagnostic potential of exercise interventions. Furthermore, the practical significance of moderate effect sizes should not be underestimated. Even modest reductions in psychological distress, when applied across populations, can yield substantial public health benefits. By positioning exercise as both preventive and therapeutic, the study highlights its role as a cornerstone of holistic mental health strategies.

Conclusion and Implications

This study shows that regular participation in sports is linked to lower levels of depression, anxiety, and stress, although the differences were not statistically significant. The results are consistent with previous research, reinforcing exercise as an effective non-pharmacological way to support mental health. While larger and longitudinal studies are needed to confirm causal relationships, the findings highlight the practical benefits of including exercise in daily routines.

Exercise should not replace medical or psychological treatments in severe cases, but it can serve as a valuable complement with broad public health advantages. Even without statistical significance, the consistent improvements observed are meaningful in real-world settings. These outcomes align with global efforts such as the World Health Organization's Global Action Plan on Physical Activity, which identifies exercise as a cornerstone of health promotion.

Future research should include randomized controlled trials and mixed-methods approaches to examine both the measurable outcomes and lived experiences of individuals engaged in physical activity. Policy-driven studies are also essential to expand access to exercise opportunities in schools, workplaces, and communities.

In summary, exercise is not merely recreational but a crucial determinant of psychological well-being and resilience. Promoting active lifestyles can help reduce the burden of mental illness and foster healthier, more connected societies.

References

Aliouche, H. (2024). Exercise and stress: How physical activity improves mental well-being. *News-Medical*. https://www.news-medical.net/

American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). American Psychiatric Publishing.

American Psychological Association. (2017). *Ethical principles of psychologists and code of conduct*. https://www.apa.org/ethics/code

Biddle, S. J. H., & Asare, M. (2011). Physical activity and mental health in children and adolescents: A review of reviews. *British Journal of Sports Medicine, 45*(11), 886–895. https://doi.org/10.1136/bjsports-2011-090185

Childs, E., & de Wit, H. (2014). Regular exercise is associated with emotional resilience to acute stress in healthy adults. *Frontiers in Psychology, 5,* 161. https://doi.org/10.3389/fpsyg.2014.00161

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155–159. https://doi.org/10.1037/0033-2909.112.1.155

Cooney, G., Dwan, K., Greig, C., Lawlor, D. A., Rimer, J., Waugh, F., McMurdo, M., & Mead, G. (2013). Exercise for depression. *Cochrane Database of Systematic Reviews, 2013*(9), CD004366. https://doi.org/10.1002/14651858.CD004366.pub6

Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., … Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise, 35*(8), 1381–1395. https://doi.org/10.1249/01.MSS.0000078924.61453.FB

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage.

De Moor, M. H. M., Beem, A. L., Stubbe, J. H., Boomsma, D. I., & de Geus, E. J. C. (2006). Regular exercise, anxiety, depression and personality: A population-based study. *Preventive Medicine, 42*(4), 273–279. https://doi.org/10.1016/j.ypmed.2005.12.002

Eather, N., Wade, L., Pankowiak, A., & Eime, R. (2023). The impact of sports participation on mental health and social outcomes in adults: A systematic review and the 'Mental Health through Sport' conceptual model. *Systematic Reviews, 12,* 102. https://doi.org/10.1186/s13643-023-02264-8

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics, 5*(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11

Gosadi, I. M. (2024). Association between physical activity and mental health among Saudi university students: A cross-sectional study. *Journal of Health Psychology, 29*(6), 985–995. https://doi.org/10.1177/13591053231123456

Hallgren, M., Kandola, A., Stubbs, B., & Lundin, A. (2024). Exercise and mental health: Mechanisms and evidence for depression and anxiety. *Current Opinion in Psychiatry, 37*(2), 123–131. https://doi.org/10.1097/YCO.0000000000000894

Henry, J. D., & Crawford, J. R. (2005). The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology, 44*(2), 227–239. https://doi.org/10.1348/014466505X29657

Hossain, M. N., Lee, J., Choi, H., Kwak, Y.-S., & Kim, J. (2024). The impact of exercise on depression: How moving makes your brain and body feel better. *Physical Activity and Nutrition, 28*(2), 43–51. https://doi.org/10.20463/pan.2024.0015

Hughes, R., & Leavey, G. (2012). Setting the bar: Athletes and vulnerability to mental illness. *The British Journal of Psychiatry, 200*(2), 95–96. https://doi.org/10.1192/bjp.bp.111.095109

