

# Musculo-Skeletal Disorder among Re-Creational Badminton Players of Districts of Arunachal Pradesh

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## Abstract:-

**Introduction:** Badminton, a popular racquet game is a non-contact sport which requires a combination of jumps, lunges, quick changes in direction and rapid arm movements. During such movements, the body gets exposed to various forms of injuries. Hence, it is not uncommon for badminton players to sustain various injuries during the game. Thus, the purpose of this study was to find musculoskeletal disorder among re-creational badminton players in the districts of Arunachal Pradesh.

**Method:** A cross sectional survey was carried out on 100 badminton players using Modified Nordic Musculoskeletal Questionnaire to find the prevalence of musculoskeletal problems in re-creational badminton players of districts of Arunachal Pradesh.

**Result:** The study revealed that highest numbers of players were between the age group of 22-25 years with 38 subjects. The maximum players were affected in wrist/hand with 44% during the last 12 months. 27% of players reported having low back pain during the past 7 days and highest numbers of players' ADLs were affected by wrist pain during the past 12 months with 28% followed by shoulder with 22%.

**Conclusion:** The most common injuries sustained by recreational badminton players were Wrist/hand followed by shoulder injuries.

**Keywords:-** Musculoskeletal disorders, badminton players, recreational badminton player, sport injuries, overuse injuries.

## I. INTRODUCTION

Badminton is one of the most widely-played sports in the world and the second most played sport in INDIA<sup>1</sup>. The Badminton World Federation (BWF) estimated that about 150 million people play the game worldwide<sup>2</sup>. It is a popular non-contact, racquet sport which requires combination of jumps, lunges, quick changes in direction, burst actives and rapid arm movements in various awkward body postures<sup>3</sup>. During such movements, the body may be susceptible to various injuries. Therefore, it is common for badminton players to get different injuries during the game. Hence it is uncommon for badminton players to sustain various injuries during the game<sup>4</sup>. Although badminton is one of the most frequently played sports in the world, it has received little interest from sports medicine specialists. Based on the few existing studies on injuries in badminton, badminton is

considered as low-risk sport, dominated by overuse injuries. While recovery time from injury is relatively long, Anatomically most injuries are localized to the foot and ankle, with the most frequent injuries being Achilles tendonitis and tennis elbow<sup>5</sup>. An injury is defined as an episode of pain, swelling, stiffness or numbness during playing badminton or after the game. Badminton injuries as a whole are predominantly sprains and strains, and not overuse in nature as widely believed<sup>6</sup>.

But according to L.D. Hensey, Badminton is a sport of relatively low risk and that the majority of related injuries were chronic overuse injuries<sup>7</sup>. It is a fast sport that requires quick movements and sudden changes of direction. Injuries in sports are common due to contact with players, ground, objects and other reasons such as pressure, overuse and fall. Weakness is also a common cause of injuries. There are factors to be considered like knowing injury extension, the mechanism, and the preventive strategies. Proper training and treatment can help in protecting the damaged tissues which will help healing in the inflammatory stage and pain control. In addition, it helps in muscle flexibility, strength, Proprioception, and balance in improving the game performance<sup>8</sup>. Repetitive loading during the performance of the different kinds of strokes is the typical injury mechanism in badminton. The overuse injury mechanism in badminton is, however, as in most other sports less documented and more speculative, due to its multifactorial origin. Achilles tendon injuries in badminton could be due to a combined effect of the special footwork with fast forward movement/stop with forceful heel strike and eccentric work by the Triceps Surae (TS) alternating with backwards toe running and concentric work of the TS and backward or combined back/sideward jumps with forceful eccentric work by the TS. Injuries could also be caused by chronically practicing movements that produce alternating fast changing movements that cause high tension on the Achilles tendon, which could produce microtrauma<sup>5</sup>.

The important factors for badminton players are muscle strength, muscular endurance, power, speed, agility, flexibility, balance and coordination. Functional movements are highly dependent on this part of the body, and lack of core muscular development can result in predisposition of injury<sup>9</sup>. Core muscles includes transverse abdominal muscle, abdominal external oblique muscle, multifidus muscles, abdominal internal oblique, psoas major muscle. A core muscle is used to stabilize the thorax and pelvis during dynamic movement and it also provides internal pressure to expel substances. Static core functionally is the ability of

one's core to align the skeleton to resist a force that does not change. The core strength training plays an important role in reducing and preventing lower and knee joint injuries<sup>10</sup>.

The injuries in badminton can be recognized on the basis of type of injuries, severity and body part. There are many prevalence studies stating that there are more of ankle and knee injuries<sup>11</sup>.

As badminton is the second most popular sport in India, it is necessary to understand the injury prevalence, so as to predict risk factors and to set up preventive measures to prevent injuries. Also to make awareness for coaches to develop a better plan for training thereby reduce risk of injury and improve training quality<sup>6</sup>. Due to huge force involved in badminton while jumping and other movements it is expected that injuries would occur. Ankle, shoulder, and knee injuries are common injuries in badminton which needs rehabilitation. It is recognized that the overall injuries in badminton is low comparing to other sports<sup>8</sup>. Furthermore, badminton match requires high intensity intermittent actions within short resting period<sup>12</sup>. Fatigue may affect the neuromuscular control of lower limb, which is susceptible to increase the risk of injuries<sup>13</sup>. Other studies showed the majority of injuries among badminton players occurred in lower extremities, which might be due to rapid movements required in this game. Currently only limited evidence is available about the relationship between risk factors and lower extremity injuries among re-creational badminton players<sup>14</sup>.

