

Epidemiology of Sports Injuries in Iran

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Abstract

Introduction: Further to high physical damage, sports trauma has high costs. So the epidemiology of these traumas is importance. The aim of this study was to investigate the epidemiology of sports injuries in Iran.

Materials And Methods: In this review study, the needed data collected by searching the key words of "sport trauma", "sport" "trauma", "injuries", "sport injury", and "Iran" in the databases of PubMed, IranMedex, SID and MagIran from 2000 through 2017.

Results: The epidemiological pattern of sports injuries was evaluated in seven sport fields: football / futsal, basketball, volleyball, martial arts (karate, judo, taekwondo), handball, wrestling and gymnastics, as well as disabled and veteran sports. Epidemiologic data was evaluated in terms of injuries, injured limbs, the most common causes of the injuries and the most important types of injuries.

Conclusion: It is important to pay attention to sport fields that cause serious damages to athletes. Identification of such sports and planning for them can promote the sports and also can help to prevent the occurrence of the injuries.

Keywords: Sports, Epidemiology, Injuries, Iran, Trauma, Review

1. INTRODUCTION

Having physical activity is one of the needs of all ages and essential to the health of the individual [1, 2]. Exercising is one of the most suitable strategies for physical activity, the most important reasons for which can be pleasure, relaxation, health and healthy competition. Continuous exercising prevents many diseases, early mortality, and chronic diseases as well [1-4]. One of the elements preventing people from participating in sports activities is the sports traumas and the consequences [4, 5]. Traumas can be detrimental to the health of individuals given their intensity. Sport traumas are no exception to this, and can seriously affect people's health [6]. Today, due to the high participation of young people in the sports activities, the main cause of youth injuries in many countries are the sports traumas [7-10].

It is estimated that sport traumas annually keep away 8% of the adolescent from sports [11]. Studies in Canada showed that 30-40% of the

adolescents visits to doctors is due to sport traumas [9, 10]. Moreover, the Center for Disease Control of the USA reported the incidence of sports injuries in the school's sports competitions in 2005-2006 as 1.4 million injuries [12]. A study conducted in the Netherlands on national tournaments, reported 1.5 million sport traumas, more than half of which was accounted to the injuries in football, volleyball, skiing, futsal, horse riding, tennis, and hockey [13]. The study by Barani et al. (2009) reported 88 percent of the injuries to the female futsal players in their lower limbs [14].

In Iran, the statistics of sports traumas is relatively high in some sports [15-18] which reveals the importance of attention to sports injuries and their epidemiology such as frequency of the injuries, limbs damaged and many other important issues. The review of the literature shows that although limited, studies have been carried out in this field in different regions of Iran, these studies are usually limited

to a specific sport with a small number of athletes in a limited area, and thus cannot provide comprehensive information for decision makers and planners. Therefore, the results of these studies should be systematically summarized to be able for use by the policymakers and relevant authorities in the field of sport to reduce and prevent these injuries. The aim of this study was to investigate the epidemiology of sports traumas in Iran since 2000.

2. MATERIALS AND METHODS

The present study is a narrative review study to assess the epidemiology of sport traumas in Iran. Search was performed in databases PubMed, IranMedex, SID and MagIran using the keywords "sport trauma", "sport", "trauma", "injuries", "sports injury", "soccer", "football", "handball", "wrestling", "gymnastics", "basketball", "martial arts", "volleyball", "veterans and disabled sports" and Iran. Moreover, the search for organizational reports and dissertations was done manually. The search was carried out at the time period of 16 years (2000 to 2016). The epidemiological patterns of sports traumas have been addressed in seven areas of sport: football/futsal, basketball, volleyball, martial arts (karate, judo, and taekwondo), handball, wrestling and gymnastics, as well as disabled and veteran sports. Epidemiologic data was evaluated in terms of sport injuries, injured limbs, the most common causes of athletes' injuries and the most important types of injuries.

3. RESULTS

3.1. Football and Futsal

3.1.1. Injuries

The results of study by Zarei et al. (2010) showed that for every 1,000 hours of playing soccer, 36.5 cases of injuries occur in young and novice players at the national level [19]. Moreover, Alizadeh et al. (2012) reported that 3 injuries occur for each young player annually [20]. The results of Ebrahimi Varkiani (2013) also showed that among futsal players, an average of 8.1 injuries occur in every 1000 players [21]. The results of the study by Barani et al. (2009), which investigated the underlying injuries in female futsal players in Iran, showed that almost half of them had been injured [14].

