



Review Article

Epidemiological Review of Badminton Related Injuries Among Competitive Badminton Players

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To cite this article:

Vindya Vimani Senadheera. Epidemiological Review of Badminton Related Injuries Among Competitive Badminton Players. *International Journal of Sports Science and Physical Education*. Vol. 4, No. 3, 2019, pp. 41-44. doi: 10.11648/j.ijsspe.20190403.12

Received: February 1, 2019; **Accepted:** October 30, 2019; **Published:** November 6, 2019

Abstract: As the fastest racket sport in the world, playing badminton involves jumps, lunges, multidirectional movements with fast-spaced changes of direction, rapid postural changes, repetitive movements of upper limb and prolonged gripping of racket with high velocity movements. These high physical demands for badminton suggest that injuries related to badminton among players may have a frequent occurrence. Therefore, the epidemiology of badminton related injuries had been studied among competitive (elite and sub elite) players and recreational players of all ages in many countries. Therefore, the current review discusses the literature on epidemiology (incidence/prevalence, severity, location, type, competition/practice injuries) of badminton related injuries among competitive badminton players in diverse populations. The search strategy included PubMed, Science Direct and Google Scholar search from the year 1979. Fourteen (14) studies which have investigated epidemiology of badminton injuries were found. Injury incidence/prevalence was diverse in different populations. Majority of badminton related injuries are recorded as mild injuries. Lower limb was recorded as the most susceptible region for badminton related injuries. Overuse injuries have been recorded as the dominant type of injury. Dominance of competition/practice injuries was diverse in different populations. It is evident that the epidemiology of badminton related injuries shows a population difference. Investigating the epidemiology of injuries in a given population is required to understand the extent of injuries and identify the priority areas to implement specific injury prevention programmes.

Keywords: Badminton, Injuries, Incidence, Severity, Types

1. Introduction

Badminton is one of the most popular sports worldwide. It is a commonly played sport by people of all ages, either recreationally or competitively. It is a racket sport in which badminton racket is used to hit the shuttlecock across a net. Playing badminton involves jumps, lunges, multidirectional movements with fast-spaced changes of direction, rapid postural changes, repetitive movements of upper limb in various strokes, prolonged gripping of racket and high velocity movements of racket. Moreover, it is a sport with high metabolic demand requiring both aerobic and anaerobic fitness [1]. These high physical demands for badminton suggest that badminton related injuries among players may have a frequent occurrence.

Badminton related injuries can be defined as any kind of

injury, pain or physical damage that occurs during playing badminton and lead to player being unable to fully participate in training or match play [2]. Known research on badminton related injuries are available from 1970s onwards. The epidemiology of badminton related injuries had been studied among competitive (elite and sub elite) players and recreational players of all ages in many countries. In these epidemiological studies overall injury incidence, injury incidence in males and females, severity of injuries, types of injuries (traumatic/overuse), location of injuries, nature of injuries, frequency of competition and practice injuries had been studied. The current review discusses the literature on epidemiology of badminton related injuries among competitive badminton players in diverse populations.

2. Methodology

2.1. Search Strategy

A literature search was performed by the author using PubMed, Science Direct and Google Scholar. Using the key search terms as 'badminton', 'injuries', 'epidemiology', 'competitive'. The key words were used independently and/or were combined. All the publications included for the study were in English.

2.2. Inclusion Criteria

Studies investigated the epidemiological characteristics on badminton related injuries among competitive badminton players were included in the study. Fourteen (14) studies which have investigated epidemiology of badminton injuries were found.

3. Results

3.1. Incidence/Prevalence of Badminton Related Injuries

Incidence of badminton related injuries among a players ranging from international to club players (mean age; females - 27; males - 33) in United States of America was reported as 0.9 injuries per person per year for males and 0.14 injuries per person per year for females [3]. In Danish elite badminton players (mean age; females - 22.9; males - 24.3) injury incidence was reported as 2.8 per 1000 hours, where one hour is equal to one hour participation of sport by one player [4].

Injury incidence in badminton players (competitive and recreational) in Denmark was reported as 28 per 1000 per year for players below 18 years of age, 45 per 1000 per year for players between 18 to 25 years of age and 42 per 1000 per year for players more than 25 years of age, where incidence had been calculated as injuries per 1000 players per year [5]. In Hong Kong elite badminton players, incidence of badminton related injuries was reported as 7.38 per 1000 hours for elite senior players and 5.04 per 1000 hours for elite junior players where one hour is equal to one hour participation of sport by one player [6]. Injury incidence among youth competitive players (age 13 – 16 years) in Malasia was reported as 0.9 per 1000 hours where one hour is equal to one hour participation of sport by one player [7]. Among Japanese elite badminton players, injury incidence was reported as 0.9 in male junior players, 1.3 in female junior players, 1.5 in male highschool players, 2.4 in female highschool players, 2.5 in male university players and 5.1 in female university players per 1000 hours where one hour is equal to one hour participation of sport by one player [8].

