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Effectiveness of Sports-Based Interventions for Mental Health in At-Risk Youth: A Systematic Review

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Abstract

Introduction and Objective

Adolescents' mental health is a growing public health concern, particularly for at-risk youth exposed to adverse circumstances such as poverty, trauma, discrimination, or social exclusion. These individuals face higher risk of developing mental health issues, including anxiety, depression, and post-traumatic stress disorder (PTSD), which can significantly impact their education, social interactions, and long-term well-being. Addressing these challenges requires holistic, non-stigmatizing approaches, which will be tailored to the unique needs of at risk youth. Sports-based interventions have emerged as a promising strategy to promote mental health by leveraging the psychological and social benefits of physical activity. This systematic review analyses the effectiveness of sports-based interventions in improving mental health outcomes in at-risk youth, focusing on areas such as anxiety, depression, PTSD, self-esteem, social skills, and emotional regulation.

State of Knowledge

Existing research highlights the multidimensional benefits of sports-based interventions, particularly their capacity to reduce psychological distress, enhance emotional regulation, and foster positive social interactions. Team sports have been associated with improvements in social skills and community belonging, while individual sports emphasise self-discipline and personal growth. Trauma-sensitive programs, which integrate mindfulness and counseling, provide unique benefits for youth exposed to violence or adversity. However, evidence remains fragmented, with variations in study design, intervention types, and long-term impact, underscoring the need for further research to standardise methodologies and explore program scalability.

Methods of research

A comprehensive search strategy was used to identify relevant studies. The databases PubMed, ScienceDirect, and Google Scholar were searched systematically. The search strategy incorporated a combination of keywords and Medical Subject Headings (MeSH) terms to

ensure thorough coverage of the topic. These included: "sports-based interventions", "mental health", "at-risk youth", "low-income families", "anxiety", "depression", "self-esteem", "PTSD". Search filters were used to limit the results to studies published in English and within the last 20 years (2004–2024), prioritising articles published within the last five years.

Keywords

Sports-based interventions, mental health, at-risk youth, anxiety, depression, PTSD, self-esteem, social skills, emotional regulation, trauma-sensitive programs.

1. Introduction

Mental health of adolescents is becoming an urgent public health issue, with significant consequences for personal well-being, community strength, and societal advancement. Mental health conditions during this pivotal developmental stage can have profound and lasting impacts, particularly for at-risk youth. These young individuals, often marginalized by factors such as social exclusion, exposure to trauma, poverty, unsafe environments, or adverse family dynamics, face elevated risks of developing mental health challenges [1]. Conditions such as anxiety, depression, post-traumatic stress disorder (PTSD), sleep disturbances, and behavioral disorders are disproportionately more prevalent in this population, further compounding their vulnerability. The effects of these challenges extend beyond mental health, influencing academic performance, interpersonal relationships, and overall life satisfaction [2]. At-risk youth are also more likely to experience difficulties in areas such as sexual and reproductive health, as well as reduced social and economic opportunities, perpetuating cycles of disadvantage [2]. Addressing these complex issues necessitates holistic, multisectoral approaches that are not only effective but also accessible and non-stigmatizing, ensuring these interventions resonate with the unique needs of this demographic.

Sports and physical activity programmes have emerged as a promising strategy to support at-risk populations. It is widely acknowledged that beyond promoting physical health, organized sports and structured physical activities additionally provide benefits to mental and social health [3]. The team environment fosters a sense of belonging and social support, while the physical activity itself contributes to reduced depression, anxiety and better cognitive

functioning [3,4]. For youth in high-risk circumstances, these benefits are particularly critical, offering a constructive outlet and a sense of stability amidst challenges [4].

Despite the growing interest in sports-based interventions, the evidence on their effectiveness for mental health outcomes in at-risk youth remains fragmented. While some studies highlight association of physical activity with cognitive functioning and depression symptoms reduction [3], others emphasise improvements in psychosocial outcomes such as self-concept and academic achievements [5]. However, questions persist about the most effective types of interventions, the specific mechanisms driving these benefits, and the long-term impact on diverse at-risk groups.

This systematic review aims to address these gaps by synthesizing existing research on the effectiveness of sports-based interventions for improving mental health in at-risk youth. Specifically, it will examine their impact on anxiety, depression, PTSD, self-esteem, social skills, and emotional well-being. Additionally, the review will explore how factors such as the type of sport, frequency of participation, and participant demographics influence outcomes. By consolidating current evidence, this review seeks to provide actionable insights for practitioners, teachers, policymakers, and researchers dedicated to supporting the mental health of at-risk youth through sports-based programming.

