

Epidemiology of Sports-Related Injuries among Athletes in Jeddah, Saudi Arabia

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ABSTRACT

Practicing sports regularly has a known positive impact on the well-being of individuals; however, it exposes individuals to sports-related injuries. To date, scarce epidemiological studies are available about the prevalence of sports-related injuries in Saudi Arabia. **Objectives:** The aim of this study was to determine the prevalence of sports injuries among basketball and soccer players in Jeddah, and to compare the number and the severity of sports-related injuries between different types of sports. **Patients and Methods:** It was a cross-sectional study conducted on 1054 participants aged between 10 and 60 years with sports-related injuries. Data were collected via personal interview or online surveys and analyzed using SPSS. **Results:** Males constituted 79.9% of participants. The median age of the sample was 24.8 ± 7.8 . 50% of injuries were related to soccer, 34% to basketball, and only 2% to swimming. Recreational practice constituted 78.9% of injuries, whereas 12.9% were professional and 8.5% were collegiate practitioners. About 38% were injured three–four times. Practicing for 2–4 hours weekly had the highest risk of injury, 62%, while the lowest rate was among practitioners for 11–14 hours weekly. 49% got injured outdoors. Ankle, knee, and hands and fingers injuries constituted 40%, 46%, and 27%, respectively. Twisting was the mechanism of injury in 56%. Over 50% needed rest for 1–4 weeks only. **Conclusions:** Soccer was the most common sport associated with injury. Recreational practice, few weekly hours, and outdoor practice had the highest risks. Twisting, ankle sprains, and ligamentous injuries were the most prevalent.

Keywords: Sports injury, prevalence, severity.

INTRODUCTION

Practicing sports regularly, when viewed from different aspects, has a known positive impact on the well-being of individuals, even though athletes practicing those sports still have the risk of developing sports-related injuries which may affect their health in a negative way or even lead to severe complications^(1,2).

Sport injuries are defined by **Engebretsen et al.**⁽³⁾ as "any damage of the tissues of the body that occurs as a result of sport or exercise" Recent studies have found that athletes sustain 4 million sports-related injuries annually and require approximately 2.6 million emergency room visits at a cost of nearly \$2 billion⁽³⁻⁵⁾. Therefore, a standard protocol for screening and monitoring those injuries must be performed, in the addition of a reliable management plan for preventing advanced complications; in order to reach this, assessment of the incidence, extent, and severity of sport injuries must be done. Up to this date, there are still no available epidemiological studies to facilitate measuring sports-related injuries in Saudi Arabia. Consequently, this study aims at measuring the incidence, extent, and severity of sports-related injuries in Jeddah, Saudi Arabia.

Rationale: Studies about the epidemiology of sports-related injuries in basketball and soccer and other sports (incidence prevalence) in the Middle East and Saudi Arabia are scarce, and those we found were lacking in quality.

Objectives

1. To determine the prevalence of sports injuries among basketball and soccer players in Jeddah, Saudi Arabia, focusing on knee, ankle, upper extremities, and face injuries.
2. To compare the number and the severity of sports-related injuries between different types of sports.

PATIENTS AND METHODS

This was a cross-sectional study at King Abdulaziz University Hospital, Jeddah, Saudi Arabia. The study was done in the Western Province, Makkah Region at Jeddah city.

Saudi Arabia's population, according to the last census, is estimated to be 30,770,375 people. Age structure: 0–14 years:27.6%; 15–24 years:19.3%; 25–54years:45.4%;55–64years:4.5%;65years and over:3.2%. Median age:

total: 26.4 years; male: 27.3 years; female: 25.3 years. Sex ratio: at birth: 1.05 male/female; 0–14 years: 1.05 male/female; 15–24 years: 1.15 male/female; 25–54 years: 1.33 male/female; 55–64 years: 1.2 male/female; 65 years and over: 1.08 male/female; total population: 1.21 male/female. Jeddah has one sports city, three governmental clubs, and 30 private clubs.

Patients recruited to this study were all athletes and people who practiced sports, and were diagnosed with a sports-related injury in the past five years; both genders were included, with age ranging between 10–60 years. Participants were recruited from sports recreational centers, governmental clubs, private clubs, academies, and public courts. People who were unable to participate or partake in the personal interview were excluded. The data was collected over a two-month period.

One thousand and fifty-four participants who met the eligibility criteria were recruited from those attending/were attendants of the local sports clubs, gyms, or public courts. Inclusion criteria were having a previous or current confirmed diagnosis of sports-related injury and aged between 10 and 60 years, both genders. Those with non-sports-related injuries were excluded.

