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Review

Sports injury surveillance practices and data collection methods in university student athletes: A systematic review

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Abstract

Background: Injury surveillance is essential for the safety and protection of athletes' health. Consistent data collection methods are needed in sports injury surveillance and reporting. This systematic review aimed to identify the injury surveillance practices and data collection methods in university student athletes and to evaluate the extent to which these injury surveillance practices and data collection methods align with the International Olympic Committee (IOC) consensus statement.

Methods: A systematic review was conducted to identify studies describing injury surveillance practices and data collection methods in university student athletes. Studies not describing university injury surveillance or that described non-athlete populations were excluded, as well as case-control, cross-sectional, retrospective cohort studies, interventions, reviews, grey literature, and non-primary research. Four databases (PubMed, SPORTDiscus, Scopus, and Web of Science) were searched from January 2000 to August 2024. Potential references were recorded through Mendeley and exported to Covidence. Two reviewers (RCS and JV) independently screened studies and assessed risk of bias using the Newcastle−Ottawa Scale. References were managed using Mendeley and Covidence. Data were analyzed descriptively, synthesized, and summarized.

Results: A total of 11,188 records were identified. After screening the titles, abstracts, and full texts, 50 were eligible for the systematic review. The studies were conducted across 9 countries and included a total number of 11,182 participants. Fifty-four percent of the included studies used a time-loss definition of injury, while an athletic trainer recorded the injury data (62%), and an electronic tool/web system was used to collect injury data (30%). Only 3 studies aligned with the IOC consensus statement.

Conclusion: This review highlighted the necessity for consistent, standardized injury surveillance practices and data collection methods in university sport. Only 3 of the included studies adhered to the IOC consensus statement, which provides a methodological framework to guide injury surveillance with appropriate contextual adaptation to facilitate injury prevention at the university level.

Keywords: Data collection; Methods; Surveillance; University

1. Introduction

Regular involvement in sports or physical activity provides numerous physical, mental, and social health benefits.[1,2] Participating in sport inherently carries a risk of injury, which can negatively impact an athlete's performance and health and contribute to a broader individual and societal cost.[3,4] Sports injuries impact a university student athlete's daily life, and their future athletic career varies vastly depending on the severity of the injury. Severe injuries can have long-term health, performance, and psychosocial consequences, with

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much broader societal implications, whereas minor injuries may only lead to temporary disruption.[5]

The number of student athletes participating in university sports has risen worldwide over the past decade.[6,7] In the 2021−2022 academic year, the number of student athletes competing in National Collegiate Athletic Association (NCAA) sports increased by more than 520,000, marking a 1-year rise of 30,000 student athletes.[8] The Fédération Internationale du Sport Universitaire World University Summer and Winter Games have experienced growth in sports competitions and student athlete participation every 2 years since 2003.[9] There has been a significant rise in university sports competitions and student athlete participation worldwide. This surge has resulted in a high incidence and prevalence of sports injuries,[10−12] necessitating a greater focus on standardized sports injury surveillance methods and the implementation of injury prevention strategies.[13]

Preventive efforts are essential for protecting athletes' health, minimizing the burden of sports-related injury, and enhancing athletes' performance capacity. Although injury and illness are both used to define athlete health in the International Olympic Committee (IOC) consensus statement, this review only focuses on injury surveillance in university sport. Sports injury surveillance is a fundamental step in preventing injury and improving athlete health and performance by providing valuable information on the magnitude of sports injuries and consistent tracking of injury outcomes, which is critical for evaluating prevention initiatives.[5,14,15] Injury outcomes such as time to return to training or competition, long-term functional impairment, and ongoing medical needs are essential indicators of injury impact. They should be consistently tracked as part of surveillance systems to assess the true burden of sport-related injuries.[16,17] This informs and directs health and safety initiatives such as future policy and rule changes,[18] neuromuscular and biomechanical training,[19] awareness and education initiatives,[5] and modification of sports equipment.[13] Although collecting and reporting sports injuries has been well documented in the university sport setting worldwide,[20−22] only the NCAA has a regulated injury surveillance system for surveillance and reporting of sports injuries among university student athletes.[23] There is a lack of comprehensive systematic reviews and well-structured overviews of existing injury surveillance systems in university student athletes. There is also an obvious lack of implementation of injury surveillance systems in university sports worldwide, and the practices thereof remain inconsistent outside of the NCAA.[24,25]

Various injury surveillance systems and sport-specific consensus statements regarding the methodology of injury surveillance have been developed and implemented in different sports environments and competitions.[26−31]

Injury surveillance practices and data collection methods remain inconsistent within university student athletes.[24] By systematically synthesizing the current injury surveillance practices and data collection methods in university student athletes, guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology,[32] this review will address a critical research gap within this population. In addition, considerable efforts are still necessary to fully implement and adhere to the sport-specific consensus[33,34] and the IOC consensus statements[15] across various sports contexts, particularly in university sports. This systematic review aimed to identify current injury surveillance practices and data collection methods in university student athletes. As a complement to the main objective of the review, it also evaluates the extent to which the current injury surveillance practices and data collection methods in university student athletes align with the 2020 IOC consensus statement on injury surveillance in sport.[15] The IOC consensus statement, including the Strengthening the Reporting of Observational Studies in Epidemiology−Sports Injury and Illness Surveillance (STROBE−SIIS) extension, provides standardized data collection methods for injury data collection and reporting to improve quality and consistency of athlete health research.[15] Assessing the adherence helps to evaluate the quality and comparability of injury surveillance practices and data collection methods in university student athletes. This review not only identifies current injury surveillance practices and data collection methods but also evaluates their adherence to international frameworks.

The intention was to highlight research gaps and recommend future opportunities for more standardized injury surveillance practices and data collection methods in university student athletes. This will facilitate the creation of a context-appropriate injury surveillance system within this population and setting to support effective athlete health, injury prevention, and safety measures within university sports.

2. Methods

2.1. Literature search

This systematic review was registered online with the International Prospective Register of Systematic Reviews (PROSPERO) at the University of York, Centre for Reviews and Dissemination. It is reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocol (PRISMA-P) guidelines[32] (record CRD42021257204, available at: https://www.crd.york.ac.uk/prospero/#myprospero (accessed 6 February 2023)).

Four databases were searched: PubMed (MEDLINE), Web of Science, Scopus, and SPORTDiscus. The reference lists of the included articles were checked for additional relevant studies. The search terms included "university" OR "college*" OR "student" OR "athlete" AND "injury*" OR "wound*" AND "surveillance", with synonyms and derivatives contained in the titles and abstracts of the articles. The search strategies for each database were adapted as detailed in Supplementary Table 1. The searches were conducted by RCS and encompassed all papers on injury surveillance methods and practices concerning university student athletes from January 1, 2000, to August 30, 2024. The search process is illustrated in Supplementary Table 1.

2.2. Selection criteria

This systematic review considered only prospective cohort studies published in English. The participants included were university student athletes aged 18 years and older who were participating in any university sports discipline. This review included only student athletes competing at the highest levels (e.g., varsity, NCAA) and those participating in recreational or club-level sports. The full-text review identified university sport-based studies reporting on sports injury surveillance systems that recorded and reported sports injuries over the past 25 years (2000−2024). The 25-year time period was deemed appropriate as it coincided with the development and publication of several consensus statements on the methodology and reporting of epidemiological studies related to injuries in sports. These consensus statements aim to standardize the methodology of epidemiological studies and reporting for individual and team sports. Eligible studies for inclusion described the practices and data collection methods used to record and report sports injury surveillance data in university student athletes. Studies that did not investigate sports injuries in university student athletes were excluded. Case-control studies, cross-sectional studies, retrospective cohort studies, interventions, systematic reviews, editorials, reports, letters, books, abstracts, conference papers, grey literature, and all other reviews were also excluded from this review.

2.3. Study selection

Duplicates and false hits (refers to studies retrieved that appeared relevant based on the title and abstracts but which were excluded after the full-text screening because they did not meet the set inclusion criteria of the review) were removed after the initial search was completed, and the 2 authors (RCS and BT) independently screened the titles and abstracts for eligibility. The same 2 reviewers independently assessed the full texts of the remaining articles for eligibility. Any disagreements concerning inclusion were resolved through discussion by the review authors (RCS and BT) and a senior 3rd author (JV). The study selection process was documented via Covidence software,[35] which also managed the screening process.

