

Knowledge and awareness toward anterior cruciate ligament (ACL) injury among population of Aseer region, Saudi Arabia

Alsheri Shaker¹, Mohammed Sultan M. Alshehri², Fayez Saeed Alshehri²,
Mazen Mohammed Alshahrani², Meshary Safar Alshahrani²,
Omar Mohammed Alamri²

¹Department of Surgery, King Khalid University, College of Medicine, ²College of Medicine, King Khalid University, Abha, Saudi Arabia

ABSTRACT

Purpose: The aim of this article is to determine the knowledge and awareness of population toward anterior cruciate ligament (ACL) injury in Aseer region, and to determine the extent of knowledge about what does a person with ACL injury suffer from, and thus investigate the main sources of information that public obtained their medical information about sport injury from. **Materials and Methods:** This is a cross-sectional study based on a questionnaire distributed to the participants either in malls, campuses, or campaigns and filled by them in Aseer region. A sample of 576 participants was successfully interviewed. Convenience sampling method was used. **Results:** Nearly all of the participants considered this injury as a multi-factorial incident resulting from a combination of any of the following risk factors: sports, high body weight, heavy housework, and car accidents. Regarding mechanisms responsible about occurrence of ACL injuries during playing sports, the majority (60.8%) proposed a combination of two or more incorrect technical movements: lack of self-protection awareness, insufficient preparation, and overload of exercise. Regarding the participant's information about methods that could decrease pain of ACL injury, about three quarters of all participants (72.2%) stated that resting could alleviate pain. Moreover, most of individuals with previous ACL injury confirmed this. In addition, those with previous ACL injury supported the role of ice significantly more than the remainder (53.6% vs. 48.1%). Prescription pain medications were selected by 47.3% of all participants. In all, 53.8% of all participants considered Internet as a main source of information about ACL injury. **Conclusion:** Findings indicated reasonable awareness of the general population in Aseer region about the seriousness of ACL injury, but there was a lack of information about risk factors other than sports, that is, dangerous actions that increase incidence of ACL injuries and their characteristic symptoms.

Keywords: ACL injury, Aseer region, awareness, sport medicine

Background

The anterior cruciate ligament (ACL) is considered the primary passive restraint to anterior translation of the tibia with respect to the femur. It runs from the posterior medial aspect of the lateral

femoral condyle in the intercondylar notch to the anterior aspect of the intercondylar eminence of the tibia and limits anterior movement of the tibia relative to the femur. Also, it contributes to knee rotational stability in both frontal and transverse planes due to its specific orientation.^[1,2]

Generally, one of the most common and devastating knee injuries nowadays is injuries to the ACL, which is mainly sustained as a

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Address for correspondence: Dr. Fayez Saeed Alshehri, Surgery Department, College of Medicine, King Khalid University, Abha, Saudi Arabia.
E-mail: dr.fayez.saeed@gmail.com

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result of sports participation. Injuries to the ACL are associated with many symptoms such as joint effusion, altered movement, muscle weakness, and reduced functional performance.^[3] ACL injuries are mainly associated with other concomitant articular injuries and may result in an increased risk of early onset post-traumatic OA at 10 to 15 years post-injury (as high as 80%), especially in the presence of concomitant meniscal damage.^[4-6]

Globally, there is a wide prevalence of ACL injuries, where some studies declared that the total number of ACL repairs is between 32 and 78 cases per 100,000 citizens/year.^[7] Also, it is estimated to be 1 in 3000 in the United States.^[8] In addition, some studies have shown that the number of cases performed has increased in recent years. ACL injury is commonly affecting young, active individuals, athletes. ACL injuries are commonly seen in high active sports such as basketball, football, and soccer players, who often jump or pivot compared with other athletes. Ignoring a torn ACL can potentially lead to further knee injury.^[9,10] Females are at a reported 2- to 10-fold greater risk than males playing the same sport.^[11] High risk of injury along with the high rate of sports participation among girls and young women over the last three decades has led to a rapid rise in ACL injuries in females.^[12]

ACL injuries are an often possible after-effect of low-speed, noncontact, deceleration injuries and contact injuries with a rotational part. Contact sports also may produce injury to the ACL secondary to turning, valgus stress, or hyperextension all directly related to contact or impact.^[13,14] ACL injuries can occur by a different mechanism, including both high energy and low energy. Low-energy injuries may include contact mechanism. However, non-contact injuries are more typical, representing approximately 70% of ACL tears.^[15,16]

