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THE POSITIVE AND NEGATIVE IMPACT OF RUNNING ON MENTAL HEALTH: A CURRENT LITERATURE REVIEW

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ABSTRACT

Introduction: Mental health is a critical component of overall well-being, shaping daily functioning and resilience. Amid rising stress and the increasing prevalence of mood and anxiety disorders, interventions that enhance psychological well-being are of growing interest, including physical activity. Running, as an accessible and cost-effective exercise, has been associated with mood improvement, stress reduction, and decreased risk of mental health disorders. Despite robust evidence of its benefits, individual differences and potential limitations in psychological responses to running remain underexplored. This review synthesizes recent research on the physiological and psychological mechanisms linking running to mental health, highlighting its impact on stress, depressive symptoms, and overall well-being. Understanding these multidimensional effects can inform tailored, evidence-based strategies for promoting mental health through running.
Methods: This review synthesizes recent literature (2015–2025) on running and mental health. A comprehensive search of PubMed, Scopus, and Google Scholar was conducted using keywords including "running," "mental health," "depression," and "psychological well-being." All relevant studies were considered to provide an inclusive overview of current evidence.
Aim of The Study: The aim of this perspective review is to synthesize and critically evaluate current research on the effects of running on mental health as documented in the recent literature.
Conclusion: Running constitutes a multidimensional activity with both beneficial and potentially adverse effects on mental health. Evidence supports its role in reducing depression and anxiety symptoms, enhancing mood, cognitive function, and self-efficacy. Effective use of running as a mental health intervention requires consideration of individual differences in motivation, personality, and emotional state, alongside strategies to balance physical exertion with psychological well-being and prevent burnout. Future research should adopt an interdisciplinary approach, integrating psychology, physiology, and public health, to elucidate mechanisms underlying these effects. Such insights can inform personalized and sustainable training recommendations, promoting both physical performance and long-term psychological well-being.

KEYWORDS

Running, Mental Health, Depression, Psychological Well-Being, Exercise Addiction, Stress

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Introduction and Background

Mental health constitutes an inherent and integral component of overall human well-being—it influences the quality of relationships, adaptive capacities, work or academic performance, and overall life satisfaction. Contemporary societies face increasing levels of stress and a growing prevalence of mood and anxiety disorders, which highlights the importance of preventive measures and strategies aimed at supporting psychological resilience. One of the most frequently recommended approaches—both in scientific literature and in popular sources—is physical activity.

An increasing number of studies indicate that regular physical activity may play a role not only in preventing the deterioration of mental health but also in promoting its improvement. For instance, a large cross-sectional population study demonstrated that an optimal range of physical activity (2.5–7.5 hours per week) was associated with better mental health outcomes among adults (Kim, 2012).

In a subsequent meta-analysis, it was found that physical activity–based interventions reduced symptoms of anxiety, depression, and stress among university students (Huang, 2024).

A comprehensive review summarizing available data from 247 studies identified numerous mediating and moderating factors in the relationship between physical activity and mental health, including self-esteem, psychological resilience, social support, and body image, among others (White, 2024).

Physical activity is one of the key components of health prevention, and running represents one of the simplest and most accessible forms of exercise. An increasing body of research indicates that regular running affects not only the cardiovascular system but also psychological functioning (Oswald, 2020; Keating, 2018).

Due to its accessibility, simplicity, and low cost, running has become one of the most commonly chosen forms of physical activity. Research highlights its potential to reduce stress, improve mood, and lower the risk of depressive and anxiety disorders (Pereira, 2021; Chan, 1988). However, the majority of scientific publications focus primarily on these positive aspects, often overlooking potential limitations, the risk of overtraining, and individual differences in psychological responses to running.

Despite numerous studies documenting the positive effects of running on mental health, there is a limited body of research examining the potential negative consequences of excessive running or individual differences in psychological responses (Wang, 2025; Živčić Tomić, 2023). Few studies have investigated the impact of running on mental health among populations at elevated risk of mood disorders or among individuals who are beginners in running training.

The aim of the present review is to provide an overview of the current state of research on the impact of running on mental health, with particular emphasis on both the benefits and the limitations reported in the literature. This work attempts a critical analysis of the available data, highlighting gaps and shortcomings in existing publications, thereby offering a more balanced perspective on the role of running in supporting mental health.