2.4. Data extraction

One reviewer (RCS) extracted and recorded data from all included studies via an Excel spreadsheet (Microsoft, Redmond, WA, USA) and verified accuracy and completeness with a 2nd reviewer (BT). The following study information was extracted: study characteristics (first author, year, country, title, study design), population under surveillance (gender, age, sport), injury definition, who provided information (e.g., athlete, physician, physical therapist, coach, nonclinical volunteer), which data sources were used (e.g., athlete self-reports, medical records, examinations, video recording), the frequency of data collection and reporting (e.g., daily, weekly, monthly), the timing of and windows for data collection (e.g., day of injury or competition/training or the following day, within a week), duration of surveillance (e.g., tournament, season, whole year, playing career), and the direct method of data collection (e.g., physical paper document, electronic tool).

2.5. Critical appraisal/risk of bias

Two reviewers (RCS and JV) independently evaluated the methodological quality of the included studies via the Newcastle−Ottawa Scale (NOS), which was designed for cohort studies.[36] The reliability and validity of the NOS for cohort studies have been established previously.[37] The 2 reviewers (RCS and JV) convened before the assessment to discuss and familiarize themselves with the scale and tools. To minimize the risk of bias, identifiable study information (authors' names, countries, *etc.*) was removed. Any disagreements between the 2 authors regarding the study's risk of bias were resolved through discussion with a 3rd reviewing author (BT).

The NOS awarded each study a maximum of 1 point for each numbered item within the selection and outcome categories. A maximum of 2 points was given for comparability, so the highest score on the NOS was 9 points. Each study was judged on 8 items and categorized into 3 groups: (a) the selection of the study groups (4 items); (b) the comparability of the groups (2 items); and (c) the ascertainment of either the exposure or outcome of interest (3 items) for case-control or cohort studies, respectively. To determine the methodological quality of the studies, a three-group rating system was used on the basis of the number of points awarded. Studies that scored a total of 8 or 9 points were considered to have a minimal risk of bias; 6 or 7 points were considered to have a medium risk of bias; 5 points or fewer were considered to have a high risk of bias. With respect to selection, studies were considered to have a low, medium, or high risk of bias if they scored 4, 2−3, or 1 point, respectively. With respect to comparability, studies were considered to have a low, medium, or high risk of bias if they scored 2, 1, or 0 point, respectively. With respect to outcome, studies were considered to have a low, medium or high risk of bias if they scored 3, 2 or 1 point, respectively.[38]

The data collected were assessed by 1 author (RCS) to evaluate how many of the included studies on injury surveillance practices and data collection methods in university student athletes are consistent with the IOC consensus statement: Methods for recording and reporting epidemiological data on injury in sports.[15] This serves as a proxy for the reporting quality.

2.6. Data synthesis and summary measures

A narrative synthesis method was employed to achieve the aim of this review to identify the injury surveillance practices and data collection methods in university student athletes. The characteristics and findings of the studies were summarized, analyzed, and described descriptively in table format. Meta-analyses were not conducted as the objective of the review was to narratively summarize the literature. Furthermore, the considerable heterogeneity across the included studies surrounding the variations in injury definitions, data sources, responsibility for data recording, frequency and timing of data collection, duration of surveillance, and methodological approaches rendered quantitative pooling of results inappropriate.

3. Results

3.1. Search results

A total of 11,188 articles were identified from 4 electronic database searches, with 8438 remaining after duplicates were removed. Six hundred forty-seven articles were assessed for eligibility, and the full texts were reviewed following abstract and title screening. Fifty articles met all the inclusion criteria,[12,39–87] and these studies were included for critical appraisal and data extraction (Fig. 1).

3.2. Characteristics of the included studies

Fifty prospective cohort studies were conducted across 9 countries spanning 5 continents (North America: USA = 34, Canada = 4; Asia: Japan = 4, Republic of Korea = 1; Europe: Ireland = 3, the Netherlands = 1; Africa: Cameroon = 1, South Africa = 1; Oceania: Australia = 1). The sample size was 278.20 ± 452.44 (mean ± SD; as reported by 40 studies). The total number of participants included in the review was 11,182, of which 2528 (23%) were presented as a combined sample (both male and female), 5623 (50%) were male, 2831 (25%) were female, and the gender of 200 (2%) participants was not reported. The age of the participants was 20.01 ± 1.19 years (as reported by 40 studies); the age for male participants was 20.26 ± 1.11 years (as reported by 18 studies); and for female participants, it was 20.01 ± 0.89 years (as reported by 11 studies). The included studies covered 28 different university sports codes, which consisted of 12 studies each in soccer,[47,49,50,53–60,86] and basketball,[47,49,53,60–67,86] 11 studies each in American football,[39–49] and athletics,[48,49,53,55,60,64,68–71,86] 9 studies in volleyball,[47,49,53,55,60,61,64,72,86] 8 studies in tennis,[48,49,53,55,60,64,73,86] 5 studies in softball,[47,48,55,60,86] 4 studies each in rugby,[12,46,50,74] and swimming,[48,49,68,75] 3 studies each in ice hockey,[76–78] Gaelic football,[50–52] and

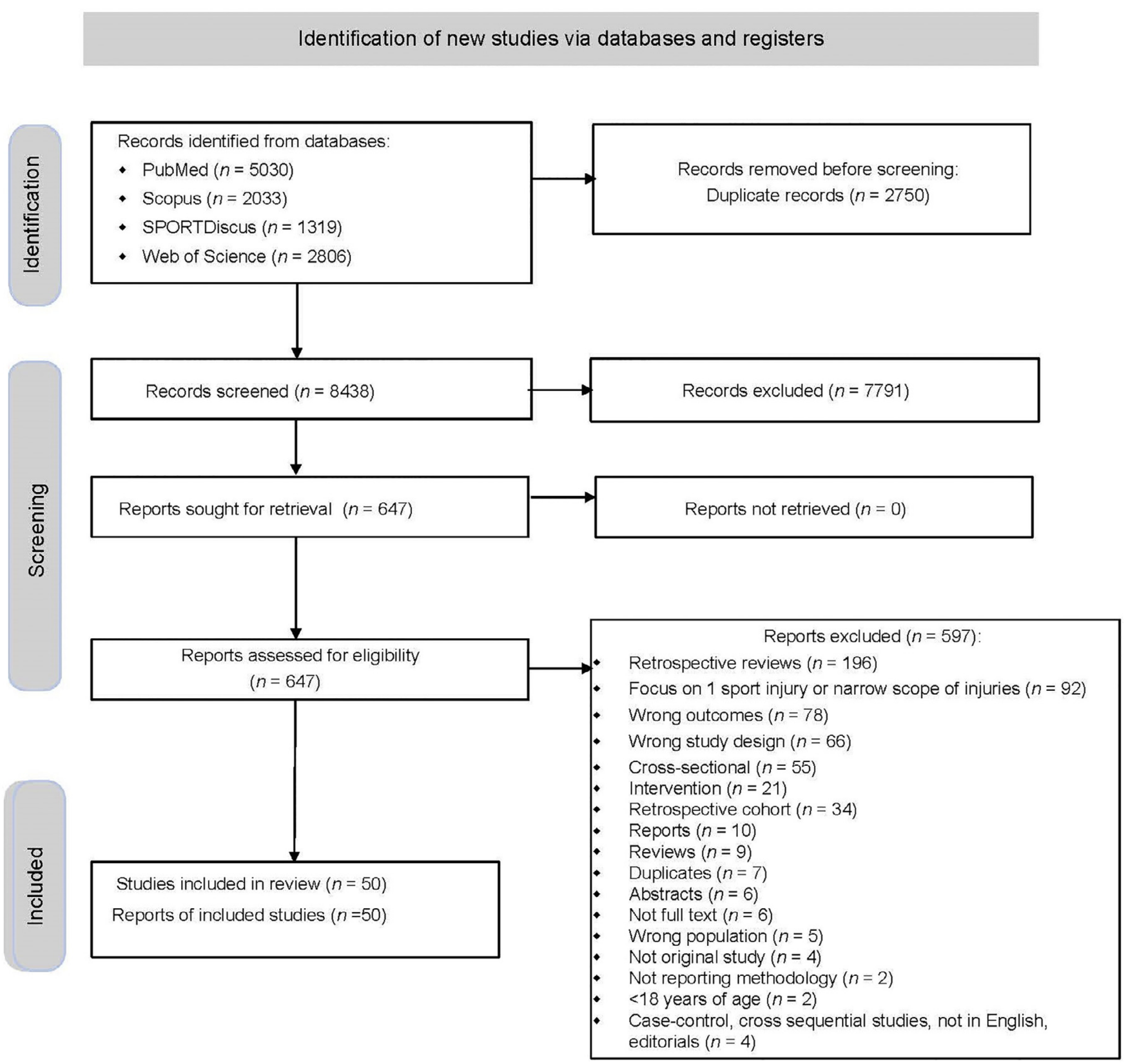

Fig. 1. Flowchart of the literature search.