The most common mechanism is a low-energy, noncontact injury to be continuous during a sport movement. Acute ACL injury is usually followed by pain, knee effusion, and muscular inhibition.^[17] Steady disability after the acute phase is attributed to expanded knee joint laxity and altered neuromuscular capacity, which may prompt to dynamic joint instability.^[17] The combination of pop sound during a rotational movement or fast sudden stop together with powerlessness to proceed participation, and followed by early swelling, is said to demonstrate a 90% likelihood of rupture of the ACL.^[14]

Several reports have examined the risk factors for noncontact ACL injury. Hewett *et al.*^[18] and Myer *et al.*^[19] reported that decreased notch width, greater tibial slope, poor neuromuscular control, ligamentous laxity, high body mass index (BMI), sex, knee abduction (valgus), and knee laxity are all reportedly associated with an increased risk of ACL injury. In addition, many researchers showed that patients with ACL are at high risk of developing osteoarthritis 10 to 15 years after injury, regardless of treatment.^[6,20,21] Therefore, prevention is important in reducing the effect of ACL injury.

ACL injury might be prevented and reduced by raising awareness of techniques that used to help reduce the effect of ACL injury.

Such techniques include paying attention in the game and not making a sudden movement that can destabilize knee. Warm-up drills also help reduce the injury, and stretching the knee and lower body can build muscle and reduce the risk.^[22]

Ramjug *et al.*^[23] reported that education and enforced awareness of dangerous positions and mechanisms of ACL injury decrease ACL injuries. It is important to teach athletes to avoid biomechanically disadvantageous and dangerous positions in any sport.^[23]

In addition, raising awareness about ACL injury and its prevention and treatment may reduce the prevalence of such injury and its complications. Alshewaier^[24] reported that there is a high prevalence of ACL injury in younger and active individuals in Riyadh. According to our knowledge, the general level of awareness among people with ACL injury is still limited, a fact that highlights the importance of increased awareness about ACL for people in Kingdom of Saudi Arabia (KSA) to set appropriate preventative practice to reduce the incidence of ACL injury. However, according to that, no study has specifically examined the awareness about cruciate ligament in Aseer region.

Thus, the main objective of this study was to determine the knowledge and awareness of population toward ACL injury in Aseer region; moreover, to determine the extent of knowledge about what does a person with ACL injury suffer from, and thus investigate the main sources of information that public obtained their medical information about sport injury from; discuss the factors that affect knowledge of ACL injury such as previous injury, coaches, players, and a person whose interested in many sports; and assess the knowledge of treatment options and their outcomes regarding ACL injury.

Materials and Methods

This is a cross-sectional study based on a questionnaire distributed to the participants either in malls, campuses, or campaigns and filled by them in Aseer region. The questionnaire contained many different questions, in which some of them were close-ended questions and others were open-ended questions.

The questionnaire involved questions about characteristics of the participants like gender, age, level of education, occupation, and marital status, in addition to participants' height and weight. The study also asked if the participant practiced any kind of sports and its type.

In addition, the questionnaire included some questions to measure the level of knowledge and awareness of population toward ACL injury like source of information about ACL injuries, causes of ACL injuries, and factors that affect the increase of incidence of ACL injury. Also, the questionnaire includes questions about participant's history with ACL injuries and his or her experience with it.

This study interviewed males and females aged between 18 and 65 years who agreed to be involved in the study. This means that any person below 18 years and/or above 65 years was excluded from the study. Also, participants who refuse to be involved in the study by answering the questionnaire were excluded too.

Finally, a sample of 576 participants was successfully interviewed. The size and sampling technique for the study is considered for convenience, as we only interviewed participants within this pre-designated period; hence, the mode of sampling is considered convenience sampling.

A structured data sheet was created as a study tool to aid in data collection; in addition, data were entered into the data sheet and then into an Excel document; and this process was repeated for all variables. The duration of the data collection process did not exceed 30 days.

After raw data were processed in accordance with the best practice for raw data management to identify any inaccuracies in advance to the statistical analysis, implausible values were flagged. A similar process was applied to categorical variables to identify any potential anomalies. All identified anomalies were discussed with biostatistics team and were corrected prior to initial statistical analysis. Data were filled into appropriately designed Excel sheet. Statistical analysis was done using SPSS V22. Descriptive statistics will be presented as number, percentages, means, and standard deviation in that report. All statistical tests were declared significant at a *P* value of 0.05.

