














PROTOCOL

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Do team sports have positive effects on anxiety levels and mood disorders? A systematic review protocol

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Abstract

Background Mental disorders, particularly anxiety and mood disorders, significantly impair individuals' ability to perform daily activities, potentially leading to sedentary behavior and increasing the risk of non-communicable diseases such as diabetes, cancer, and obesity. Physical activity plays a crucial role in supporting mental health, and team sports represent a promising intervention strategy. Therefore, the aim of this systematic review is to evaluate the impact of team sports practice on anxiety and mood disorders. Furthermore, it will analyze how different modalities of team sports contribute to mental health improvements and identify gaps in the current literature to guide future research directions.

Methods This systematic review will be reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P) guidelines and is registered in PROSPERO (CRD420251121611). A comprehensive search will be carried out across four electronic databases (PubMed, Embase, Web of Science, and Scopus) with no restrictions on language or publication date. Two independent reviewers will screen titles and abstracts using predefined eligibility criteria and extract data with standardized tables. A third independent reviewer will resolve any disagreements. Extracted data will include publication title, authors, year, assessment tools for anxiety and mood disorders, type of intervention, and primary outcomes related to the effects of team sports on these disorders. Risk of bias will be assessed using the Cochrane Risk of Bias tool (RoB 2.0). Data will be synthesized using a random-effects meta-analysis (DerSimonian-Laird) when at least two sufficiently homogeneous studies report the same outcome. Continuous outcomes will be pooled as mean differences (same scale) or standardized mean differences (different instruments). Statistical heterogeneity will be assessed using Cochran's Q and the I^2 statistic. If heterogeneity is high ($I^2 > 75\%$) or if pooling is not feasible, findings will be summarized narratively, with planned subgroup and sensitivity analyses. The certainty of evidence will be assessed using GRADE.

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Discussion This systematic review is expected to provide comprehensive evidence on the potential effects of team sports participation on anxiety and mood disorders. By synthesizing findings from randomized controlled trial, the review aims to clarify the extent to which engaging in team sports may contribute to mental health promotion and symptom reduction. The results may inform clinical practice, guide the design of community-based interventions, and support policymakers in developing evidence-based strategies that use team sports as a non-pharmacological approach to improve psychological well-being.

Trial registrations Systematic review registration: PROSPERO CRD420251121611.

Keywords Mental health, Sports participation, Team sports, Physical activity

Background

It is well established that insufficient physical activity increases the risk of developing non-communicable diseases such as diabetes, cancer, and obesity [1, 2]. According to the World Health Organization (WHO), adults should engage in at least 150 min of moderate-intensity or 75 min of vigorous-intensity physical activity per week [3]. In 2010, approximately 26.4% of the global population was classified as physically inactive; by 2022, this figure had risen to 31.3%, representing nearly 1.8 billion people, and if current trends persist, projections indicate that by 2030, 34.7% of the global population will be insufficiently active [4]. This growing prevalence of physical inactivity is expected to place an additional burden on healthcare systems worldwide, leading to an increased incidence of preventable chronic diseases, higher healthcare costs, and further declines in mental health, quality of life, and overall well-being, reinforcing the urgency of implementing effective public health strategies to promote physical activity.

Concomitant with this rise in sedentary behavior, a parallel increase in mental health disorders is anticipated [5]. Anxiety and mood disorders are particularly associated with sedentary lifestyles [6]. While anxiety is a universal human emotion, it becomes pathological when individuals are unable to effectively manage daily stressors [7]. Mood disorders, often comorbid with anxiety [8], are characterized by persistent emotional dysregulation and maladaptive behavioral changes [9, 10].

Mental disorders represent a major global public health challenge. As early as 1985, reports indicated that approximately 30% of the workforce exhibited symptoms of mild cognitive dysfunction, with an additional 5–10% presenting with more severe psychiatric conditions [3]. Individuals with mental illness have a reduced life expectancy, estimated to be 10–15 years shorter than the general population, primarily due to lifestyle-related factors such as physical inactivity [11]. In this context, physical activity has consistently been shown to improve quality of life and well-being, with beneficial effects on mental health [12].