Hitting the shuttlecock in badminton places a high degree of force on the shoulder joint, and a characteristic feature of this sport is that it requires more shoulder mobility than other sports. Arm rotation, particularly at the shoulder, is an important component of strokes, and stroke repetition increases the load on the shoulder<sup>15</sup>. The injuries in badminton can be recognized on the basis of type of injuries, severity and body part. It is necessary to understand the injury prevalence, so as to predict risk factors and to set up preventive measures to prevent injuries<sup>16</sup>. High prevalence rate of musculoskeletal disorders indicates that it is necessary to organize the training courses about sports and coaching intervention in order to raise players' awareness and skills. These programs can be used to improve the health of players by preventing from the occurrence of musculoskeletal disorders<sup>17</sup>.

A retrospective study carried out in Hong Kong on elite badminton players showed that sprains were the most common type of injuries, and that the back, shoulder, thigh and knee were the most common areas involved<sup>18</sup>. Studies reporting injuries in recreational badminton players are limited. Thus, the purpose of this study was to describe common injuries sustained by recreational badminton players<sup>4</sup>. Risk factors for lower limb injuries need to be investigated to help develop appropriate preventive measures. Thus, the study was aimed to analyze the relationship of demographic and physical characteristics to lower limb injuries in badminton players<sup>14</sup>. A study conducted by J. Suresh et al concluded that there is high prevalence rate of varied musculoskeletal disorders in recreational badminton players which is due to improper training and awareness

about the sport that mainly affects the shoulder, wrist and low back region comparing to other areas<sup>19</sup>.

This study was aimed to provide objective data and information for physiotherapists working in Arunachal Pradesh at recreational clubs, badminton institutes etc. to develop a better plan of training advice for players thereby to reduce risk of injury, which in turn will help to improve the player's performance more effectively. This study will also provide important information for badminton player in Arunachal Pradesh to understand more about the injury patterns and predicting their causes so as to prevent them. Therefore the study was conducted to find out the prevalence of musculoskeletal disorder among the re-creational badminton players of district of Arunachal Pradesh.

## II. AIM AND OBJECTIVE OF THE STUDY

### A. Aim of the study:

The aim of the study is to examine the prevalence of musculoskeletal disorder among re-creational badminton player of districts of Arunachal Pradesh.

### B. Objective of the study:

- To determine the prevalence of musculoskeletal disorder among re-creational badminton players of districts of Arunachal Pradesh.
- To find out the most prevalent region of disorder among re-creational badminton player of Arunachal Pradesh.

## III. METHODOLOGY

- Source of data: 5 Districts of Arunachal Pradesh (Lower Subansiri, Papumpare, East Kameng, West Siang, Kara Dadi).
- Study setting: Badminton clubs, local youth clubs
- Sampling method: Convenient.
- Sample size: 100 recreational badminton players
- Inclusion Criteria:
  - Re-creational badminton players
  - Age group 18- 30
  - Players playing for 12 months
  - Players playing badminton with others sports too
- Exclusive Criteria:
  - Players with injuries within one month of duration.
  - Players with previous formal badminton training.
  - Players with neurological and systemic disorders.
- Procedure:
 

A survey was conducted to examine the prevalence of musculoskeletal disorder among re-creational badminton players of districts of Arunachal Pradesh. An approval was obtained from the Indira Gandhi Technology and Medical Science University, Ziro. 20 re-creational players were selected from each 5 districts of Arunachal Pradesh (Lower Subansiri, Papumpare, Kara Dadi, East Kameng, West Siang). A total of 100 re-creational badminton players were selected randomly considering inclusion and exclusion

criteria. The players were made aware of the purpose of the study and a consent form were taken. Each player's demographic data, performance were taken and all component of Nordic Musculoskeletal Questionnaire were explained to each and every player. Players were asked to recall the injuries they sustained in last one year and along with players have been prevented from carrying out normal activities during past 12 month and the injuries they sustained in last 1 week as on the following anatomical site of injury (Neck, Shoulders, Elbow, Wrists/Hands, Back,

Hips/Thigh/Buttocks, Knees Ankles) and category of injury ( Muscular pain, Sprain, Strain, Fracture, Dislocation) was noted. The distribution of the form started from Feb. 26 2022 and it took about 3& half months to complete the data collection. The total of all 100 re-creational players responded to the questionnaire and they with full cooperation completed their questionnaire form and submitted and the results were analyzed using (Microsoft Office Excel) Graphs and tables.