All participants who met the eligibility criteria were included; they were either personally interviewed or surveyed online about their body mass index, type of sports they played, level of playing, days per week they practiced sports and hours per week they practiced. Then we screened the sports-related injury: its site and location, whether it was a contact or non-contact injury, the mechanism of the injury, and what kind of injury. We also asked about the time they had to take rest from sports due to injury, the type of treatment they received, aids used post injury, how the treatment cost was covered and surgeries related to the injury. They were also asked about the warming-up routine before and after practicing sports and if they had any psychological issues following the injury (anxiety, depression, lack of interest in practicing sports, fear of playing).

The data sheet was created using Google Forms, the raw data was compiled into a Microsoft Excel data sheet and analyzed using SPSS. Pearson correlation coefficient was applied to measure the association between various variables; independent sample *t*-test was used to measure the mean between different parameters. Values are expressed as a mean

standard error. The results were considered non-significant when $p > 0.05$.

Data collection methods: Athletes and sports participants meeting the eligibility criteria were personally interviewed to fill the survey. Data collected were inserted and analyzed using SPSS V.23.0.

Variables: Variables studied were primary outcome (soccer players were prone to more injuries than other sports), secondary outcomes (stretches, protective apparel), primary exposure (sports-related injuries), secondary exposures (age, sex, socioeconomic status, educational level, occupational status, income level), sociodemographic data (age, sex), socioeconomic data, club variables (floor type, court location if indoor or outdoor, number of coaches), location of injury, and sports intensity

Bias: Selection bias could not be avoided in this study, but we included all possible available candidates as we could and measured their variables to increase the response rate. Non-response bias was decreased as much as possible by good communication skills, support from the administration, support from the department, and usage of small incentives that are ethically acceptable (like fliers, pins, and pens). Information bias was decreased via using an updated and reliable survey to use in the personal interviews⁽⁶⁾.

Ethical consideration: An approval from the student research assessment committee at the Faculty of Medicine, King Abdul Aziz University, was obtained. Approval was also obtained from the Research Ethics Committee at King Abdulaziz University, the Saudi Federation of Sports Medicine, and the Saudi Sports Authority. An information sheet on the study and a consent form was distributed to all participants; those who read and understood the study and had signed the consent form were recruited to the research.

RESULTS

A. Demographic Data

Eight hundred and twenty of the participants, representing 77.8 % of the sample, were Saudis, and 234 participants were non-Saudis, representing 22.2% of the sample. About 79.9% of the participants were males, while 20.1% were females. The mean age of the participants was 24.8 years and the standard deviation was 7.8 years, while the mean BMI was 24.6 and the standard deviation was 5.1.

B. Analysis of the Injuries

Participants were asked about the sports they were practicing; many of them gave more than one answer, but the most common sport was soccer, which was mentioned by 50% of the participants, followed by basketball, which was mentioned by 34% of them. Overall 78.6% of the participants were practicing sports for recreational reasons, followed by the professionals, who represented 12.9% of our sample, and finally the collegiate group, who represented only 8.5 %.

The most common pattern of practice was 3–4 days per week, representing 37.5% of the sample, while 35.9% said that they were practicing 1–2 days per week, with the least common pattern of 5–7 days a week, representing 26.6% of the group.

On the hourly pattern we see that 62% of the participants were practicing sport 2–4 hours per week, which was the most common attitude, followed by those practicing 5–10 hours per week, representing 29%, and the least was 11–14 hours per week, representing 9% of the group.

The participants were asked about the number of injuries they had experienced; 27.9% said that they had no injuries before, while 54.1% of the group had 1–3 injuries, and 10.8% had 4–6 injuries, and only 7.2% had 7–10 injuries.

They were asked about the location where the injury occurred; many of them mentioned more than one place, 49% mentioned the outdoor court, 43% mentioned the indoor court, and the street, school, and home were less frequently mentioned. 55% stated that their injuries were due to a contact, 38% were not due to a contact, and 1% were both, while 49 cases, representing 6%, did not mention the sort of injury.

Regarding the most common site of the body affected by an injury was the ankle, which was injured in 46% of the participants, then the knee in 40% of the participants, then the foot and toes in 32%. With having the most common mechanism of

injury as twisting, which happened in 56% of cases, followed by tearing in 41% of the cases (Table 3).

The injuries that involved ligaments only represented 27% of the cases, while muscles were only 21%, and bones only 18%. Bones, ligaments and muscles were affected together in 10% of the cases. The most common injury was ankle sprain, in 48% of cases, followed by sprained finger, in 25%, and groin strain in 15%. Although, 51% of the participants were given ice after the injury, while 47% had physiotherapy.