The mental health benefits of physical activity are attributed to several physiological and biochemical mechanisms, including increased serotonin production [13] endorphin release, regulation of the hypothalamic–pituitary–adrenal (HPA) axis, and reduced cortisol levels [14, 15]. Consequently, regular physical activity and sports participation are recognized as effective non-pharmacological strategies for managing anxiety and mood disorders, providing combined physical, social, and psychological benefits [16]. Recent evidence reinforces these benefits, highlighting improvements in mood [17] and reductions in stress, anxiety, and depression [18]. Moreover, the psychological effects of exercise have been shown to be comparable to those of pharmacological interventions, with fewer side effects and additional health benefits [19–22].

Sports participation, regardless of cultural or socioeconomic differences [23], has emerged as a viable intervention strategy for promoting mental health [24]. Engagement in sports provides physical, cognitive, emotional, and social benefits [25]. Over the past decade, sports have been increasingly employed in health promotion initiatives, gaining recognition from government agencies, policymakers, and researchers as a cost-effective and scalable strategy for improving population health [26, 27]. This stems from the potential of sports to effectively and economically address various individual and collective health issues, spanning physical, psychological, and social domains [28–30].

Sports offer a unique avenue for engaging diverse populations, including marginalized or hard-to-reach groups [31, 32]. Evidence consistently supports the positive relationship between sports participation and mental health, including the prevention of depression and the enhancement of mood [33]. Sports participation has also been shown to positively influence brain metabolism, increase cerebral blood flow, improve oxygen and nutrient delivery, modulate behavior, and enhance cognitive functioning [34].

Within this context, team sports represent a particularly promising modality. In addition to the physiological benefits of exercise, team sports foster social

connectedness, belonging, and interpersonal interaction, which can significantly contribute to improvements in mental health and quality of life [35]. Growing evidence suggests that team sports may be more effective than individual sports in promoting psychological well-being [36–38], with lower self-reported rates of depression, anxiety, and emotional distress [39]. Supporting this, Harrison et al. [40] reported that participation in team sports was associated with reduced emotional suffering, fewer suicidal ideations, and lower rates of suicide attempts compared with non-athletes engaged in other extracurricular activities such as music or choir.

Given the potential of team sports to enhance mental health, this systematic review will synthesize evidence from randomized controlled trials to evaluate the influence of team sports on anxiety and mood disorders. In addition, it will examine how team sports contribute to the promotion of mental health in adults (≥ 18 years). We hypothesize that participation in team sports reduces anxiety symptoms and negative mood states while increasing positive mood outcomes.

Methods and registration

This systematic review will be reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P) guidelines [41] (see Additional file 1). The protocol has been prospectively registered in PROSPERO (CRD420251121611).

Eligibility criteria

Eligibility criteria were defined a prior using the PICOS framework:

- Population (P): Adults (≥ 18 years), physically able to participate in sports, without medical conditions that prevent participation.
- Intervention (I): Regular participation in team sports (recreational or competitive).

- Comparator (C): No structured physical activity or non-team sport modalities.
- Outcomes (O):
 - Primary: anxiety symptoms and mood indicators assessed using validated instruments (e.g., POMS).
 - Secondary: subjective well-being, quality of life, and social support indicators.
- Study design (S): Randomized controlled trials (parallel or crossover), with no restriction on language or publication date.

Studies will be excluded if they are non-randomized, focus on specific clinical population, do not directly assess anxiety and/or mood outcomes, do not clearly characterize the team-sport intervention, are duplicate publication, or provide insufficient data for extraction. Where data permit, subgroup analyses will be conducted by age group (e.g., 18–59 vs. ≥60 years), and by key intervention characteristics (e.g., type of team sport, recreational vs. competitive setting, frequency, duration, and intensity).

Information sources and search strategy

The literature search will be performed with no restriction on publication date. Although only randomized controlled trials will be included, reference lists of relevant systematic reviews will be screened to identify additional eligible studies [42]. All databases will be searched from inception until the final search date (planned for December 2025). The date of each search, specific search strategies, and the number of retrieved records will be documented in a structured Excel spreadsheet.

An initial exploratory search was conducted in PubMed using keywords listed in Table 1. The final search strategy will be refined and conducted after publication of this protocol. Keywords and indexing terms from relevant titles and abstracts were used to build a comprehensive strategy for PubMed, Embase, Web of Science, and Scopus. Search terms will be adapted to the indexing systems of each database.

