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Review Article

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A Systematic Review of The Epidemiology of Sports Injuries Among Iranian Athlete School Students

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Abstract

Introduction: Student engagement in sports is on the rise, promoting various health advantages while heightening the likelihood of sustaining sports-related injuries. This study aimed to review the epidemiology of sports injuries among Iranian students.

Methods: A systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The search used selected keywords from inception to June 2025 to search PubMed, Scopus, Web of Science, SID, Magiran, and IranMedex databases for original and peer-reviewed articles. Google Scholar was also searched for additional records. The quality of the included studies was assessed using the Joanna Briggs Institute checklist.

Results: After searching the mentioned databases, 3360 articles were identified. Ultimately, 15 articles were selected for this review based on the inclusion criteria. It revealed a high prevalence of sports injuries among Iranian student-athletes, with reported injury rates ranging from 24.2% to 33.3%. Football (69%) and futsal (11.6%) had the highest injury rates among boys, while volleyball (17.2%) and handball (4.7%) were the most common among girls. Lower limb injuries were the most frequently reported (n = 8), accounting for > 50% of all cases. The most common injury types included muscle-tendon injuries, sprains, and cramps, often resulting from contact mechanisms, such as collisions and inadequate warm-up. Injuries occurred more frequently during training than during competitions.

Conclusions: These findings provide valuable guidance for stakeholders to develop evidence-based injury prevention strategies to improve the students' safety and health in Iran. However, crucial research gaps remain, including the need for longitudinal studies and improved injury surveillance systems to better understand risk factors over time.

Key words: Iran, Prevalence, Sports injuries, Students

Introduction

Sports are a vital part of student life, contributing significantly to both physical well-being and mental health (1). Engaging in sports activities enhances overall fitness and health (2) while fostering psychological resilience, boosting self-esteem, and developing social skills (3). These injuries can vary in severity, from minor injuries, such as muscle strains, to more serious conditions, including bone fractures or anterior cruciate ligament (ACL) tears (4, 5). In Iran, where sports are prominent in both school programs and extracurricular activities, understanding the patterns and prevalence of such injuries among school-aged children is crucial (6). The growing concern over the effect of these injuries on students' physical health, quality of life (7), and educational outcomes has increased focus on this area of research.

Sports injuries can lead to a temporary cessation of sports activities and have long-term effects on students' physical and mental health (8). For example, serious injuries, such as ACL tears, often necessitate surgical intervention and extended rehabilitation periods, potentially disrupting academic progress and limiting social engagement (9). From an economic perspective, the costs

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associated with treating these injuries and missing school significantly burden families and the education system (10).

Conversely, school-based sports are widely acknowledged as an effective means of enhancing students' physical and psychological well-being, while also helping to ward off long-term health issues, such as obesity and type 2 diabetes (11, 12). In Iran, where schools are placing growing emphasis on athletic competition and physical engagement (13), there is a rising demand for deeper insights into the patterns and prevalence of sports-related injuries among students.

Student sports injuries can stem from a range of causes, including poor physical conditioning (14), incorrect training methods, substandard equipment, and insufficient supervision during activities (15, 16). Research indicates that the likelihood and nature of injuries are influenced by various factors, such as the specific sport being played (17), the athlete's experience level, and the intensity of physical activity (18). For instance, high-contact and physically demanding sports, such as soccer and gymnastics, often show elevated injury rates (19, 20). Moreover, age and gender contribute to injury patterns; male students and older adolescents are generally more susceptible (21, 22), mainly due to their involvement in more rigorous or competitive sports environments.

Although student involvement in sports is on the rise in Iran, there remains a noticeable gap in comprehensive data regarding the epidemiology of sports injuries in this age group. The available evidence is highly fragmented, with most studies focusing on specific sports groups such as gymnasts or soccer players (23, 24), while broader, population-based data on Iranian school students are scarce. This fragmentation makes it difficult to compare findings across studies. Additionally, factors, such as regional disparities, varying access to sports facilities, and differences in the quality of school physical education programs can influence injury rates and patterns. Therefore, a systematic review to collect and analyze existing data in this field is essential.

