



# Prevalence of Sports Injuries Among School Student-Athletes and Their Effects on the Mental and Physical Health

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## Abstract

**Background:** Regular exercise is beneficial for children and teenagers in terms of physical and mental health, but it is crucial to acknowledge the potential for injuries and the lack of extensive research on the prevalence and consequences of sports-related injuries in this age group.

**Objectives:** This study aims to investigate the occurrence of sports injuries and assess how they may affect students' mental and physical well-being.

**Methods:** The current study was cross-sectional research conducted in Hamedan City from 1401 to 1402. The statistical population of this study consisted of students who participated in team sports. A total of 153 students, with an average age of  $14.1 \pm 2.8$ , were selected as the study population. The quality of life was assessed using the SF36 scale, while physical and mental health were evaluated using the PROMIS-2 scales. The collected data were analyzed using SPSS version 21 software and the independent *t*-test statistical method, with a significance level set at 0.05.

**Results:** The research results have shown that 24.2% of student-athletes in Hamedan City suffer from sports injuries in at least one part of their body. The areas that most commonly affected were the feet and toes (16.2%), ankles (13.5%), and knees (10.8%). Furthermore, the findings from the research indicate that student-athletes with a previous history of sports injuries had a significantly lower average quality of life, physical health, social functioning, and pain interference compared to those who had not experienced such injuries ( $P < 0.05$ ).

**Conclusions:** Sports injuries are common among student-athletes who participate in team sports, and they can significantly affect both their physical and social well-being. Such injuries can have a detrimental impact on the daily lives and social interactions of adolescent athletes. Therefore, health professionals must be fully aware of these repercussions and make them a key focus when managing sports injuries.

**Keywords:** Sports Injuries, Mental Health, Physical Health, Student Athletes

## 1. Background

Regular exercise for children and adolescents provides physical benefits such as a reduced risk of heart disease, diabetes, and osteoporosis (1, 2). It also has psychosocial advantages, including decreased depression and anxiety, improved cognitive functions, increased self-confidence, and enhanced mental resilience (3). However, it is important to note that exercise can also lead to injuries in this age group (4). Studies show that an average of 12 million student-athletes between the ages of 5 and 22 experience sports-related injuries each year, resulting in significant medical expenses (5). These injuries can have consequences for students, leading to a decrease in

sports participation and missed classes (6). Additionally, sports injuries may have long-term effects on an athlete's overall health, although more research is needed in this area (7-9). Therefore, it is crucial to focus on preventing and managing sports injuries to protect the well-being of young athletes.

After a sports injury, the main goal is to get the athlete back to their sport efficiently (10, 11). This involves evaluating physical components like strength, range of motion, fitness, and the health of the injured area. The physical abilities of an injured individual are important for them to be able to continue their sport without the risk of reinjury (12, 13). However, physical recovery

indicators only show the physiological state of tissues and physical disorders, and do not provide information about the patient's understanding of their health status (13, 14). As a result, these indicators may not accurately represent the individual's overall health (15, 16). Therefore, the medical community has consistently supported the utilization of tools that assess patient-reported outcomes (PRO) to evaluate overall health (17, 18). These tools directly measure the patient's subjective interpretation of their condition and are considered a better way to gauge patient well-being.

These tools are used to assess the effects of sports injuries on an athlete's overall health and to evaluate how subsequent healthcare services affect their health (12, 14). Health-related quality of life (HRQOL) is an important measure that evaluates an individual's satisfaction with life and overall well-being (19, 20). It considers different aspects of health, such as physical, psychological, and social components, which are influenced by the person's experiences, expectations, beliefs, and perceptions (19, 21). However, the use of HRQOL in sports rehabilitation research is uncommon, possibly due to a lack of understanding among professionals in the field. Understanding an athlete's HRQOL is important for physicians to make informed care decisions when they return to activity after a severe injury (19). Although previous research indicates that athletes generally report higher health-related quality of life compared to non-athletes, sports injuries can have significant implications for athletes beyond physical symptoms (22, 23).

## 2. Objectives

Despite these facts, there have been limited studies to date exploring the relationship between sports injuries and HRQOL in this vulnerable population. Therefore, this study aimed to examine the prevalence of sports injuries and their impact on the mental and physical health of student-athletes. Additionally, it sought to compare the prevalence of sports injuries between male and female students. The hypothesis suggests that sports injuries might have a negative impact on the mental and physical well-being of student athletes.

