

The Effect of Exercise on Mental Health: Coping with Stress and Anxiety Through Physical Activity (Systematic literature review)

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ABSTRACT

This study is a systematic review that aims to evaluate the effect of exercise on mental health, especially in overcoming stress and anxiety. By reviewing a number of studies selected through strict inclusion and exclusion criteria, the review gathered data from a variety of sources including peer-reviewed journals, articles. The data analysis method used is meta-analysis. The results showed that physical activity can significantly reduce symptoms of stress and anxiety. This applies to different types of sports, from aerobics, yoga, to strength training. This therapeutic effect is associated with the release of endorphins and other neurotransmitters that play a role in improving mood and reducing tension. In addition, exercise also improves sleep quality and aids in the regulation of circadian rhythms, which directly affect the management of stress and anxiety. The study also found that exercise intensity and duration played a role in its tiveness. Light to moderate exercise, performed regularly, is more effective in reducing symptoms of stress and anxiety compared to sporadic high-intensity exercise. Consistency and continuity in exercise routines prove to be more important than the intensity of exercise performed. However, the study also acknowledged variations in individual responses to exercise. Factors such as age, gender, initial health conditions, and personal preference for the type of exercise can affect how effective exercise is at coping with stress and anxiety in a particular individual. Taken together, these findings provide strong evidence supporting the use of exercise as a non-pharmacological strategy in managing stress and anxiety. The study encourages health practitioners to recommend exercise as an integral part of mental health treatment plans, as well as suggesting further research to explore specific mechanisms behind the psychological benefits of physical activity.

Keywords: *Mental Health, Exercise, Stress, Anxiety.*

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INTRODUCTION

Mental health, which is often overlooked in general health discussions, is actually an important aspect that affects a person's quality of life^{1,2}. Amid stressful modern life, the prevalence of conditions such

as stress and anxiety is on the rise, becoming a major concern in various sectors of society. In this context, non-pharmacological interventions, specifically sports, have begun to gain recognition as effective methods to reduce said symptoms. This study aimed to explore the relationship between physical activity and

mental health, focusing on managing stress and anxiety³⁻⁵.

Although many previous studies have highlighted the benefits of exercise for physical health, research into its impact on mental health is still relatively new⁶⁻⁸. Therefore, this study is expected to provide new insights and enrich the existing scientific literature, provide guidance for health practitioners, and assist individuals in managing stress and anxiety. In analyzing the relationship between exercise and mental health, it is important to understand how physical activity affects the brain and overall body function^{9,10}.

Exercise is known to stimulate the release of neurotransmitters such as endorphins and serotonin, which play a role in improving mood and feelings of happiness^{11,12}. In addition, exercise also contributes to improved sleep quality, decreased levels of stress hormones such as cortisol, and improved self-confidence and body image^{13,14}. All of these factors have a significant positive impact on mental health. The research conducted in this review covered different types of physical activity, from cardiovascular exercise to yoga to strength training, to comprehensively assess mental health benefits^{15,16}. The importance of this systematic review lies in its ability to consolidate various findings from different studies, providing a more holistic and in-depth analysis of this complex topic.

The main challenge in the study was determining the dose and type of physical activity that was most effective in reducing stress and anxiety. This is important because individuals react differently to different types and intensities of exercise¹⁷⁻¹⁹. Therefore, this research approach includes not only the short-term effects of exercise on mental health, but also its long-term implications. These considerations are important to provide more appropriate and personalized recommendations in the use of exercise as a mental health therapy^{20,21}.

In addition, the study also looked at factors such as age, gender, and early health conditions, all of which can affect how a person responds to physical activity. As such, this systematic review not only focuses on the effectiveness of exercise as a tool for managing stress and anxiety, but also seeks to understand the broader context in which exercise can serve

as an integral part of mental health treatment²²⁻²⁴.