#### IV. RESULT

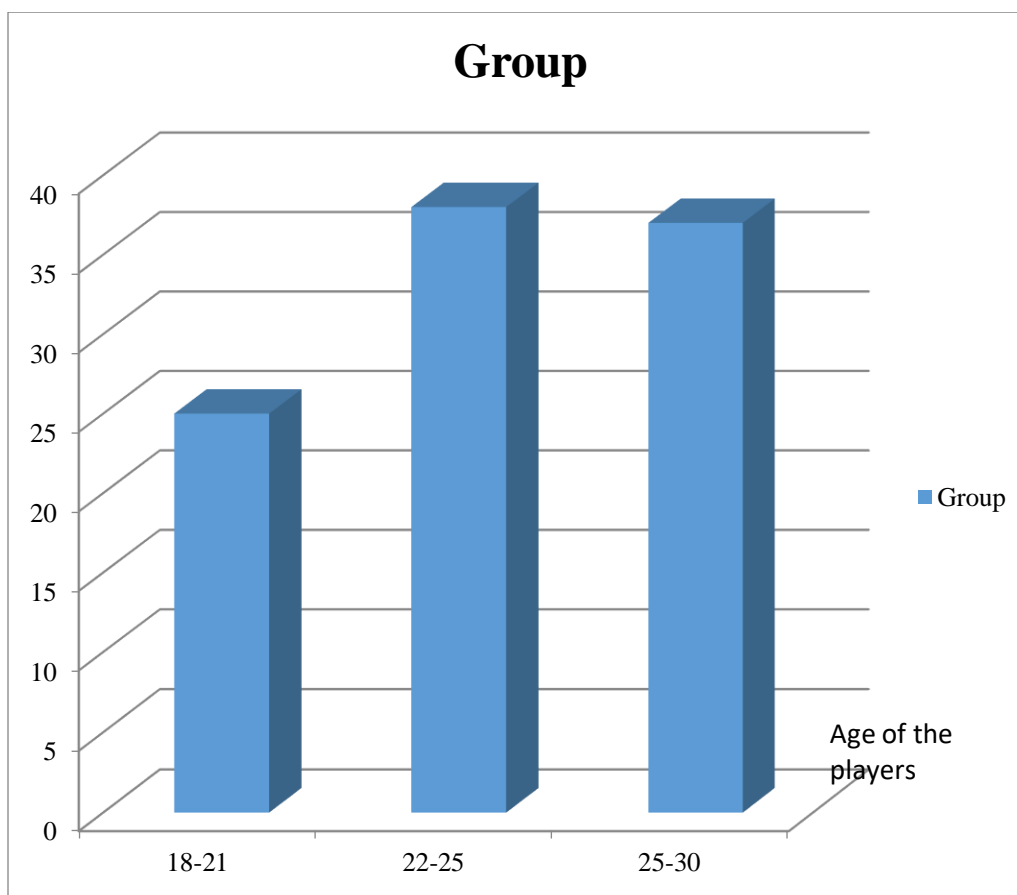


Fig. 1: Age Group Distribution

The subjects were divided three groups into according to their age; Group – A (18-21) 25 subjects, Group – B (22-25) 38 subjects and Group – C (25-30) 37, the study showed

highest number of recreational badminton players were between the age group of 22-25 years with 38 subjects.