lacrosse,[55,82,86] and wrestling,[47,64,86] 2 studies each in badminton,[79,80] baseball,[47,86] dance,[68,81] golf,[48,49] and 1 study each in fencing,[83] field hockey,[47] handball,[64] table tennis,[64] climbing,[68] martial arts,[68] judo,[64] Paralympic sports,[64] hurling,[50] gymnastics,[68] and rodeo.[87] One study did not report the type of sports[84] and 1 study reported as College Outdoor Education Activities.[85] A detailed overview of the characteristics of the included studies is provided in Table 1.

3.3. Critical appraisal/risk of bias

According to the NOS,[38] 41 studies (82%) had a high risk of bias[12,41–55,59,61–67,69–72,74–77,79–87] and 9 studies (18%) had a medium risk of bias.[39,40,56–58,60,68,73,78] The average risk of bias score for the included studies was 5. Supplementary Table 2 illustrates the percentage of included studies with low, medium, or high risk of bias for selection, comparability, and outcome based on the NOS.

3.4. Injury surveillance practices and methods

A comprehensive overview of injury surveillance methods in university student athletes is provided in Supplementary Table 3.

3.4.1. Injury definitions

The injury definitions identified and included in the studies were (a) time loss (54%; $n = 27$ studies,[12,39–41,50–55,61–63,65–68,71,72,76–78,80–82,84,86] (b) medical attention and/or time loss (28%; $n = 14$ studies),[42,45–47,56–58,60,64,69,75,79,85,86] (c) medical attention (10%; $n = 5$ studies),[49,59,74,83,87] (d) time loss and non-time loss (4%; $n = 2$ studies),[43,48] and (e) not reported (4%; $n = 2$ studies).[70,73] The complete list of injury definitions identified in the included studies is presented in Supplementary Table 3.

3.4.2. Who recorded the injury data

Injury data in the included studies were most commonly recorded by the (a) athletic trainers (62%; $n = 31$ studies),[39,40,42,43,45,46,48,49,53–63,67,69,72,73,76,77,80,82–84,86,87] (b) athletic therapist (14%; $n = 7$ studies),[41,44,50–52,65,78,] (c) athlete (10%; $n = 5$ studies),[47,66,68,70,81] (d) physiotherapist (8%; $n = 4$ studies),[12,64,74,79] (e) course instructors (2%; $n = 1$ study),[85] (f) athlete, coach, and medical personnel (2%; $n = 1$ study),[71] and (g) primary investigator (2%; $n = 1$ study).[75]

3.4.3. Data sources used

Notably, the majority of the included studies used (a) an examination (occurrence of injury was ascertained by health care personnel through assessment) as the data source (72%; $n = 35$ studies).[12,39–44,46,49–52,55–62,64,65,67,69,71–73,76–80,82,86,87] Others (b) did not report (14%; $n = 7$ studies)[45,53,54,63,72,74,84] or used additional data sources such as (c) athlete self-reported (12%; $n = 6$ studies),[47,68,70,71,81,85] (d) a combination of athlete self-reports and examinations (2%; $n = 1$ study),[71] and (e) interviews (2%; $n = 1$ study).[75]

3.4.4. Frequency of data collection and reporting

Data collection and reporting occurred (a) weekly (46%; $n = 23$ studies),[39,40,44,50–52,54–58,61,62,67,68,71,74,75,77,81,83,84,86] (b) not reported (24%; $n = 12$ studies),[47–49,53,59,63,70,73,79,82,85,87] (c) daily (20%; $n = 10$ studies),[12,42,44–46,60,64,66,69,80] (d) monthly (6%; $n = 3$ studies),[41,76,78] (e) daily (collected) and weekly (reported) (2%; $n = 1$ study),[72] and (f) weekly (collected) and monthly (reported) (2%; $n = 1$ study).[43]

3.4.5. Timing and window for data collection

The timing and window for data collection coincided with (a) the day of the injury (64%; $n = 32$ studies),[12,39–42,44–46,50–52,55–58,60,61,64–67,69,72,73,76–81,83,86] (b) not reported (28%; $n = 14$ studies),[43,47,49,53,54,59,62,63,68,70,82,84,85,86] (c) the following day and within the week of injury (4%; $n = 2$ studies),[48,71] (d) after training and matching (2%; $n = 1$ study),[74] and (e) within the week of injury (2%; $n = 1$ study).[75]

3.4.6. Duration of surveillance

The duration of surveillance was reported as follows: (a) 1 or multiple seasons (78%; $n = 38$ studies),[39–46,48–59,61–63,67,69,70–74,76,77,80,82–84,86,87] (b) 1 or multiple years and academic years (12%; $n = 3$ studies each),[47,60,65,75,79,85] (c) tournament and weeks (4%; $n = 2$ studies each),[12,64,66,68] (d) semester and university career (2%; $n = 1$ study each).[60,81]

3.4.7. Direct methods of data collection

The direct method of data collection varied, with different methods utilized: (a) electronic tools/databases/systems (30%; $n = 15$ studies),[12,39–41,43,44,47,49,60,64,65,70,72,77,87] (b) not reported (30%; $n = 15$ studies),[42,45,53–55,61–63,67,72,73,79,83,84,87] (c) injury surveillance/reports form (not reported whether paper or electronic) (22%; $n = 10$ studies),[46,50–52,59,69,71,75,76,82] (d) paper/hard copy (6%; $n = 3$ studies),[56–58] (e) Excel spreadsheet (6%; $n = 3$ studies),[74,80,85] (f) paper/hard copy and electronic (4%; $n = 2$ studies),[68,81] and (g) electronic questionnaire (2%; $n = 1$ study).[66]

3.5. Adherence to the IOC consensus statement

Of the 50 included studies, only 3 (6%) fully adhered to the key components as outlined in the IOC consensus statement. Fig. 2 summarizes the key components of the IOC consensus statement reported in all included studies. A more detailed overview of the key IOC components for each study can be found in Supplementary Table 4.

3.5.1. Study population characteristics

All 50 studies described the characteristics of the study population, such as sport type, gender, and age, although not all studies specified age clearly and various categories were used (e.g., university athletes) (Supplementary Table 4).

Table 1
Characteristics of the included studies.