3.1.2. Injured limbs

A study by Zarei et al. (2010) showed that about 80% of injuries occurred in soccer happen in

lower limbs [19]. The results of the study by Ebrahimi Varkiani (2013) showed that about 63% of injuries in futsal occurred in the lower limbs [21]. It seems that in soccer and futsal, the lower limbs are more likely to be injured and damaged compared to other limbs.

3.1.3. The most common causes of injuries

There is very little information available about the causes of injury in soccer and futsal sports. In this regard, the results of the study by Amani et al. (2015) showed that the history of previous injuries, low physical fitness of athletes, opponent player's hard fouls on the players, training pressures and deficiencies in warming up the body are the most common causes of injury in professional players of football in Iran [22]. Furthermore, the results of Salehian et al. (2014) showed that weakness in aerobic power has a significant effect on neck and waist injury in futsal of women [23].

3.1.4. The most important types of injuries

Only in two studies, Zarei et al. (2010) and Barani et al. (2009), the most important types of injuries in soccer and futsal had been pointed out. According to the results of these two studies, strains, sprains, and contusions were the most important types of injuries in soccer and futsal [14, 19].

3.2. Volleyball

3.2.1. Injuries

There was very limited information on volleyball injuries. The only study that was quoted on this issue and among female volleyball players was the study by Sharareh et al. (2013) that showed that an average of 0.5 injuries occur annually among professional female volleyball players. Moreover, according to the results of this study, for every 1000 hours of training, 1.4% of injuries occurred [24]. Thus, considering the growth of volleyball in Iran in recent years, further attention is required in this regard.

3.2.2. Injured limbs

Based on the results of Ebrahimi Atri (2011), the upper and lower limbs were almost equally damaged [25]. However, according to the results of Rahimian Mashhad et al. (2012) and Rajabi et al. (2009), the upper limbs were more exposed to injury than other limbs [26, 27]. According to the results of the study by Sharareh et al. (2013), the most affected limbs were fingers, neck and shoulders, respectively. Thus, unlike football

and futsal, where mostly lower limbs were involved, the upper limbs in the volleyball are more susceptible to injury. Of course, given the nature of these sports, this seems to be quite natural.

3.2.3. The most common causes of injuries

According to the results of studies, the most important causes of injury in this group of athletes include low physical fitness, improper warm-up before training, low sport skills, previous history of injuries, inappropriate exercises, lack of use of protective equipment and high fatigue [26, 27].

3.2.4. The most important types of injuries

According to the results of the published studies, muscle tendon rupture is the most common type of injury among volleyball players. The other most important types of injuries in this area include joints injury, skin damage, bone fractures, and sprain.

3.3. Basketball

3.3.1. Injuries

The results of Velayati et al. (2012) showed that out of 127 professional basketball players participating in the Iranian Premier League, about 60% had the experience of some kind of injury [15]. Furthermore, the results of the study by Barani et al. (2009) showed that out of 73 women participating in the Iranian Premier League in 2006-2007, about half were suffered from injuries [16].

3.3.2. Injured limbs

Only in the study of Barani et al. (2009) the injured limbs were mentioned in basketball players, which showed that the most injured limbs were lower limbs, head and face, upper limbs and torso, respectively [14].

3.3.3. The most common causes of injuries

Only in the study of Amani et al. (2015) the commonest causes of injuries in basketball players were mentioned. The results showed that the most common causes were: extra pressure of exercises and competitions, inadequate warming up and cooling down, excessive fatigue, falling, stumbling, previous history of injury and other causes [22].

3.3.4. The most important types of injuries

According to the results of the studies, it seems that sprain is the major type of injury in basketball players. Fracture, strain, and

dislocations are the most important types of injuries in these athletes.

3.4. Martial Arts

3.4.1. Injuries

Boostani et al. (2013) showed that in 322 matches at the national karate level in six weights, a total of 112 injuries have occurred (on average, an injury for three matches) [28]. Narenjchi Shotorbani et al. (2012) examined 97 karate women in Iranian clubs and showed that each athlete suffered an average of 47.5 times of injury each year [17]. Two studies by Ziaee et al. (2010 and 2015) showed that for every 100 taekwondo athletes, 45.6 injuries per year were occurred, and for each 100 karate athletes, 20.2 injuries per year [18, 29]. The study by Halabchi et al. (2007) showed that for every 1000 karate women athletes, 183 injuries occur per year [30].

3.4.2. Injured limbs

The results of Boostani et al. (2013) [28], Ziaei et al. (2015) [18] among taekwondo athletes, Rahimi et al. (2012) [31] and the study of Halabchi et al. (2007) showed that head and face are the parts of the body where most injuries occur [30]. Nevertheless, the results of Rahnama et al. (2007) among judo athletes [32], Narenjchi Shotorbani et al. (2012) [17], and Rahimi et al. (2009) among karate athletes [33] showed that in martial arts, the lower limbs are most likely to be injured. Furthermore, the results of the study by Ziaee et al. (2010) among karate men showed that upper limbs are injured more. Thus, lower limbs and face in martial arts seem to be more prone to be at the risk of injury in martial arts [29].