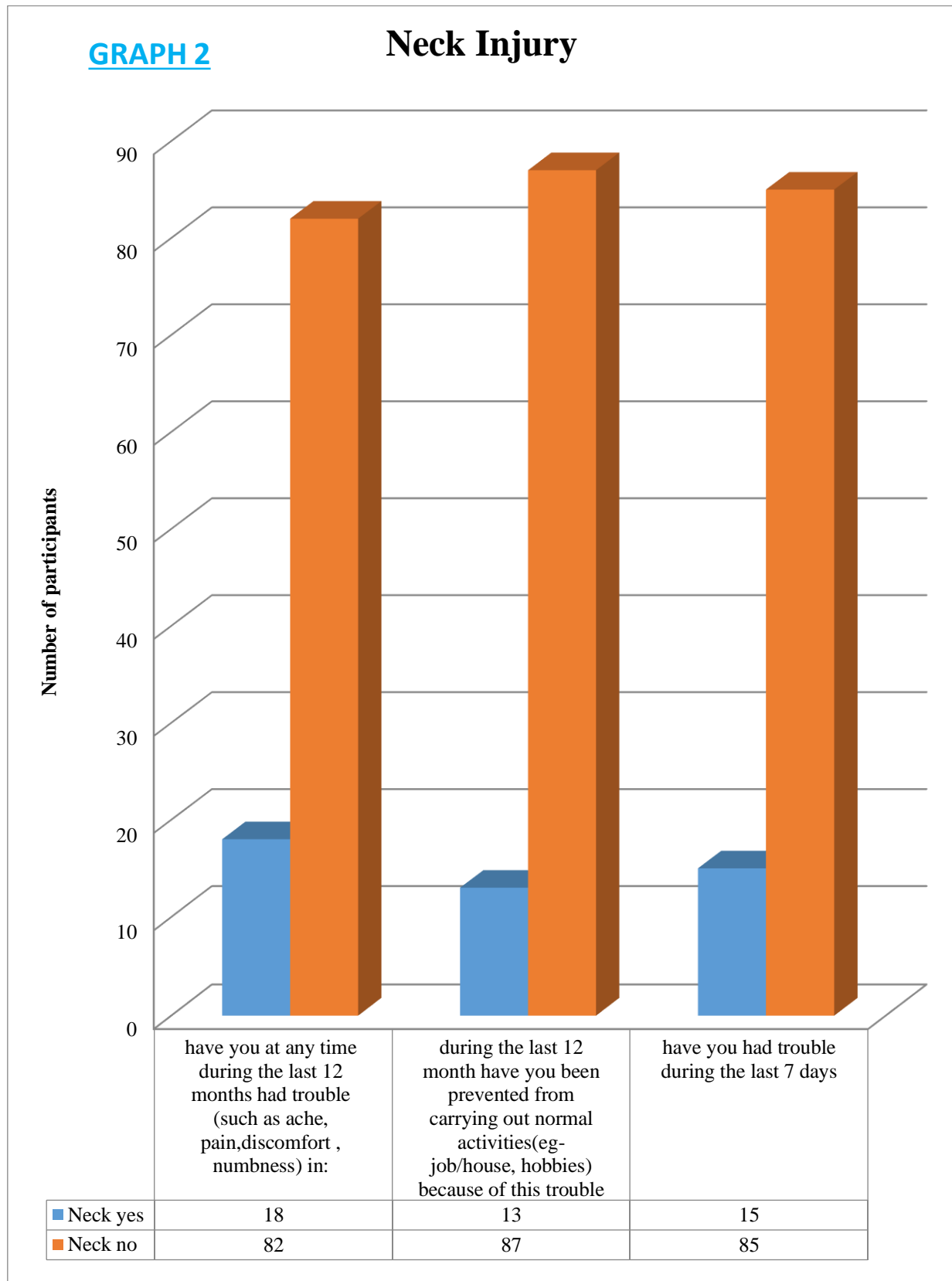


Fig. 2: Prevalence of Neck disorder

The present study showed that 18 out of 100 recreational badminton players have had trouble on neck during past 12 months. Out of 18 subjects, 13 of them have been

prevented from carrying out normal activities during past 12 month and 15 out of 100 players complain of repetitive neck pain within past 1 week.

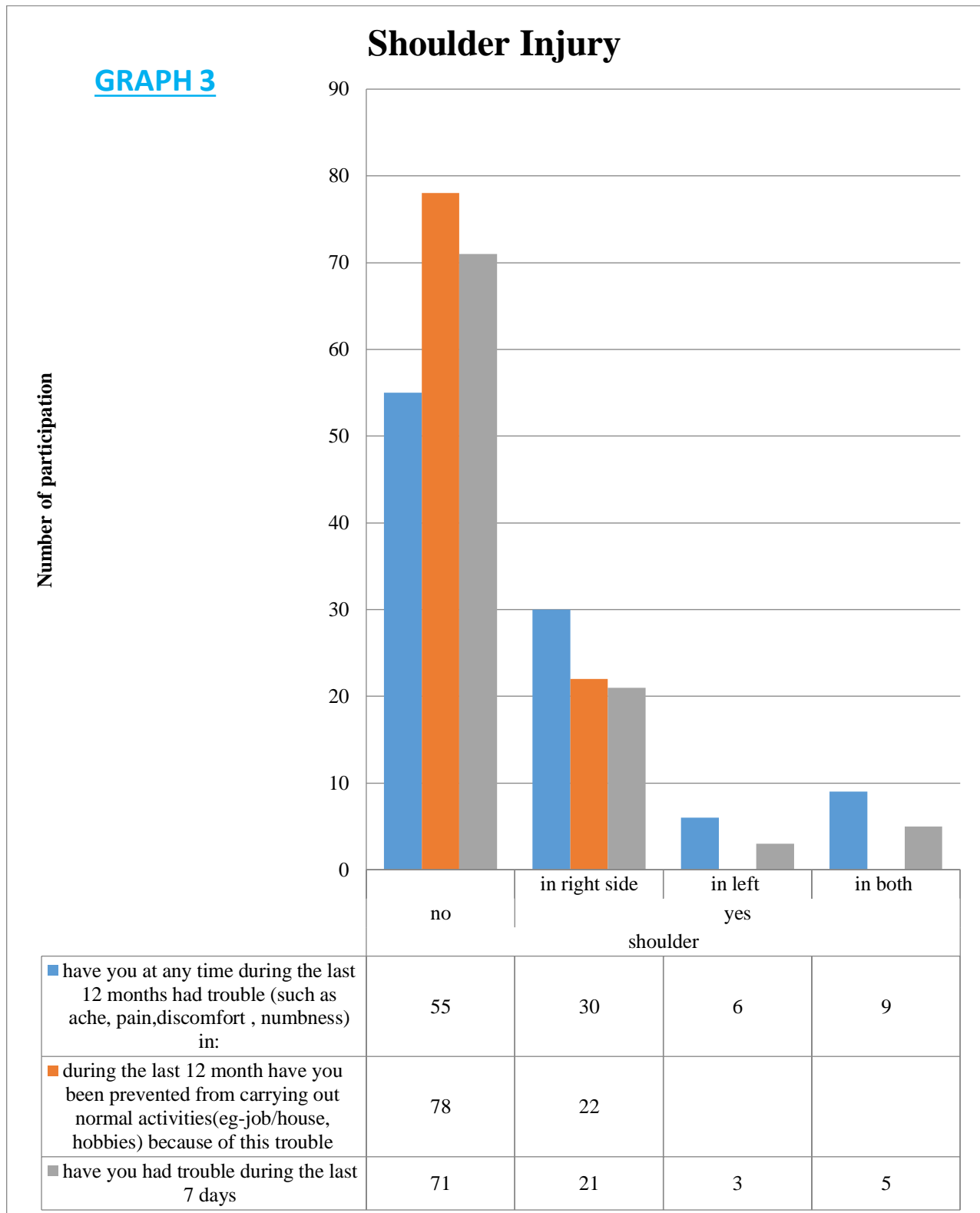


Fig. 3: Prevalence of Shoulder Disorder

The present study shows that 45 out of 100 re-creational badminton players have trouble on shoulder during past 12 months. Out of 45 only 22 of them have been prevented from

carrying out normal activities during past 12 months. On further, we found 29 out of 100 players complain of repetitive shoulder pain within past 1 week.