## 3. Methods

The present study is a retrospective study conducted in the first half of 1401 in Hamedan City. The research sample consisted of 153 school student-athletes (37 girls and 116 boys) aged 10-20 years, who were purposefully selected

from the population based on inclusion and exclusion criteria between May 1401 and March 1401. The inclusion criteria for this study encompassed an age range of 10 - 20 years, regular engagement in sports (at least 2 sessions of 40 minutes per week), participation in team sports including football, basketball, volleyball, and handball, and inclusion of any skill level from recreational and amateur to professional sports. Conversely, the exclusion criteria consisted of a history of lower limb surgery and failure to complete the questionnaires. The sample size for the study was calculated using formula  $n = [z^2 p(1 - p)]/d^2$  based on previous studies that reported sport injuries between 24 and 28 percent among athletes students (24). A sample size of 125 participants was required, but 160 participants were included to account for incomplete questionnaire responses.

### 3.1. Sports Injuries Questionnaire

A sports injury was defined as any injury that occurred during sports, resulting in the athlete missing their training session or the subsequent competition (10, 25). The questionnaire was designed to collect information about two types of injuries: Traumatic injuries, which happen suddenly for a specific reason, and overuse injuries, which are caused by small repetitive injuries without a clear cause. The questionnaire collected specific details about the location, type, mechanism, and severity of these injuries (25).

### 3.2. Quality of Life Questionnaire

The SF12 questionnaire was used in this study to evaluate the health-related quality of life. It measures various aspects of quality of life, physical functioning (2 items), role limitations due to physical problems (2 items), bodily pain (1 item), general health perceptions (1 item), vitality (1 item), social functioning (1 item), role limitations due to emotional problems (2 items), and mental health (2 items). Finally, since each subscale of SF-12 has different ranges, they are adjusted to share a common range of 0 (indicating worst health) to 100 (representing best health). A lower score on the SF12-scale indicates lower health-related quality of life. The scale has also been validated and shown to be reliable in a study conducted in Iran (26).

### 3.3. Psycho-physical Health Questionnaire

The PROMIS scale was used to assess the frequency of reported symptoms across various psycho-social domains. The PROMIS profile consists of 29 items that evaluate health status in six domains. Each item is rated on a five-point Likert scale, ranging from 0 (no problem/never)

to 4 (inability to do/almost always). The total score for each subscale is calculated as the raw score for that specific domain. A higher score in any given subscale indicates a greater experience in the measured domain (e.g., frequent anxiety) (27).

The data analysis was conducted using SPSS version 23 software. Descriptive statistical methods, including mean, standard deviation and frequency were utilized to describe the data. To ensure the normality of the data, the Kolmogorov-Smirnov test was employed. The research hypotheses were examined using an independent *t*-test. A significance level of 0.05 was considered for all tests.

#### 4. Results

Table 1 presents the demographic characteristics of the study participants.

In this research, it was found that 24.2% of student-athletes had experienced sports injuries in the past 6 months (Figure 1). The most common areas of injury were the feet and toes, followed by the ankle and knee (Figure 2). Although the prevalence of injuries was slightly higher among female students (27%) compared to male students (23.3%), this difference was not statistically significant according to the chi-square test ( $P = 0.4$ ,  $\chi^2 = 0.22$ ) (Figure 1).

When analyzing the prevalence of sports injuries based on educational level, it was observed that seventh to ninth-grade and tenth-to-twelfth-grade students had a higher prevalence of injuries (28.3% each) compared to fourth to sixth-grade students (16.7%). Nevertheless, statistical analysis using the chi-square test revealed that this difference was not statistically significant ( $\chi^2 = 2.57$ ,  $P = 0.28$ ).

Our findings show that student-athletes with a history of sports injuries have a significantly lower average quality of life compared to students without such injuries ( $P = 0.02$ ,  $t = 2.45$ ). Additionally, a significant difference was observed in terms of physical performance ( $t = 0.002$ ,  $P = 3.14$ ), role limitations due to physical problems ( $t = 0.001$ ,  $P = 3.68$ ), social functioning ( $t = 2.0$ ,  $P = 11.04$ ), and bodily pain ( $t = 0.01$ ,  $P = 2.63$ ) between student-athletes with and without a history of sports injuries (Table 2).

Student-athletes with a history of sports injuries had significantly lower physical health compared to students without such injuries ( $t = 4.65$ ,  $P = 0.001$ ). They also experienced a noticeable difference in pain interference scores ( $t = 2.38$ ,  $P = 0.02$ ). However, there were no significant differences between the two groups in terms of anxiety ( $t = 0.25$ ,  $P = 1.13$ ), depression ( $t = 0.88$ ,  $P = 0.16$ ), fatigue ( $t = 0.1$ ,  $P = 1.65$ ), and peers communication ( $t = 0.21$ ,  $P = 1.27$ ) (Table 3).