Methods

Search Strategy

This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (25). The databases PubMed, Scopus, Web of Science, SID, Magiran, and IranMedex were searched from January 2000 to June 2025. Google Scholar was also searched for additional records. Keywords were selected according to Table 1 and searched using Boolean operators. The search strategy was developed based on previous studies. The search was conducted in English-language databases; however, Persian databases used Persian translations.

Inclusion Criteria

The inclusion criteria included studies conducted in Iran, focusing on students aged 6-18 years, examining sports injuries, articles in Persian or English, and original studies.

Exclusion Criteria

Articles had to be published in journals with a peer-reviewed process. Irrelevant studies, conference papers, systematic reviews, and studies without quantitative data were excluded.

Article Screening and Bias Risk Assessment

After searching the databases, the results were transferred to EndNote 7X software. Then, the two independent researchers screened articles' titles and abstracts. Relevant articles were selected for full-text review. In the case of disagreement, a consensus method was used.

Data Extraction, Collection, and Synthesis

After identifying eligible articles, general data, study characteristics, and results were extracted and summarized in Table 2. The researcher extracted the data. The quality of the studies was assessed using the Joanna Briggs Institute (JBI) tools for prevalence studies (Table 3) (26). The risk factors and common types of injuries were reported.

Table 1. Search Strategy Used for This Study

Variable	Keywords
Sports injuries (≠1)	("Sports injury*" OR "Athletic injury*" OR "Exercise-related injury*" OR "Physical activity injury*" OR "Musculoskeletal injury*" OR "Sprain*" OR "Strain*" OR "Fracture*" OR "Dislocation*" OR "Concussion*" OR "Anterior cruciate ligament injury*" OR "ACL injury*" OR "Overuse injury*" OR Injury*)

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Iranian students (≠2)	("Iran*" OR "Persia*") AND ("Student*" OR "Schoolchild*" OR "Adolescent*" OR "Youth*" OR "Teen*" OR "Child*" OR "School*" OR "High school*" OR "Secondary school*" OR "Primary school*" OR "Elementary school*")
Epidemiology (≠3)	("Epidemiolog*" OR "Prevalence" OR "Incidence" OR "Risk factor*" OR "Cause*" OR "Etiolog*" OR "Distribution" OR "Frequency" OR "Occurrence" OR "Pattern*" OR "Burden")
Final search	≠1 AND ≠2 AND ≠3

Table 2. The Eligible Studies Characteristics

Study	Sample Size	Study Population	Mode of Data Collection	Main Findings
Naderi et al. 2024 (6)	153 students	Students with an average age of 14.1 ± 2.8	PROMIS-2 scales and the SF-36 scale	The most commonly impacted areas included the feet and toes (16.2%).
Mozafari et al. 2025 (27)	100 players	Female Karate players	The Oslo standard questionnaire	The results showed that acute injuries occurred most frequently in the knees.
Seyedahmadi et al. 2023 (28)	425 male student-athletes	Adolescent boys with a sports history of 3.03 ± 0.18 years	Fuller injury report form	The data revealed that sports injuries were most frequently reported among track-and-field athletes (54%).
Asgari et al. 2022 (29)	93 players	Young players aged 16 to 19 years	Football-specific performance tests	A total of 31 lower extremity injuries were recorded, impacting 24 players, which accounted for 26.6% of the participants.
Erfani et al. 2021 (30)	285 male students	Students at tenth and twelfth grade of high school	qualitative and quantitative descriptive techniques (semi-structured interviews)	The overall injury incidence was 33.3 injuries per 100 student athletes.
Esmaeilpoor et al. 2021 (31)	295 athletes	Karate and Taekwondo athletes aged 11–17-year-old	Online questionnaire	A significant correlation was observed between self-reported orofacial injuries and factors, such as age, weekly training duration, sport type, and prior training on orofacial injury prevention.
Khorzoghi et al. 2021 (32)	81 young athletes	Elite players of the Premier League	Retrospective descriptive and Questionnaires	Libero players reported back injuries at 15.87% and 8.33%.
Zarei et al. 2020 (33)	60 players	Adolescent taekwondo players of Iran Premier League	Performance tests and Questionnaires	The overall injury incidence rate was calculated as 7.9 per 1000 hours of exposure.
Asadi Melerdi et al. 2020 (34)	548 female students and 575 male students	National Olympiad students aged 21-24	Prospective study and injury report form	Among boys, 43 injuries were reported, with an incidence rate of 0.07 injuries per individual.
Alizadeh et al. 2020 (35)	6300 students	Male and female students aged 12-16 years	Prospective manner and Questionnaires	In boys, most injuries occurred in football (69%) and futsal (11.6%), while in girls, volleyball (17.2%) and handball (4.7%) had the highest injury rates.