This systematic review aims to synthesize recent literature to elucidate these trends and their implications for future practices.

Materials and Methods

The inclusion criteria focused on peer-reviewed scientific publications from 2015 to 2025 that examined the relationship between regular running and mental health. The search encompassed articles published between 2015 and 2025 using the following keywords: running, jogging, mental health, depression, psychological well-being, stress. Studies assessing both the beneficial effects of running—such as stress reduction, mood improvement, and alleviation of depressive and anxiety symptoms—as well as potential negative impacts on mental health were considered (Kruisdijk, 2019; Thuany, 2023).

Priority was given to randomized controlled trials, systematic reviews, and meta-analyses to ensure the inclusion of rigorous evidence. The synthesized data were subjected to qualitative analysis to identify recurring themes and discrepancies.

In summary, the methods employed in this systematic review involved a thorough and methodical approach to literature review and data synthesis to clarify the impact of running on mental health. The aim was to ensure that the findings reflect both emerging insights and current clinical realities.

Results

Recent research on the impact of running on mental health highlights the significant role of regular physical activity, as well as its frequency and intensity, in shaping psychological well-being. Among the publications analyzed, running was found to contribute to mood improvement, reduction of anxiety and depressive symptoms, and enhancement of overall psychological resilience. These findings also underscore the importance of an individualized approach to physical activity, as different levels of intensity and duration of training can influence the therapeutic effect. The studies emphasize that running, as a low-cost and highly accessible form of exercise, can serve as an effective component of strategies aimed at supporting mental health in the general population.

To organize the collected data, the selected publications were divided into two groups:

1. Studies clearly indicating a positive impact of running on mental health.
2. Studies presenting ambiguous, inconsistent results or highlighting certain limitations in the observed effects.

This classification allows for a more detailed analysis of the consensus in the literature and the identification of areas requiring further research.

1. Studies clearly indicating a positive impact of running on mental health.

The study “Running after your mental health” published in EClinicalMedicine in 2025 discusses the growing global popularity of running—from marathons to community initiatives such as Park Run—and its multidimensional health benefits. The study highlights both physical and psychological effects of regular running, including a reduced risk of cardiovascular disease, type 2 diabetes, stroke, as well as depression and anxiety disorders. Analyses of large populations (e.g., data from the UK Biobank encompassing over 160,000

individuals) indicate that even moderate activity, such as walking or jogging, is associated with improved psychological well-being.

The study also points out that running in groups can strengthen social bonds and a sense of belonging, further supporting mental health. Evidence from studies such as the MOTAR project in the Netherlands and the MINDFIT program in the UK suggests that regular running may have effects on well-being comparable to pharmacological treatment in mild cases of depression. The authors conclude that, despite risks such as injury or dehydration, running represents an accessible, low-cost, and effective form of both physical and mental health prevention across different age groups.

The findings of Wittchen (2025) suggest that running may serve as an effective intervention for improving mental health and pain perception in individuals with chronic lower back pain. Regular physical activity, such as running, may contribute to the reduction of depressive and anxiety symptoms and enhance overall psychological well-being. Additionally, a decrease in pain catastrophizing can lead to better management of chronic pain and an improved quality of life for patients. In the context of research on the impact of running on mental health, these results underscore the importance of regular physical activity as a potential therapeutic strategy for addressing psychological disorders coexisting with chronic pain.

The study by Roeh (2020) on marathon runners found that regular running can lead to a reduction in depressive symptoms and an improvement in overall mood. The study aimed to assess the impact of completing a marathon on participants' mood and perceived quality of life. Forty-three individuals participated, completing questionnaires evaluating mood and levels of negative affect both before and after the marathon. The results indicated a significant improvement in mood and a reduction in negative affect following marathon completion. The authors suggest that intensive physical activity, such as running a marathon, may have a positive impact on the mental health of participants.

In a scoping review conducted by Oswald (2020), 116 studies examining the relationship between running and mental health were analyzed. The authors demonstrated that both regular and single sessions of running are associated with improved well-being, reduced symptoms of depression and anxiety, and overall enhancement of psychological health. Running programs lasting from several weeks to several months were also found to be effective in populations with pre-existing mental health issues.