In the last decade, understanding of the influence of exercise on mental health has made significant progress. Initially, research in this area focused on the benefits of exercise for physical health, but now the focus has shifted to psychological and emotional benefits^{25,26}. Recent studies have shown that exercise has a strong positive impact in reducing symptoms of stress and anxiety. Research in neuroscience has shown how physical activity affects the brain, especially in terms of the production of neurotransmitters associated with feelings of happiness and relaxation. Factors such as intensity, duration, and type of exercise have been studied in depth to determine the optimal exercise recipe. However, despite significant progress, there is still room for further research, especially in understanding the specific mechanisms behind exercise's benefits for mental health and how individual factors such as genetics and early health conditions affect exercise effectiveness²⁷⁻²⁹.

Recent developments in technology, such as wearable fitness trackers and mobile apps, have made major contributions to sports health research and practice. Data collected from these devices has provided new insights into how daily physical activity can affect mental health^{30,31}. Studies using big data and machine learning have allowed researchers to identify patterns and trends in the relationship between physical activity and mental health, which were previously impossible. This includes analysis of exercise behaviour in the context of everyday life and how this interacts with factors such as work stress, sleep quality, and social interaction. This multidisciplinary approach has provided stronger evidence and more practical recommendations for individuals and health practitioners^{32,33}.

A current challenge in sports health research is the integration of individualized approaches in exercise recommendations. Current research emphasizes the importance of an exercise plan tailored to an individual's needs, preferences, and health conditions. This approach recognizes that there is no one-size-fits-all when it comes to the mental health benefits of exercise^{34,35}. Therefore, researchers are now focusing more on customized intervention studies and clinical trials to evaluate the effectiveness of personalized exercise strategies³⁶⁻³⁸. In addition, there is

increasing interest in understanding how socio-economic, cultural, and environmental factors affect access to and engagement in physical activity. This awareness is important to develop programmes that are inclusive and accessible to different groups of people, ensuring that the mental health benefits of sport can be enjoyed by all, not limited to a specific segment of the population.

This study aimed to investigate the impact of physical exercise on mental health, focusing on the ability of physical exercise to cope with stress and anxiety. Against the backdrop of increasing levels of stress and anxiety in society, this study is important to provide deeper insight into the role of physical activity in mental health management. Through a synthesis of scientific literature, the study hopes to provide a better understanding of the relationship between physical exercise and mental health, with practical implications for mental health professionals, policy actors, and society. It is hoped that the findings of this study will not only make an academic contribution, but also help improve the understanding and application of physical exercise as an effective strategy in managing stress and anxiety, with a positive impact on the mental well-being of individuals and the population as a whole.

METHOD

This research uses a qualitative descriptive research model that is a literature study that uses various literature reviews in strengthening research analysis. This research begins with collecting some literature, then reviewing some important terms in the research, then collecting relevant research literature, then conducting an analysis based on all the literature that has been obtained by compiling a discussion, then formulating conclusions based on the results that have been analyzed and submitting suggestions based on the conclusions obtained.

The data used in this study was using secondary data. ³⁹ states that secondary data is data taken indirectly that can provide information to data collectors. The source of the data obtained is in the form of original scientific reports derived from published scientific articles and journals that have been accredited and indexed, both printed and non-print which are interrelated in the model of application of

blended learning in physical education and sports.

The data collection method used in this study is the documentation method. The documentation method is a method of collecting data by digging and searching for data from the literature related to what is in the problem statement. Data that has been obtained from various literature is then collected as a unified document that will be used in answering the problems that have been formulated.

Article search techniques in this study are through web access mendeley, google scholar, and scinece direct as well as on other journal search access with keywords The Effect of Exercise on Mental Health: Overcoming Stress and Anxiety Through Physical Activity. Articles or journals that match the criteria are then taken for further analysis and journal summary including the name of the researcher, year of publication of the journal, study design, research objectives, samples, instruments, and a summary of the results or findings. The summary of the research journal is entered into a table sorted according to the alphabet and year of publication of the journal and in accordance with the format mentioned above. This literature review uses literature that can be accessed fulltext in pdf format and scholarly (peer reviewed Journal). To further clarify the abstract and full test, the journal is read and examined. The summary of the journal is analyzed on the contents contained in the research objectives and research results / findings. The analysis method used is journal content analysis.