Study	Country	Number of participants	Gender	Mean age (year)	Sport
Ball et al. (2020)[74]	Australia	34	Male	19.3	Rugby
Bliekendaal et al. (2021)[68]	Netherlands	797[a]	Male/female	19.4	Athletics, climbing, dance, field sports, gymnastics, martial arts, swimming
Brumitt et al. (2021)[61]	USA	155/117	Male/female	20.0/19.3	Basketball/volleyball
Brumitt et al. (2016)[67]	USA	71	Male	20.2	Basketball
Brumitt et al. (2018)[55]	USA	106	Female	19.1	Soccer, volleyball, basketball, lacrosse, tennis, softball, and athletics
Brumitt et al. (2013)[86]	USA	83/110	Male/female	19.1/19.5	Baseball, lacrosse, softball, volleyball, wrestling; men's and women's basketball, cross-country, soccer, tennis, track and field
Brumitt et al. (2016)[84]	USA	83/106	Male/female	19.5	Not reported
Brumitt et al. (2018)[62]	USA	95	Male	20.0	Basketball
Brumitt et al. (2020)[54]	USA	119	Female	19.2	Soccer
Brumitt et al. (2018)[63]	USA	169	Male	19.9	Basketball
Brumitt et al. (2018)[53]	USA	102/104	Male/female	18.0	Soccer, volleyball, basketball, athletics, tennis
Chase et al. (2013)[75]	USA	16/18	Male/female	19.5	Swimming
Colberg et al. (2015)[73]	USA	32/26	Male/female	19.4/20.4	Tennis
Curtis et al. (2021)[59]	USA	117/139	Male/female	20/20	Soccer
DiPasquale et al. (2015)[81]	USA	10/158	Male/female	19.6	Dance
Enoki et al. (2021)[69]	Japan	51 athletes in the 1st year (36/15) 54 athletes in the 2nd year (38/16)	Male/female Male/female	19.6 19.8	Athletics
Flik et al. (2005)[76]	USA	8 teams	Male	Not reported	Ice hockey
Fuller et al. (2007)[39]	USA	52 teams 64 teams in the 2005 season 54 teams 72 teams in 2006 season	Male Female Male Female	Not reported Not reported	American football American football
Fuller et al. (2007)[40]	USA	52 teams 64 teams in 2005 season 54 teams 72 teams in 2006 season	Male Female Male Female	Not reported Not reported	American football American football
Gaudio et al. (2010)[85]	USA	Not reported	Male/female	Not reported	College Outdoor Education Activities
Grant et al. (2015)[77]	USA	79	Male	20.2	Ice hockey
Hagel et al. (2003)[41]	Canada	Not reported	Male	Not reported	American football
Haraldsdottir et al. (2021)[72]	USA	17	Female	19.6	Volleyball
Hayes et al. (2019)[70]	USA	40/57	Male/female	19.0/19.2	Athletics
Iguchi et al. (2013)[42]	Japan	289	Male	20.5	American football
Jang et al. (2022)[80]	Korea	64	Male	21.5	Badminton
Kelley et al. (2022)[60]	USA	119/159	Male/female	Not reported	Basketball, softball, soccer, tennis, volleyball, and athletics
Matz et al. (2004)[82]	USA	18 teams	Female	Not reported	Lacrosse
Maurice et al. (2021)[64]	Cameroon	2583 (1175/898/510)[b]	Male/female/No information available	24.0	Athletics, basketball, soccer, handball, judo, tennis, table tennis, volleyball, wrestling, paralympic sports, fan's club
McCunn et al. (2017)[43]	USA	76	Male	20.2	American football
Meeuwisse et al. (2000)[44]	Canada	1010	Male	Not reported	American football
Meeuwisse et al. (2003)[65]	Canada	318	Male	Not reported	Basketball
Meyers et al. (2017)[56]	USA	Not reported	Male	Not reported	Soccer
Meyers et al. (2010)[57]	USA	Not reported	Male	Not reported	Soccer
Meyers et al. (2013)[58]	USA	Not reported	Female	Not reported	Soccer
Miyake et al. (2016)[79]	Japan	50/7	Male/female	20.0/20.7	Badminton
Mortensen et al. (2020)[45]	USA	208	Male	21.4	American football
Nagano et al. (2021)[66]	Japan	54	Female	19.0	Basketball

(*continued on next page*)

Table 1 (Continued)

Study	Country	Number of participants	Gender	Mean age (year)	Sport
O'Connor et al. (2021)[51]	Ireland	132	Female	Not reported	Gaelic football
O'Connor et al. (2017)[52]	Ireland	217	Male	19.3	Gaelic football
Rebella et al. (2015)[71]	USA	83/52	Male/female	20.6	Athletics
Schick et al. (2003)[78]	Canada	147/114	Male/female	23.5/20.9	Ice hockey
Sanfilippo et al. (2024)[48]	USA	92/35	Male/female	Not reported	American football, softball, rowing, track, golf, cross-country, tennis, swimming
Smith et al. (2015)[49]	USA	200	Not reported	18−24[c]	Men's basketball, women's basketball, men's cross-country running, women's cross-country running, men's football, women's golf, men's track and field, women's track and field, men's tennis, women's tennis, women's volleyball, women's· soccer, and women's swimming/diving
Sullivan et al. (2022)[47]	USA	957[a]	Male/female	18	Men's baseball, basketball, American football, wrestling; women's basketball, field hockey, soccer, softball, or volleyball
Teahan et al. (2021)[50]	Ireland	416/256	Male/female	Not reported	Gaelic football, hurling/camogie, soccer and rugby
van Zyl et al. (2024)[12]	South Africa	171	Male	19.7	Rugby
Walrod et al. (2019)[83]	USA	28/16	Male/female	Not reported	Fencing
Watts et al. (2022)[87]	USA	264[a]	Male/female	Not reported	Rodeo
Willigenburg et al. (2016)[46]	USA	1 team	Male	Not reported	American football
		1 team	Male		Rugby

[a] Distribution of data according to gender not available.
[b] Distribution of data for Fan's club according to gender not available.
[c] Age is presented as range in years.

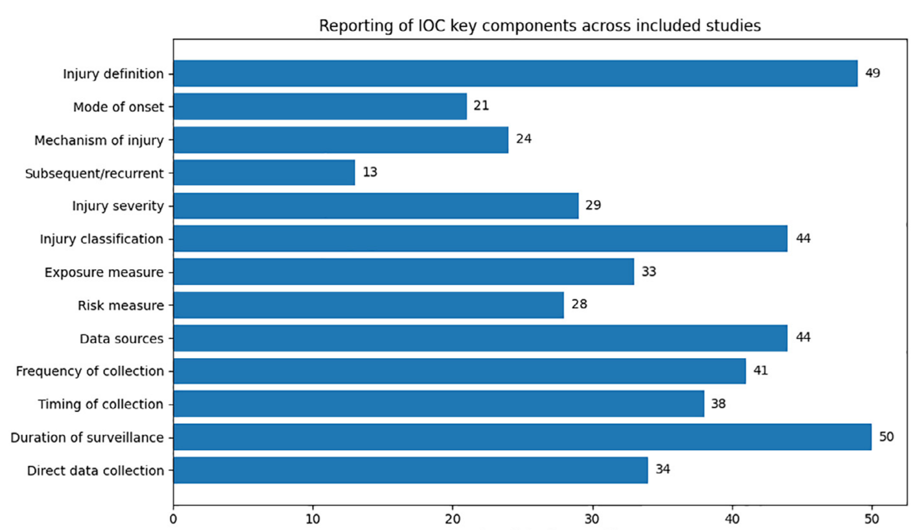

Fig. 2. Key IOC components reported by included studies shows the number of included studies ($n = 50$) that reported each key component recommended by the IOC consensus statement for injury surveillance in sport. IOC, International Olympic Committee.

3.5.2. Defining and classifying health problems

Almost all studies ($n = 48$) reported the definition of injury. Notably, less than half of the studies reported mode of onset ($n = 21$) or the mechanism of injury ($n = 24$). Only 13 studies detailed whether injuries were subsequent, recurrent, or exacerbations. Slightly more than half ($n = 29$) classified injury severity and 44 specified injury classification. Thirty-three studies reported exposure measures, whereas risk measures were reported in 28 studies (Supplementary Table 4).

3.5.3. Data collection methods

All studies reported the person responsible for collecting injury data, who was the athletic trainer. Forty-four studies described their data sources, and 41 studies reported the frequency of data collection. Notably, only 38 studies reported the timing and window for data collection. All studies reported the duration of injury surveillance, while only 34 studies reported the direct method of data collection used. The rest of the studies reported using retrospective reviews or athlete self-reports (Supplementary Table 4).

4. Discussion

This is the first review to identify, summarize, and critically appraise injury surveillance practices and data collection methods in university student athletes. This review also evaluated the extent to which these injury surveillance practices and data collection methods align with the 2020 IOC consensus statement on injury surveillance in sport.[15] Fifty studies from 9 countries across 5 continents were included, covering 28 university sports codes, with over half (68%) of the included studies conducted in the USA. Fifty-four percent of the included studies defined injury as time-loss, with the athletic trainer primarily responsible for recording in over half (62%) of the studies. In 72% of the studies, injury was confirmed through examination (occurrence of injury was ascertained by health care personnel through assessment), with data most often (64%) collected on the day of injury, and with a little fewer than half (46%) of the studies reporting data weekly. Surveillance was season-long in 78% of the studies, and electronic or web-based tools were the most common data collection method (30%). There were significant variability and heterogeneity among the injury definitions and data collection methods for the included studies (Supplementary Table 3). Notably, only 3 studies[52,71,77] fully adhered to the IOC consensus guidelines, emphasizing a clear methodological gap in terms of standardization within this context.