#### 5. Discussion

The purpose of this study was to investigate the prevalence of sports injuries and their relationship with the mental and physical health of student-athletes. The results of the study revealed that 24.2% of students participating in team sports had experienced at least one sports injury in the past 6 months. The variable of warming up before exercise showed a significant correlation with the occurrence of sports injuries in student-athletes. The research findings indicated that 21.6% of students with a history of sports injuries did not regularly warm up, while only 8.6% of students without a history of injury did warm up regularly. Regarding the body areas most commonly injured among students, the feet and toes accounted for 16.2% of injuries, followed by the ankles at 13.5% and knees at 10.8%. This finding is consistent with a study by Leininger et al., who reported the ankle (18.2%) and knee (11.4%) as the most frequently injured areas among student-athletes (28). DiStefano et al. have also highlighted lower limb injuries as the most frequently encountered injuries among student-athletes (24). Many children and adolescents participate in organized sports, with team sports like soccer, volleyball, basketball, and handball being popular. Unfortunately, these sports carry the risk of both overuse and traumatic injuries. Ankle and knee injuries are a heightened risk due to quick cutting maneuvers, and there are also other lower extremity injuries and musculoskeletal problems associated with overuse.

The present study also found that student-athletes with a history of sports injuries have a lower quality of life compared to those without such injuries. This is mainly due to physical performance limitations, role limitations due to physical problems, social functioning, and bodily pain. The study by Valovich McLeod et al. also used the SF-36 and PODCI self-report scales to assess the impact of sports injuries on the quality of life of young athletes. Based on the SF-36 scale, the injured group had lower scores in physical functioning, role limitations due to physical problems, bodily pain, social functioning, and overall quality of life (29). Another study conducted by McAllister et al. found that athletes who had severe sports injuries had lower scores in all SF-36 domains, including role limitations due to physical problems, mental health, physical pain, social functioning, and general health (14). The research also showed a significant difference in physical health and pain interference between student-athletes with past injuries and those without. This supports previous studies by Yang et al. and Weiss and Troxel (30, 31). Yang et al. found that female freshman athletes with previous injuries were

