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Original Article

Prevalence of Musculo-Skeletal Pain among Badminton Players in Twin Cities of Pakistan (Cross Sectional)

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ABSTRACT

Badminton is a popular sport with a rich tradition in Pakistan twin cities Islamabad and Rawalpindi. In badminton, players are more susceptible to certain musculoskeletal problems due to the sport's dynamic character, abrupt accelerations and decelerations. Badminton has an injury rate of 1 to 7/1000 hours per person of playing time. **Objective:** To find out prevalence of musculoskeletal problem including pain among the badminton players played in various clubs of Islamabad and Rawalpindi. **Methods:** 255 badminton players participated in a convenience sample-based cross-sectional study after ethical permission. The incidence of musculoskeletal discomfort in novice badminton players' shoulder, elbow, wrist, hands, thigh, hips, knee and ankle was measured using a self-drafted survey and the Nordic Musculoskeletal Questionnaire. Data collection was done sports clubs of Islamabad and Rawalpindi. Study ran from September 22, 2021, to June 30, 2022. SPSS version-25.0 software was used for data analysis. **Results:** The results showed prevalence was 16.5, back 18.4, hip 7.4, knee 28.6, ankle 16.5, elbow 22.4, wrist 21.2, low back 12.9, and shoulder 49.4. Among badminton players, the most common pain regions were the shoulder and knee. Other areas that players are less likely to have discomfort in include the hands, hips and ankles. **Conclusions:** Conclusions of study showed younger athletes had higher prevalence of musculoskeletal discomfort. Most prevalent pain areas among badminton players were the knee and shoulder.

INTRODUCTION

Musculoskeletal pain can result from trauma to an area, such as jerking movements, car accidents, falls, sports, fractures, sprains, dislocations, and direct impacts to the muscle [1]. The second most popular sport worldwide is badminton. Around 150 million individuals are thought to play badminton globally, and more than 2,000 players compete in international tournaments, according to the Badminton World Federation (BWF) [2, 3]. Badminton is a popular sport enjoyed by both genders and people of all

ages around the world. Unlike recreational badminton, competitive badminton places a greater burden on the player due to vigorous upper arm, trunk, and leg movements. In general, men are injured more often than female players. However, there has been a significant increase in injuries with age and injury rates are much higher in female players than in male players across all age groups [4]. Depending on the population, badminton has an injury rate of 1 to 7/1000 hours per person of playing time.

The majority of injuries (91%) suffered by young athletes are mild and do not prevent them from participating in practice [5]. Muttalib et al., also suggested that most of the injuries acquired by badminton players are due to overuse, primarily in the knee [6]. According to statistics, between 16 and 19 percent of top athletes compete while still experiencing shoulder, Achilles, or patellar tendon pain [7]. It was shown that players between the ages of 18 and 25 had a higher frequency of injuries [8]. Badminton injuries constituted 4.1 percent of the total number of registered injuries during the one-year period [9]. According to Krøner et al., 82.9 percent of injuries included the lower extremities, 11.1% of cases involved the upper extremities, and 2.3% involved the eyes [10]. Badminton requires a lot of over shoulder motion along with external shoulder rotation; hence it is an essential component of the sport. A common issue for athletes participating in sports requiring overhead motion is shoulder soreness which is brought on by the anterior instability of the shoulder joint [2]. According to studies, every 1000 hours of badminton play results in an injury rate of 2.9 per player. Ankle sprains and Achilles tendinitis are the two most frequent injuries in the ankle region of badminton players [11]. The most common injury sites among badminton players were found to be the ankle (23.5%), knee (14.0%), foot (12.5%), arm (8.5%), and leg (five.4 percent) [12, 13]. It is strongly advised that badminton players strengthen their muscles in this area and engage in the proper training and body-building exercises in order to prevent injury. This is due to the high percentage of sports-related ailments involving the shoulder, ankle, wrist, and elbow. High incidence of musculoskeletal issues suggest that training interventions and sports-related activities should be incorporated into courses to help players focus and perform better. These applications can improve players' health by lowering the incidence of musculoskeletal issues [14]. Purpose of study was to find out prevalence of musculoskeletal problem including pain among the badminton players played in various clubs of Islamabad and Rawalpindi. The existing literature has limited research focusing prevalence of musculoskeletal problem including pain among the badminton players of Pakistan. This study aimed to fill a research gap by investigating prevalence of musculoskeletal problem among Pakistani badminton players.