4.1. Injury surveillance practices and methods

4.1.1. Injury definitions

Fifty-four percent of the included studies employed a time-loss definition for injury, which has been well documented as the most commonly used definition, particularly in team sports where injury surveillance is undertaken over an extended period.[88,89] This definition will lead to the exclusion of minor injuries that affect athletes' participation in training and matches but do not fully prevent them from participating.[90] Subsequently, non-time-loss (minor) injuries such as contusions and mild ankle sprains remain underreported, even though those injuries may still affect atheles' well-being and performance. Furthermore, recurrent injuries are often initially concealed by athletes and managed through modified participation and only become visible in time-loss definitions once they worsen and cause absence from training or matches.[15] As a result, this narrow definition of injury may underestimate the true incidence, particularly in overuse injuries, and report the fewest injuries. It is also acknowledged that a time-loss injury definition will exclude physical complaints that do not prevent participation and may in fact underestimate the true injury incidence. Athletes continue to play or train while managing minor injuries, which still impairs performance and increases future risk of injury.[91] Hence, practitioners are advised to consider the magnitude of all symptoms encountered alongside the burden associated with time-loss[92] and use a broader definition to capture the full spectrum of injury burden.[17]

This definition has been shown to compromise prevention strategies and team success in elite sports[93] while providing a reliable method to identify injuries when athletes are unable to fully participate in training and matches and to compare injury rates across different teams over various seasons.[91] Using a time-loss injury definition may lead to (a) underreporting of injuries, (b) delayed recognition of early warning signs, (c) bias towards acute and severe injuries, and (d) mitigated impact of gradual onset-type injuries. Injury surveillance needs to be comprehensive to be able to produce quality data, which is what effective injury prevention strategies depend on.[15] The majority of sport-specific consensus statements[27,33,34] recommend the use of the time-loss injury definition, and further suggest that future studies should avoid using multiple, separate injury definitions,[34] instead using a single, comprehensive definition that captures any injury that affects an athletes' physical and psychological status, irrespective of time-loss or the need for medical attention.[15] To further reinforce this recommendation, Waldén et al.[33] suggested that future studies use an injury definition encompassing both injuries and relevant medical conditions.

4.1.2. Who recorded the injury data

Standardized methods and data collection designs are essential for developing reliable, accurate, and effective injury surveillance systems.[94] Over half of the included studies used an athletic trainer for recording injury data and diagnosing injuries through examination. The majority of these studies are based in the US, where the term "athletic trainers" is used, especially in universities, as these individuals complete a university degree in injury assessment and management. The NCAA-Injury Surveillance Program (ISP) employs athletic trainers to track, record, and analyze injury data across a range of U.S. college (university) sports[95] because understanding how college athletic trainers diagnose, treat, and make reporting decisions is crucial in both research and clinical settings.[96] Ekegren et al.[24] reported that athletic trainers contribute to maintaining the NCAA Injury Surveillance System. Furthermore, involving trained medical personnel will enhance and support consistent injury surveillance and reporting. In resource-limited settings where funding and access to medically trained personnel are constrained, self-reported injury surveillance can be a feasible alternative.[97] However, it is essential to acknowledge its inherent limitations, including social desirability bias, recall bias, and the absence of clinical verification, all of which may impact the accuracy and reliability of the collected data.[98]

4.1.3. Data sources used

Most studies relied on healthcare professionals to confirm injury occurrence, which enhances diagnostic accuracy[27] but may miss minor or non-time-loss injuries, leading to underreporting.[17] This method may also be impractical in low-resource university settings. Incorporating validated self-report tools could improve data completeness and feasibility across diverse contexts.

4.1.4. Frequency of data collection and reporting

The IOC consensus statements describe frequency of data collection and reporting as either daily, weekly, or monthly.[15] In 64% of the included studies, data were collected on the day of injury, which improves recall accuracy and timeliness. However, same-day reporting may miss delayed-onset symptoms or injuries not immediately recognized, potentially affecting injury classification and completeness.[16] It is recommended that injury data be collected as the injury occurs to support accurate reporting.[94]

4.1.5. Timing of and window for data collection

The IOC consensus statements describe timing of and window for data collection as either the day of injury or competition/training or the following day, within a week.[15] Fewer than half (46%) of the included studies reported timing of data collection in weekly collection intervals. This inconsistent and infrequent data collection can lead to recall bias and increase the likelihood of missed injuries, especially minor injuries, as well as compromise data accuracy.[16] Weekly reporting allows for more timely and reliable capture of injury and better indicates fluctuations in exposure and training load. Creating consistent and standardized data collection intervals, such as weekly reporting, is essential to enhancing the overall quality and comparability of injury surveillance systems in university sport.

4.1.6. Duration of surveillance

Surveillance was season-long in 78% of the included studies, which supports consistent monitoring during periods of structured competition and training. While this aligns with typical academic and athletic calendars, it may overlook injuries sustained during pre-season, off-season training, or recreational activities. These periods can pose significant injury risk due to fluctuations in training load, reduced medical oversight, and limited conditioning support.[17] As a result, restricting surveillance to the competitive season may underestimate the true injury burden among university athletes. Extending surveillance beyond the playing season could enhance the completeness of injury data and improve the effectiveness of prevention strategies.

4.1.7. Direct method of data collection

The direct data collection method varied across the included studies, from traditional paper-based methods to electronic tools and databases.[56,75,81] The pen-and-paper method is easy to implement, requiring minimal technical knowledge, equipment, and financial resources.[15] However, the initial use of the pen-and-paper method in the NCAA Injury Surveillance System burdened athletic trainers. First, the data needed to be entered twice. Second, injury and exposure data must be mailed or faxed, which consumes time and resources, potentially leading to data entry errors.[99] While using an electronic tool or database has financial implications for the design and training of medical staff using the database, it does reduce free-text input. This contributes to a more consistent data capture method.[100] The electronic format employed in the NCAA-ISP allows real-time access to individual data and eliminates the duplication of institutional records, facilitating easier access and analysis for individual universities.[99] Finally, a web-based or electronic database will promote the consistent and valid practice of injury surveillance, enabling the comparison of injury outcomes and the development and implementation of effective injury prevention strategies.[101]

4.1.8. Adherence to the IOC consensus statement

Notably, only 3 studies[52,71,77] fully adhered to the IOC consensus guidelines by reporting and documenting all the components of study population characteristics, defining and classifying health problems, and utilizing effective data collection methods, highlighting a clear methodological gap in terms of standardization within this context. In addition, none of the included studies considered or directly applied the IOC Female Athlete Health consensus supplement.[15] Inconsistent reporting of exposure and risk measures limits the comparisons between studies and reduces the interpretability of incidence rates.

4.2. Limitations

A key limitation was the decision to include only English-language publications. This may have excluded relevant studies conducted in other languages, particularly from regions with differing sports cultures and injury surveillance practices. The predominance of male participants in the included studies limits the applicability of findings to female university student athletes. Given documented sex differences in injury risk and patterns, the lack of female representation and sex-stratified analysis may reduce the relevance of results for developing female-specific prevention strategies.[15]

Some of the included studies lacked standardized and detailed reporting methodologies, such as injury definitions, sampling methods, and injury validation procedures. This variability complicated the evaluation of study quality and may have influenced the interpretation of the results. Additionally, surveillance systems often prioritize time-loss injuries, neglecting subclinical or overuse injuries that do not immediately impact participation but may contribute to long-term injuries. Another limitation of the included studies was the lack of adherence to the IOC consensus statements, as well as the lack of consideration given to the Female Athlete Health domains supplement, which restricts the comparability and reliability of findings across studies. No formal reporting quality tool was used, but instead we used the IOC consensus statement on injury epidemiology in sport due to its relevance.