2. Mental Health of Adolescents and At-Risk Youth

Adolescence is a vital period of human development during which mental health challenges can greatly influence overall well-being, academic achievement, and future opportunities. According to the World Health Organization (WHO), approximately one in seven 10–19-year-olds experiences a mental disorder, accounting for 15% of the global burden of disease in this age group [6]. Suicide is the third leading cause of death among those aged 15–29 years, reflecting the urgent need for preventive and supportive interventions [6]. At-risk youth, including those exposed to poverty, domestic violence, discrimination, or social exclusion, face a disproportionate burden of mental health challenges due to their heightened exposure to adverse life circumstances [1,6]. These individuals often grapple with a range of psychological, emotional, and behavioral issues, exacerbated by systemic inequalities and limited access to resources [3,7]. Social and relational health risks—including family dysfunction, peer victimization, and community violence—compound mental health

difficulties, leading to outcomes like increased anxiety, depression, and lower self-esteem [4,7]. Furthermore, these stressors not only disrupt emotional regulation but also hinder the development of critical coping mechanisms and resilience, leaving youth more vulnerable to long-term psychological distress [3,4]. Despite the urgency of addressing these issues, many at-risk youth face significant barriers to accessing traditional mental health services, including stigma, financial limitations, and a lack of culturally appropriate care options [8,9]. The COVID-19 pandemic has further exacerbated these challenges, leading to increased rates of anxiety, depression, and psychological distress among adolescents [9].

3. Mental Health Outcomes in At-Risk Youth

Sports-based programs have emerged as a promising intervention for improving mental health outcomes in at-risk youth, addressing a wide range of psychological, emotional, and behavioral challenges. Research highlights their effectiveness in reducing symptoms of anxiety, depression, and PTSD, while fostering self-esteem, social skills, and emotional regulation.

Reductions in Anxiety, Depression, and PTSD Symptoms

Participation in organized sports has been linked to significant reductions in anxiety, depression, and PTSD symptoms among at-risk youth. Physical activity, a core component of sports-based programs, promotes the release of endorphins, which improve mood and reduce stress [10]. Moreover, structured and supportive environments in programs like trauma-informed martial arts and team sports leagues provide safe spaces for participants to process trauma and build resilience. Studies indicate that these programs help youth reframe negative experiences, enhance coping mechanisms, and develop a sense of control over their lives, leading to reductions in PTSD symptoms [5,11]. For example, trauma-sensitive yoga and mindfulness practices integrated into sports activities have been shown to alleviate hypervigilance and improve emotional stability in youth exposed to violence or adversity [12].

Self-Esteem and Social Skills

Sports-based programs are particularly effective in enhancing self-esteem and social interactions. Team sports, such as soccer and basketball, encourage collaboration, peer support, and communication, which foster a sense of belonging and improve interpersonal

relationships [4]. These programs also provide opportunities for participants to experience achievement and recognition, boosting self-confidence and self-worth [13]. Individual sports, like martial arts, further emphasize personal growth and discipline, contributing to greater self-awareness and a sense of accomplishment [14]. Adolescents involved in organized sports consistently report improved social interactions, reduced feelings of isolation, and stronger connections with peers and mentors [15].

Behavioral Regulation and Emotional Control

Enhanced behavioral regulation and emotional control are key outcomes of participation in sports-based programs for at-risk youth. The structured nature of these activities promotes routine and discipline, helping participants develop better self-regulation skills [16]. Martial arts programs, in particular, emphasize mindfulness, patience, and respect, which help reduce impulsivity and aggression while improving emotional control. Team sports also teach participants to manage emotions in high-pressure situations, fostering resilience and adaptability [17]. Studies have found that youth engaged in such programs exhibit fewer behavioral problems, including decreased aggression and defiance, and improved classroom behavior [3].

4. Intervention Types and Effects

Adolescents, particularly those who are at risk due to factors like poverty, domestic violence, discrimination, or social exclusion, benefit significantly from sports-based interventions designed to enhance mental health outcomes [1,2]. These interventions leverage physical activity, teamwork, and structured participation to address psychological, emotional, and behavioral challenges faced by at-risk youth [4,5].