For aids used after the injury, 37% of the participants used splints, 28% had casts, and 27% had braces, while 26% had no aids. 53% of the injured participants had 1–4 weeks of rest, 33% had 2–6 months, 11% had 7 months to 1 year, and 3% (20 cases) had permanent damage, as shown in Table 5.

About 38% of the injured people had to self-pay for the treatment of the injury, 36% were covered by insurance, 19% had both self-payment and insurance coverage, and 8% did not mention the payment method. 10% of the injured practitioners said that they had had previous surgical operations related to their injury.

We asked them about the practice of warm-ups; 53% replied that they do it only before exercise, 25% before and after, and 7 % after only, while 15% said that they were not doing warm-ups. 31% of the injured practitioners in our sample said that they had psychological issues after the trauma.

A Chi-square test for association was done to detect any association between the occurrence of injury and the type of practitioner, which was found to be significant, with a *p*-value =0.031, as the percentage of injuries in collegiate and professional types were higher than in recreational practitioners. However, this association is very weak with Cramer’s *V*= 0.081. A Chi-square test for association was done to detect any association between the type of sport and type of work-up in the injured practitioners, which was found to be significant, with a *p* value <0.001. The association is moderate with Cramer’s *V*=0.341.

Table 1: Association between occurrence of injury and type of practitioner

		Value	P-Value
Nominal by Nominal	Phi	.081	.031
	Cramer's V	.081	.031
N of Valid Cases		1054	

Table 2: Association between type of sport and type of work-out

		Value	P-value
Nominal by Nominal	Phi	.591	.000
	Cramer's V	.341	.000
N of Valid Cases		760	

C. Tests for Association

Ever Injured * Type Cross Tabulation

A Chi-square test for association was done to detect any association between the occurrence of injury and type of practitioner and was found to be significant, with a p -value=0.031, as the percentage of injures in collegiate and professional types were higher than in the recreational practitioners. However, this association was very weak with Cramer’s V= 0.081 (Table 8). Similarly, a Chi-square test for association was done to detect any association between the type of sport and type of work-up in the injured practitioners, which was found to be significant with p -value<0.001. The association is moderate with Cramer’s V=0.341 (Table 9).

Table 3: The number and percentage of participants practicing each of the sports

Sports	Frequency	Percentage
Basketball	359	34%
Soccer	527	50%
Swimming	20	2%
Gym and lifting	93	9%
Others	74	7%

N.B. some participants mentioned more than one answer

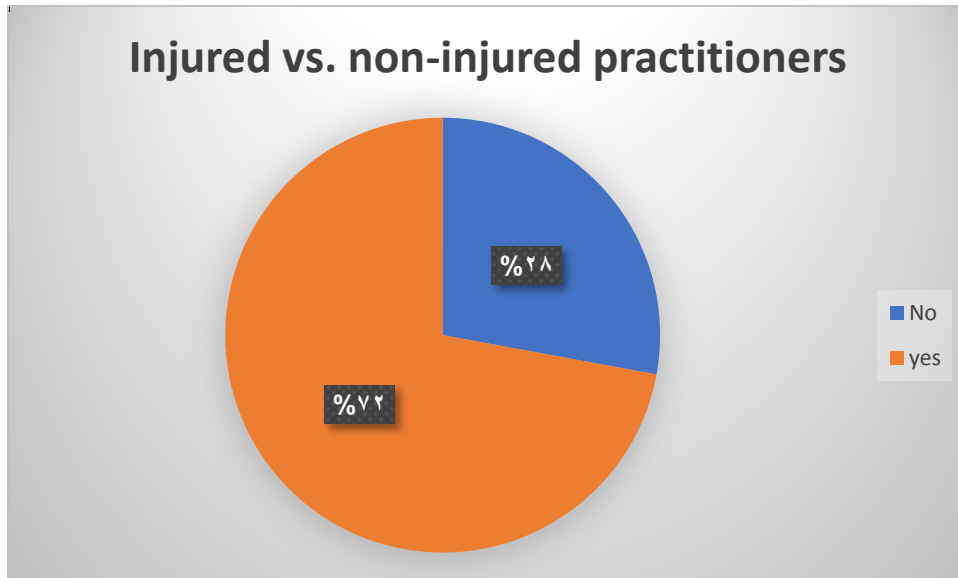


Figure 1: The percentage of injured/non-injured participants

Table 4: The location where injuries occurred

Location	Frequency	Percentage
Outdoor court	369	49%
Indoor court	323	43%
Street	89	12%
School	66	9%
Home	15	2%

N.B. Some of the participants mentioned more than one answer

Table 5. The number and frequency of body site of injury.