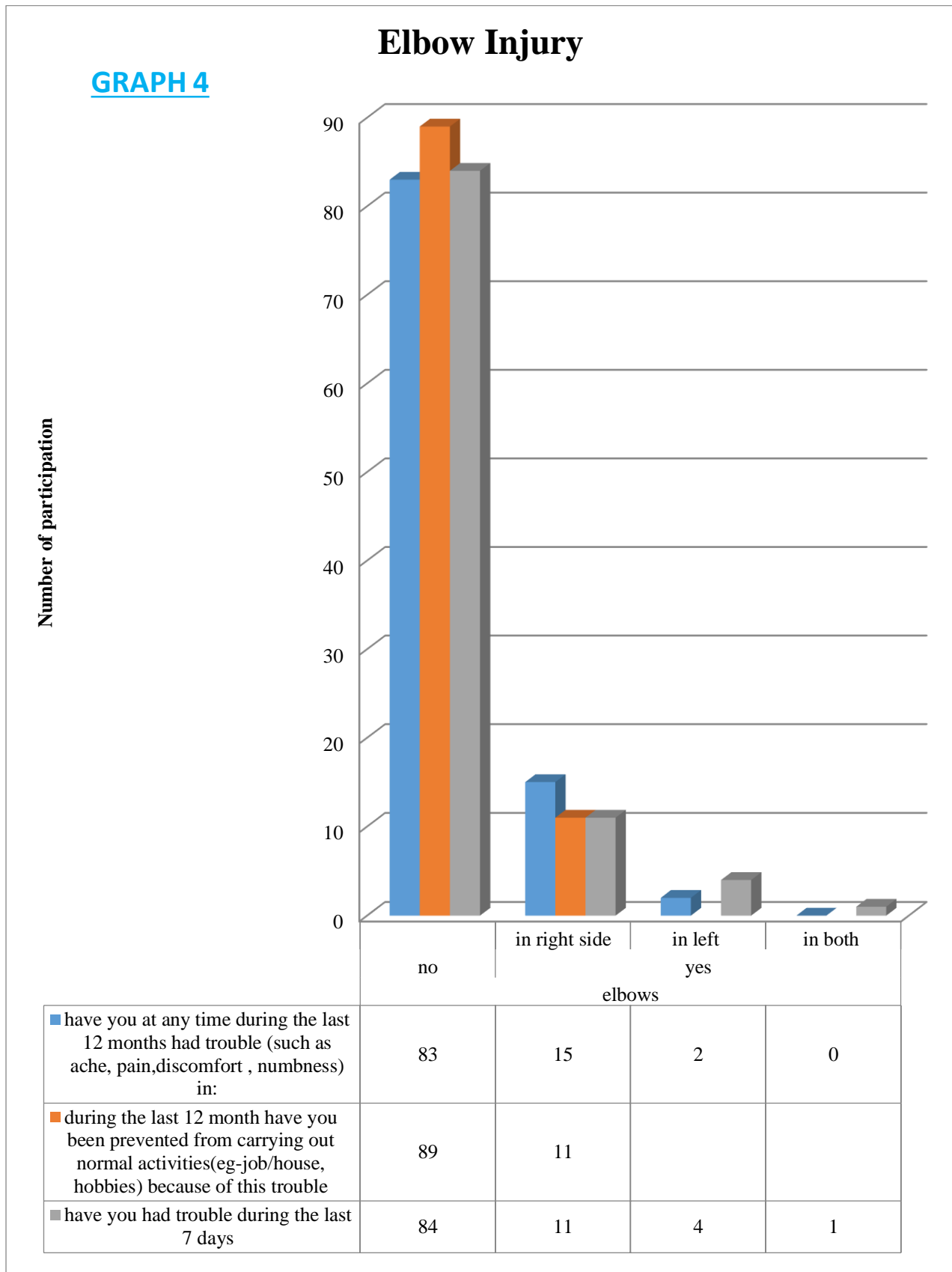


Fig. 4: Prevalence of Elbow Disorder

The present study shows that 17 out of 100 re-creational badminton players have trouble on elbow during past 12 months. Out of 17 only 11 of them have been prevented from

carrying out normal activities during past 12 months. On further, we found 15 out of 100 players complain of repetitive elbow pain within past 1 week.