METHODS

A descriptive cross-sectional study design was used. Convenient (non-probability) sampling technique was implied data collection was done from sports clubs of Islamabad and Rawalpindi. Sampling size was 255 calculated by using Rao-soft calculator, using a confidence interval of 95%, margin of error of 5% at an estimated population size of 750 badminton players [15]. Inclusion criteria was adult players (18-35 years), level of

performance (beginner athletes), male and female badminton players and players playing at least 2 times per week. Subjects with history of fracture, recent history of surgical procedure, neurological deficit and tumor were excluded. A self-structured questionnaire was used to gather data on the badminton players' demographics. The Nordic Musculoskeletal Questionnaire (NMQ) was used to collect data on specific outcomes related to the reported musculoskeletal discomfort of badminton players. When utilized as a component of a routine general health checkup, the questionnaire was provided as part of a specialized study on musculoskeletal problems. It offered 28 multiple-choice questions divided into two clearly distinct sections. Section 1 was a general questionnaire with 40 forced-choice questions that identified body parts where musculoskeletal issues are present. A body map that highlighted the nine symptom sites—the neck, shoulders, upper back, elbows, low back, wrist/hands, hips/thighs, knees, and ankles/feet—helps with completion. Respondents were asked if they have experienced any musculoskeletal pain in the previous year and the previous seven days that had prohibited. Additional questions in section 2 focused on the neck, shoulders, and lower back to go into more detail about pertinent topics. Twenty-five multiple-choice questions were used to gather information about accidents that had affected each area, the functional impact at home and at work (such as a change in job responsibilities), the length of the problem, a health professional's assessment, and recent musculoskeletal issues. Using a test-retest approach, the dependability of the NMQ revealed that the percentage of changed answers ranged from 0 to 23%. Comparing pain in the past week to a clinical assessment, it was discovered that sensitivity varied from 66 to 92 percent and specificity from 71 to 88 percent. NMQ is a reliable, sensitive, and practical screening technique as a result. Descriptive statistics was used to examine collected data through questionnaires (e.g., mean and standard deviation). Data were presented in form of graphs and tables. SPSS version 25.0 software (SPSS Inc. Chicago IL, USA) was used for data analysis. The study ran from September 22, 2021, to June 30, 2022. Ethical approval was obtained from ethical review committee of the Margalla Institute of Health Sciences Rawalpindi. All the players enrolled signed informed consents and all the information gathered was considered confidential, and it was used for research study only.

RESULTS

Following last 12 months and last week, prevalence was found to be shoulder 49.4, neck 16.5, upper back 18.4, elbow 22.4, wrist 21.2, low back 12.9, hip 7.4, knee 28.6, and ankle 16.5 respectively. Pain among shoulder and knee were most susceptible region of pain among badminton players. Other regions including elbows, hands, thighs, hips, and ankles were less susceptible to pain among players. Out of data

obtained, there was male predominance 62% while remainder 38% were female. Table 1 shows mean age 24.27 years, mean height 168.84cm, mean weight 64.27 kg and BMI is 22.04.

Table 1: Demographic Variables

Variable	Mean ± SD
Age (years)	24.27 ± 4.9
Height (cm)	168.84 ± 8.7
Weight (kg)	64.27 ± 10.1
BMI	22.04 ± 2.9

Figure 1 Shows the different number of participants of ages 18 to 35 in this study.

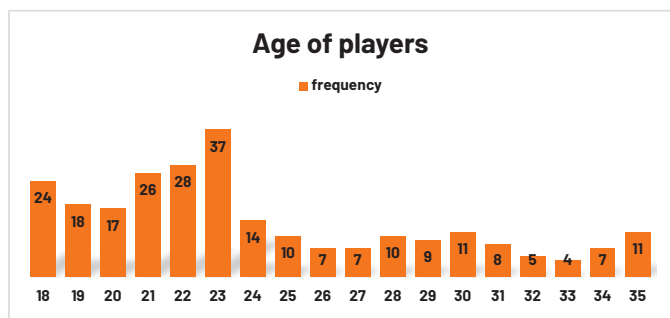


Figure 1: Age of players

Figure 2 shows two qualitative categories male and female. There was a total of 255 participants out of which 159 (62%) were male and 96(38%) were female.