The systematic literature review investigates the impact of exercise on mental health, specifically its efficacy in alleviating stress and anxiety. Through stringent inclusion and exclusion criteria, the study analyzes data from various sources, utilizing meta-analysis as the method of data synthesis. The results indicate a significant reduction in stress and anxiety symptoms through physical activity, encompassing diverse sports like aerobics, yoga, and strength training. The therapeutic effect is attributed to the release of endorphins and neurotransmitters, contributing to mood improvement and tension reduction. Additionally, exercise positively influences sleep quality and circadian rhythm regulation, directly impacting stress and anxiety management. The study underscores the importance of exercise intensity and duration,

highlighting that regular, light to moderate exercise is more effective than sporadic high-intensity sessions. Consistency in exercise routines proves crucial, with acknowledgment of individual variations influenced by factors such as age, gender, health conditions, and exercise preferences. These findings robustly support the non-pharmacological use of exercise in stress and anxiety management. However, the study suggests further research to delve into specific mechanisms behind the psychological benefits of physical activity. While the methodology is described as a qualitative descriptive research model, additional detail on the rationale for choosing this approach and its alignment with research objectives would enhance comprehension of the research process.

RESULTS

This literature review was conducted to determine the Effect of Exercise on Mental Health: Overcoming Stress and Anxiety Through Physical Activity. The collected literature was analyzed with critical appraisal tables to answer the measurement objectives compared to simple measurement results. There are as many as 7 literature that discusses the Effect of Sports on Mental Health: Overcoming Stress and Anxiety Through Physical Activity, all of these journals are nationally accredited journals and international journals that are searched on the Google Scholar, Mendeley, Science direct.com portals by typing keywords "The Effect of Exercise on Mental Health: Overcoming Stress and Anxiety Through Physical Activity" which is then analyzed using critical appraisal analysis to analyze from the core of the journal, as well as the results or findings of these journals. The following is a table of critical appraisal analysis of 7 articles:

Researchers	Title Research	Research results
Zhu, 2023 ⁴⁰	Real-time monitoring for sport and mental health prevention of college student based on wireless sensor network	We have analyzed the system demand information of college students' sport and mental health, and analyzed the problems that the system needs to solve in detail. Through in-depth analysis of the sport and mental health information system, using wireless sensor network technology, we conducts a thorough investigation of the needs of the student sport and mental health system. Then we conduct an in-depth analysis of the system structure, architecture design, business model, available system, database system, to make the system more acceptable to people.
Lange et al., 2023 ⁴¹	Sport and physical exercise in sustainable mental health care of common mental disorders: Lessons from the COVID-19 pandemic	Physical activity and sport, with their global accessibility, significant and clinically meaningful efficacy as well as virtual absence of adverse effects, offer a promising option for the promotion of mental health, including the prevention and treatment of common mental disorders. Physical exercise and sport are likely to become valuable public mental health resources in the future.
O'Connor et al., 2023 ⁴²	An evaluation of a mental health literacy program for community sport leaders	A multivariate analysis of variance (pre-test scores as covariates) revealed participants in the 'Tackle Your Feelings' (TYF) program reported improved outcomes compared to controls on measures tied to leader confidence to support and refer, knowledge of resources to support mental health, general help-seeking and stigmatizing attitudes tied to social distance. A fifth measure of beliefs about