Results

From data shown in Figure 1, it is clear that the sample contained male participants more than females (69% and 31%, respectively).

The age distribution of the sample in Table 1 shows that about a quarter of the sample was aged 23 to 27 years old, which means that more than half of the sample were young youth (below age 32).

Also it was clear that most of the sample were highly educated, where 55.8% of the participants had a bachelor's degree and about 8.2% had a master's degree or PhD [as shown in Table 2].

Data in Figure 2 show that most of the participants were students (28.8%), teachers (23.5%), and housewives (12.2%).

According to data which were collected from the participants, around 36% of participants were not practicing any kind of sports, while 64% of the participants were practicing sports [as shown in Table 3].

There were 58 ACL injuries reported by the participants; 52 of them were between males, while only 6 injuries were between females. Among 58 participants, the majority of them aged between 18 and 27 years (36.2%). Figure 3 shows that the trend

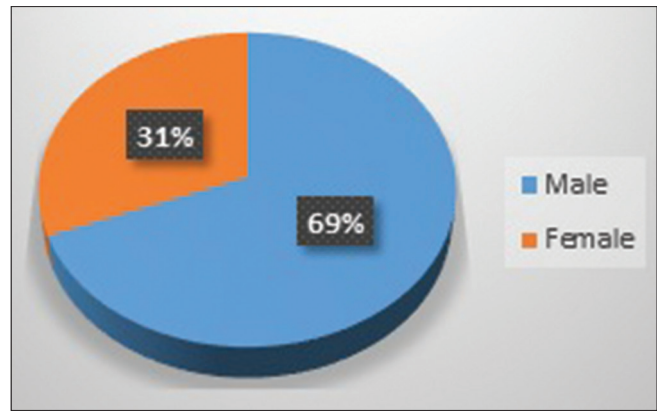


Figure 1: Gender

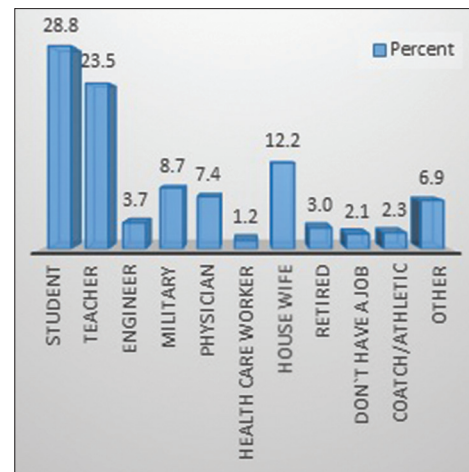


Figure 2: Occupation of participants

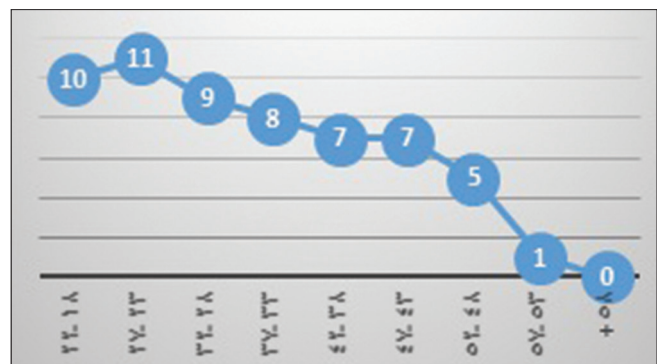


Figure 3: No. of ACL injuries by age groups

of number of ACL injuries declines by age, while the rate of ACL injuries was highest between young youth. In addition, the ACL injury rate in women (10%) was less than that of the men's rate (90%).

Nearly all of the participants considered this injury as a multi-factorial incident resulting from a combination of any of the following risk factors: sports, high body weight, heavy housework, and car accidents. Table 4 shows that 48.1% of the participants said that sport activities were the main cause of ACL

Table 1: Age groups		
	Frequency	Percent
18-22	87	15.4%
23-27	146	25.8%
28-32	91	16.1%
33-37	61	10.8%
38-42	90	15.9%
43-47	45	8.0%
48-52	35	6.2%
53-57	4	0.7%
58+	6	1.1%
Total	565	100.0

Table 2: Educational level		
	Frequency	Percent
Primary	6	1.1
Secondary	117	20.7
Intermediate	16	2.8
Diploma	65	11.5
Bachelor's degree	315	55.8
Master's degree	23	4.1
PhD	23	4.1
Total	565	100.0