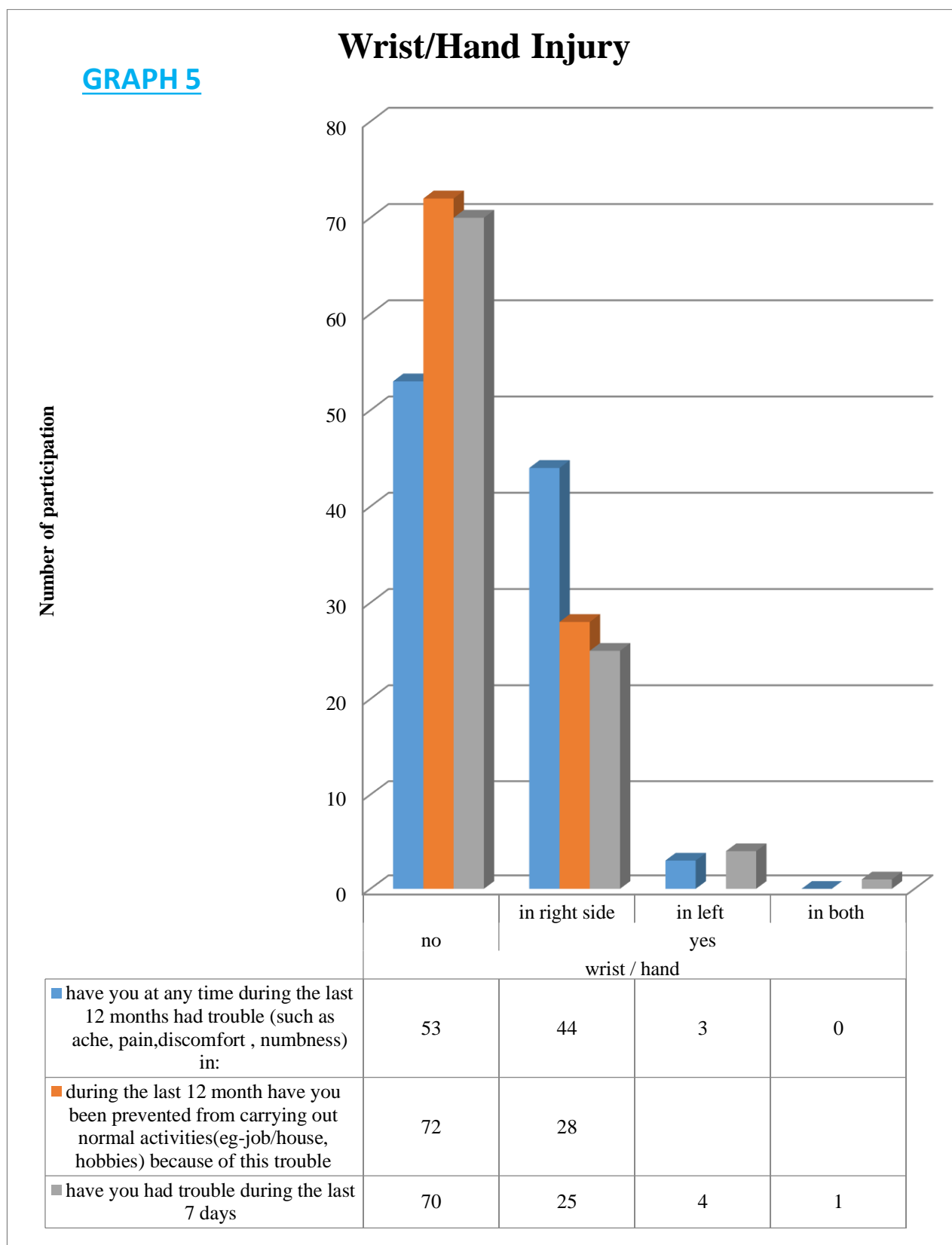


Fig. 5: Prevalence of Wrist/Hand Disorder

The present study shows that 47 out of 100 re-creational badminton players have trouble on wrist/hand during past 12 months. Out of 47 only 28 of them have been prevented from

carrying out normal activities during past 12 months. On further, we found 30 out of 100 players complain of repetitive wrist/hand pain within past 1 week.