Table 1 Search strategy for PubMed

Search	Query	Records retrieved
#1	"sport**"[tiab] OR "team sport**"[tiab] OR "sport team"[tiab] OR "game team"[tiab] OR "team game**"[tiab]	124,304
#2	"e-sport**"[tiab] OR "electronic game**"[tiab] OR "virtual reality game"[tiab] OR "electronic sport"[tiab]	632
#3	"adult**"[tiab] OR "elderly"[tiab]	2,040,597
#4	"teenager"[tiab] OR "teen"[tiab] OR "adolescent"[tiab]	396,569
#5	anxiety"[tiab] OR "mood disorder"[tiab] "mental health"[tiab] OR "depression"[tiab] OR "mood**"[tiab]	893,509
#6	"humans"[Filter]	22,753,170
#7	#1 NOT #2 AND #3 NOT #4 AND #5 AND #6	520

Search conducted on June 06, 2025, with no language limits

The search strategy will be developed and refined by members of the review team with experience in conducting systematic reviews (AF, MN, CL, and BK), without input from an information specialist or librarian. An initial exploratory search in PubMed was undertaken to inform the final strategy by identifying additional synonyms and relevant indexing terms from titles/abstracts of pertinent records and by estimating the expected volume of retrieved studies. These terms will be incorporated to refine the database-specific search strings prior to the final searches, which will be fully reported in the main manuscript and/or supplementary material.

Selection of sources of evidence

Duplicates will be removed using Rayyan (Qatar Computing Research Institute) [43]. As a calibration exercise, the two reviewers (AR and MR) will independently screen a sample of records (e.g., 60 titles/abstracts) to ensure a consistent interpretation of eligibility criteria and to refine decision rules before the main screening phase [44, 45]. Discrepancies will be discussed within the team, and the eligibility criteria and screening guidance will be clarified where needed. Agreement during this calibration step (e.g., Cohen's Kappa) may be calculated to document consistency. All records will then be screened independently by both reviewers at the title/abstract stage, and reports deemed potentially eligible will undergo full-text retrieval and independent full-text assessment by the same reviewers. Reasons for exclusion at the full-text stage will be documented. Disagreements at any stage will be resolved through discussion or, when necessary, by a third reviewer (GC). The final manuscript will illustrate the study selection process using the PRISMA 2020 flow diagram [46].

Data extraction

Process and quality control

Two reviewers (AR and MR) will independently extract data using a standardized extraction form. The form will be tested on a small sample of included studies and refined, if necessary, before full data extraction. Any amendments will be documented. Disagreements will be resolved by consensus or by a third reviewer (GC).

Data items

Extracted data will include study identification (author, year, country, clinical trial registry), population characteristics (age, sex), detailed description of the team sports intervention (type of team sport, frequency, duration, intensity), control group characteristics, instruments used to assess anxiety and mood, and secondary outcomes related to well-being, quality of life, and social support. All predefined primary and secondary outcomes

and the corresponding statistical estimates (means, standard deviations, effect sizes, confidence intervals, and p values) will be recorded. *Missing or graphical data.* When relevant data are not available in the text or tables, the corresponding authors will be contacted. If outcomes are reported only graphically, values will be extracted using WebPlotDigitizer. Extracted values, software version, and calibration parameters will be documented to ensure transparency and reproducibility. These methodological procedures are aligned with previous systematic reviews [47–50], ensuring duplicate data extraction, structured documentation, and methodological rigor.

Risk of bias assessment

Risk of bias will be assessed using the Cochrane Risk of Bias 2.0 (RoB 2.0) tool [51], considering both primary outcomes (anxiety and mood indicators) and secondary outcomes (subjective well-being, quality of life, and social support). Two independent reviewers will evaluate five domains: randomization process, deviations from intended interventions, missing outcome data, outcome measurement, and selective reporting. A pilot assessment of 5–10 studies will be conducted to calibrate judgments. Discrepancies will be resolved by consensus or by a third reviewer. Results will be presented descriptively and summarized in tables.

Data synthesis

When at least two sufficiently comparable studies report the same outcome, a meta-analysis will be conducted using a random-effects model (DerSimonian–Laird). If only two studies are available for a given outcome, pooled estimates will be interpreted cautiously. For continuous measures of anxiety and mood, mean differences will be calculated on the original scales, and standardized mean differences (SMD) will be applied when different instruments are used. For dichotomous outcomes (e.g., anxiety categorized using validated cut-off scores), pooled effects will be calculated as risk ratios.

