The prevalence of sports injuries in female Handball players

Susan Rasuli, Afshar Jafari, Jafar Barghi Moghaddam, Fahimeh Narenjichi Shotorbani

Abstract

The purpose of this study was to investigate the injuries prevalence of female Handball players. Ninety seven female competitors (aged 17-23 years), playing in state's teams, were randomly selected. Data were collected with structured questionnaire (SIP) and analyzed by Chi-Square and Cocheran methods at 5% level by SPPSS software. Sport injuries rate in this study was very high (100%), and its rate in competition was higher than training period (z= 6.38, p ≤ 0.05). The highest and lowest rate of sport injuries in competition was related to lower limbs (63.44%) and trunk (13.01%), respectively (χ²=7.43, p≤0.05). Moreover, the highest and lowest rate of sport injuries in training was related to upper limbs (42.52%), head and neck (4.62%), respectively (χ²=3.3, p≤0.05). However, the highest and lowest injuries rate in competition was related to muscular (58%) and skeletal (3.06%), respectively (χ²=12.77, p≤0.05), but highest and lowest injuries rate in training was related to muscular (44.46%) and skeletal (7.99%), respectively (χ²=4.20, p≤0.05).

Key words: Handball, sport injuries, female handball players, East Azerbaijan Province.

Introduction

Handball ball as the mother of ball sports has attracted many young fans and a lot of people play it as a professional or amateur [1]. Injuries in handball as like as other sports might cause suspensions of elite players from sport fields and sustains a lot of money loss to the club and community [2]. Because of its speed and explosive nature and players contact with each other and equipment are considered traumatic [3,4]. Characteristics of this sport, for example, the frequency and severity of collisions with opposing players, often caused injuries [5]. Several researchers have examined the incidence of handball injuries, definition of damages, and periodic reviews of the game and numerous contradictions regarding quality and quantity of handball injuries were seen among risk factors, for example, some researchers considered injuries to lower limbs [3,6,7,8,9] and some like Asembo and Jorgensen considered the most damages to the upper extremities (1988). Asembo and Wekesa refers to the speed and nature of handball pathogenic, declared 60% injuries to the head and found bruises as the most common type of injuries. Other studies have indicated that the ankle and knee sprain are the most common type of injury [10]. According to the relationship between injury and gender, but some have declared the risk of injuries in women Handbalists more than men [10,11,2]. Overall, the researchers sought to identify factors influencing injury prevention and control them in different sports. Since a limited number of internal studies have been evaluated the incidence of injuries in handball. Statistics show a need to increase efforts to prevent and reduce the risk of handball injuries [1,7]. Given the inconsistency of the previous studies and limited documents and comprehensive studies into the status of girl handball players, the present study was to determine the prevalence and causes of sports injuries in female players.

Materials and Methods

This research was a retrospective design in the form of field - description using a questionnaire, were performed by observations and measurements. The sample consisted of 97 female athletes, participated in provincial competitions (17-27 years), randomly selected. Data were collected through a modified questionnaire in commemoration of the previous studies. The questionnaire was designed in three parts: the first part of the necessary information and personal profile of players, the second part to identify the prevalence of injuries and the third sector, to identify causes of injuries.

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Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 16. The criterion for significance was set using an alpha level of \( p \leq 0.05 \). Chi test was used to determine the type and incidence of sports injuries.

**Results:**

**Table 1:** Type of athletic injuries during training and competition

<table>
<thead>
<tr>
<th>Nature of injury</th>
<th>Injuries during the event</th>
<th>Injuries during practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Average (for 1000 hours play)</td>
</tr>
<tr>
<td>Muscles</td>
<td>417</td>
<td>4.29</td>
</tr>
<tr>
<td>Joint</td>
<td>193</td>
<td>1.99</td>
</tr>
<tr>
<td>Cutaneous</td>
<td>87</td>
<td>0.90</td>
</tr>
<tr>
<td>Skeleton</td>
<td>22</td>
<td>0.23</td>
</tr>
<tr>
<td>Total</td>
<td>719</td>
<td>7.41</td>
</tr>
</tbody>
</table>

All participants in this study reported at least one injury in a limb of their bodies. The incidence of injuries during practice and during competition was different (respectively, 7.41 versus 5.03 injury per 1000 play) and more damage has occurred during the event. Statistically, there was a significant difference in the different types of injuries during competition (\( p \leq 0.05, Z = 6.38 \)). Table 1 shows most injuries belong to the muscles (58%, average 4.29 injury per 1000 hours play) and the least injuries to the bone (3.06%, average 0.23 injury per 1000 hours play). The type of injuries occurred during training also show a significant difference (\( \chi^2 = 7.43, p \leq 0.05 \)). During training the most injuries belonged to the muscles (44.46%, average 2.24 injury per 1000 hours play) and skin (35.45%, average 1.78 injury per 1000 hours play), and the least injury to the bone (7.99%, average 0.61 injury per 1000 hours play) and arthritis (12.10%, average 0.61) (Table 1).

