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Effects of Mindfulness-Based Interventions on Basketball Performance in the Context of Competitive Anxiety: A Systematic Review

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ADMINISTRATIVE INFORMATION

Support - No support.

Review stage at the time of initial registration - Formal screening of search results against eligibility criteria.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 27 November 2026 and was last updated on 27 November 2026.

INTRODUCTION

Review question / Objective This systematic review aims to examine the effects of mindfulness-based interventions on competitive anxiety among basketball players and to evaluate their effects on basketball performance when these outcomes are reported. Specifically, this review aims to:

(1) Summarize the effects of mindfulness-based interventions on competitive anxiety, considering the different types of anxiety measured.

(2) Examine the effects of mindfulness-based interventions on basketball performance in the context of competitive anxiety.

(3) Compare intervention methods, anxiety measures, basketball performance outcomes, research designs, and methodological limitations across studies.

Through a narrative synthesis of the available evidence, this review aims to provide a clearer understanding of the current findings and identify directions for future research.

Rationale Competitive anxiety is an important psychological factor that may influence athletic performance. In basketball, players are required to maintain attentional control, make rapid decisions, regulate their emotions, and effectively execute technical and tactical skills under competitive pressure.

Mindfulness-based interventions have received increasing attention in sports psychology because of their potential to regulate competitive anxiety, improve attentional control, and support athletic performance. Although previous systematic reviews and meta-analyses have examined the effects of mindfulness-based interventions on competitive anxiety and athletic performance across different sports, basketball-specific evidence remains insufficiently synthesized,

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particularly regarding basketball performance in the context of competitive anxiety.

Furthermore, variations in intervention methods, anxiety measures, performance outcomes, and research designs may contribute to inconsistencies in the reported findings. Therefore, a basketball-specific systematic review is needed to systematically synthesize the available evidence, clarify current findings, identify methodological limitations, and provide directions for future research and applied practice.

Condition being studied The condition of interest is competitive anxiety among basketball players. Competitive anxiety refers to anxiety associated with sports competition and may be experienced as cognitive anxiety or somatic anxiety. It may be assessed as a temporary psychological state or as a relatively stable tendency to experience anxiety in competitive situations.

This review focuses on the effects of mindfulness-based interventions on competitive anxiety and basketball performance. Basketball performance outcomes may include shooting performance, free-throw performance, technical and tactical skills, decision-making, and other basketball-specific performance indicators when reported in eligible studies.

The focus of this review is sport-related competitive anxiety rather than general anxiety or clinical anxiety disorders.

METHODS

Search strategy Electronic literature searches will be conducted in five databases: Web of Science, Scopus, PubMed, SPORTDiscus, and China National Knowledge Infrastructure (CNKI). Google Scholar will be used as a supplementary search source.

The search strategy will use combinations of terms related to basketball, mindfulness-based interventions, and competitive anxiety. Broad searches using terms related to basketball and mindfulness will also be employed to identify potentially relevant studies and minimize the risk of missing eligible studies.

Boolean operators (AND and OR) and truncation symbols will be used where appropriate. Search terms and strategies will be adapted to the characteristics of each database.

The reference lists of relevant studies and existing systematic reviews will also be examined to identify additional potentially eligible studies.

Participant or population This review will include basketball players regardless of age, sex, competitive level, or geographical location. Eligible participants may include youth, collegiate, amateur, semi-professional, and professional basketball players.

Studies involving athletes from multiple sports will be eligible only if data for basketball players can be separately extracted. Studies involving participants who are not basketball players will be excluded.

Intervention This review will include mindfulness-based interventions in which mindfulness is a core component of the intervention. Eligible interventions may include, but are not limited to, mindfulness-based stress reduction (MBSR), mindfulness-acceptance-commitment (MAC), mindfulness-acceptance-insight-commitment (MAIC), mindful sport performance enhancement (MSPE), mindfulness meditation, and other mindfulness-based training programs.

Both brief mindfulness interventions and multi-session mindfulness training programs will be eligible. No restrictions will be imposed on intervention duration, frequency, delivery format, or setting.