At the same time, it was noted that excessive intensity or frequency of running can, in some cases, lead to negative outcomes, such as exercise addiction or eating disorders. The authors highlighted the limited number of studies involving children, older adults, and clinical populations, as well as the considerable variability in methods used to assess mental health. They concluded that running represents a promising approach to supporting mental health, but further, more diverse research is needed in this area.

Regular physical activity, including running, exerts a protective effect against the negative consequences of stress by modulating neurobiological mechanisms responsible for central nervous system adaptation. As highlighted in the review by Nowacka-Chmielewska (2022), physical exercise influences the hypothalamic–pituitary–adrenal (HPA) axis, increases the expression of neurotrophic factors such as BDNF, supports synaptic plasticity, and reduces inflammatory processes and oxidative stress in brain tissue. These effects contribute to enhanced stress resilience, defined as the organism's ability to cope effectively with psychosocial challenges. Although most data come from preclinical studies, these findings suggest that regular aerobic activity may represent a significant preventive factor in mental and neurodegenerative disorders associated with chronic stress.

Regular running may serve as an effective intervention for improving mental health, particularly during periods of crisis. Physical activity, such as running, can play an important role in the prevention and treatment of mental health disorders among students.

In the study by Lin (2021), the impact of running on the mental health of students in Guangzhou during the COVID-19 pandemic was assessed. The results suggest that regular running can enhance mood, reduce symptoms of anxiety and depression, and generally improve students' psychological well-being. The authors emphasize the importance of physical activity in maintaining mental health, especially during challenging periods such as a pandemic.

The study by Desai (2022) suggests that physical exercise, including running, can influence the endocannabinoid system, which is involved in mood regulation and stress reduction. Regular physical activity leads to elevated levels of endocannabinoids, such as anandamide (AEA) and 2-arachidonoylglycerol (2-AG), which are associated with improved mood and reduced pain perception. Physical activity may enhance mental health through modulation of the endocannabinoid system, potentially contributing to reductions in depressive

and anxiety symptoms. However, the endocannabinoid response to exercise may vary depending on individual factors, such as genotype or mental health status.

The study by Verhoeven (2023) aimed to compare the effectiveness of running therapy and pharmacological treatment in patients with depression and anxiety disorders. Participants included individuals diagnosed with depression and/or anxiety disorders. Interventions consisted of a running program tailored to the participants' individual capabilities and standard pharmacological treatment in accordance with clinical guidelines. Outcomes were assessed based on participants' mental and physical status before and after the intervention.

The study found that both running therapy and pharmacotherapy effectively improved participants' mental and physical well-being, with running therapy being equally effective as pharmacological treatment in reducing symptoms of depression and anxiety. Additionally, participants in the running therapy group reported benefits such as improved physical fitness, better sleep quality, and increased self-esteem. The findings underscore that running therapy can serve as an effective and safe alternative to pharmacological treatment for depression and anxiety, while also highlighting a potential mechanism through which running positively impacts mental health. These results are significant for future research on the role of physical activity in mood enhancement and the reduction of psychopathological symptoms.

2. Studies presenting ambiguous, inconsistent results or highlighting certain limitations in the observed effects.

The study "Mental Health in Ultra-Endurance Runners: A Systematic Review" (Thuany, 2023) examined the impact of extreme running on the mental health of ultra-endurance athletes. The results indicate that regular participation in ultra-endurance events may improve mood, reduce symptoms of depression and anxiety, and enhance overall psychological well-being. At the same time, excessive training load is associated with risks of mental health issues, such as exercise addiction, eating disorders, and sleep disturbances. The authors emphasize the need for further research that considers individual responses, as well as risk and protective factors.

A 16-week running program implemented in individuals with affective disorders resulted in significant reductions in depressive and anxiety symptoms. However, no detectable changes were observed in the functional connectivity of major brain networks, such as the default mode network or the attention network. These findings suggest that, although running can effectively improve patients' psychological well-being, its impact on the structural and functional aspects of the brain may be limited or may require longer intervention periods, higher intensity, or targeted protocols. Moreover, the absence of differences in network connectivity between patients and healthy controls indicates that the studied population did not exhibit pronounced deficits in these networks that could be ameliorated (Vriend, 2025).