3.4.3. The most common causes of injuries

According to the results of the studies, one can state that the most important causes of injuries in martial arts include wrong movements / opponents foul, fatigue, lack of physical fitness, low skill or mistake in applying skill, non-use of protective equipment and history of previous injuries.

3.4.4. The most important types of injuries

According to the results of the studies, one of the most important types of injuries in martial arts is cutaneous damage. Other most important types of injuries in martial arts include dislocation, tendon rupture, sprain, bleeding, fractures, and injuries to the muscles.

3.5. Wrestling

3.5.1. Injuries

The results of a study by Yalfani et al. (2013) showed that among 28 professional wrestlers, 250 cases were injured in the past year and there happened 187 injuries among the 28 novice wrestlers [34]. Kordi et al. (2012) surveyed 411 wrestlers from sport clubs in Tehran showing that 42.3 injuries per 100 wrestlers occurred during the last year [35]. Akbarnejad and Sayah (2012) surveyed 50 wrestlers from the national team and reported that over the past five years, 6514 injuries have occurred for them [36].

3.5.2. Injured limbs

In all three studies, Yalfani et al. (2013) among professional wrestlers, Kordi et al. (2012) and Akbaranejad and Sayahh (2012), upper limbs were more susceptible to injury than other body parts of the wrestlers [34, 36-38].

3.5.3. The most common causes of injuries

There was little information about the causes of injuries among wrestlers. However, the most important reasons mentioned in a few studies include: opponent's fouls, fatigue, poor physical fitness, poor support or guidance, inadequate training or implementation of techniques, inadequate warming up, high weight differences between wrestlers and the lot of pressure to lose weight.

3.5.4. The most important types of injuries

Only Kordi et al. (2012) investigated the type of injuries that occurred, according to whose results, respectively, sprain, fractures, strain, dislocation, skin injuries and other types of injuries were the most important types of injuries among wrestlers [37].

3.6. Gymnastics

3.6.1. Injuries

The results of two studies by Ghasempour et al. (2013) and (2014) showed that among 43 male athletes, 79% of athletes experienced a type of neck injury during the last year and 53.5% had a wrist injury experience [39, 40]. Moreover, the results of Jafari et al. (2011) showed that among 75 female athletes, 53.5% have had an injury [41].

3.6.2. Injured limbs

In the study of Nikroo et al. (2012), the upper limbs, the lower limbs, the trunk, and the head and neck, respectively, were the most injured

limbs [42]. Moreover, in the study by Jafari et al. (2011), the lower limbs, upper limbs, head, neck and trunk, respectively, were the most injured limbs [41].

3.6.3. The most common causes of injuries

The most common causes of injuries were mentioned in two studies: Nikroo et al. (2012) and Jafari et al. (2011). Based on the results of these two studies, the most common causes of injuries in gymnastics include the lack of standard equipment suitable for exercises and tournaments, lack of fitness, fatigue, low skill, insufficient warming up, and non-use of protective equipment [41, 42].

3.6.4. The most important types of injuries

According to the results of the studies, three types of injuries: torsion, wound, and sprain are the most damaging events for gymnastics athletes. Other types of injuries include dislocation, strain, inflammation, wrists ganglia, abrasion, and callus.

3.7. Handball

3.7.1. Injuries

Piry et al. (2011) analyzed 46 handball films and showed that 164.5 injuries have occurred for every 1000 hours of handball [43]. Rasuli et al. (2012) found that among 97 female handball players, almost all of them had a history of injury during the past year, with an average of 7.4 injuries per 1000 hours of matches and 5 injuries per 1000 hours of training [44]. Shadanfar et al. (2011) examined 154 male and 125 female professional handball players and showed that 2.83 cases were injured per every 1,000 hours of matches [45].

3.7.2. Injured limbs

In two studies, Shadanfar et al. (2011) and Rasuli et al. (2012) were referred to the injured limbs, the results of which showed that the most injuries were in the lower limbs, upper limbs, trunk, and head and neck, respectively [44, 45].

3.7.3. The most common causes of injuries

Only in the study of Rasuli et al. (2012) the cause of the injury were mentioned which was the opponents' fouls. Inadequate warm up, inadequate protective equipment, low familiarity with safety issues, low physical fitness and low skill levels were the other common causes of injury [44].