Combined interventions will be considered eligible if mindfulness is explicitly identified as a core component. Interventions without an explicit mindfulness component, such as relaxation training, breathing exercises, or yoga alone, will be excluded.

Comparator Eligible comparators may include no intervention, waitlist controls, usual basketball training, active control interventions, or other psychological interventions. Studies without a separate control group will also be eligible if they assess outcomes before and after the mindfulness-based intervention.

Study designs to be included Randomized controlled trials (RCTs), quasi-experimental studies, and single-group pre-post intervention studies will be included. Observational studies, qualitative studies, case reports, and studies without an evaluation of intervention effects will be excluded.

Eligibility criteria Only original empirical studies published in peer-reviewed journals will be eligible

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for inclusion. Studies must directly assess competitive anxiety as an intervention outcome. Basketball-specific performance outcomes will be extracted when available but are not mandatory for inclusion.

Studies assessing only general anxiety, perceived stress, or competitive anxiety solely as a baseline characteristic or covariate will be excluded.

Reviews, meta-analyses, conference abstracts, dissertations, study protocols, editorials, and other non-original research publications will be excluded.

Multiple publications reporting data from the same study will be identified and linked to avoid double-counting of participants and outcomes.

Information sources The following electronic databases will be searched: Web of Science, Scopus, PubMed, SPORTDiscus, and China National Knowledge Infrastructure (CNKI). Google Scholar will be used as a supplementary information source. The reference lists of relevant studies and existing systematic reviews will also be screened to identify additional potentially eligible studies. Study authors may be contacted when necessary to obtain unavailable full texts or clarify missing or unclear information.

Main outcome(s) The primary outcome is the effect of mindfulness-based interventions on competitive anxiety among basketball players. Competitive anxiety outcomes may include competitive state anxiety, competitive trait anxiety, cognitive anxiety, and somatic anxiety, assessed using relevant measurement instruments such as the Competitive State Anxiety Inventory-2 (CSAI-2), the Sport Competition Anxiety Test (SCAT), or other measures of competitive anxiety.

Outcome data will be extracted at baseline, immediately after the intervention, and at follow-up, where available. Within-group changes, between-group differences, outcome scores, measures of variability, effect sizes, confidence intervals, and p-values will be extracted when reported.

Findings will be synthesized narratively, taking into account differences in anxiety types, measurement instruments, assessment timing, and study designs.

Additional outcome(s) The secondary outcome is the effect of mindfulness-based interventions on basketball-specific performance, particularly in competitive or pressure-related contexts.

Performance outcomes may include shooting accuracy, free-throw performance, technical and tactical performance, decision-making performance, and other basketball-specific performance indicators.

Where available, baseline, post-intervention, and follow-up data, within-group changes, between-group differences, and reported effect measures will be extracted.

Findings will be synthesized narratively, considering differences in performance measures, assessment conditions, and study designs. Basketball performance outcomes will be extracted when reported but will not be mandatory for study inclusion.

Data management All retrieved records will be organized using reference management software, and duplicate records will be identified and removed before screening. Two reviewers will independently screen titles and abstracts, assess full-text articles against the eligibility criteria, and extract relevant data using a standardized data extraction form.

Extracted information will include author(s), publication year, country, participant characteristics, sample size, study design, intervention characteristics, comparator conditions, outcome measures, assessment time points, and main findings.

Disagreements will be resolved through discussion or consultation with a third reviewer when necessary. Multiple publications reporting the same study or overlapping participant data will be carefully examined to avoid double-counting. The study selection process will be documented using a PRISMA flow diagram.

Quality assessment / Risk of bias analysis The risk of bias of the included studies will be assessed using the revised Joanna Briggs Institute (JBI) critical appraisal tools appropriate to each study design. The revised JBI tool for randomized controlled trials (Barker et al., 2023) will be used for randomized controlled trials, and the revised JBI tool for quasi-experimental studies (Barker et al., 2024) will be used for non-randomized intervention studies, including single-group pre-post studies.