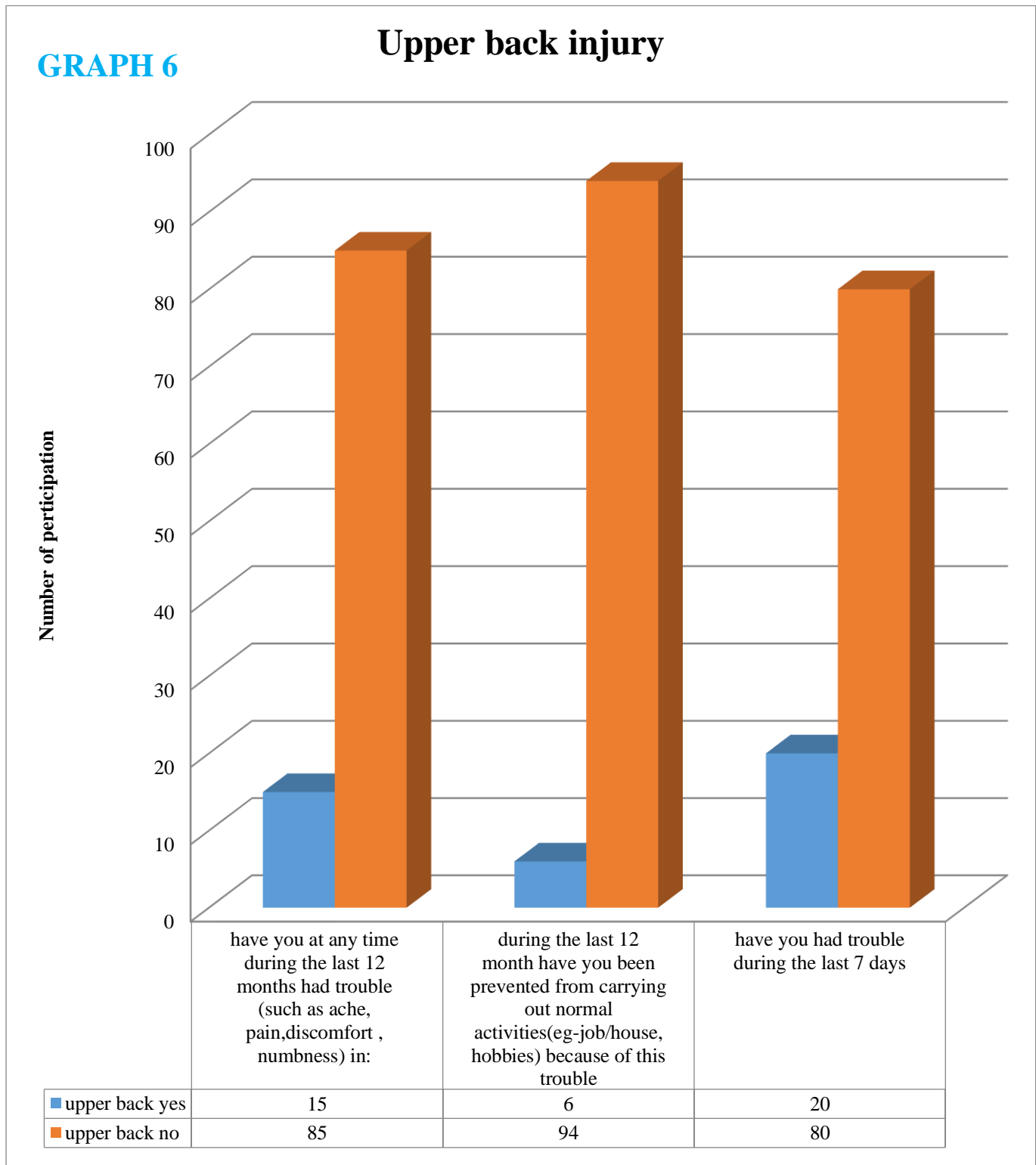


Fig. 6: Prevalence of Upper back Disorder

The present study shows that 15 out of 100 re-creational badminton players have trouble on upper back during past 12 months. Out of 15 only 06 of them have been prevented from

carrying out normal activities during past 12 months. On further, we found 20 out of 100 players complain of repetitive upper back pain within past 1 week.