The article "Precompetitive anxiety profiles in runners: Differences in the running motives" by Prieto and González-García (2024), published in the *Journal of American College Health*, examined the influence of runners' motivation on pre-competition anxiety levels. The study found that runners driven by external motivations, such as social pressure or expectations from others, experienced higher levels of pre-competition anxiety compared to those motivated by internal factors, such as enjoyment or personal growth. Moreover, runners with intrinsic motivations demonstrated better stress adaptation and higher satisfaction with physical activity. These findings suggest that motivation plays a crucial role in shaping the psychological experiences associated with running.

The article "A Moderated Mediation Model of Wellbeing and Competitive Anxiety in Male Marathon Runners" by Jaenes (2022) examined the relationship between psychological well-being and pre-competition anxiety in male marathon runners in Seville. The study included 238 participants and demonstrated that higher levels of psychological well-being, measured using Ryff's model, were associated with lower levels of somatic anxiety, worry, and concentration disturbances. Furthermore, psychological well-being was found to mediate the relationship between anxiety experiences and marathon performance. The results also indicated that greater running experience (i.e., the number of marathons completed) correlated with higher psychological well-being and lower pre-competition anxiety.

The study conducted by Tecco (2022) investigated the effects of running on the mental and physical health of adolescents in southern Belgium. The authors compared the maximal aerobic speed (MAS) of contemporary teenagers with that of their parents and examined correlations between physical activity and depressive symptoms. Despite exhibiting better physical fitness, adolescents displayed higher levels of depressive symptoms compared to their parents.

In terms of study limitations, it is noteworthy that the authors did not account for factors such as diet, sleep, or substance use, which may significantly influence adolescents' mental health.

Discussion

The obtained results unequivocally confirm that running constitutes a significant factor in supporting mental health; however, its effects are complex and depend on a range of individual and contextual factors. The collected evidence indicates that regular running activity can contribute to mood improvement, reduction of depressive and anxiety symptoms, and overall enhancement of psychological well-being. The underlying mechanisms may involve both biological processes (e.g., activation of the endocannabinoid system) (Desai, 2022) and psychosocial factors, such as increased sense of agency, social belonging, and goal attainment („Running after your mental health. EClinicalMedicine).

In the context of existing literature, the findings supporting the positive effects of running are consistent with previous reports on the overall impact of physical activity on mental health. Notably, studies by Verhoeven (2023) and Oswald (2020) provide evidence that running can be as effective as pharmacological treatment in reducing symptoms of depression and anxiety, highlighting its therapeutic potential. Importantly, it has also been shown that even moderate running activity - such as jogging or short sessions - can yield noticeable psychological benefits, suggesting that these effects are not limited to individuals with high levels of physical fitness.

At the same time, the analyzed publications reveal a growing awareness of the potential risks associated with excessive engagement in running. The review by Thuany (2023) indicates that very intense forms of running, particularly ultra-distance events, may lead to negative psychological consequences, such as exercise addiction, eating disorders, or sleep disturbances. Additionally, studies by Prieto and González-García (2024) and Jaenes (2022) emphasize the importance of intrinsic motivation in shaping runners' emotional responses—individuals driven by extrinsic motives (e.g., social pressure) exhibit higher levels of anxiety and lower wellbeing. These findings suggest that the psychological benefits of running are not solely derived from the physical activity itself but are also influenced by the psychological and social context in which it is performed.

It should also be noted that not all studies unequivocally support the positive effects of running on mental health. For instance, research in adolescent populations (Tecco, 2022) suggests that despite high levels of physical activity, young people may experience higher levels of depressive symptoms compared to their parents. This finding indicates that while running is beneficial, it is not sufficient on its own to ensure mental wellbeing, particularly if it is not accompanied by a balanced lifestyle that includes proper nutrition, sleep, and stress management.

The limitations identified in the analyzed studies highlight the need for further verification of the observed effects under more controlled experimental conditions. Many studies rely on self-reported measures, which may be subject to biases associated with subjective assessment. Moreover, most analyses focus on the short-term impact of running, with limited data on the long-term sustainability of these effects (Lin, 2021). There is a lack of standardization regarding the intensity and frequency of running, which complicates comparisons across studies.

