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Prevalence of musculoskeletal injuries among badminton players of Vadodara

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Abstract

Badminton is a popular sport; it is easily accessible to Asian adolescents. The diversified nature of the sport necessitates physical features that include basic motor skills, the upper extremities musculature needed for throwing and catching the heavy badminton shuttle, as well as a quick reflex response specifically designed for players with racquet training and all the co-ordination to play a team sport. The purpose of the study was to find the prevalence of musculoskeletal problems in Badminton players. In this study, sixty Badminton players were enrolled with mean age 22 Years old. A questionnaire designed in order to assess the Prevalence of Musculoskeletal Injury which was validated by sports players. Fifty-four players (70%) reported injury during playing. The most common onset was acute injuries (59.26%), while the most common type of injury was the overuse (70%), Strains (15%), Sprains (10%) and Fracture (4%).

Keywords: Badminton, musculoskeletal, injuries, athletes

Introduction

Badminton is one of the most widely played sports worldwide; the cardinal annual championships involve over 2,000 competitors around the globe. The World Badminton Federation estimates that approximately 150 million people play the game worldwide and that more than 2,000 players take part in international competitions [1]. Badminton is a fast-paced game and is considered the fastest of all racquet sports. Competitive badminton is predominantly played with overhead shots and requires excellent fitness. Singles require exceptional physical ability and are a game of patient positional manoeuvring, while doubles, on the other hand, require full aggression throughout the game and are often extremely fast-paced [2].

Despite not being a contact sport, badminton frequently results in injuries. These include both acute traumatic incidents and overuse injuries. The game is physically demanding, requiring players to perform difficult actions with frequent posture changes such lunges, reaches, retrievals, and hops. Additionally, the upper extremity is subjected to extreme stress due to repetitive overhead forehand and backhand strokes that are used in conjunction with deception and very quick hitting actions [2] In badminton, the injury rate ranges from 1 to 7 per 1000 hours, dependent on the population, and the amount of playing time [3].

In India, Asia, and Europe, participation in the sport and interest among spectators have steadily increased over the past few decades. Both men's and women's singles Badminton World Federation (BWF) top rankings have been held by Indian players, and at the moment India holds the most positions in the top thirty men's singles players of any other nation [4]. Despite this, information regarding injuries among badminton players is still lacking. Hence, this study was conducted to investigate the prevalence of Musculoskeletal Injuries among badminton players of Vadodara.

Materials and Methods

Study Design: Cross – Sectional Survey Study

Study Setting: Sports Complex, Vadodara

Sample Size: Sixty Badminton Players

Inclusion Criteria: Age 15 to 25, male and female playing experience of at least 1 years and has regular practices.

Exclusion Criteria: Players who have an experience of less than 1 years. Players who do not practice regularly and play for leisure.

Methodology: Sixty Players were selected considering inclusion and exclusion criteria. The players were made aware of the purpose of the study. Self -Developed Questionnaire was used to obtain information related to the injuries occurred in badminton players, as well as some information about specific training. Questionnaire consist of three sections. 1st Part is related to basic demographic data, 2nd Part is related to players practice Schedule and 3rd Part is related to musculoskeletal injuries which include type, location, cause, event of injuries and treatment taken for the injuries. Each component of the Questionnaire was explained to each and every player. The information obtained from the scale was analysed using graphs and pie charts.

Result Analysis

A total of 60 badminton players was enrolled in this study; 38 (63.33%) among them was boys and 22 (36.66%) was girls. Most players (63.4%) competed both in singles and doubles matches. Fifty-four players (70%) reported injury during playing. The majority of the injuries, forty-six (85.19%) occurred during training or practice sessions, while only eight (14.81%) occurred during a competition as shown in graph 1.