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Zarei et al. 2019 (36)	40 players	Male youth football players aged 7-14 years	Performance tests and Questionnaires	There was a 55% decrease in lower extremity injuries, a 45% reduction during training, and a 66% decrease in knee injuries.
Atri et al. 2012 (37)	1156 male student athletes	Middle school and high school students	Fuller's damage report form	Most injuries were muscle-tendon-related, comprising 81% of the total, while skin (13%) and joint-ligament injuries (6%) were less common.
Sayyah et al. 2011 (38)	37 injured girl athletes and 133 none-injured girl athletes	Girl students participating in the sport Olympiads	Injury recording form and Seca scale model	The study found that injuries most commonly occurred in the lower body (44.4%), followed by the upper body (38.9%).
Sayyah et al. 2011 (39)	62 players	Players aged 19-24 years	Injury recording form	The greatest number of injuries occurred during handball and taekwondo competitions, with 45 and 35 cases.
Soori et al. 2002 (40)	1079 children	Children 15 years old or younger	Questionnaire	Most injuries occurred on the street (51.9%) and at home (42.3%), with the head being the most commonly affected area.

Table 3. The Quality Assessment of the Eligible Studies

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Overall Score
Mozafari et al. 2025	Y	N	N	Y	Y	Y	Y	Y	Y	7
Naderi et al. 2024	Y	N	Y	Y	Y	Y	Y	Y	Y	8
Seyedahmadi et al. 2023	Y	N	Y	Y	Y	Y	Y	Y	Y	8
Asgari et al. 2022	Y	N	N	Y	Y	Y	Y	Y	Y	7
Erfani et al. 2021	Y	N	Y	Y	Y	Y	Y	Y	Y	8
Esmaeilpoor et al. 2021	Y	N	Y	Y	Y	Y	Y	Y	Y	8
Khorzoghi et al. 2021	Y	N	N	Y	Y	Y	Y	Y	Y	7
Zarei et al. 2020	Y	N	N	Y	Y	Y	Y	Y	Y	7
Asadi Melerdi et al. 2020	Y	N	Y	Y	Y	Y	Y	Y	Y	8
Alizadeh et al. 2020	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
Zarei et al. 2019	Y	N	N	Y	Y	Y	Y	Y	Y	7
Atri et al. 2012	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
Sayyah et al. 2011 a	Y	N	N	Y	Y	Y	Y	Y	Y	7
Sayyah et al. 2011 b	Y	N	N	Y	Y	Y	Y	Y	Y	7
Soori et al. 2002	Y	Y	Y	Y	Y	N	Y	Y	Y	8

Results

The initial search of the selected databases yielded 3360 reports. After removing duplicates (n =818) based on the predefined inclusion and exclusion criteria, the remaining count for screening amounted to 44 reports, as shown in the flow diagram (Figure 1). Ultimately, only 15 studies fulfilled the eligibility criteria.