3.7.4. *The most important types of injuries*

According to the results of the studies, muscle damage and bone fractures were the commonest type of handball injuries.

3.8. Veterans and Disabled Sports

3.8.1. *Injuries*

In the field of injuries of veterans and disabled people, only two studies were found. by studying 94 Iranian athletes with disabilities and veterans attending the Paralympic games in Athens, Daneshmandi et al. (2008) showed that 817 injuries occurred in these games for the athletes [46]. Shojaei et al. (2009) surveyed the frequency of sport injuries in 600 veterans and disabled athletes participating in the Milad Kowsar festival, and found that 125 athletes were injured and a total of 222 injuries were registered [47].

Injured limbs

According to the results of both studies, the most cases of damage occurred in the upper limbs, lower limbs, trunk, and head and neck, respectively.

The most common causes of injuries

None of the two reviewed studies had referred to the incidence of injuries and no information was available on this subject. Therefore, further studies in this field seem necessary.

The most important types of injuries

Only in the study of Daneshmandi et al. (2008), it was referred to a variety of injuries. According to the results of this study, respectively, injury to muscles, damage to joints, sprain, skin lesions, bone fractures and other types of injuries were the most important types of injuries happened [46].

4. DISCUSSION

Regarding the results of the studies, it can be said that football / futsal sports have a very high rate of injuries than the other sports. The studies showed that injuries in these sports were more often in the lower extremities. The importance of paying attention to the severity of the injuries in these sports is such that injuries in this area often prevent the athlete from pursuing a professional sport. In a study by Knowles et al. (2006) in the United States by direct observation on high school students, 252 cases of physical injury were reported that equals to 2.81 injuries per 1000 male soccer players [48]. Moreover, in

the study of Le Gall et al. by direct observation over 30 months on adolescents aged 14 to 16 years showed 1152 injuries in football players which equals to 4.8 injuries in every 1000 athletes [49].

Other sports, including volleyball, are also important in regards of injuries. The evidence was limited about injuries of volleyball players, but by reviewing the available studies, it can be said that the most limbs that are damaged are the upper limbs. In volleyball, due to the high involvement of trunk, the damaged limbs mostly are the fingers, neck and shoulders. In a study for 9 months by Powell and Barber-Foss in high school students in America, 601 injuries in volleyball were reported with a rate of 1.7 cases per 1000 athletes [50].

In the field of basketball also high levels of injuries have been reported due to the high level of physical activity of athletes and the attacks of players. Both the upper and lower limbs are injured in basketball due to their involvement. In a study by Powell and Barber-Foss in the United States, 1933 cases of injuries were reported in basketball that is 4.8 injuries per 1000 players [50].

Due to the nature of martial arts, these sports are also subject to injuries. And due to the heavy collisions between martial arts athletes, heavy sports injuries occur. A review of the evidence shows that a very high percentage of athletes in the martial arts competitions are injured. Due to the nature of martial arts, various limbs of the body are affected.

It is important to pay attention to wrestling and the injuries occur for the wrestlers. Because the wrestling is introduced as the first national Iranian sport, it attracts many young people. Due to the nature of the engagement of the athletes, the wrestling causes many injuries to athletes in the field. The studies have shown that wrestling is one of the most injury-prone sports in Iran, which has sometimes even caused irreparable damage to the athletes. In a study by Pasque and Hewett in the United States, over a period of 3 months, 219 cases of sports injuries were reported in wrestling which is equal to 6 injuries per 1000 athletes [51]. A study by Hoffman and Powell in the United States by direct observation in 6 months reported 7.6 injuries in every 1000 athletes [52]. Reviewing the studies on veterans and disabled sports also showed that these athletes suffer a lot of physical injuries due to physical constraints.

Although the research on gymnastics' injuries in Iran was limited, the few studies have been reported many injuries to these athletes. So that, few professional athletes have had significant injuries in the past year. A study by Bak et al in Denmark, using a questionnaire at sports clubs, showed 27 sports injuries in gymnastics in the past year [53].

5. CONCLUSION

Reviewing related papers shows that doing sports activities both professionally and for recreation, besides the positive health outcomes can have injuries that compromise the athletes' health. It is necessary to pay attention to sports that cause a high incidence of injuries. In order to prevent the sports injuries, it is possible to use the findings of these studies, to identify the limbs that are mostly exposed to damage in particular sports and to examine the causes of the injuries and then give the athletes the necessary trainings. The trained athletes can prevent the injuries by strengthening the limbs involved in the particular sports. Identifying the main sports that cause injuries and then planning for such sports can contribute to the development of the sports and the prevention of injuries of the athletes.

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