INPLASY

Beyond Incidence: Injury Epidemiology, Concussion Events and Contextual Risk in Men's FIFA World Cup Football – A Systematic Review

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 20 July 2026 and was last updated on 20 July 2026.

INTRODUCTION

Review question / Objective To synthesise the available evidence on injury epidemiology in men's FIFA World Cup football and to examine temporal injury trends, injury characteristics, contextual match-related risk factors, head-impact events, and potential concussion-related events.

Rationale Despite the progressive reduction in injury incidence reported across successive FIFA World Cups, injuries remain a significant clinical concern in elite football because of their ongoing impact on player health, performance, and tournament participation. Traditional surveillance systems have improved understanding of injury patterns but may not fully capture the dynamic nature of injury risk during competition. Emerging evidence suggests that injury occurrence is influenced not only by physical factors such as fatigue and workload, but also by contextual match-related factors, including scoreline changes, goals, disciplinary sanctions, and game interruptions, which may generate transient periods of increased injury risk. Furthermore, discrepancies between clinically diagnosed head injuries and video-observed head-impact events have raised concerns regarding the recognition and management of potential concussion-related incidents. Therefore, a comprehensive synthesis of the available evidence is needed to integrate injury epidemiology, contextual risk factors, and head-impact data in men's FIFA World Cup football, thereby supporting injury prevention strategies, concussion recognition, and player safety initiatives.

Condition being studied Injury epidemiology in men's FIFA World Cup football, including temporal injury trends, injury patterns and characteristics, contextual match-related factors influencing injury risk, and head-impact and potential concussion-

related events identified through clinical surveillance and video-based analyses.

METHODS

Search strategy A systematic literature search was conducted between February and April 2026 in the following electronic databases: MEDLINE (via PubMed), Scopus, PEDro, Dialnet, and the Cochrane Library.

The search strategy combined controlled vocabulary and free-text terms related to football, FIFA World Cup tournaments, injury epidemiology, concussion, head injury, and contextual match-related risk factors.

Search terms included combinations of: football, soccer, FIFA World Cup, World Cup, injury, injuries, injury incidence, epidemiology, time-loss, medical attention, concussion, head injury, head collision, foul play, score, yellow card, red card, goals, and match context. Boolean operators ("AND" and "OR") were adapted to the syntax of each database.

In addition, the reference lists of relevant studies and FIFA injury surveillance publications were manually screened to identify potentially eligible articles.

Participant or population Elite male football players participating in FIFA World Cup final.

Intervention Participation in men's FIFA World Cup matches or tournament-related football activity.

Comparator Comparisons across FIFA World Cup editions, match periods, score status, team status, contextual match-related events, player positions, injury definitions, and data collection methods.

Study designs to be included Observational studies, prospective injury surveillance studies, retrospective analyses, video-based studies, and secondary analyses of FIFA World Cup datasets.

Eligibility criteria Studies were eligible for inclusion if they met the following criteria: observational studies, prospective injury surveillance studies, retrospective analyses, video-based studies, or secondary analyses of FIFA World Cup datasets; inclusion of men's FIFA World Cup final tournaments; quantitative reporting of injury, illness, head-impact, concussion-related, or contextual injury-risk outcomes; and full-text availability in English or Spanish.

Studies were excluded if they focused exclusively on domestic leagues, youth tournaments, women's tournaments, futsal, beach soccer, Olympic football, non-football sports, or non-World Cup competitions without reporting separate data for men's FIFA World Cup tournaments. Reviews, editorials, commentaries, conference abstracts, and studies without original quantitative injury-related data were also excluded.

Studies based on overlapping FIFA World Cup datasets were retained only when they addressed distinct outcomes, such as injury incidence, foul play, score status, potentially game-disruptive incidents, or head-impact events. In these cases, overlapping datasets were not synthesized as independent sources of injury counts.

Information sources Electronic databases searched were MEDLINE (via PubMed), Scopus, PEDro, Dialnet, and the Cochrane Library. In addition, reference lists of included studies and relevant FIFA injury surveillance publications were manually screened to identify additional eligible studies.

Main outcome(s) The primary outcomes were injury incidence, time-loss injury incidence, injury characteristics (location and type), injury severity, injury mechanisms, contextual match-related risk factors, head-impact events, potential concussion-related events, and rates of medical assessment following head-impact incidents. Outcomes were extracted and reported according to the definitions used in the original studies, including medical-attention injuries, time-loss injuries, injury time-outs, and video-observed head-collision events.

Additional outcome(s) No additional outcomes were specified.