Additionally, there is a shortage of detailed research addressing the phenomenon of unhealthy competition, which can lead to chronic stress, reduced self-esteem, body image disturbances, or athletic burnout. Contemporary running culture, often promoted through social media and race organizers, frequently emphasizes comparisons of performance, total kilometers run, or ranking positions. Although seemingly motivating, such pressure may reinforce perfectionism, excessive self-control, and difficulty in accepting personal limitations.

It is surprising that the majority of studies on runners' mental health overlook the aspect of interpersonal competition and its impact on individual well-being. Theoretical and empirical approaches tend to focus on intrapersonal competition (i.e., "competing with oneself") rather than examining how the pressure to compare oneself with others may disrupt motivation and lead to negative psychological outcomes.

It would also be valuable to include more diverse study populations—including children, older adults, and patients with mental disorders—to better understand the mechanisms that modulate the effects of running depending on age, sex, or mental health status.

In summary, running can be considered a promising intervention for supporting mental health, both in the general population and in clinical groups. Its advantages include low cost, widespread accessibility, and the possibility of adjusting intensity to individual capabilities. However, to fully harness the potential of this activity, it is essential to promote a balanced approach that takes into account physiological, psychological, and social aspects. Future research should focus on identifying optimal parameters for running training (frequency, intensity, and duration) as well as on the long-term effects of this activity on mental health and quality of life.

Conclusions

The accumulated evidence clearly indicates that running constitutes an important component supporting human mental health, extending far beyond the realm of purely physical activity. Regular running contributes to the reduction of depressive and anxiety symptoms, mood enhancement, increased self-efficacy, and the development of psychological resilience to stress. From the perspective of contemporary biopsychosocial models, running can thus be considered a natural form of therapy, simultaneously engaging biological, psychological, and social processes.

At the same time, the results of the analyzed studies show that the effectiveness of running in improving mental health is highly dependent on individual factors. Psychological benefits are most pronounced when running is undertaken for intrinsic reasons—such as self-realization, enjoyment, or personal health—rather than due to compulsion, social pressure, or competitive drive. Proper individualization of the training program, adjustment of intensity and frequency to the organism's capacities, and maintenance of a balance between exertion and recovery appear to be key conditions for achieving positive psychological effects.

It is important to emphasize that running is not without potential risks. Under certain circumstances, particularly with excessive training load or a strong focus on performance outcomes, running can lead to negative consequences such as overtraining, exercise addiction, eating disorders, or sleep disturbances. These phenomena illustrate that the boundary between the therapeutic and detrimental effects of running is fluid and depends on the psychological and social context in which the activity is performed.

Comparative research findings further suggest that running may serve as an effective alternative or complement to traditional treatments for mental disorders, particularly depressive and anxiety-related conditions. Programs based on regular running can yield effects comparable to pharmacotherapy, while avoiding adverse side effects and providing additional benefits for physical health. In this context, running emerges as a potential component of complementary therapy, supporting the treatment process, enhancing its effectiveness, and promoting the consolidation of positive changes in psychological functioning.

The social dimension of running is also highly significant. This activity, particularly when performed in groups, fosters social bonds, builds community, and reduces feelings of isolation, further enhancing its relevance for mental health. Initiatives such as Parkrun or local running clubs not only serve a recreational function but also provide social and emotional support, acting as informal means of mental health promotion and preventive care at the population level.

Despite abundant evidence confirming the beneficial effects of running, further in-depth and interdisciplinary research in this area is necessary. In particular, it is important to elucidate the neurobiological mechanisms underlying mood improvement and stress reduction, as well as to determine the optimal training parameters that maximize psychological benefits. Longitudinal studies encompassing diverse age groups and clinical populations are still lacking, limiting the full generalizability of the current findings.

In summary, running should be regarded not merely as a form of physical activity but as a phenomenon with profound psychological and social dimensions, capable of playing a significant role in shaping contemporary understandings of mental health. In its simplicity and universality, running becomes a symbol of balance between body, mind, and environment, thus representing one of the most accessible and effective means of promoting human well-being in an increasingly dynamic world.

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