Prevalence of Sports Injuries

Among the reviewed studies, Khorzoghi et al. (2021) reported a notably high injury occurrence among elite volleyball players in Iran's Youth Premier League, with specific pattern based on playing positions and injury type (32). Naderi (2024) identified that 24.2% of school-aged student-athletes reported injuries in at least one body region within six months (6). In a prospective study, Asadi Melerdi et al. (2020) showed that 136 injuries were identified in 190 competitions among Olympiad students (34), and Zarei et al. (2020) reported that male taekwondo athletes experienced an injury incidence rate of 7.9 per 1000 hours of exposure. Alizadeh et al. (2020) found that football (69%) and futsal (11.6%) had the highest injury rates among boys, while volleyball (17.2%) and

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handball (4.7%) were the most common injury-prone sports for girls (35). Atri et al. (2012) noted that injuries were most common in handball and indoor soccer, whereas basketball and volleyball recorded the fewest injury cases (37). Erfani et al. (2021) reported an injury incidence rate of 33.3 injuries per 100 student-athletes and 63.3 injuries per 100 hours of training and competition (30). Moreover, Sayyah et al. (2011) indicated that the highest frequency of traumas was recorded in handball matches (45 cases, 25.6%), followed by football matches (36, 22.5%) (39). Also, Seyedahmadi et al. (2023) found that 54% of track and field athletes, 23.3% of those practicing skipping rope, 13.5% of gymnasts, and 9.2% of swimmers reported a history of sports-related injuries (28). The prevalence of sports injuries among Iranian students has been reported to be high, and the country's educational policymakers must consider appropriate solutions to reduce them.

Anatomical Distribution of Injuries

Most studies consistently highlighted the lower limbs as the most injury-prone region (28, 29, 36, 38). For example, Asadi Melerdi et al. (2020) reported that injuries among boys were predominantly located in the knees and shins (21.4%), whereas in girls, the thighs (28.3%) and ankles (20.7%) were the most commonly affected areas (34). Another study by Mozafari et al. (2025) showed that the knee was the most common location of acute injuries (27). Also, Erfani et al. (2021) revealed that the lower extremity accounted for the highest rate of injuries at 51.6% (30). Furthermore, Atri et al. (2012) demonstrated that the most frequent injuries were lower extremities (51%) among 122 injuries (37). On the other hand, Soori (2002) reported that the head was the part of the body most frequently injured (55.0%) (40). In addition, Sayyah et al. (2011) showed that face and head (11.1%), and trunk (5.6%) were the most common locations of injuries (38).

The reported injury rates ranged from 35% to over 51%. Studies have shown that the most prevalent injury sites are the knees and shins in boys, and thighs and ankles in girls.