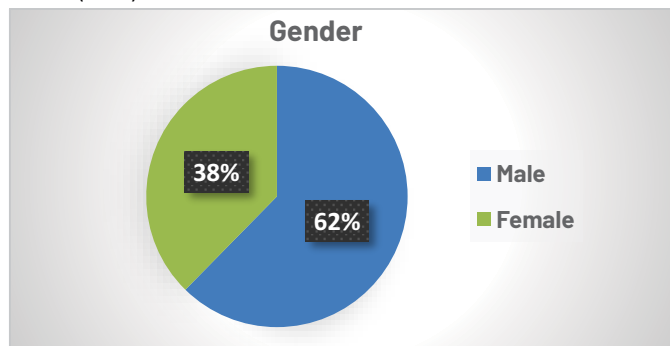


Figure 2: Gender distribution

Figure 3 shows that out of 255 total participants 164 (64%) reported no pain at the moment when questionnaire was filled and 91(36%) reported pain at the moment when the questionnaire was given.

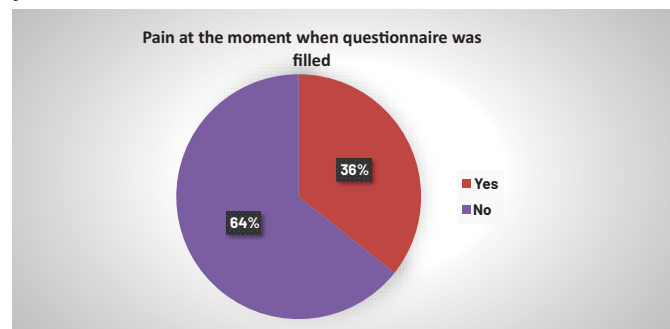


Figure 3: Pain at the moment when questionnaire was filled

Figure 4 shows pain during last 12 months in badminton players. The anatomical sites of pain seen in player were shoulder in 126 players, knee in 73, elbow in 57, wrist in 54, upper back in 47, neck and ankle in 42, lower back in 33 and hip in 20 players respectively.

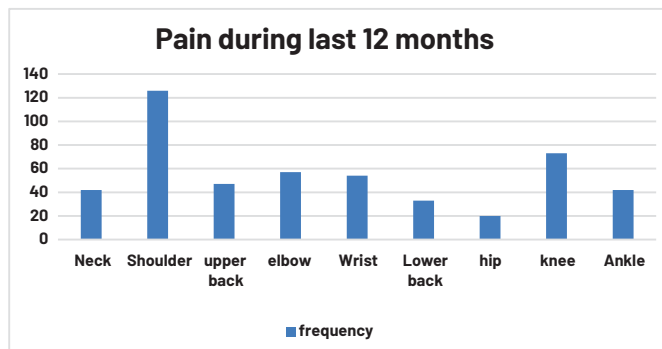


Figure 4: Prevalence of musculoskeletal pain during last 12 months

Figure 5 shows number ratio of players who have visited a physician about this ailment. The anatomical sites of pain seen in players were shoulder in 16, knee in 13, ankle in 10, wrist in 9, upper back in 8, neck in 7, elbows and lower back in 6, and hip in 3 players respectively.

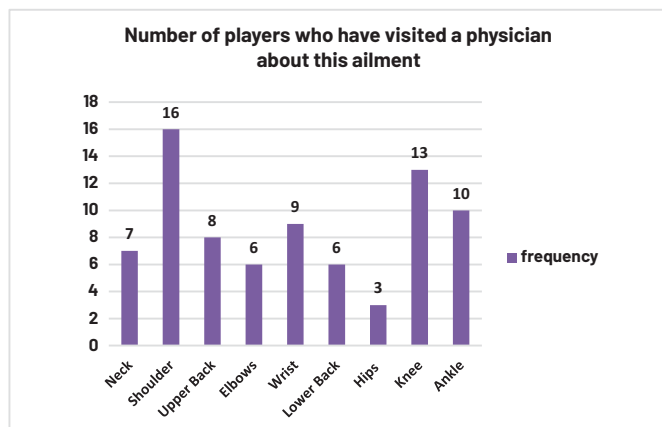


Figure 5: Number of players who have visited a physician about this ailment

Figure 6 shows number of players having pain during last 7 days. The sites of pain seen in players were shoulder 36, knee 30, neck 23, lower back 22, upper back 21, elbow and wrist 14, hip and ankle 13 respectively.