Individual vs. Team Sports

Both individual and team sports offer unique advantages for mental health, and their effectiveness can vary based on the specific needs of the adolescent participants. Individual sports such as martial arts, running, or swimming are associated with improvements in self-discipline, emotional regulation, and self-confidence [18,19]. These activities allow adolescents to focus on personal goals and self-improvement, which can be particularly beneficial for those dealing with anxiety or low self-esteem [3]. For example, martial arts

emphasize mindfulness and discipline, helping reduce aggression and improve emotional control [14]. Running is known for its positive effects on mood enhancement and stress reduction through the release of endorphins [10].

On the other hand, team sports like soccer, basketball, or volleyball are especially effective in promoting social connectedness, a sense of belonging, and cooperative skills [13,17]. Participation in team sports can reduce feelings of isolation and enhance the ability to trust and collaborate with others—crucial factors for at-risk youth who may lack stable social networks [20]. Team sports also provide opportunities to develop leadership skills and navigate interpersonal relationships, fostering both social and emotional growth [21]. Studies suggest that team sports may be more effective in mitigating symptoms of depression due to their emphasis on social interaction and peer support [22].

Trauma-Sensitive Sports Programs

For adolescents who have experienced trauma, specialized sports programs that incorporate counseling and trauma-informed practices offer significant benefits [11,23]. These trauma-sensitive programs are designed to create safe and supportive environments that prioritize emotional well-being alongside physical activity. Coaches and staff are trained to recognize trauma responses and adapt their approaches to avoid triggering participants, focusing instead on building trust and resilience [24].

Core features of trauma-sensitive sports programs include:

Integration of Counseling: Access to on-site mental health professionals who can address trauma-related symptoms during or after sports activities [23].

Trauma-Informed Practices: Use of non-competitive games, emphasis on personal growth over performance, and maintenance of predictable routines to foster a sense of safety [24].

These programs have been shown to significantly improve self-esteem, reduce anxiety, and enhance emotional regulation among at-risk youth [13,25]. For instance, participation in trauma-sensitive martial arts or yoga can help adolescents reconnect with their bodies and reduce symptoms of post-traumatic stress disorder (PTSD) [12]. Additionally, these programs

emphasize the development of supportive relationships with peers and mentors, which is essential for youth who have experienced relational trauma [26].

5. Discussion

This systematic review highlights the growing evidence supporting sports-based interventions as a valuable approach to addressing mental health challenges in at-risk youth. These programs have demonstrated significant potential to reduce psychological distress, improve emotional regulation, and foster positive social relationships, making them a crucial component in the broader strategy for mental health promotion among vulnerable populations. While the findings affirm the effectiveness of sports-based interventions, they also underscore the complexity of addressing the multifaceted needs of at-risk youth. This discussion explores the implications of these findings in greater depth, examining their practical applications, challenges, and opportunities for future development.

Mental Health Impacts

The review consistently found that participation in sports-based interventions significantly reduces symptoms of anxiety, depression, and PTSD among at-risk youth. This improvement is attributed to several mechanisms, including the release of endorphins through physical activity, the structured and supportive nature of sports environments, and the sense of achievement gained from participation. Programs such as trauma-sensitive yoga, martial arts, and team sports leagues provide safe and constructive outlets for stress and trauma processing, helping participants rebuild a sense of control over their lives. These findings align with existing literature on the psychological benefits of physical activity, particularly its ability to regulate stress hormones and enhance mood.

Additionally, the unique ability of sports-based interventions to address trauma-related symptoms like hypervigilance and emotional dysregulation is noteworthy. Programs that incorporate mindfulness and counseling practices, such as trauma-sensitive martial arts, have shown particular efficacy in improving emotional stability and resilience among youth exposed to violence or adversity. These findings reinforce the importance of tailoring

interventions to address the specific psychological and emotional needs of participants, ensuring they receive targeted support.

Social and Behavioral Benefits

Sports-based interventions offer critical social and behavioral benefits, particularly for at-risk youth who often experience isolation, marginalization, or strained relationships. The enhancement of self-esteem and social skills emerged as a prominent outcome in this review. Team sports, such as soccer and basketball, provide structured environments for building trust, communication, and collaboration. These interactions foster a sense of belonging and community, which is vital for adolescents who may lack stable support networks. Participants often report reduced feelings of loneliness, increased confidence in social settings, and stronger connections with peers and mentors. Individual sports, such as martial arts or running, offer complementary benefits by emphasizing personal growth, discipline, and self-awareness. These activities provide opportunities for participants to set and achieve personal goals, which can be empowering and transformative, particularly for youth struggling with low self-esteem. The dual focus on individual development and community connection positions sports-based interventions as uniquely suited to addressing the holistic needs of at-risk youth.