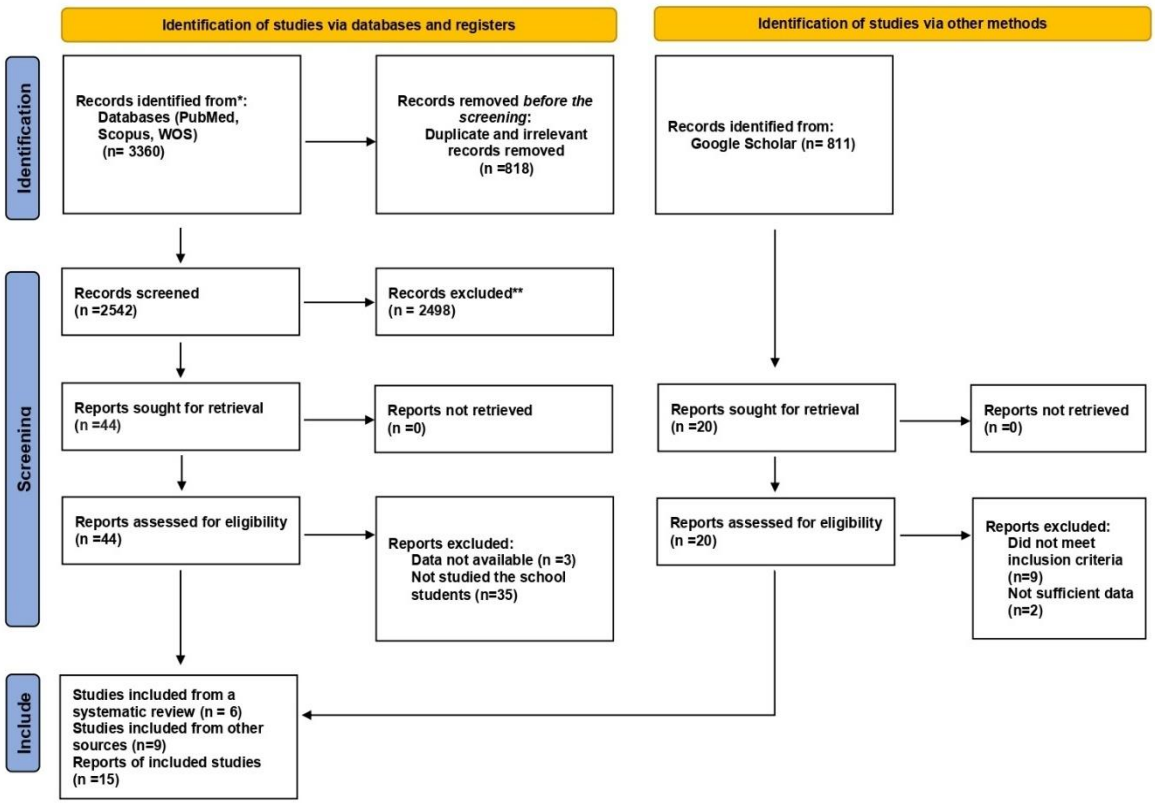

Figure 1. Flow Diagram for Eligible Studies

Injury Type and Severity

Different injury types were reported in all studies. Asadi Melerdi et al. (2020) reported cramps as the predominant injury type in both

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genders (34). Seyedahmadi et al. (2023) reported that the types of injuries included 54% muscular-tendon, 3.32% bone-joint, and 7.13% skin-related injuries (28). Mozafari et al. (2025) revealed that sprains and fractures were the most common acute injuries, while other types of injuries and tendonitis were predominant among chronic cases (27). Erfani et al. (2021) indicated that collisions were the primary cause of most injuries sustained by student-athletes during sports activities (30). Atri et al. (2012) also reported that the majority of injuries were muscle-tendon-related, comprising 81% of the total, while skin (13%) and joint-ligament (6%) injuries were less common (6%) (37).

The eligible studies reported diverse injury types. Muscle-tendon injuries (54%-81%) seem to be the most common injury type. Then, cramps and skin-related issues are the most common problems. Sprains and fractures are the most frequent acute injuries, while tendonitis is common in chronic injuries. Less frequent types of sport-related injuries included bone-joint and joint-ligamentous injuries.

Risk Factors and Mechanisms

Several injury risk factors were identified. In a study, the primary cause of injury among boys was insufficient warm-up (29.78%), while girls reported excessive exercise pressure (27%) and inappropriate warm-up (24.81%) (34). Alizadeh et al. (2020) reported that most injuries occurred in crowded classes (35). Atri et al. (2012) showed that the highest causes of injury were collisions between two players (59.86%) and lack of proper warm-up before the match (16.42%) (37). Another study revealed that acute contact injuries (59.23%) were more common than non-contact injuries (40.77%) (27). Seyedahmadi et al. (2023) found that 36% of injuries resulted from improper exercise techniques, 30% were linked to inadequate warm-up routines, and 20% stemmed from insufficient physical conditioning (28).

Multiple injury risk factors were identified across studies. For example, inadequate warm-up is reported as a frequent cause for both boys and girls, alongside excessive exercise pressure (especially for girls) and player collisions. Moreover, the eligible studies showed that environmental risks may contribute to injury, including crowded classes, inappropriate conditions, improper exercise techniques, and insufficient physical preparation. Furthermore, acute contact injuries were more common than non-contact injuries. Most injuries occurred during training sessions rather than competitions.

Discussion

Students experience rapid physical and psychosocial changes that can increase their vulnerability to injuries. Risk-taking behaviors and limited awareness of injury prevention may exacerbate susceptibility among students. This necessitates the incorporation of adolescent-specific factors into injury prevention frameworks to reduce injury incidence effectively.

