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Effects of Mental Fatigue on Olympic Ball-sport Performance: A Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION

Support - No financial support or sponsorship was received for this study.

Review Stage at time of this submission - Piloting of the study selection process.

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 28 January 2024 and was last updated on 28 January 2024.

INTRODUCTION

Review question / Objective This review focuses on identifying articles published from 2014 to 2024, determining the impact of psychological fatigue on the physical, technical, cognitive, and tactical performances of ball sports athletes.

Rationale A systematic review can integrate existing research on psychological fatigue in ball sports, providing a comprehensive perspective. Choosing Olympic ball sports events aims to focus on globally more prominent and socially impactful ball sports, making this systematic review more representative. Therefore, researchers need a comprehensive understanding of psychological fatigue in ball sports, including the characteristics, trends, and various aspects related to its definition in the current field.

Condition being studied By gaining a profound understanding of the influence of psychological fatigue on Olympic ball sports, we hope to provide more comprehensive support to ball sports athletes, further enhancing their competitiveness in intense competitions.

METHODS

Search strategy This systematic review was done following the PRISMA (2020) guidelines. The AND and OR Boolean operators were used in the keywords: “mental fatigue” OR “cognitive fatigue” OR “mental effort” OR “cognitive effort” OR “mental exertion” OR “ego depletion” AND "performance" OR "decision making" OR "skill" OR "technique" AND "3x3 Basketball" OR "Badminton" OR "Baseball" OR "Softball" OR "Basketball" OR "Beach Handball" OR "Beach Volleyball" OR "Cricket" OR "Flag Football" OR "Football" OR "Futsal" OR "Golf" OR "Handball" OR "Hockey" OR "Ice Hockey" OR "Lacrosse" OR

"Rugby Sevens" OR "Squash" OR "Table Tennis" OR "Tennis" OR "Volleyball" OR "Water Polo".

Participant or population The sample population comprised athletes (with no gender and age restrictions).

Intervention Mental fatigue.

Comparator With the control group having either no induced MF or less induced MF than the intervention groupWithout mental fatigue.

Study designs to be included Randomized controlled trials (RCTs), non-randomized controlled trials (nRCTs), and non-randomized non-controlled trials (nCTs) were required to be included.

Eligibility criteria Studies had to meet the following inclusion criteria: (1) the sample population comprised athletes (with no gender and age restrictions); (2) included tasks inducing mental fatigue (MF), with the control group having either no induced MF or less induced MF than the intervention group; (3) involved skill tasks related to ball sports; (4) outcomes encompassed any form of sports performance.

Information sources We utilized electronic databases, namely PubMed, Web of Science, SPORTDiscus, and Scopus, to search for included articles.

Main outcome(s) A comprehensive understanding of the causal effects of psychological fatigue on ball sport performance.

Additional outcome(s) To understand the characteristics and trends in the study of mental fatigue in ball sports and to explore possible future research directions in this area.

Data management We will use an electronic data management system to manage records and data. All literature retrieved from databases and other sources will be imported into EndNote software for screening.

Quality assessment / Risk of bias analysis “QualSyst” was used to assess the methodology quality (Kmet and Lee, 2004). It contained 8 items. The score was set according the degree to which the certain criteria were met (yes = 2, partial = 1, no = 0). “NA” was marked when the items did not apply to the study design and excluded from the total calculation of score. A score of ≥75% indicated strong quality, a score of 55–75% indicated moderate quality, and a score of ≤55% indicated weak quality.

Strategy of data synthesis Data will be synthesized through a systematic review if the included studies are sufficiently rich and similar. We will use either a fixed-effects model or a random-effects model, depending on the presence of heterogeneity. We will check for heterogeneity and conduct subgroup analyses, moving to descriptive synthesis if necessary.

Subgroup analysis If sufficient data become available, we plan to conduct subgroup analyses to explore differences between interventions, subject characteristics, and study design. This will help to more fully understand the impact of mental fatigue in golf and support individualized treatment recommendations.

Sensitivity analysis We will conduct sensitivity analyses to assess the impact of studies of different quality and to exclude studies that may lead to changes in the conclusions of the systematic review. This helps us to assess the robustness of the synthesis results.

Language restriction Just English.

Country(ies) involved Malaysia.

Keywords mental fatigue, cognitive effort, athletic performance, Olympic, ball-sport.

Contributions of each author

Author 1 - Xiaoyang Pan - Author 1 is responsible for the design of the overall systematic evaluation program, including formulating the research question, selecting the search strategy, defining the eligibility criteria, and determining the data analysis methodology. In addition, Author 1 was responsible for retrieving and screening the literature, performing data extraction and quality.
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