4.3. Future research

Only 3 of 50 studies fully adhered to the IOC consensus statement. Future research should explore barriers to adoption of the IOC consensus statement in university settings and test implementation strategies that could increase adherence. There was a lack of consistency in injury definitions, with most using only time-loss. Future studies should compare the impact of different injury definitions (e.g., time-loss *vs*. medical attention *vs*. all physical complaints) on injury incidence and prevention outcomes. A limited measurement of reporting on exposure data and risk measures across studies was evident, which renders a need to design studies that integrate standardized exposure and risk measures to improve the comparability of injury rates and burden across sports and institutions. Only 6% of studies included the IOC consensus statement; none applied the IOC Female Athlete Health supplement. Future injury surveillance systems must incorporate the IOC Female Athlete Health framework to address the underrepresentation of female athletes and sex-specific health considerations. Data collection methods varied widely (e.g., paper *vs*. electronic tools), with many studies lacking transparent reporting. Research is needed to evaluate the feasibility and data quality of different digital tools for injury surveillance, especially in low-resource settings. Only the NCAA had a formalized, structured surveillance system, and more research should focus on developing context-appropriate injury surveillance systems in non-NCAA and non-U.S. university settings, especially in lower−middle income countries. Many studies had a high risk of bias due to inconsistent sampling, reporting, and follow-up. Methodological studies are needed to build and validate high-quality injury surveillance protocols tailored to university sport contexts.

4.4. Practical implications

The findings of this review highlight the need for consistent and standardized injury surveillance practices in university sports settings. Institutions can adopt the IOC consensus guidelines to unify definitions, data collection methods, and reporting standards. Addressing variability in injury definitions and underreporting of non-time-loss injuries can improve data quality, ultimately benefiting researchers, clinicians, coaches, and sport governing bodies involved in athlete health and safety. Furthermore, it is crucial to incorporate sport-specific and population-specific adaptations into surveillance systems to ensure that they meet the unique demands of university athletes. Additionally, leveraging technology, such as electronic data collection tools, can increase efficiency and reliability, enabling real-time surveillance of injuries. These recommendations can support the development of tailored surveillance systems that inform injury prevention strategies and foster safer sporting environments for university student athletes. Finally, universities should implement standardized injury surveillance systems, guided by well-established frameworks such as the IOC consensus statement, to improve consistency, which will allow for the comparability of injury data and enhance how athlete health is managed. In addition, university student athlete health is much more comprehensive than just injury, therefore we should consider illnesses and athlete health domains.

5. Conclusion

Injury surveillance practices and data collection methods in university sports are highly variable, with inconsistencies in definitions, data sources, and collection timing. Alignment with the IOC consensus statement is minimal, with only 6% of studies fully adhering to its core components. This lack of standardization limits the effectiveness of injury prevention strategies and compromises athlete safety. Future research should prioritize developing and validating surveillance systems tailored to university settings, including in underrepresented populations and sports, as well as in low-resource settings. Strengthening methodological quality across studies will also enhance the comparability and utility of injury data in this field.

Authors' contributions

RCS contributed to the original concept, screened the articles for inclusion, performed the risk of bias assessment, and extracted the data from included studies; BT contributed to the original concept, screened articles for inclusion, and performed the risk of bias assessment; JV performed the risk of bias assessment; LL, RM, EV, and BA contributed to the original concept. All authors contributed to the editing of the manuscript, have read and approved the final version of the manuscript, and agree with the order of presentation of the authors.

Declaration of competing interest

The authors declare that they have no competing interests.

Supplementary materials

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References

1. Arsović N, Đurović R, Rakočević R. Influence of physical and sports activity on mental health. *FU Phys Ed Sport* 2019;**17**:559–68.
2. Malm C, Jakobsson J, Isaksson A. Physical activity and sports—Real health benefits: A review with insight into the public health of Sweden. *Sports (Basel)* 2019;**7**:127. doi:10.3390/sports7050127.
3. Mendonça LD, Schuermans J, Wezenbeek E, Witvrouw E. Worldwide sports injury prevention. *Int J Sports Phys Ther* 2021;**16**:285–7.
4. Eliakim E, Morgulev E, Lidor R, Meckel Y. Estimation of injury costs: Financial damage of English Premier League teams' underachievement due to injuries. *BMJ Open Sport Exerc Med* 2020;**6**:e000675. doi:10.1136/bmjsem-2019-000675.
5. Finch C. A new framework for research leading to sports injury prevention. *J Sci Med Sport* 2006;**9**:3–10.
6. Swim N, Lee Y, Hums MA. "Sorry, I'm not from here!": Female international student-athletes' transitions into college athletics in the United States. *Front Psychol* 2023;**14**:1103194. doi:10.3389/fpsyg.2023.1103194.