Two reviewers will independently assess the included studies, with disagreements resolved

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through discussion or consultation with a third reviewer when necessary.

Assessment results will be reported at the individual-item level without assigning overall numerical quality scores or arbitrary quality categories. No studies will be excluded solely on the basis of risk of bias assessments. Identified sources of bias and methodological limitations will be considered in the synthesis and interpretation of the findings.The risk of bias of the included studies will be assessed using the revised Joanna Briggs Institute (JBI) critical appraisal tools appropriate to each study design. The revised JBI tool for randomized controlled trials (Barker et al., 2023) will be used for randomized controlled trials, and the revised JBI tool for quasi-experimental studies (Barker et al., 2024) will be used for non-randomized intervention studies, including single-group pre-post studies.

Two reviewers will independently assess the included studies, with disagreements resolved through discussion or consultation with a third reviewer when necessary.

Assessment results will be reported at the individual-item level without assigning overall numerical quality scores or arbitrary quality categories. No studies will be excluded solely on the basis of risk of bias assessments. Identified sources of bias and methodological limitations will be considered in the synthesis and interpretation of the findings.

Strategy of data synthesis A structured narrative synthesis will be conducted to summarize the findings of the included studies. Given the anticipated heterogeneity in intervention characteristics, competitive anxiety measures, basketball performance outcomes, assessment conditions, and study designs, a meta-analysis is not planned.

Study characteristics and main findings will be presented in summary tables. The synthesis will focus on two main outcome domains: (1) competitive anxiety and (2) basketball-specific performance, where reported.

Competitive anxiety findings will be examined according to anxiety type, measurement instrument, and assessment timing. Basketball performance findings will be examined according to performance indicators and assessment conditions, including competitive and pressure-related contexts.

Differences in intervention type, duration, frequency, participant characteristics, comparator conditions, and study design will also be considered when interpreting the findings. Within-group changes and between-group differences will be distinguished where applicable.

The direction and magnitude of intervention effects, reported effect sizes, statistical uncertainty, and consistency of findings across studies will be considered. Findings will not be interpreted solely on the basis of statistical significance.

Methodological limitations and risk of bias assessments will be incorporated into the interpretation of the evidence. Potential explanations for inconsistent findings and implications for future research and applied practice will also be discussed.

Subgroup analysis No formal statistical subgroup analysis is planned because this review will employ a narrative synthesis approach. Where sufficient information is available, descriptive comparisons will be conducted according to intervention type and duration, competitive anxiety type, outcome measurement instruments, participant characteristics, comparator conditions, study design, and basketball performance outcomes. These comparisons will be used to explore potential differences in findings across studies.

Sensitivity analysis No formal sensitivity analysis is planned because this review will employ a narrative synthesis rather than a meta-analysis. However, differences in study design, methodological limitations, and risk of bias assessments will be considered when interpreting the consistency and robustness of the available evidence.

Language restriction No language restrictions will be applied to the literature search.

Country(ies) involved Malaysia.

Other relevant information This systematic review will be reported in accordance with the PRISMA 2020 guidelines. Any amendments to the registered protocol will be documented and reported transparently in the final manuscript.

Keywords Mindfulness-based interventions; Competitive anxiety; Basketball players; Basketball performance; Systematic review.

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Dissemination plans The findings of this systematic review will be submitted for publication in a peer-reviewed academic journal.

Contributions of each author

Author 1 - Zhengjie Chen - The author conceived and designed the study, developed the search strategy, conducted literature searches, and will lead study screening, data extraction, risk of bias assessment, data synthesis, and manuscript preparation.
Email: gs73742@student.upm.edu.my
Author 2 - Roxana Dev Omar Dev - The author will provide research supervision and methodological guidance, contribute to the development of the review protocol, assist in resolving disagreements when necessary, and critically review and revise the manuscript.
Email: rdod@upm.edu.my
Author 3 - Yuqi Li - The author will independently participate in study screening, eligibility assessment, data extraction, and risk of bias assessment, and contribute to the interpretation of findings and manuscript revision.
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