Table 3: Sport practice		
Sport practice	Frequency	Percent
No	203	35.9
Yes	362	64.1
Total	565	100.0

Table 4: Causes of ACL injury		
	Frequency	Percent
Sport activities	272	48.1
Car accidents	77	13.6
Overweight	113	20.0
Lifting heavy objects	86	15.2
Other	17	3.0
Total	565	100.0

injury, while 20% of them said that overweight were the main cause, 15.2% saw that lifting heavy objects could be the main cause, and 13.6% said that car accidents were the main cause of ACL injuries.

Regarding mechanisms responsible about occurrence of ACL injuries during playing sports, 14.9% of the study population attributed this only to incorrect technical movements. The majority (60.8%) proposed a combination of two or more of incorrect technical movements: lack of self-protection awareness, insufficient preparation, and overload of exercise.

Figure 4 demonstrates the participant's opinion about ACL injuries, where 84.1% of participants considered ACL as a serious injury.

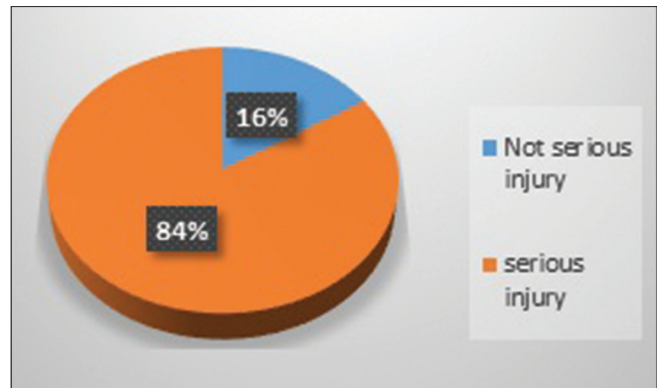


Figure 4: Opinion about ACL injuries

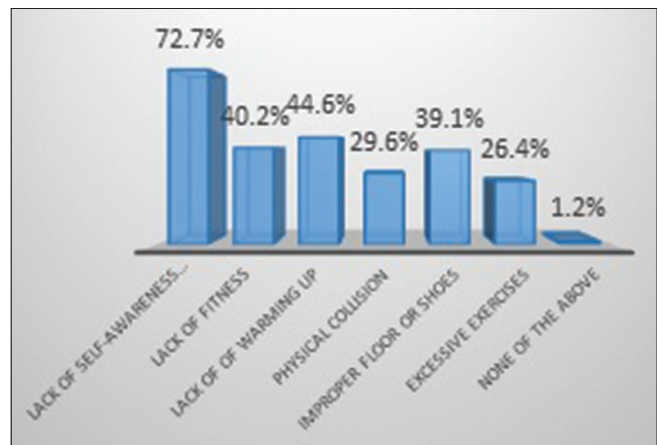


Figure 5: Factor can cause ACL injury during practicing sports

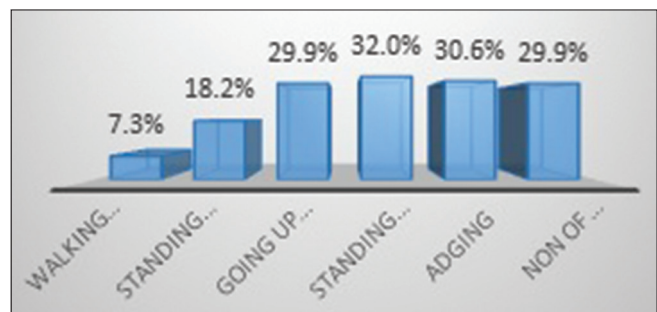


Figure 6: Factors increase the incidence of ACL injury

The awareness of the participants about factors that may increase the incidence of ACL injuries during practicing sports was illustrated in Figure 5, where most of participants said that lack of self-awareness about the protective methods from ACL injuries (72.7%) is the most common factor that may increase the incidence of ACL injuries during practicing sports followed by lack of warming up (44.6%), lack of fitness (40.2%), and improper floor or shoes (39.1%).