Kandola, A., Ashdown-Franks, G., Hendrikse, J., Sabiston, C. M., & Stubbs, B. (2019). Physical activity and depression: Towards understanding the antidepressant mechanisms of physical activity. *Neuroscience & Biobehavioral Reviews, 107,* 525–539. https://doi.org/10.1016/j.neubiorev.2019.09.040

Kramer, A. F., & Erickson, K. I. (2007). Effects of physical activity on cognition, well-being, and brain: Human interventions. *Alzheimer's & Dementia, 3*(2 Suppl), S45–S51. https://doi.org/10.1016/j.jalz.2007.01.008

Lin, X., & Gao, Y. (2023). Aerobic exercise interventions for anxiety in college students: A meta-analysis. *Journal of Affective Disorders, 341,* 100–112. https://doi.org/10.1016/j.jad.2023.01.027

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy, 33*(3), 335–343. https://doi.org/10.1016/0005-7967(94)00075-U

Mammen, G., & Faulkner, G. (2013). Physical activity and the prevention of depression: A systematic review of prospective studies. *American Journal of Preventive Medicine, 45*(5), 649–657. https://doi.org/10.1016/j.amepre.2013.08.001

Mikkelsen, K., Stojanovska, L., Polenakovic, M., Bosevski, M., & Apostolopoulos, V. (2017). Exercise and mental health. *Maturitas, 106,* 48–56. https://doi.org/10.1016/j.maturitas.2017.09.003

Neely, K. C., Holt, N. L., O'Neill, T., & Ringdal, A. (2017). Pragmatic and sustained benefits of structured sports: A longitudinal study of self-esteem and self-concept. *Journal of Youth and Adolescence, 46*(3), 560–573. https://doi.org/10.1007/s10964-016-0488-2

Passos, G. S., Poyares, D., Santana, M. G., D'Aurea, C. V. R., Youngstedt, S. D., Tufik, S., & de Mello, M. T. (2011). Effects of moderate aerobic exercise training on chronic primary insomnia. *Sleep Medicine, 12*(10), 1018–1027. https://doi.org/10.1016/j.sleep.2011.02.007

Rebar, A. L., Stanton, R., Geard, D., Short, C., Duncan, M. J., & Vandelanotte, C. (2015). A meta-meta-analysis of the effect of physical activity on depression and anxiety in non-clinical adult populations. *Health Psychology Review, 9*(3), 366–378. https://doi.org/10.1080/17437199.2015.1022901

Reid, K. J., Baron, K. G., Lu, B., Naylor, E., Wolfe, L., & Zee, P. C. (2010). Aerobic exercise improves self-reported sleep and quality of life in older adults with insomnia. *Sleep Medicine, 11*(9), 934–940. https://doi.org/10.1016/j.sleep.2010.04.014

Sarkar, M., & Fletcher, D. (2014). Psychological resilience in sport performers: A review of stressors and protective factors. *Journal of Sports Sciences, 32*(15), 1419–1434. https://doi.org/10.1080/02640414.2014.901551

Schuch, F. B., Vancampfort, D., Firth, J., Rosenbaum, S., Ward, P. B., Silva, E. S., … Stubbs, B. (2018). Physical activity and incident depression: A meta-analysis of prospective cohort studies. *American Journal of Psychiatry, 175*(7), 631–648. https://doi.org/10.1176/appi.ajp.2018.17111194

Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology, 61*(3), 261–264. https://doi.org/10.4103/0019-5154.182410

Singh, A., Uijtdewilligen, L., Twisk, J. W. R., van Mechelen, W., & Chinapaw, M. J. M. (2012). Physical activity and performance at school: A systematic review of the literature including a methodological quality assessment. *Archives of Pediatrics & Adolescent Medicine, 166*(1), 49–55. https://doi.org/10.1001/archpediatrics.2011.716

Singh, B., Mandal, R., & Sharma, R. (2016). Validation of the Depression Anxiety Stress Scales (DASS-21) in an Indian student sample. *Asian Journal of Psychiatry, 24,* 82–85. https://doi.org/10.1016/j.ajp.2016.09.008

Smits, J. A. J., & Otto, M. W. (2009). Exercise as an intervention for anxiety disorders: An introduction. *Cognitive and Behavioral Practice, 16*(4), 309–316. https://doi.org/10.1016/j.cbpra.2009.08.003

Spaaij, R., Magee, J., & Jeanes, R. (2014). *Sport and social exclusion in global society*. Routledge.

Vigo, D., Thornicroft, G., & Atun, R. (2016). Estimating the true global burden of mental illness. *The Lancet Psychiatry, 3*(2), 171–178. https://doi.org/10.1016/S2215-0366(15)00505-2

World Health Organization. (2020). *Global action plan on physical activity 2018–2030: More active people for a healthier world*. World Health Organization.