3.2. Severity of Badminton Related Injuries

When considering the severity of badminton related injuries, it was reported that incidence of severe injuries was very low [3], as 6.8% [9], 26% [5], 7% [10] and as 1.9% [8]. Incidence of moderate injuries was reported as 52% [5], 1.5% [10], 6.8% [8]. Incidence of minor injuries was reported as 22% [5], 50%

[7], 91.5% [10] and 91.3% - mild, minimal, slight [8].

3.3. Anatomical Distribution of Badminton Related Injuries

When anatomical distribution of badminton related injuries is taken into account, it was observed that according to previous studies lower limb is the most affected region (58% - 92.3%) [3, 4, 9, 5, 11, 6, 10, 7]. In elite badminton players the knee was reported as the most affected part of lower limb, followed by ankle in some studies [10, 7, 12]. In the knee, ligament sprains were reported as the most common injury in Swedish players [12] while patellar tendinopathy was reported as the most common injury in Malaysian players [10]. In the ankle achilles tendon pain was reported as a common finding among elite badminton players (32%) [13]. Ankle sprain was reported as the most common ankle injury while plantar fasciitis was the commonly reported injury in the heel [10]. In the upper limb the shoulder pain was reported as a common complaint among international badminton players (52%) [14]. In the shoulder, rotator cuff tendinopathy was reported as the most common cause (48.4%) for shoulder pain [10]. Similarly, it was reported that elbow injury was mainly due to golfer's elbow, wrist injury due to ligament sprain and back injury due to muscle strain [10]. Other reported badminton related injuries include eye trauma [15, 16], facet injuries [6], blisters, groin pain and muscle cramps [3].

3.4. Types of Badminton Related Injuries

The majority of badminton related injuries was reported as overuse injuries when elite badminton players from all age groups considered together [4, 8]. However, a study among junior elite players had showed that traumatic (acute) injuries are three times more common than overuse injuries in junior players [7]. When considering all upper limb injuries, 98.5% were reported due to overuse, while 26% of knee injuries and 17% of ankle injuries and 79% of back injuries were reported due to overuse [4].

3.5. Setting of Badminton Related Injuries (During Competition or Practice)

When setting of the injury (during competition or practice) was taken into account it was observed that there were contrasting findings among previous studies. In some studies majority of injuries had reported as competition injuries [3, 5, 6, 8]. On the contrary, injuries during practice were recorded as the majority by some other studies [4, 10, 7].

4. Discussion

According to results of previous studies it was observed that incidence of badminton related injuries is different in diverse populations and even in the same population when comparing male and female players, competitive and recreational players and players of different age groups. It was also observed that there are differences in the definition for 'injury incidence' adopted by different studies. Number of injuries per year per person [3], number of injuries per thousand players per year

and number of injuries per thousand hours, where one hour equals to one hour of sports participation [4, 7, 8] have been used to define injury incidence.

Moreover, the majority of badminton related injuries seemed to be mild followed by moderate and severe injuries. However, it was observed that different studies had used different scales to classify injury severity. Type of management (hospitalization/ outpatient) [3, 9], number of days of practice or competition lost due to injury [10, 8] and abbreviated injury scale [5], had been used to classify severity of injuries by previous investigators.

According to previous studies it was observed that lower limb is the most susceptible region for injuries in badminton players. Nevertheless, the most affected part of lower limb showed variations in different populations. In some populations knee is reported as the most susceptible part [10, 7, 12] whereas some studies report ankle as the most susceptible part [3, 9].

Furthermore, there were contrasting findings recorded regarding the major pathophysiological cause (trauma/overuse) of badminton related injuries and time of injury (during practice/ during competition) in previous studies conducted in various populations.

When considering the age of players, elite senior players had showed more recurrent injuries while elite junior players had showed more occurrences of new injuries [6]. Though previous studies have observed differences in injury incidence between male and female players, the difference had not been significant [6, 4, 10]. Moreover, studies among athletic population on sports injuries have suggested that higher body mass index (BMI) was associated with increased risk of lower limb injuries. Ankle and knee were reported as the most susceptible areas. The effect of high BMI on ankle and knee injuries was thought to be related to player's ability to rapidly change the direction and momentum, which directly challenges the knee and ankle stability [17]. Accordingly, badminton, being a sport with strenuous footwork may place a player with high BMI at risk for lower limb injuries. In addition, higher BMI had shown reduction in upper limb strength, endurance and speed and an increase in upper limb power in 9 to 15 years old badminton players in Kandy district Sri Lanka [18] suggesting higher BMI may predispose badminton players to upper limb injuries as well. When total exposure hours taken into account it was observed that increased exposure hours may lead to overuse injuries and recurrent injuries than new injuries [6].

5. Conclusion

Accordingly, it is evident that the epidemiology of badminton related injuries shows a population difference. Injury incidence/prevalence was diverse in different populations. Majority of badminton related injuries are recorded as mild injuries. Lower limb was recorded as the most susceptible region for badminton related injuries. Overuse injuries have been recorded as the dominant type of injury. Dominance of competition/practice injuries was diverse in

different populations. It is evident that the epidemiology of badminton related injuries shows a population difference. Investigating the epidemiology of injuries in a given population is required to understand the extent of injuries and identify the priority areas to implement specific injury prevention programs.

Statement of Conflicts of Interests

The author has no conflicts of interests.

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