The findings of this systematic review corroborate previous reports of significant sports injury prevalence among Iranian student-athletes. Reported rates vary due to heterogeneity in study design, population demographics, sports disciplines assessed, and injury definitions. For example, Khorzoghi et al. (2021) documented high injury rates among elite youth volleyball players (32), while Naderi (2024) reported that nearly one in four student athletes experienced an injury within six months (6). These discrepancies underscore the multifactorial nature of injury risk and the need for context-specific surveillance and prevention. Consistent with previous literature, this review highlights the predominance of lower extremity injuries, particularly affecting the knees, thighs, and ankles (27, 30, 34). The biomechanical demands and frequent loading of the lower limbs during dynamic sports activities contribute to their vulnerability. Nonetheless, variations exist, with some studies indicating a higher frequency of head injuries, such as Soori (2002), pointing to potential sport-specific or methodological differences (40).

The high proportion of collision-induced injuries, particularly in contact sports, such as handball and football, further emphasizes the impact of direct player interactions on injury risk (30, 37). The predominance of muscular injuries also signals the importance of conditioning, flexibility, and neuromuscular control in injury prevention efforts.

Sport-specific injury patterns highlight the need for targeted interventions. Football, identified as having the highest injury rate among boys, and volleyball and handball among girls, align with their popularity and inherent physical demands in Iran (35). Notably, football was also associated with the highest concussion rates internationally, underscoring the necessity of tailored concussion prevention protocols in high-contact sports (41). This suggests that Iranian school athletes face

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challenges similar to those of their peers worldwide, and evidence-based prevention strategies in other countries could be particularly relevant to the Iranian context. Importantly, modifiable risk factors such as insufficient warm-up, excessive training loads, improper exercise techniques, and crowded training environments were repeatedly implicated as key contributors to injury (28, 34, 35). These mechanisms align with broader injury prevention frameworks, such as van Mechelen's "sequence of prevention" and the Translating Research into Injury Prevention Practice framework (TRIPP), which emphasize identifying modifiable risk factors and adapting training environments as crucial steps toward effective prevention strategies. These findings advocate for structured warm-up routines, workload monitoring, and educational programs aimed at coaches, athletes, and stakeholders to enhance injury prevention awareness.

The limitations of the reviewed studies include heterogeneity in injury definitions, data collection methods, and variability in follow-up periods, which may impact the comparability of findings. Also, the possibility of publication bias cannot be ruled out. Moreover, only articles published in English and Persian were included, raising the possibility that studies in other languages were overlooked. Future research should focus on prospective, standardized injury surveillance systems to enable more precise epidemiological assessments and evaluations of preventive interventions.

The findings of this review underscore the urgent need for policy and practice initiatives to reduce sports injuries among Iranian school students. Policymakers should encourage the development of standardized injury surveillance systems to generate trustworthy data to guide prevention strategies. Additionally, coach and teacher training programs can consistently teach safe exercise techniques.

Conclusions

In conclusion, this review highlights a significant prevalence of sports injuries among Iranian student-athletes, predominantly affecting the lower extremities and primarily driven by modifiable risk factors such as inadequate warm-up and training practices. From a practical standpoint, policymakers and educators should prioritize integrating structured warm-up protocols, monitoring training loads, and improving physical education programs to reduce injury risk. Future interventions that address these modifiable factors, while also building stronger surveillance and reporting systems, can play a crucial role in enhancing student safety and health in Iran.

Ethics Approval and Consent to Participate

Not applicable.

Consent for Publication

Not applicable.

Data Availability Statement

The data supporting this study's findings are available upon request from the corresponding author.

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Authors' Contribution

RS examined and interpreted the searched papers from the databases, performed the data extraction from the eligible studies, and wrote the manuscript. He read and approved the final manuscript.

Conflict of Interest

The authors declared no conflict of interest.

Declaration of Generative Artificial Intelligence (AI) in Scientific Writing

The researcher did not use artificial intelligence to generate content at any stage of the research. Grammarly Premium software was used to check the text grammar and spelling.

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