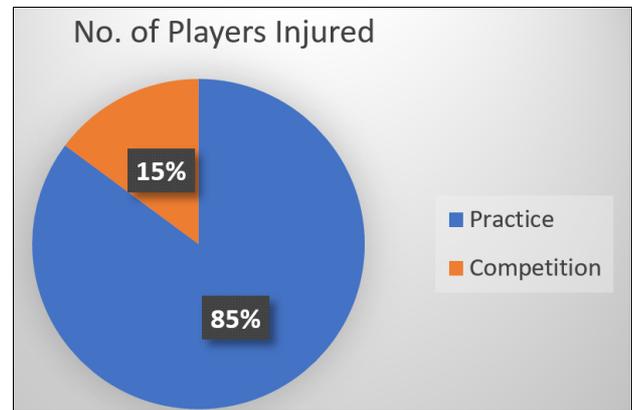


Fig 1: Pie charts shows injury during practice /training and Competition

The most common onset was acute injuries (59.26%), whereas 40.74% was Chronic. Fig. 2 shows the musculoskeletal injuries according to the injured area. The majority of the injuries (42 or 77.78%) occurred in the lower extremities. The commonest location of these lower extremity injuries was the knee (37.1%), followed by the ankle (28.3%), thigh (13.2%), heel (13.5%), and toes (7.8%). Of the upper extremity injuries, the shoulder was frequently affected (41.66%), followed by elbow (33.33%) and wrist (25%).

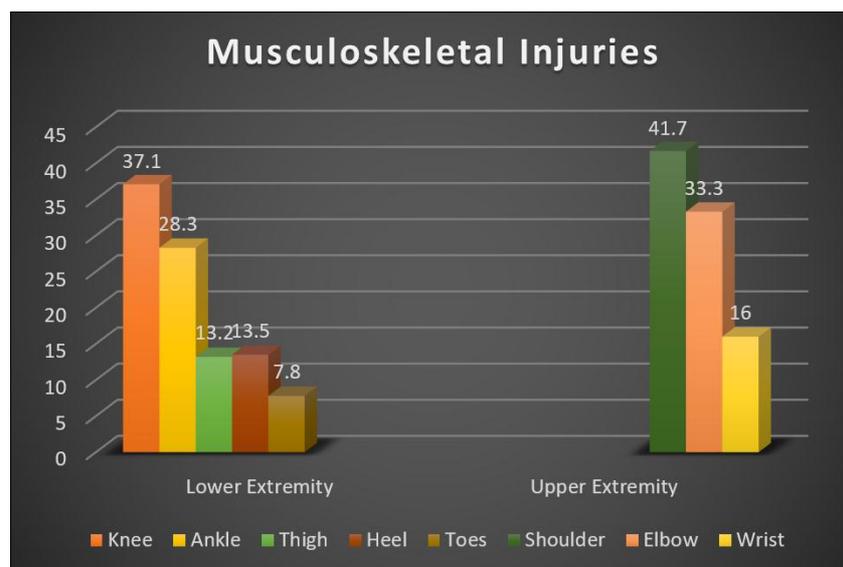


Fig 2: Bar Graph shows injury by region

The most common type of injury was the overuse (70%), Strains (15%), Sprains (10%) and Fracture (4%) as shown in Fig. 3. The commonest type of knee injury was tendinitis (51.7%), followed by muscle (hamstring and quadriceps) strain (15.8%), meniscus and ligamentous injuries (11.9%) and injuries including bursitis, patellar fracture, impingement syndrome (18.3%). Ankle sprain (recurrent and acute) was the most frequent type of injury affecting the ankle (82.7%), followed by tendon injury. Quadriceps, hamstrings and adductor (70.4%) muscle strains were frequently associated with thigh injury. The most frequent injury affecting the heel was plantar fasciitis (48.4%), followed by Achilles tendinopathy (30.3%), Achilles tendon tears (15.1%) and heel blisters (6.1%). Metatarsophalangeal joint sprain ranked first (52.8%) for injuries affecting the toes, followed by metatarsal fractures, blisters, and corn. The upper extremity was the second most injured area (22.2%). Of the upper extremity

injuries, the shoulder was frequently affected (41.6%), biceps tendinopathy, muscle strains (deltoid, trapezius and triceps) and acromioclavicular joint sprains. Elbow injuries were the second most affected area of upper extremity injuries. The commonest elbow injuries diagnosed were golfer's elbow and tennis elbow. The commonest injury affecting the wrist was wrist sprain (25%). Back muscle strain (82.4%) was the commonest injury diagnosed in players with back symptoms, followed by lumbar vertebrae (L4, L5) fracture of the pars interarticularis (10.2%) and prolapsed intervertebral disc (7.3%). 35 (65%) players were injured during doubles match, 12 (22%) injured resulting from shuttle cock impact and 8 (15%) players injured by partner.