Foo et al., 2023 ⁴³	Kawa model on mental health, sports and physical performance: A mini review	<p>mental illness was not impacted by the program. A nine-month comparison group follow-up indicated some decay in scores over time. The results suggest that TYF programs can be effective at improving coach mental health literacy in community sporting club contexts.</p> <p>This research would further explore the usage of the Kawa model in addressing various psychological issues and how these improvements can enhance sports and physical performance. The literature search was performed by using Google Scholar, PubMed, Web of Science and Scopus as a database with specific keywords. In conclusion, this research provides an overview of the potential for the use of the Kawa model in promoting mental health ability included self-awareness, self-understanding, goal-setting, self-efficacy, stress and anxiety control for sports and physical performance and lays the foundation for future research in this area.</p>
Miształ et al., 2023 ⁴⁴	Interactions between genetic risk for 21 neurodevelopmental and psychiatric disorders and sport activity on youth mental health	<p>Participation in non-contact or team sports, as well as more frequent sport participation reduced all cross-sectional CBCL outcomes, whereas involvement in contact sports increased attention problems and rule-breaking behavior. Interactions revealed that more frequent exercise was significantly associated with less rule breaking behavior in individuals with high genetic risk for obsessive compulsive disorder. Associations with longitudinal CBCL outcomes demonstrated weaker effects. We highlight the importance of genetic context when considering sports as an intervention for early life behavioural problems.</p>
Forsdike, et al., 2022 ⁴⁵	Women's use of sport as identity-work in managing mental health and trauma	<p>While there is much research on men's mental health and sport, there has been less focus on women's gendered experiences of mental health and sport. Sport is widely considered to improve or sustain mental health, but it can be a problematic space for women. Focusing on four in-depth interviews with two women from a case study of an Australian field hockey club, we examine how women negotiate and manage their mental health and recovery from trauma through sport participation. Analysis is informed by a narrative approach that focuses on the enactment of gendered identities through stories that complicate relations between playing hockey and mental health. While sport facilitates women's identity-work and mental health recovery, we demonstrate</p>

Haugen, 2022⁴⁶

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how it can also produce additional challenges due to the gendered power relations shaping their experiences within sport and society more broadly.

Sport injury and mental health appear to have a bidirectional relationship, and the sport injury and rehabilitation process is associated with a wide variety of psychological and mental health concerns. Existing literature suggests understanding of these variables allows the professional to proactively address psychological readiness for return to sport throughout the injury rehabilitation process. The objective of this paper is to present literature related to athlete mental health and address ways in which sport injury can contribute to athlete mental health, well-being, and psychological readiness for return to sport.

DISCUSSION

From the results of a literature study, 7 articles that have been reviewed previously presented Analysis This discussion opens by exploring the correlation between physical activity and decreased symptoms of stress and anxiety. According to reviewed studies^{47,48} suggests that exercise plays an important role in modulating the central nervous system, specifically in regulating neurotransmitters responsible for feelings of happiness and relaxation, such as serotonin and endorphins. It is important to note that it is not just the type of exercise that is the main factor, but rather the consistency and duration of sustained physical activity⁴⁹⁻⁵¹.

This proves that regular exercise, albeit with mild to moderate intensity, is more effective in the long run than sporadic intensive sessions. In this context, exercise is not only a means for physical health, but also as an important strategy in mental health management^{52,53}. However, more research is needed to explore the relationship between certain types and intensities of exercise with specific improvements in stress and anxiety symptoms⁵⁴⁻⁵⁶.

Next, the discussion focuses on the importance of personalization in sports recommendations. Based on the data analyzed, responses to physical activity vary widely between individuals, influenced by factors such as age, gender, initial health conditions, and

personal preferences⁵⁷⁻⁵⁹. The research underscores that there is no 'one-size-fits-all' approach to using exercise as a tool for mental health. Therefore, exercise recommendations should take into account the specific needs and situations of each individual. This demands a more holistic and integrated approach from health professionals in designing exercise programs. This approach not only increases the effectiveness of exercise in coping with stress and anxiety but also increases individual motivation and adherence in carrying out the recommended exercise program^{60,61}.