**Table 2:** The amount of injuries during practice and during athletic competition.

<table>
<thead>
<tr>
<th>Limb position</th>
<th>Injuries during the event</th>
<th>Injuries during practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Average (for 1000 hours play)</td>
</tr>
<tr>
<td>Lower limbs</td>
<td>457</td>
<td>4.71</td>
</tr>
<tr>
<td>Upper extremities</td>
<td>146</td>
<td>1.50</td>
</tr>
<tr>
<td>Trunk</td>
<td>93</td>
<td>0.95</td>
</tr>
<tr>
<td>Head and neck</td>
<td>23</td>
<td>0.25</td>
</tr>
<tr>
<td>Total</td>
<td>719</td>
<td>7.41</td>
</tr>
</tbody>
</table>

Most injuries in limbs belonged to lower extremities during the match (63.44%, average 4.71 injury per 1000 hours play) and the least injuries to the head and neck (3.25%, average 0.35 1000 hours injury per 1000 hours play) (Table 2). There was a significant difference in injury of lower extremities during practice (\( P<0.05 \)). Results showed that during exercises, most injuries belonged to upper extremities (42.52%, average 2.13 injury per 1000 hours play) and to head and neck (4.62%, average 0.24 injury per 1000 hours play).

For 1000 hours play, 64.3% of injuries belonged to lower limbs muscles. Most injuries occurred in the lower limbs belonged to the muscles. Type of joint damage in the trunk (41.4%) and muscles (39.8%), and skin damages on head and neck (42.9%) and arthritis (31.8%) were more common (Figure 1).

**Fig. 1:** Incident of injuries in different limbs.
Among muscle injuries, muscle soreness (42%) and muscle stretch (33%), respectively, with a prevalence of 2.83% and 2.17% injuries are seen per 1000 hours play and less injuries to tendon rupture (1%) with an incidence of 0.11 injury per 1000 hours play (Figure 2).

Figure 3 also shows the type of joint sprain is the most injuries (55% with 1.67 injuries per 1000 hs play) type of joint erosion (2% with 0.06 injury per 1000 hours play).

Fig. 2: Percent injuries of muscle.

Fig. 3: Percent injuries of joint.

Fig. 4: Percent injuries of skin.
Among the types of skin injuries, bleeding (38%) with an incidence of 0.73 damage per 1000 hours play, wear (34%) with an incidence of 0.67 damage per 1000 hours play and blisters (28%) with an incidence of 0.54 injury per 1000 hours play, are common among handball players. There is no significant difference between the percentage of skin injuries (0.05<P) (Figure 4).

![Fig. 5: Percent injuries of skin and bone.](image)

The findings demonstrated a significant difference in a variety of bone injuries among subjects (0.05>P). So that a significant percentage of bone injuries were seen in the form of split and the least ones as open fractures (71% and 4% respectively; 0.44, 0.02 damage in 1000 h play) (Figure 5).

Among Knee injuries, most injuries were seen in lower limbs (40%, average 2.96 damage to 1000 h play), and the lowest in the pelvic, toes and feet (Figure 6).

![Fig. 6: Incident of injuries in lower limbs.](image)

The incidence of injuries in the upper extremities, respectively, 64.43% (average 1.77 damage to 1000 hours play) in the fingers and palm of the hand, the maximum amount of 4.92% (mean 0.13 damage to 1000 hours play) and the least was in arms (Figure 7).

Among trunk injuries, 59.53% (average 0.99 damage to 1000 hours play) was seen the highest in shoulder and 1.15% (0.02 damages in 1000 hours play) in the clavicle (Figure 8).
Fig. 7: Incident of injuries in upper limbs.

Fig. 8: Incident of injuries in trunk.

Fig. 9: Incident of injuries in head and neck.
In the head and neck most injuries were observed in face 45.23% (0.17 damage to 1000 hours play), and the least in ears, scalp, neck (Figure 9). Opponent kicks and hitting to equipment and falling ground (21.2%) to poor heating (19.15%) achieved the greatest cause of injury, also, the lack of protective equipment (13.08%), non-compliance with safety issues (12.14%), lack of fitness (10.75%), and non- sport specific fitness (11.68%) were common injuries (Figure 10).