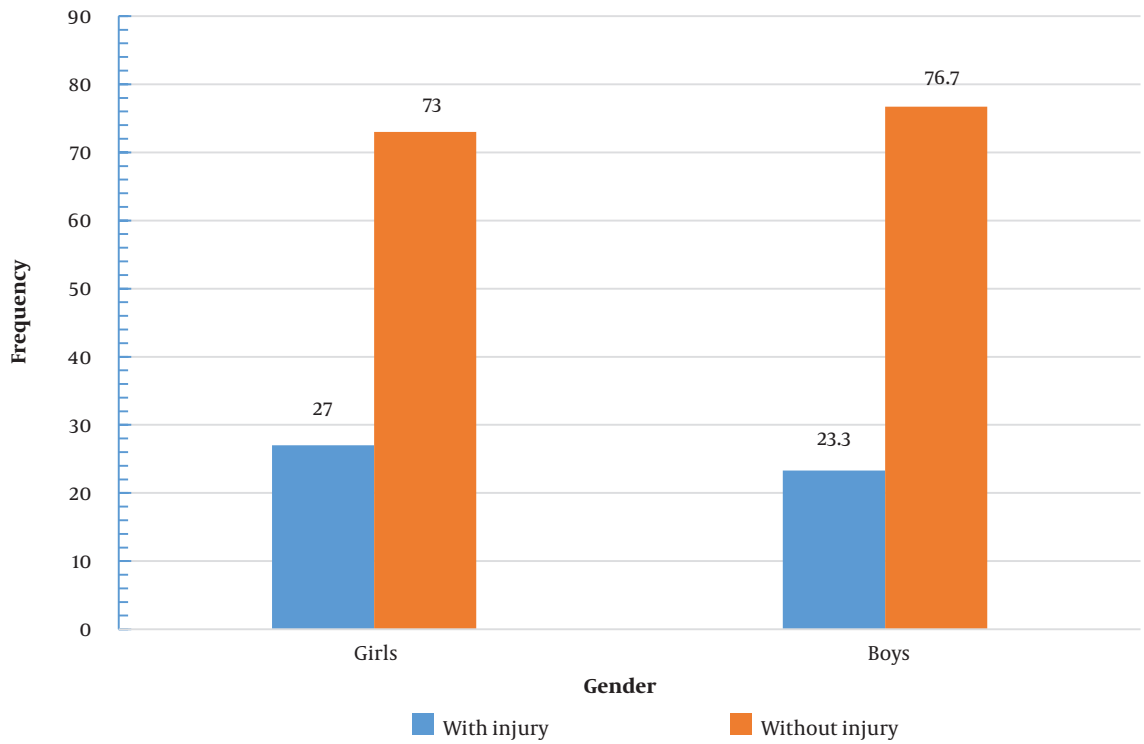


Figure 1. Prevalence of sports injuries among student-athletes according to gender

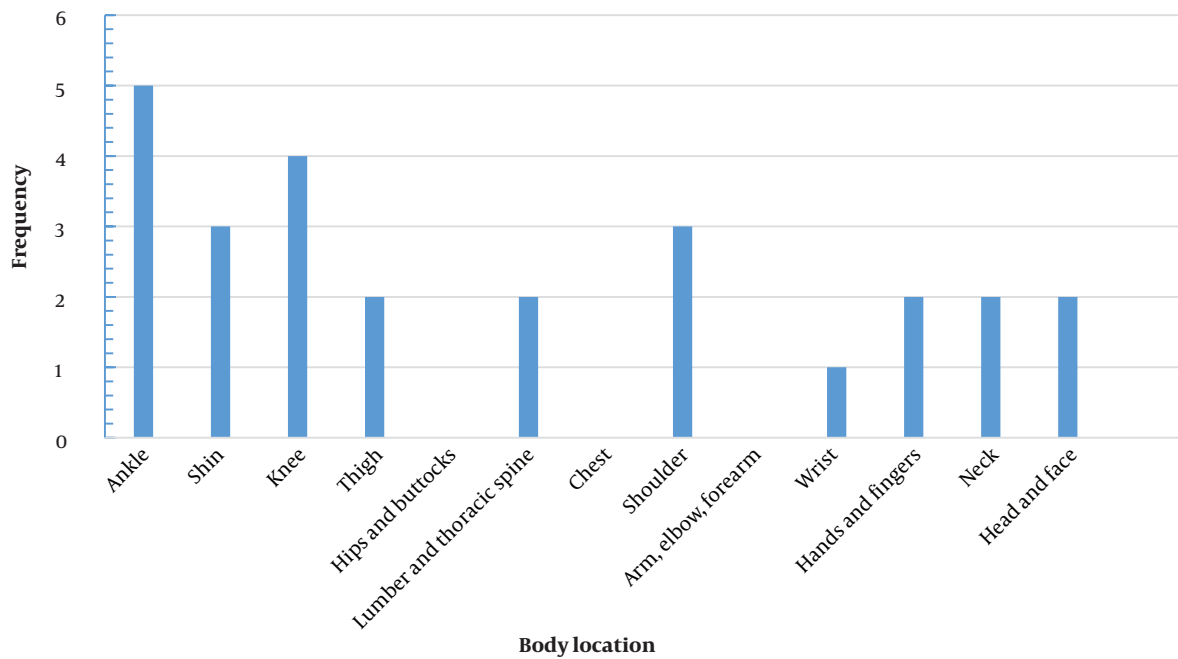


Figure 2. The frequency of sports injuries in students according to the location of the injury

**Table 1.** Demographic Characteristics of the Research Subjects

Variables	Mean $\pm$ SD	Minimum	Maximum
Age (y)	14.1 $\pm$ 2.71	10	20
Height (m)	153.8 $\pm$ 11.5	131	180
Weight (kg)	49.1 $\pm$ 5.52	25	78
Body mass index (kg/m <sup>2</sup> )	26.4 $\pm$ 3.3	19.4	35.6
<b>Gender; prevalence (%)</b>			
Girls	37 (24.2)		
Boys	116 (75.8)		

**Table 2.** Comparison of the Quality of Life and Its Related Components Between Students with a History of Injury and Without a History of Injury