Data management All records identified through database searching were exported and screened after duplicate removal. Study selection was conducted in two stages: (1) title and abstract screening and (2) full-text eligibility assessment. Reasons for exclusion at the full-text stage were documented and summarized in a PRISMA flow diagram. Disagreements were resolved through consensus.

Data were extracted using a standardized extraction form developed for this review. Extracted variables included study characteristics, FIFA World Cup edition, study design, data source, injury definitions, exposure metrics, sample size, injury incidence, injury characteristics, injury mechanisms, injury severity, contextual match-

related variables, and head injury or concussion-related outcomes.

Additional information regarding head-impact events, medical assessment rates, removal from play, and return-to-play behavior was collected when available. For contextual studies, data on score status, match period, fouls, disciplinary sanctions, goals, injury interruptions, and potentially game-disruptive incidents were extracted.

When studies reported outcomes using different denominators or injury definitions, the original metrics and definitions were retained to avoid inappropriate data transformation and to preserve methodological consistency.

Quality assessment / Risk of bias analysis Methodological quality and risk of bias were assessed using an adapted version of the Joanna Briggs Institute Critical Appraisal Checklist for Prevalence Studies, as most included studies reported injury incidence, event frequency, or surveillance-based epidemiological outcomes.

The tool was adapted to the context of elite football injury surveillance and video-based event analysis. The following domains were evaluated: population and tournament setting, data source, injury or event definition, exposure measurement, outcome ascertainment, completeness of data, statistical analysis, severity assessment and follow-up, and risk of misclassification.

For studies evaluating contextual match-related exposures, additional domains informed by ROBINS-E were considered, including exposure measurement, temporal relationship between exposure and injury, confounding, missing data, and selective reporting.

Each domain was rated as low risk, some concerns, high risk, or not applicable, and an overall risk-of-bias judgment was assigned as low, low-to-moderate, moderate, or high.

Prospective FIFA surveillance studies were generally considered at lower risk of bias because of their standardized reporting procedures and clear injury definitions. Secondary analyses of FIFA datasets were considered low-to-moderate risk, whereas video-based studies were considered moderate risk due to the absence of clinical confirmation. Studies relying primarily on public or journalistic sources were considered at high risk of bias because of potential underreporting and limited methodological standardization.

Strategy of data synthesis A narrative synthesis was performed because the included studies differed substantially in study design, injury definitions, exposure metrics, tournament coverage, and outcome ascertainment. No meta-analysis was conducted because pooling was considered inappropriate due to substantial heterogeneity in study methods, definitions, and outcome measures.

Studies were grouped into three predefined synthesis domains: (1) injury incidence and injury characteristics, including observed injuries, medical-attention injuries, time-loss injuries, injury location, injury type, mechanisms, and severity across FIFA World Cups from 1994 to 2022; (2) contextual match-related risk factors, including match period, score status, team status, foul play, number of fouls, and potentially game-disruptive incidents; and (3) head-impact and concussion-related outcomes, including clinically diagnosed head injuries and concussions, video-observed head-collision events, medical assessment rates, and return-to-play behavior.

Findings were synthesized descriptively and compared across studies only when injury definitions, outcome measures, and exposure denominators were sufficiently similar. Particular attention was given to distinguishing medical-attention injuries from time-loss injuries and clinically diagnosed concussions from video-observed potential concussion-related events.

Subgroup analysis No formal subgroup analyses were conducted because no meta-analysis was performed. Findings were synthesized according to three predefined domains: (1) injury incidence and injury characteristics; (2) contextual match-related risk factors; and (3) head-impact and concussion-related outcomes.

Sensitivity analysis Not applicable. No quantitative synthesis was performed because of substantial methodological heterogeneity across studies. Consequently, formal sensitivity analyses were not conducted.

Language restriction No language restrictions were applied during the literature search.

Country(ies) involved Morocco and Spain (Universiapolis International University of Agadir, Universidad Europea de Madrid, and Universidad de Castilla-La Mancha).

Other relevant information This review was conducted and reported in accordance with

PRISMA 2020 and SWiM recommendations. No meta-analysis was performed because of substantial methodological heterogeneity across studies.

Keywords Football; Injury Epidemiology; FIFA World Cup; Concussion; Injury Prevention.

Dissemination plans The findings of this systematic review will be disseminated through submission to a peer-reviewed scientific journal and presentation at national and international conferences in sports medicine, sports physical therapy, and football science. The results will be made available to researchers, clinicians, sports physical therapists, and football governing bodies to support evidence-based injury prevention strategies, concussion recognition, player safety, and clinical decision-making in elite football.

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