Sites	Frequency	Percentage
Face	56	7%
Shoulder	166	22%
Elbow	29	4%
Wrist	66	9%
Knee	304	40%
Ankle	353	46%
Back	106	14%
Hand and fingers	207	27%
Foot and toes	245	32%

N.B. some participants mentioned more than one site

Table 6. The number and frequency of given types of aids.

Aid	Frequency	Percentage
Brace	204	27%
Cast	213	28%
Splint	280	37%
None	199	26%

N.B. some participants mentioned more than one answer

Table 7. The number and frequency of rest periods needed by the participants after injury.

Rest needed	Frequency	Percent
1–4 weeks	401	53%
2–6 months	254	33%
7 months–1 year	85	11%
Permanent damage	20	3%
Total	760	100%

Table 8. The association between the occurrence of injury and the type of the practitioner.

			Type			Total
			Collegiate	Professional	Recreational	
Ever injured	No	Count	15	35	244	294
	Yes	Count	75	101	584	760
Total		Count	90	136	828	1054

Table 9: Warm-ups * type Cross Tabulation

			Type					Total
			Basketball	Gym, cardio and weight- lifting	Other	Soccer	Swimming	
Warm-ups	After only	Count	4	32	3	11	1	.0
		Expected Count	16.8	4.4	2.4	26.6	.7	
	Before and after	Count	94	15	18	61	3	91
		Expected Count	62.8	16.6	9.0	99.8	2.8	110
	Before only	Count	112	18	10	255	6	91
		Expected Count	131.9	34.8	19.0	209.5	5.8	110
	None	Count	40	1	5	70	1	7
		Expected Count	38.5	10.2	5.5	61.1	1.7	70
Total		Count	250	66	36	397	11	50
		Expected Count	250.0	66.0	36.0	397.0	11.0	50.0

DISCUSSION

In this study, we aimed at measuring the incidence, extent and severity of sports-related injuries in Jeddah, Saudi Arabia. Focusing on different types of sports, including the most popular ones in Saudi Arabia, which are soccer and basketball. It was found that 54.1% of the sample had 1–3 injuries, 10.8% had 4–6 injuries, and only 7.2% had 7–10 injuries; similar large numbers were also found in the US and many other countries ⁽³⁾, which only proves that sport injuries represent a great medical challenge in Saudi Arabia, as much as in other countries.

This could be a lack of education on how to prevent injuries, a lack of resources such as trainers and experts in the sport field, along with unprepared facilities, which encompasses several issues such as slippery floors, pumps and poor type and quality of flooring used in building the facility.

Also, it was found that more than half of the injuries were accrued in the setting of contact sports and another study on the incidence and nature of sports injuries in Ireland found that contact sports had both a high rate of injury and incidence ⁽⁷⁾. This could be due to the lack of skills, ground rules and

education about how to avoid injuries in contact sport.

In general, lower limb injuries, including knee, ankle and foot and toe had the higher majority of injuries. Most injuries were ankle sprains, which may be caused by the lack of awareness of the importance of wearing proper footwear and protective joint braces, as the joint becomes more susceptible to injury with the excessive rotation and inversion or eversion causing stress on the ankle, therefore leading to sprains ⁽⁸⁾; there is also the fact that most fouls and penalties occur in the lower limb due to soccer being the most played sport in Saudi Arabia.

Only 25% of the sample did before-and-after exercise stretches, which is the recommended type of stretch being directed to keeping the muscle flexible, this also may be due to the lack of education in basic sports injury prevention. Although, excessive exercise and not allowing the body to recover from exercise can lead to imbalance, which might lead to sport injuries ⁽⁹⁾.

Most of the injuries occurred in outdoors courts, which could be explained by the fact that ensuring all safety precautions are met, this can be

much harder in outdoor courts. Furthermore, players can be more susceptible to injuries due to the dehydration of the muscles due to the heat in Saudi Arabia.

Also, this study found that most of the injuries required costly medical treatment; this was also being found in many other studies^(5,6), which could be due to the fact that most sport injuries are high-impact traumas and most of the players would like to go back to practicing sport as soon as possible.

Finally, it was found that there was a significant association between the occurrence of injury and type of practitioner, as beginners got a higher frequency of injury, which might be because of the lack of education and well-trained coaches and trainers, especially for this category.

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