Concerning factors increase the incidence of ACL injury, only 7.3% of all participants stated that prolonged walking might increase the incidence of ACL injuries. On the contrary, higher number (524, 92.7%) of them did not believe this idea. Individuals

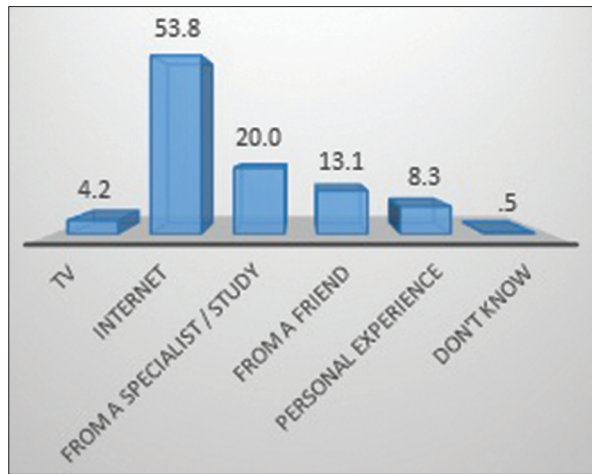


Figure 7: Source of information about ACL injury

with previous ACL injury also reported low risk (7.3%) of prolonged walking. However, it was observed for other questions where most of the participants consider prolonged standing, going up and down stairs, getting up from a sitting position, and edging were responsible for increased incidence of ACL injury (18.2%, 29.9%, 32%, 30.6%, and 29.9%, respectively) [Figure 6].

Regarding the participant's information about methods that could decrease pain of ACL injury, Table 5 shows that about three quarters of all participants (72.2%) stated that resting could alleviate pain. Moreover, most of individuals with previous ACL injury confirmed this. Ice was chosen as a method to decrease pain of ACL injury by 57.9% of all participants.

In addition, those with previous ACL injury supported the role of ice significantly more than the remainder (53.6% vs. 48.1%). Prescription pain medications were selected by 47.3% of all participants, and a greater percentage was recorded by individuals with a history of ACL injury. On the contrary, only 10.4% of all participants nominated heat and over the counter medications, with higher frequencies reported by those with previous ACL injury (15% and 11%, respectively).

Figure 7 shows that 53.8% of all participants considered Internet as a main source of information about ACL injury, but a lower percentage (20%) reported "specialist/study" as their source of information. Among all participants, 13.1% considered friends as their source of information about ACL injury, followed by their personal experience and TV (8.3% and 4.2%, respectively).

Discussion

In this study, 58 participants gave history of ACL injury with a prevalence rate of 10.3%. Most of the injured participants currently returned to normal (40.5%) or nearly normal activity (39.2%). Waldén *et al.*^[25] stated that the risk of suffering ACL injury is quiet low in the general population compared with sports players. The observed high prevalence seems to be due

Table 5: Methods that could decrease pain of ACL injury

	Frequency	Percent
Rest	408	72.2%
Put ice on the place of injury	327	57.9%
Put a hot compress on the place of injury	59	10.4%
Prescribed medicines	267	47.3%
Herbs and alternative medicine	26	4.6%
Total	565	100.0

to that 57.3% of the studied population who were young and active belonged to the age group 18 to 32 in addition to more than half (64.1%) of them who were practicing sports. Studies on the prevalence rate of ACL injury in Saudi Arabia population were limited. A recent study based on a questionnaire distributed to the students of Physical Education College at Umm Al-Qura University reported a prevalence rate of 5.3%.^[26]

Findings showed that 84% of the study participants were aware of ACL injury and ranked it as a serious disease. This conclusion agrees with what was reported Mather *et al.*^[12] who found that ACL rupture can lead to a considerable loss of knee function and disability and, therefore, a reduction in a person's quality of life. There is a continued emphasis on the prevention of ACL injury.^[27] That is why raising awareness of the general population about this type of injury is highly warranted.

In all, 48.1% of the studied persons realized the role of sports as a risk factor of ACL injury. Many studies reported the strong association between occurrence of ACL injury and active participation in sports, especially those involving knee pivoting movements such as soccer, football, team handball, basketball, and alpine skiing.

In conclusion, findings indicated reasonable awareness about the seriousness of ACL injury in the general population in Aseer region, but there was a lack of information about risk factors other than sports, that is, dangerous actions that increase incidence of ACL injuries and their characteristic symptoms. Hence, there is a need for increasing health education and raising awareness and more implementation of prevention programs for ACL injuries to decrease the incidence and consequences of these injuries. Furthermore, national studies addressing the prevalence rate of this injury in the general population and athletes are highly recommended.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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