7. Varsity Sports South Africa. *Varsity sports*. Available at: https://varsitysportssa.com. [accessed 17.07.2025].
8. NCAA. *NCAA student-athletes surpass 520,000, set new record*. Available at: https://www.ncaa.org/news/2022/12/5/media-center-ncaa-student-athletes-surpass-520-000-set-new-record.aspx. [accessed 30.08.2025].
9. FISU. *Summer FISU World University Games*. Available at: https://www.fisu.net/sport-events/fisu-world-university-games/summer-fisu-world-university-games. [accessed 30.09.2025].
10. Chandran A, Collins CL. The constants in the evolving sports injury-surveillance ecosystem: Athletic trainers. *J Athl Train* 2021;**56**:602–3.
11. Kimura T, Mącznik AK, Kinoda A, et al. Injury prevalence and associated factors among Japanese lacrosse collegiate athletes. *Front Sports Act Living* 2024;**6**:1360639. doi:10.3389/fspor.2024.1360639.
12. van Zyl S, Bayne H, Schwellnus M, Viljoen C. A high incidence of injury among male university student rugby players requires urgent injury prevention strategies. *Phys Ther Sport* 2024;**65**:107–12.
13. Vriend I, Gouttebarge V, Finch CF, van Mechelen W, Verhagen EALM. Intervention strategies used in sport injury prevention studies: A systematic review identifying studies applying the Haddon Matrix. *Sports Med* 2017;**47**:2027–43.
14. van Mechelen W, Hlobil H, Kemper HC. Incidence, severity, aetiology and prevention of sports injuries: A review of concepts. *Sports Med* 1992;**14**:82–99.
15. International Olympic Committee Injury and Illness Epidemiology Consensus Group, Bahr R, Clarsen B, et al. International Olympic Committee consensus statement: Methods for recording and reporting of epidemiological data on injury and illness in sports 2020 (including the STROBE extension for Sports Injury and Illness Surveillance (STROBE-SIIS)). *Orthop J Sports Med* 2020;**8**:2325967120902908. doi:10.1177/2325967120902908.
16. Bahr R, Clarsen B, Ekstrand J. Why we should focus on the burden of injuries and illnesses, not just their incidence. *Br J Sports Med* 2018;**52**:1018–21.
17. Clarsen B, Myklebust G, Bahr R. Development and validation of a new method for the registration of overuse injuries in sports injury epidemiology: The Oslo Sports Trauma Research Centre (OSTRC) overuse injury questionnaire. *Br J Sports Med* 2013;**47**:495–502.
18. NCAA. *NCAA Injury Surveillance Program*. Available at: https://www.ncaa.org/sports/2018/4/9/ncaa-injury-surveillance-program.aspx?id=1588. [accessed 30.09.2025].
19. Asgari M, Nazari B, Bizzini M, Jaitner T. Effects of the FIFA 11+ program on performance, biomechanical measures, and physiological responses: A systematic review. *J Sport Health Sci* 2023;**12**:226–35.
20. Chandran A, Morris SN, Powell JR, Boltz AJ, Robison HJ, Collins CL. Epidemiology of injuries in National Collegiate Athletic Association Men's Football: 2014−2015 through 2018−2019. *J Athl Train* 2021;**56**:643–50.
21. Kim E, Cha J, Choi H, You J. Longitudinal panel study of sports injuries in university elite athletes. *Korean J Sports Med* 2020;**38**:43. doi:10.5763/kjsm.2020.38.1.43.
22. Lempke LB, Chandran A, Boltz AJ, Robison HJ, Collins CL, Morris SN. Epidemiology of injuries in National Collegiate Athletic Association Women's basketball: 2014−2015 through 2018−2019. *J Athl Train* 2021;**56**:674–80.
23. Rosa BB, Asperti AM, Helito CP, Demange MK, Fernandes TL, Hernandez AJ. Epidemiology of sports injuries on collegiate athletes at a single center. *Acta Ortop Bras* 2014;**22**:321–4.
24. Ekegren CL, Gabbe BJ, Finch CF. Sports injury surveillance systems: A review of methods and data quality. *Sports Med* 2016;**46**:49–65.
25. Mashimo S, Ogaki R, Suhara H, Yoshida N. Sports injury surveillance systems and guidelines in Japan: A systematic review. *Int J Sports Med* 2022;**43**:1163–72.
26. Derman W, Runciman P, Jordaan E, et al. High incidence of injuries at the Pyeongchang 2018 Paralympic Winter Games: A prospective cohort study of 6804 athlete days. *Br J Sports Med* 2020;**54**:38–43.
27. Fuller CW, Ekstrand J, Junge A, et al. Consensus statement on injury definitions and data collection procedures in studies of football (soccer) injuries. *Scand J Med Sci Sports* 2006;**16**:83–92.
28. Mountjoy M, Junge A, Alonso JM, et al. Consensus statement on the methodology of injury and illness surveillance in FINA (aquatic sports). *Br J Sports Med* 2016;**50**:590–6.
29. Murray A, Junge A, Robinson PG, et al. International consensus statement: Methods for recording and reporting of epidemiological data on injuries and illnesses in golf. *Br J Sports Med* 2020;**54**:1136–41.
30. Orchard JW, Ranson C, Olivier B, et al. International consensus statement on injury surveillance in cricket: A 2016 update. *Br J Sports Med* 2016;**50**:1245–51.
31. Timpka T, Alonso JM, Jacobsson J, et al. Injury and illness definitions and data collection procedures for use in epidemiological studies in athletics (track and field): Consensus statement. *Br J Sports Med* 2014;**48**:483–90.
32. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *J Clin Epidemiol* 2021;**134**:178–89.
33. Waldén M, Mountjoy M, McCall A, et al. Football-specific extension of the IOC consensus statement: Methods for recording and reporting of epidemiological data on injury and illness in sport 2020. *Br J Sports Med* 2023;**57**:1341–50.
34. Fuller CW, Molloy MG, Bagate C, et al. Consensus statement on injury definitions and data collection procedures for studies of injuries in rugby union. *Br J Sports Med* 2007;**41**:328–31.
35. Veritas Health Innovation. *Covidence—Better systematic review management*. Available at: https://www.covidence.org/. [accessed: 29.09.2022].
36. Wells G, Shea B, Robertson J, Peterson J, Welch V, Losos M. *The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomized studies in meta-analysis bias and confounding Newcastle-Ottowa scale*. Available at: http://www.evidencebasedpublichealth.de/download/Newcastle_Ottowa_Scale_Pope_Bruce.pdf. [accessed: 30.01.2022].
37. Qumseya BJ. Quality assessment for systematic reviews and meta-analyses of cohort studies. *Gastrointest Endosc* 2021;**93**:486–94.
38. Ribeiro CM, Beserra BTS, Silva NG, et al. Exposure to endocrine-disrupting chemicals and anthropometric measures of obesity: A systematic review and meta-analysis. *BMJ Open* 2020;**10**:e033509. doi:10.1136/bmjopen-2019-033509.
39. Fuller CW, Dick RW, Corlette J, Schmalz R. Comparison of the incidence, nature and cause of injuries sustained on grass and new generation artificial turf by male and female football players. Part 2: Training injuries. *Br J Sports Med* 2007;**41**:i27–32.
40. Fuller CW, Dick RW, Corlette J, Schmalz R. Comparison of the incidence, nature and cause of injuries sustained on grass and new generation artificial turf by male and female football players. Part 1: Match injuries. *Br J Sports Med* 2007;**41**:i20–6.
41. Hagel BE, Fick GH, Meeuwisse WH. Injury risk in men's Canada West University football. *Am J Epidemiol* 2003;**157**:825–33.
42. Iguchi J, Yamada Y, Kimura M, et al. Injuries in a Japanese division I collegiate American football team: A 3-season prospective study. *J Athl Train* 2013;**48**:818–25.
43. McCunn R, Fullagar HHK, Williams S, Halseth TJ, Sampson JA, Murray A. The influence of playing experience and position on injury risk in NCAA Division I college football players. *Int J Sports Physiol Perform* 2017;**12**:1297–304.
44. Meeuwisse WH, Hagel BE, Mohtadi NGH, Butterwick DJ, Fick GH. The distribution of injuries in men's Canada West University football: A 5-year analysis. *Am J Sports Med* 2000;**28**:516–23.
45. Mortensen BB, Mitchell UH, Johnson AW, Fellingham GW, Feland JB, Myrer JW. Preseason screen cannot predict injury over three years of college football. *Med Sci Sports Exerc* 2020;**52**:2286–92.
46. Willigenburg NW, Borchers JR, Quincy R, Kaeding CC, Hewett TE. Comparison of injuries in American collegiate football and club rugby. *Am J Sports Med* 2016;**44**:753–60.
47. Sullivan L, Ding K, Tattersall H, Brown S, Yang J. Social support and post-injury depressive and anxiety symptoms among college-student athletes. *Int J Environ Res Public Health* 2022;**19**:6458. doi:10.3390/ijerph19116458.