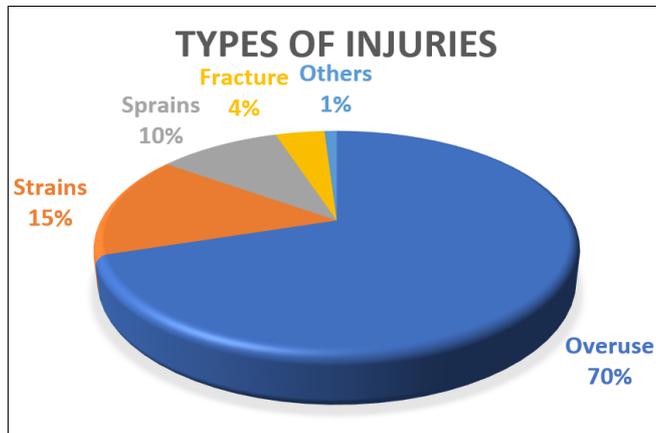


Fig 3: Pie Chart shows common type of injury

Discussion

Badminton has been identified as one of the elite core sports in India. India was able to produce many world-class players. Injuries affecting badminton player are not fully understood. The results of the current study were to determine the prevalence of musculoskeletal injuries among Badminton Players of Vadodara. This current study finding was that most of the injuries were sustained during training or practice, rather than in competition. Similar observations were also reported in earlier studies [5]. In contrast, Hoy et al observed more injuries occurring during competition; however, their study included recreational badminton players with limited experience [6]. This difference in observation could be explained by the training routine of the elite athletes, where most of their time was spent preparing for competition, and training involved 3-4 sessions (including gym workouts) daily for 1-3 hours per session. Furthermore, training sessions sometimes involved more injury-producing drills, something which the recreational player would rarely undergo [7].

Badminton is a non-contact sport that requires jumps, lunges and quick changes in direction, together with rapid arm movements from a wide variety of postural positions. Not surprisingly, the commonest area of injury was the lower limb (77.78%). Jorgensen and Winge found 58% of lower extremity injuries in their study of elite level badminton players [7]. A higher percentage of lower extremity injuries (82.9%) was observed in Kroner et al's prospective one-year study; however, these studies included only recreational badminton players [8].

Tendinitis (51.7%) was the commonest type of lower limb injury diagnosed in the present study. An earlier prospective study using ultrasonography evaluation demonstrated a patellar tendinitis incidence of 13.8% [7]. Peers and Lysens suggested that frequent knee problems were probably related to the rapidly changing eccentric/concentric work of the quadriceps in the varying degrees of knee flexion and rotation, creating a high force load on the patellar tendon [9]. Witvrouw et al, in their two-year prospective study, suggested that the lower flexibility of the quadriceps and hamstring muscles is significantly associated with patellar tendinitis in an athletic population [7].

In a study of 60 badminton players, 22% of injuries were noted to occur in the upper limb. Similar findings were noted in the assessment of 469 elite level badminton players, with 18.1% incidence of upper limb injuries. In the epidemiological assessment conducted by Jorgensen et al., they showed that majority of the injuries involving the upper limb were related to overuse type injuries (69/70). 25% of these were lateral epicondylitis and 59% were tendinitis,

peritendinitis and unspecified pain in the upper arm (32%) and shoulder (27%) [10]. Shoulder injuries are common in badminton due to repetitive overhead strokeplay. Postural asymmetry is typically considered to be associated with injuries. This study provided the data on musculoskeletal injuries sustained by Vadodara badminton players. It is hoped that such findings would provide a foundation for generating new hypotheses with regard to injuries in badminton. More prospective studies aimed toward understanding injuries and their mechanisms are essential in developing optimal injury management and prevention strategies.

Conclusion

Badminton is a noncontact sport, there is a significant risk of injuries. This prevalence of injuries is much higher than commonly assumed, and is almost similar to the incidence of injuries in other racquet sports such as tennis and squash. The majority of badminton injuries are secondary to overuse and are a result of excessive cumulative loads. Badminton coaches and trainers should note these observations and consider an alteration in the training workload of badminton players to allow the body to recover, and break the repetitive cycle leading to overuse injuries. Moreover, since data shows that younger aged badminton players are more prone to acute traumatic injuries, coaches should ensure game management techniques that inculcate a habit of "safe" and low-risk play in young exuberant players.

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