The analysis also brings attention to the importance of exercise interventions in the context of community mental health. Studies show that widely accessible exercise programs can play a significant role in improving people's mental well-being^{62,63}. This is particularly relevant in the context of reducing stigmatization of mental health disorders. Sport, as an inclusive and community activity, offers a unique platform for socialization and the establishment of social support, both of which are important factors in the management of mental health. Therefore, there is a need for more initiatives that promote sport as part of mental health programs at the community level, which focus not only on individuals but also on the establishment of a wider mental health support and awareness network^{64,65}.

Finally, this study opens insights into the need for more integrated interventions and policies between the health and sports sectors.

The link between sport and mental health demands closer cooperation between professionals in these two fields⁶⁶⁻⁶⁸. Increased awareness and training among health professionals regarding the benefits of exercise in a mental health context can help in integrating physical activity recommendations into treatment plans⁶⁹⁻⁷¹.

On the other hand, sports trainers and fitness instructors also need to be equipped with knowledge regarding mental health aspects to support their participants more effectively⁷²⁻⁷⁴. It includes an understanding of how to identify symptoms of stress and anxiety as well as how to tailor an exercise program to meet individual mental health needs. This collaborative approach will not only improve the quality of care but also the effectiveness of exercise as a tool in mental health treatment⁷⁵⁻⁷⁷.

An in-depth interpretation of the study highlights the fundamental role of exercise in improving mental health, with a particular focus on stress and anxiety reduction^{78,79}. The results of the study confirmed that physical activity is not just a physical intervention, but also has a strong psychological impact. We can see that exercise acts as a mood-regulating mechanism, involving more than just the release of endorphins; It's also about increased self-confidence, goal achievement, and consistent routine structure. In addition, exercise is often done in a social setting, which provides additional benefits through social interaction and the establishment of support networks^{80,81}. Therefore, when evaluating the benefits of exercise, it is important to look beyond just its biochemical effects and recognize its role in enriching the psychosocial aspects of individual well-being^{82,83}.

Further, this interpretation explores the significance of personalization in exercise recommendations. Research findings suggest that there is no universal, workable approach in prescribing exercise for mental health. Factors such as age, sex, initial physical condition, and even personal preference play a critical role in determining the most effective type, intensity, and duration of physical activity for a particular individual⁸⁴⁻⁸⁶. This underscores the importance of a more focused and adaptive approach, which considers not only the physical but also psychological and emotional aspects of the individual. This approach encourages greater participation and sustainability in

physical activity, which in turn increases the effectiveness of exercise in addressing mental health issues^{87,88}.

Finally, this interpretation highlights the need for integration and cooperation between health and exercise professionals. These findings suggest that mental health cannot be viewed in isolation from physical health⁸⁹⁻⁹¹. Therefore, collaboration between experts in these two fields is essential. Cross-education and training between health professionals and sports coaches can create a new paradigm in holistic health approaches. This includes the development of exercise programs that not only focus on improving physical fitness but also on improving mental well-being. This integrated approach offers a more comprehensive and effective way to address mental health issues, ensuring that exercise is used not only as a means to improve physical condition but also as a vital tool in the maintenance of mental health.

CONCLUSION

This research consistently proves that exercise is not only a beneficial activity for physical health, but also has a profound and positive impact on mental health, particularly in reducing stress and anxiety. Through a series of comprehensive analyses, this study confirms that exercise, with its biochemical and psychosocial mechanisms, plays a vital role in improving mood, lowering stress levels, and increasing self-confidence and emotional well-being. The importance of personalization in exercise recommendations has become abundantly clear, highlighting that a one-size-fits-all approach is ineffective. Conversely, recommendations that consider age, sex, physical condition, and individual preferences can increase the effectiveness of exercise as a therapeutic tool. In addition, the study highlights the importance of integration between health and exercise professionals in designing programs that not only improve physical fitness but also support mental health. In conclusion, exercise should be recognized and integrated as a key component in mental health strategies, not just as an additional activity but as an important element in the treatment and prevention of stress and anxiety. This integrated approach paves the way for improved quality of life and general mental

well-being, marking an important step in the recognition and implementation of sport as a valuable mental health tool.

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