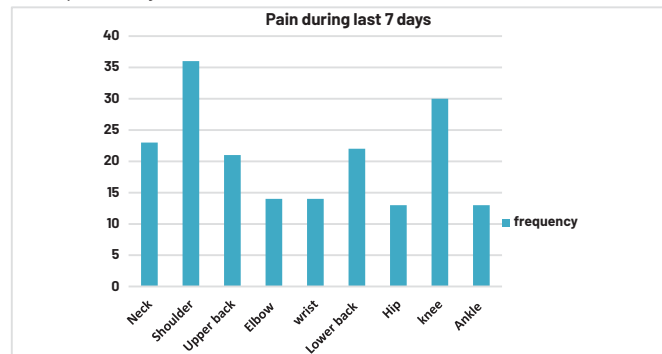


Figure 6: Pain during last 7 days

DISCUSSION

In Pakistan, badminton is the second most popular sport that is practiced widely. The availability of badminton courts is helping to increase participation rates for both sexes. Badminton players have musculoskeletal pain as a result of the contactless racquet sport's combination of hops, lunges, and quick direction changes. Finding the incidence of musculoskeletal discomfort among badminton players in Rawalpindi and Islamabad was the primary goal of this study. Males made up 62% of the population, while females made up 38%. 91 players currently reported experiencing pain. In current survey, the shoulder, knee, and elbow were the three most often involved sites of pain over the previous 12 months, with a respective percentage of 49.4%, 28.6%, and 22.4 percent. The most often affected sites that stopped the players from doing daily activities were the shoulder, knee and upper back (9%) as supported by de Oliveira et al., in which prevalence of pain in shoulder, knee and upper back was 9%, 7.1% and 6.7% respectively. Similar results were reported by Fahlström et al., where the most frequently impacted locations in athletes who experienced issues in the past week were shoulder (14.1%), knee (11.8%) and lower back (8.6%) [17]. The research on 99 recreational badminton players was done in Sweden. According to the study's findings, 16 percent of all badminton players and 50% of players who played with a dominant shoulder had recent shoulder pain. The overwhelming group of athletes claimed that their training session was impacted by pain. These findings were according to current study's findings and indicated that the shoulder is one of the most common discomfort sites. 49.4% of badminton players reported having shoulder pain, and 14.1% of players said the problem had persisted for the previous seven days [18]. An effective study was conducted at the University of Peradeniya at Sri Lanka to examine the epidemiology of badminton-related injuries among players from various populations. According to the study, rotator cuff tendinopathy is the primary cause of 48.4% of shoulder pain among badminton players. These findings were according to current study's findings that shoulder pain was a prominent factor that had been present in badminton players for a period of 49 years, and the prevalence of shoulder discomfort was 49.4% among players, with the likelihood of shoulder pain increasing by roughly 1% [19]. Islamabad, Pakistan's capital city, served as the study's location. 233 male and 67 female players out of 300 took part in the study. The purpose of the study was to determine the prevalence of knee discomfort in athletes and the risk factors related to particular sports. 16 badminton players were evaluated for knee pain, and the 28 games were included in the study. The overall prevalence rate of knee discomfort was 5.4 percent, with 11

badminton players (3.7 percent) reporting knee pain and 5 (1.7 percent) not reporting any. In the current study, which included 255 badminton players, the prevalence rate of knee discomfort was determined to be 28.6%, which is a much higher percentage than in the earlier study. Due to the lower number of badminton players included in the earlier research than in current, the incidence rate of knee pain was lower [20]. A cross-sectional study by Noormohammadpour et al., among 1135 female athletes competing in badminton, basketball, volleyball, karate, and swimming at the National Sport Athlete Olympics. A total of 1,019 athletes responded to the survey, with an average age (SD=23.1). The prevalence of low back pain (LBP) was 12.4% at the point in time, 42.4% after one year, 48.4% with active lifestyles, and 62.34 percent over the course of one's lifetime. Current study involved 255 players from a notable badminton club in twin cities in Pakistan, with a mean age of 24.27 and a standard deviation of 4.93 used a Nordic Musculoskeletal Questionnaire to look at pain in 9 different body regions. The incidence rate of LBP over the last 12 months was 12.9%; players who were unable to perform on a daily basis owing to LBP were 5.1%; patients who saw a doctor for LBP were 2.4%; and players who experienced lower back pain over the past week were 8.6%. In contrast to a prior study, current research revealed that the frequency of LBP among badminton players gradually dropped from 48.4 percent to 12.9 percent [19].

CONCLUSIONS

Several inferences about the prevalence of musculoskeletal pain among badminton players can be made based on the findings. The results of this study showed that beginners players are more likely to have musculoskeletal pain. The most often affected body parts among badminton players were the shoulder and knee.

Authors Contribution

Conceptualization: AK

Methodology: HK

Formal analysis: RB, AT

Writing-review and editing: RE, MNF, FA, AT, AA, AZ

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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