48. Sanfilippo JL, Hoffmann CN, Haraldsdottir K, Steiner Q, Watson AM. The associations between wellbeing and injury differ by time loss in collegiate athletes. *Sports Health* 2024;**16**:363–9.
49. Smith CA, Chimera NJ, Warren M. Association of Y balance test reach asymmetry and injury in Division I athletes. *Med Sci Sports Exerc* 2015;**47**:136–41.
50. Teahan C, O'Connor S, Whyte EF. Injuries in Irish male and female collegiate athletes. *Phys Ther Sport* 2021;**51**:1–7.
51. O'Connor S, Bruce C, Teahan C, McDermott E, Whyte E. Injuries in collegiate Ladies Gaelic footballers: A 2-season prospective cohort study. *J Sport Rehabil* 2021;**30**:261–6.
52. O'Connor S, McCaffrey N, Whyte EF, Moran KA. Epidemiology of injury in male collegiate Gaelic footballers in one season. *Scand J Med Sci Sports* 2017;**27**:1136–42.
53. Brumitt J, Wilson V, Ellis N, Petersen J, Zita CJ, Reyes J. Preseason lower extremity functional test scores are not associated with lower quadrant injury – A validation study with normative data on 395 division III athletes. *Int J Sports Phys Ther* 2018;**13**:410–21.
54. Brumitt J, Mattocks A, Engilis A, Sikkema J, Loew J. Off-season training habits and BMI, not preseason jump measures, are associated with time-loss injury in female collegiate soccer players. *Sports* 2020;**8**:36. doi:10.3390/sports8030036.
55. Brumitt J, Heiderscheit BC, Manske RC, Niemuth PE, Mattocks A, Rauh MJ. Preseason functional test scores are associated with future sports injury in female collegiate athletes. *J Strength Cond Res* 2018;**32**:1692–701.
56. Meyers MC. Incidence, mechanisms, and severity of match-related collegiate men's soccer injuries on FieldTurf and natural grass surfaces. *Am J Sports Med* 2017;**45**:708–18.
57. Meyers MC. Incidence, mechanisms, and severity of game-related college football injuries on FieldTurf *versus* natural grass: A 3-year prospective study. *Am J Sports Med* 2010;**38**:687–97.
58. Meyers MC. Incidence, mechanisms, and severity of match-related collegiate women's soccer injuries on FieldTurf and natural grass surfaces: A 5-year prospective study. *Am J Sports Med* 2013;**41**:2409–20.
59. Curtis RM, Huggins RA, Benjamin CL, et al. Factors associated with noncontact injury in collegiate soccer: A 12-team prospective study of NCAA Division I men's and women's soccer. *Am J Sports Med* 2021;**49**:3076–87.
60. Kelley EA, Hogg JA, Gao L, Waxman JP, Shultz SJ. Demographic factor and instantaneous lower extremity injury occurrence in a National Collegiate Athletic Association Division I population. *J Athl Train* 2022;**58**:393–400.
61. Brumitt J, Dorociak R, Dunn S, Critchfield C, Benner J, Cuddeford T. Lower preseason reactive strength index scores are associated with injury in female collegiate volleyball players but not male collegiate basketball players. *J Sci Med Sport* 2021;**24**:549–54.
62. Brumitt J, Hutchison MK, Houck J, et al. Comparison of non-contact and contact time-loss lower quadrant injury rates in male collegiate basketball players: A preliminary report. *Int J Sports Phys Ther* 2018;**13**:963–72.
63. Brumitt J, Nelson K, Duey D, Jeppson M, Hammer L. Preseason Y balance test scores are not associated with noncontact time-loss lower quadrant injury in male collegiate basketball players. *Sports* 2018;**7**:4. doi:10.3390/sports7010004.
64. Maurice D, Giordani L, Sobze Martin S, Yagaï B, Colizzi V, Foti C. The 2019 Cameroon university games: Prevention strategies for musculoskeletal injuries. *MLTJ* 2021;**11**:475–83.
65. Meeuwisse WH, Sellmer R, Hagel BE. Rates and risks of injury during intercollegiate basketball. *Am J Sports Med* 2003;**31**:379–85.
66. Nagano Y, Shimada Y, Sasaki N, Shibata M. Prevalence and burden of physical problems in female college basketball athletes: A 135-day prospective cohort study. *Open Access J Sports Med* 2021;**12**:55–60.
67. Brumitt J, Engilis A, Isaak D, Briggs A, Mattocks A. preseason jump and hop measures in male collegiate basketball players: An epidemiologic report. *Int J Sports Phys Ther* 2016;**11**:954–61.
68. Bliekendaal S, Barendrecht M, Stubbe J, Verhagen E. Mechanisms of sport-related injuries in physical education teacher education students: A descriptive analysis of 896 injuries. *Transl Sports Med* 2021;**4**:368–77.
69. Enoki S, Nagao M, Ishimatsu S, Shimizu T, Kuramochi R. Injuries in collegiate track and field jumping: A 2-year prospective surveillance study. *Orthop J Sports Med* 2021;**9**:2325967120973397. doi:10.1177/2325967120973397.
70. Hayes L, Boulos A, Cruz A. Risk factors for in-season injury in varsity collegiate cross-country athletes: An analysis of one season in 97 athletes. *J Sports Med Phys Fitness* 2019;**59**:1536–43.
71. Rebella G. A prospective study of injury patterns in collegiate pole vaulters. *Am J Sports Med* 2015;**43**:808–15.
72. Haraldsdottir K, Sanfilippo J, McKay L, Watson AM. Decreased sleep and subjective well-being as independent predictors of injury in female collegiate volleyball players. *Orthop J Sports Med* 2021;**9**:23259671211029285. doi:10.1177/23259671211029285.
73. Colberg R, Aune K, Choi J, Fleisig G. Incidence and prevalence of musculoskeletal conditions in collegiate tennis athletes. *J Med Sci Tennis* 2015;**20**:137–44.
74. Ball S, Halaki M, Orr R. Movement demands and injury characteristics in under-20-years university rugby union players. *J Athl Train* 2020;**55**:376–83.
75. Chase KI, Caine DJ, Goodwin BJ, Whitehead JR, Romanick MA. A prospective study of injury affecting competitive collegiate swimmers. *Res Sports Med* 2013;**21**:111–23.
76. Flik K, Lyman S, Marx RG. American collegiate men's ice hockey: An analysis of injuries. *Am J Sports Med* 2005;**33**:183–7.
77. Grant JA, Bedi A, Kurz J, Bancroft R, Gagnier JJ, Miller BS. Ability of preseason body composition and physical fitness to predict the risk of injury in male collegiate hockey players. *Sports Health* 2015;**7**:45–51.
78. Schick DM, Meeuwisse WH. Injury rates and profiles in female ice hockey players. *Am J Sports Med* 2003;**31**:47–52.
79. Miyake E, Yatsunami M, Kurabayashi J, et al. A prospective epidemiological study of injuries in Japanese national tournament-level badminton players from junior high school to university. *Asian J Sports Med* 2016;**7**:e29637. doi:10.5812/asjsm.29637.
80. Jang YH, Jang HS, Park S, Yun HJ, Kim D, Park J. Epidemiology of injuries in collegiate men's badminton: A five-year prospective study. *Med Sport* 2022;**75**:96–107.
81. DiPasquale S, Becker N, Green S, Sauers K. Self-reported injury and management in a liberal arts college dance department. *Med Probl Perform Art* 2015;**30**:224–30.
82. Matz SO, Nibbelink G. Injuries in intercollegiate women's lacrosse. *Am J Sports Med* 2004;**32**:608–11.
83. Walrod B, Turner W, Hartz C. A prospective cohort study of collegiate fencing injuries. *Curr Sports Med Rep* 2019;**18**:361–6.
84. Brumitt J, Heiderscheit BC, Manske RC, Niemuth P, Mattocks A, Rauh MJ. The lower-extremity functional test and lower-quadrant injury in NCAA Division III athletes: A descriptive and epidemiologic report. *J Sport Rehabil* 2016;**25**:219–26.
85. Gaudio FG, Greenwald PW, Holton M. Injury and illness in college outdoor education. *Wilderness Environ Med* 2010;**21**:363–70.
86. Brumitt J, Heiderscheit BC, Manske RC, Niemuth PE, Rauh MJ. Lower extremity functional tests and risk of injury in division III collegiate athletes. *Int J Sports Phys Ther* 2013;**8**:216–7.
87. Watts M, Bobo L, Whitehead MT, Dompier TP, Oliver GD. Characteristics of injury in collegiate rodeo. *Clin J Sport Med* 2022;**32**:E145–50.
88. Fuller CW, Taylor A. Eight-season epidemiological study of match injuries in Women's International Rugby Sevens. *J Sports Sci* 2021;**39**:865–74.
89. Panagodage Perera NK, Kountouris A, Kemp JL, Joseph C, Finch CF. The incidence, prevalence, nature, severity and mechanisms of injury in elite female cricketers: A prospective cohort study. *J Sci Med Sport* 2019;**22**:1014–20.

90. Brooks JHM, Fuller CW. The influence of methodological issues on the results and conclusions from epidemiological studies of sports injuries: Illustrative examples. *Sports Med* 2006;**36**:459–72.
91. Costello D, Daly E, Ryan L. Sports Injury Surveillance Systems: A scoping review of practice and methodologies. *J Funct Morphol Kinesiol* 2024;**9**:177. doi:10.3390/jfmk9040177.
92. Whalan M, Lovell R, Sampson JA. Do niggles matter? — Increased injury risk following physical complaints in football (soccer). *Sci Med Football* 2020;**4**:216–24.
93. Williams S, Trewartha G, Kemp SP, et al. Time loss injuries compromise team success in Elite Rugby Union: A 7-year prospective study. *Br J Sports Med* 2016;**50**:651–6.
94. Sprouse B, Chandran A, Rao N, et al. Injury and illness surveillance monitoring in team sports a framework for all. *Inj Epidemiol* 2024;**11**:23. doi:10.1186/s40621-024-00504-6.
95. Dick R, Agel J, Marshall SW. National Collegiate Athletic Association Injury Surveillance System commentaries: Introduction and methods. *J Athl Train* 2009;**44**:173–82.
96. Roos KG, Kucera KL, Golightly YM, Myers JB, Rosamond WD, Marshall SW. Variability in the identification and reporting of overuse injuries among sports injury surveillance data collectors. *Athl Train Sports Health Care* 2019;**11**:143–6.
97. Nielsen RO, Debes-Kristensen K, Hulme A, et al. Are prevalence measures better than incidence measures in sports injury research? *Br J Sports Med* 2019;**53**:396–7.
98. Mukherjee S. Retrospective designs in sports injury surveillance studies: All is not lost. *Sport Exerc Med Open J* 2015;**1**:164–6.
99. Kerr ZY. Athletic trainers: The originators of and continued experts in sports injury-surveillance data collection. *J Athl Train* 2018;**53**:725–6.
100. Tabben M, Whiteley R, Wik EH, Bahr R, Chamari K. Methods may matter in injury surveillance: “How” may be more important than “what, when or why”. *Biol Sport* 2020;**37**:3–5.
101. Clarsen B, Bahr R. Matching the choice of injury/illness definition to study setting, purpose and design: One size does not fit all!. *Br J Sports Med* 2014;**48**:510–2.