(RR) or odds ratios (OR) with 95% confidence intervals, using a consistent effect measure within each meta-analysis. When both continuous and dichotomous versions of the same construct are reported, continuous outcomes will be prioritized, and dichotomous outcomes will be synthesized separately.

Heterogeneity will be assessed with Cochran's Q test and the I^2 statistic. If high heterogeneity ($I^2 > 75\%$) or insufficient studies are detected, a narrative synthesis will be provided, grouping results by population characteristics (age group, where data permit; e.g., 18–59 vs. ≥ 60 years), sport modality, intervention frequency, and duration. Pre-specified subgroup analyses will compare different types of team sports (e.g., contact vs.

non-contact) and participant profiles (recreational vs. competitive). Sensitivity analyses excluding studies with high risk of bias will test robustness. Subgroup and sensitivity analyses will be planned primarily for the primary outcomes. Secondary outcomes will be explored narratively and, where meta-analysis is feasible, additional subgroup/sensitivity analyses will only be undertaken if sufficient data are available and the rationale is clearly justified. An exploratory meta-regression will be considered if at least ten comparable studies are available [52]. Cross-over trials will be handled using methods that account for within-participant correlation. We will preferentially extract paired (within-participant) effect estimates and corresponding measures of uncertainty from analyses appropriate to the cross-over design (e.g., paired comparisons or models accounting for period effects). If paired results cannot be obtained or derived, we will use first-period data only (treating it as a parallel-group comparison) to avoid unit-of-analysis error and potential carry-over effects. Where feasible, we will explore the impact of these decisions in sensitivity analyses (e.g., excluding cross-over trials; first-period-only versus paired analyses when available). When at least 10 studies are included in a meta-analysis, potential publication bias will be explored using funnel plots and visual assessment of asymmetry. Where appropriate, statistical tests for asymmetry (e.g., Egger's test) will be considered.

Certainty of evidence

The overall certainty of evidence for the primary outcomes (anxiety symptoms and mood indicators) will be evaluated using the GRADE (Grading of Recommendations Assessment, Development, and Evaluation) approach [51]. Five domains will be considered: risk of bias, inconsistency, indirectness, imprecision, and publication bias [52]. Two reviewers will independently apply the GRADE criteria, with disagreements resolved by consensus or by a third reviewer (GC, if required). A Summary of Findings (SoF) table will present the GRADE ratings and the main results for each primary outcome.

Discussion

This protocol outlines a rigorous and transparent methodology for conducting a systematic review on the effects of team sports on the mental health of adults and older adults, focusing on anxiety and mood disorders. By prioritizing outcomes assessed with validated psychometric instruments and restricting inclusion to randomized controlled trials, this review seeks to maximize comparability and the validity of conclusions. The synthesis is expected to consolidate evidence on the effectiveness of team sports as a non-pharmacological

strategy for mental health promotion, providing guidance for clinical practice and public health policy.

Nevertheless, some methodological limitations must be acknowledged. To minimize language bias, no restrictions on language will be applied. Variations in modality, intensity, duration, and context of team sports interventions may introduce heterogeneity, potentially limiting the feasibility of meta-analyses. To address these challenges, subgroup analyses, sensitivity analyses, and exploratory meta-regressions will be conducted, alongside careful risk-of-bias and GRADE assessments.

The findings of this review may inform healthcare professionals, physical education practitioners, and sports managers on the safe and effective incorporation of team sports into programs aimed at improving mental health, while also encouraging high-quality future research. As this review is based exclusively on previously published studies, ethical approval is not required. Ultimately, this review intends to address existing methodological gaps and foster collaboration and transparency in the scientific production on the relationship between team sports and mental health.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s13643-026-03073-5>.

Additional file 1. PRISMA-P (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols) checklist.

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Authors' contributions

All authors work equally for this work. Therefore, all authors conceptualized the project, wrote the protocol, registered it, developed it for its development, and critically read and gave final comments.

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Data availability

The data generated and detailed in this research will constitute the systematic review article.

Declarations

Ethics approval and consent to participate

Ethical approval is not required for a systematic review of publicly available literature.

Consent for publication

This systematic review will use secondary (published) data. Therefore, consent will not be required.

Competing interests

The authors declare that they have no competing interests.

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