Variables	Mean $\pm$ SD	df	t	P-Value
<b>Physical functioning</b>		151	3.14	0.002
With injury	82.5 $\pm$ 9.1			
Without injury	87.8 $\pm$ 9.7			
<b>Role limitations due to physical problems</b>		151	3.68	0.001
With injury	80.6 $\pm$ 8.8			
Without injury	87.0 $\pm$ 9.4			
<b>Role limitations due to emotional problems</b>		151	1.11	0.27
With injury	86.4 $\pm$ 10.4			
Without injury	88.5 $\pm$ 9.6			
<b>Vitality</b>		151	1.67	0.10
With injury	84.6 $\pm$ 10.0			
Without injury	87.5 $\pm$ 9.5			
<b>Mental health</b>		151	1.55	0.12
With injury	85.7 $\pm$ 10.1			
Without injury	88.5 $\pm$ 9.6			
<b>Social functioning</b>		151	2.11	0.04
With injury	83.8 $\pm$ 9.7			
Without injury	87.7 $\pm$ 10.1			
<b>Bodily pain</b>		151	2.63	0.01
With injury	82.5 $\pm$ 9.1			
Without injury	87.8 $\pm$ 9.5			
<b>General health</b>		151	1.43	0.21
With injury	96.3 $\pm$ 10.3			
Without injury	88.8 $\pm$ 9.2			
<b>Quality of life</b>		151	2.45	0.02
With injury	84.1 $\pm$ 8.4			
Without injury	88.2 $\pm$ 8.8			

more likely to experience depressive symptoms (30). Weiss and Troxel observed emotional reactions in elite collegiate athletes with injuries, including fear, anger, depression, and difficulties in coping with the limitations and rehabilitation process (31).

The evidence suggests that sports injuries greatly impact an athlete's quality of life, even beyond physical recovery (29). Healthcare professionals should be aware of the negative effects of sports injuries on the quality of life of adolescent athletes. Using measurement tools regularly can help identify changes in health-related quality of

life that may otherwise be missed. Prescribing these tools frequently is important because sports injuries can have long-lasting physical and psychological limitations on children and adolescents (32). Regular prescribing also helps with treatment decisions and evaluating the effectiveness of interventions. It is best for patients to self-report their quality of life since physicians struggle to accurately gauge it.

This study has limitations in terms of its generalizability to other sports populations as the participants were limited to student athletes. The

**Table 3.** Comparison of Components related to Physical and Mental Health Between Students with a History of Sports Injuries and Those Without a History of Sports Injuries

Variables	Mean ± SD	df	t	P-Value
<b>Physical function mobility</b>		151	4.65	0.001
With injury	14.0 ± 1.28			
Without injury	14.8 ± 0.80			
<b>Anxiety</b>		151	1.13	0.25
With injury	3.8 ± 0.97			
Without injury	3.9 ± 0.94			
<b>Depressive symptoms</b>		151	0.16	0.88
With injury	3.0 ± 1.41			
Without injury	2.96 ± 1.34			
<b>Fatigue</b>		151	1.65	0.10
With injury	5.8 ± 0.79			
Without injury	5.4 ± 0.92			
<b>Pain interference</b>		151	2.38	0.02
With injury	4.4 ± 1.10			
Without injury	3.9 ± 1.33			
<b>Peer relationships</b>		151	1.27	0.21
With injury	14.5 ± 0.83			
Without injury	14.8 ± 0.97			

study's cross-sectional and retrospective design also raises the possibility of recall bias and potential over or underestimation of the findings. Additionally, the study's cross-sectional nature restricts the ability to establish causal relationships between sports injuries and quality of life variables, as well as psychological and physical factors. To address these limitations and investigate causal relationships, future studies could use longitudinal research designs.

### 5.1. Conclusions

The present study shows that sports injuries are common among student-athletes, with the feet and toes, ankles, and knees being the most frequently affected areas. These injuries can have negative effects on the athlete's quality of life, physical and social functioning, and daily activities. To address this issue, it is important to implement intervention strategies such as promoting the use of proper sports equipment and encouraging athletes to warm up adequately. Additionally, identifying risk factors can help prevent sports injuries by modifying training routines and addressing individual vulnerabilities.

### Footnotes

**Authors' Contribution:** Both authors have made significant contributions to the conception of the work, as well as the acquisition, analysis, and interpretation of data. M. M. has drafted the manuscript, and A. N. has reviewed it critically. Both authors have given their approval for the final version of the manuscript to be published.

**Conflict of Interests:** There was no conflict of interest in this research.

**Data Reproducibility:** The dataset presented in the study is available on request from the corresponding author during submission or after publication. The data are not publicly available due to privacy or ethical restrictions.

**Ethical Approval:** This research implementation followed ethical guidelines from Shahrood University of Technology's Ethics Committee and has obtained a code of ethics with the number [IR.SHAHROODUT.REC.1402.010](https://doi.org/10.21860/IR.SHAHROODUT.REC.1402.010).

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