Fig. 10: Incident of injuries in head and neck.

Discussion and Conclusion:

The incidence of injury (6.22 damages per 1000 hours play) for girl handball players was much greater than with the results of Dimitris et al. [3] among League European handball players (0.7 damage per 1000 hours play), furthermore the difference was observed between the incidence of injuries during training and competition between this study and some others (7.41 and 5.03 damage per 1000 hours play). Nielsen et al. [13] have shown that the rate of incidence of injuries in handball increase during competition than exercise (11.4 and 4.6 damage per 1000 hours play). On the other hand, the results are parallel with the findings of Sail et al. [9], based on their findings, the incidence of injury during competitions was much more (respectively 14.3 cases vs. 0.6 per 1000 hours play). Olson et al. [8] have announced the incidence of injuries 10.8 and Wedderkopp et al. [16] 7.4 much more than practice sessions. We can explain these findings point to the fact that athletes can prevent injuries by using safety equipment during the match. On the other hand, the different incidence of sports injuries show muscle tendon damages are relatively high among subjects, especially during the competition. The immense amount of damage occurred as a groin muscle soreness may be due to the physical nature of subjects. Although in this regard, Garrick and Requa [14] found the cause of more damages due to the not warming up before the game, Wedderkopp et al. [16] also showed that an increase in muscle tendon injury on the race was due to high levels of fatigue in athletes in the result of regular and continuous training throughout the season. In this study, the incidence of injuries (24.59) is notable. Dislocation of the knee and shoulder injuries were most observed.

The subjects of this study for the joint sprains and dislocations has been very common. Nielsen et al. [13] found the ankle sprain with a prevalence of 33% the second most common injury among Handball players. Based on the findings of Nielsen and Nasiri, the high incidence of joint dislocation of the knee and shoulder may be due to the nature of motion springboard and launching of handball. In this regard, Wedderkopp et al. [16] knows the high-speed of launching the reason of these injuries . The findings of this study showed that lower limbs injuries (52%) were significantly higher than other organs. The results are parallel with the results of
Olson and Sangman, Langevoort et al. [7] reported the highest prevalence of injuries (42%) in elite handball players during six international competition. Olson stated lower limbs injuries (58.8%) in European handball players, although Olson et al. [8] found respectively, the most injured limbs related to head, upper extremities, abdomen and chest, but some researchers suggest that lower limbs injuries are more than upper limbs. Sangman et al. reported back, knee, ankle, shoulder injuries as the most ones among 44 high school, college and adult handball players. These results indicated lower limbs damages more than other organs, especially among women. Nielsen et al. [13] reported different results by studying 221 male handball players, so upper limbs damages with 41% were the most common injuries in handball players. This difference may be due to the subjects gender. In this regard, Lindbland [2] has announced the incidence of sport injuries among women 2 times than men, and considered it because of different physical structure and anthropometric characteristics. However, Jorgensen et al. [15] reported similar levels of damages in the arms and legs. The most common injuries associated with lower the knee. In addition, the knee is most vulnerable organ, respectively, then calf, ankle and toes are. These results are consistent with the results of Olson and [16]. Olson et al. [8] have announced knee injuries (26%) and ankles (24%) as a half of acute injuries. Wedderkopp et al. [16] accounted lower extremities (with a prevalence of 58.8% of acute injury) the most vulnerable organ to injuries in female European handball players. The results of these studies are very close to each other. Fine structure and low physical power in women are the factors of more damages among them. In this regard, Lindbland believes female players with the fine structure and lack of muscle strength, less experience and skills than men cannot control the ball correctly. But, injuries among male players were seen higher than women in the tournaments. Wedderkopp et al. [16] stated a reason for this contradiction and believes the male players in high competitive levels, competed in high speed and have more severe and physical contacts with other players and will be likely to be damaged as well. Based on the findings of this study (incidence of injuries), Handball is one of the high-risk sports. Incidence of sports injuries is very high in this sport, thus creating a national data to identify and better control of risk factors makes it possible to help evaluate methods to prevent these injuries. According to previous studies it can be concluded that incident of lower body injuries in sports are more serious. It is recommended to bodybuilders and team athletes to prepare and strengthen the muscles lower limbs to avoid the injuries in these parts. It is recommended to coaches and athletes to use protective equipment and other items to avoid damaging the lower extremities.

References