Behavioral Regulation and Emotional Control

Improved behavioral regulation and emotional control are critical outcomes of sports-based interventions. The structured nature of these programs helps participants develop routines, build discipline, and practice self-regulation in a supportive setting. Martial arts programs, in particular, have been effective in reducing impulsivity and aggression, fostering patience and respect through mindful practice. These qualities are essential for managing behavioral challenges and building resilience in high-stress environments.

Team sports also contribute significantly to emotional regulation by teaching participants to manage emotions in competitive or high-pressure situations. These experiences cultivate adaptability, perseverance, and problem-solving skills, which are transferable to other areas of life, such as academic performance and interpersonal relationships. The review found

consistent evidence that participants in sports-based programs exhibit fewer behavioral problems, including reduced aggression and defiance, as well as improved classroom behavior.

Key Moderating Factors

The effectiveness of sports-based interventions is influenced by several moderating factors, including the type of sport, frequency of participation, and demographic characteristics of participants. Team sports are particularly effective for enhancing social skills and reducing feelings of isolation, whereas individual sports are more closely associated with improvements in self-regulation and self-confidence. Regular and sustained participation appears critical for achieving long-term benefits, suggesting the need for accessible and inclusive program designs that encourage consistent engagement. Demographic considerations, such as age, gender, and cultural background, also play a significant role in shaping outcomes. Programs tailored to the unique needs and preferences of specific subgroups are likely to be more effective. For instance, trauma-sensitive approaches may be particularly beneficial for youth exposed to violence or adversity, while programs emphasizing teamwork and leadership may resonate more with adolescents seeking social connection.

Challenges and Barriers

Despite their potential, sports-based interventions face several challenges that must be addressed to maximize their impact. Barriers to participation, such as financial constraints, lack of access to facilities, and cultural or gender-specific considerations, limit their reach for some at-risk populations. For example, girls and young women often face additional barriers to participation, including societal norms and safety concerns, which must be addressed to ensure inclusivity.

The fragmented nature of the evidence base also poses challenges for the development and implementation of these programs. Variations in study design, intervention types, and outcome measures complicate efforts to draw definitive conclusions about their effectiveness. Additionally, limited longitudinal data restricts understanding of the long-term impacts of sports-based interventions, particularly their ability to sustain mental health improvements over time.

Opportunities for Future Development

Addressing these challenges presents significant opportunities for advancing the field of sports-based mental health interventions. Future research should prioritize standardizing methodologies and exploring the scalability of successful programs. Evaluating the long-term impacts of these interventions, particularly their effects on academic performance, employment outcomes, and community engagement, would provide valuable insights into their broader societal benefits.

Policymakers and practitioners should also focus on expanding access to sports-based programs by investing in infrastructure, reducing financial barriers, and incorporating these interventions into existing mental health and education systems. Training for coaches and mentors in trauma-informed practices is essential for creating safe and supportive environments that meet the complex needs of at-risk youth.

6. Conclusion

Sports-based interventions offer a holistic and accessible solution to the pressing mental health challenges faced by at-risk youth. By addressing psychological, social, and behavioral needs, these programs empower participants to develop resilience, build healthy relationships, and achieve long-term well-being. The dual focus on personal growth and community connection positions sports-based interventions as a vital tool in breaking cycles of disadvantage and fostering a generation of empowered, healthy youth.

To maximize their impact, these programs must be tailored to the unique needs of diverse populations, ensuring inclusivity and cultural sensitivity. Policymakers, educators, and community leaders have a critical role to play in supporting the implementation and sustainability of these interventions through investments in infrastructure, training, and research.

By bridging gaps in access and evidence, sports-based programs have the potential to transform the mental health landscape for at-risk youth, offering them not only immediate relief but also the tools and confidence to thrive in the face of adversity.

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The authors confirm contribution to the manuscript as follows:

Conceptualization: KR, MJ

Methodology: JB, AN, AC

Software: KS, AK

Check: JB, AN, WP

Formal Analysis: MJ, DB, AC

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