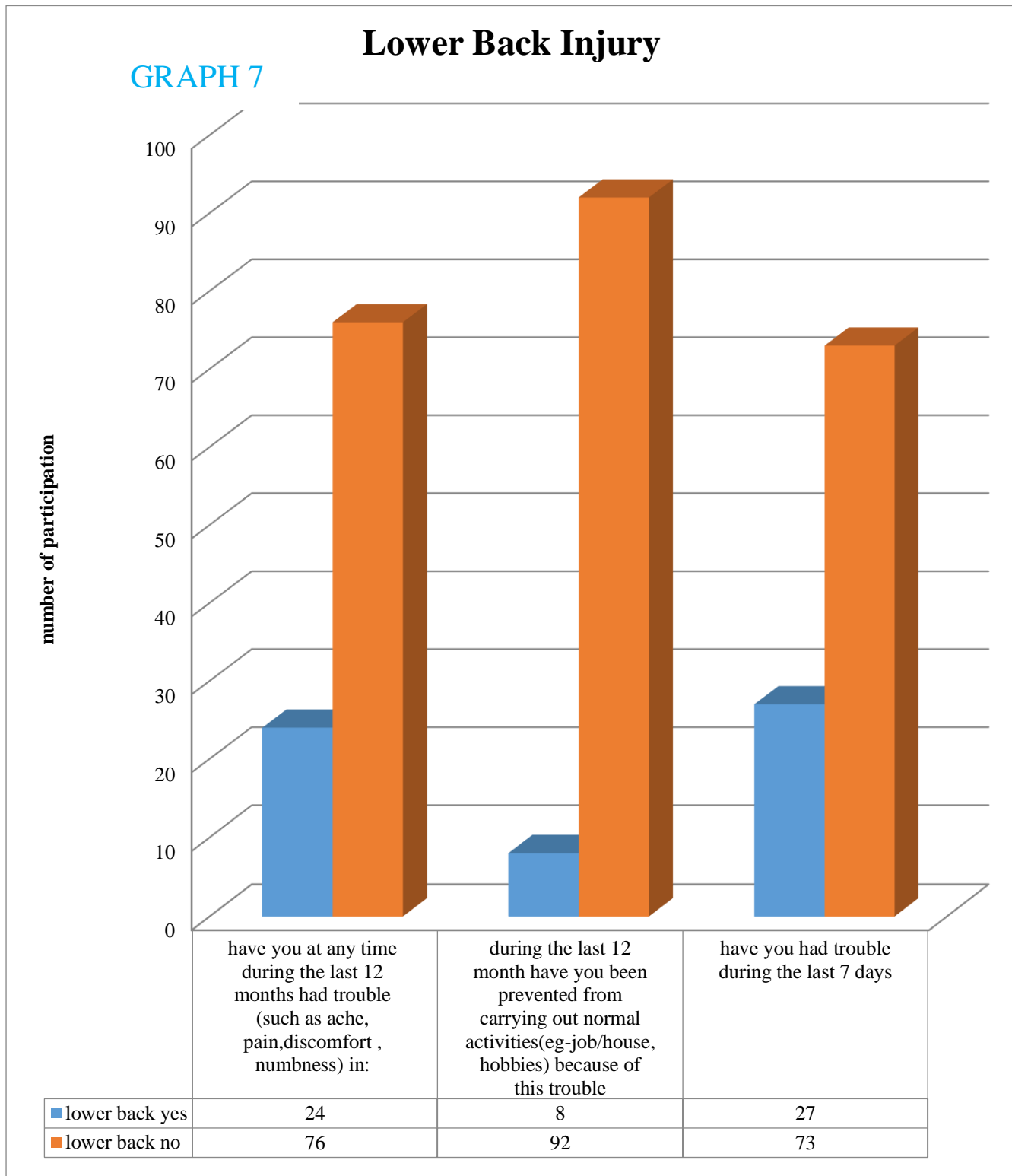


Fig. 7: Prevalence of Lower back Disorder

The present study shows that 24 out of 100 re-creational badminton players have trouble on low back pain during past 12 months. Out of 24 only 08 of them have been prevented

from carrying out normal activities during last 12 months. On further, we found 27 out of 100 players complain of repetitive low back pain within past 1 week.

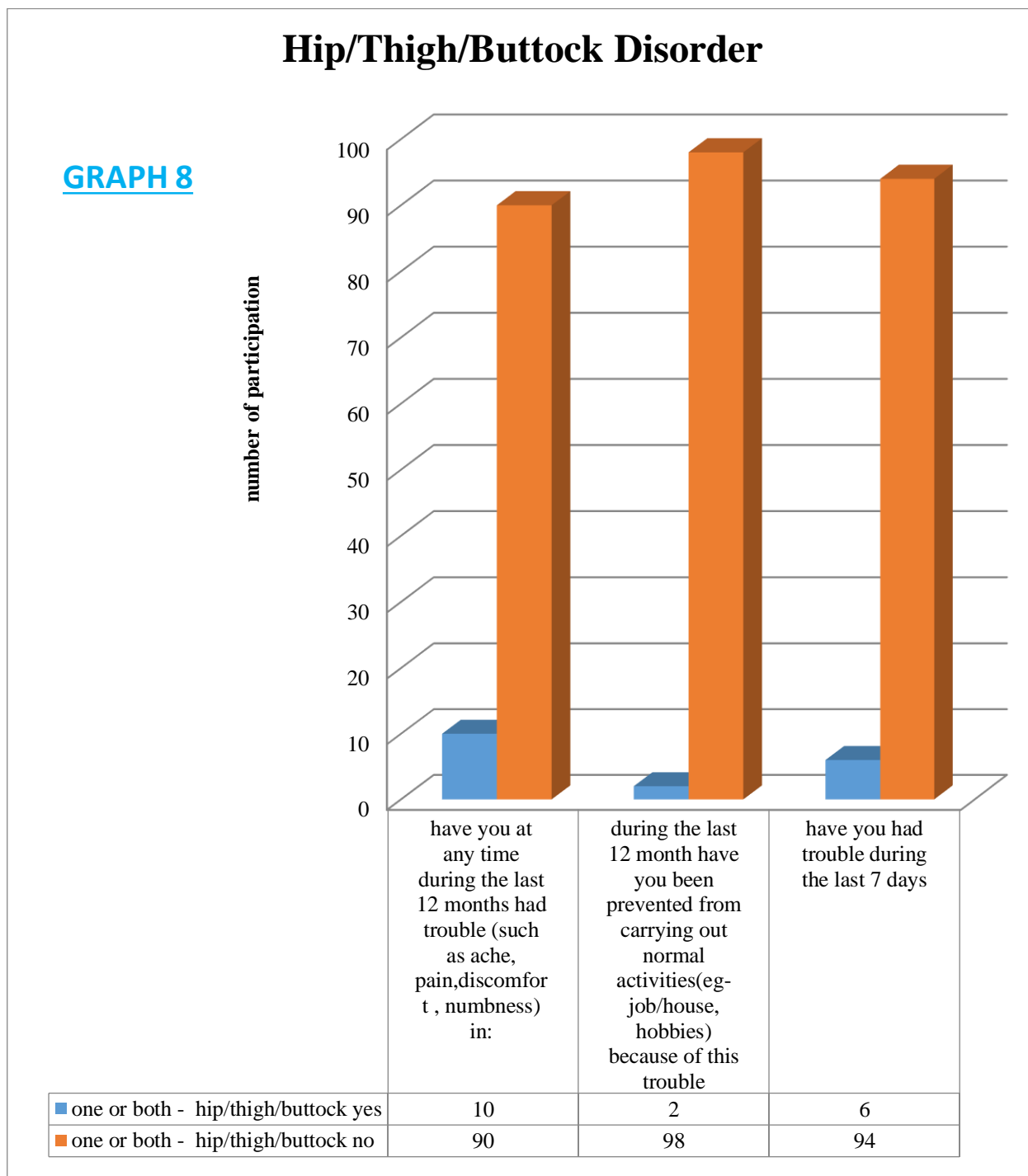


Fig. 8: Prevalence of Hip/thigh/buttock disorder

The present study shows that 10 out of 100 re-creational badminton players have trouble on hip/thigh/buttock during past 12 months. Out of 10 only 02 of them have been

prevented from carrying out normal activities during past 12 months. On further, we found 6 out of 100 players complain of repetitive hip/thigh/buttock pain within past 1 week.

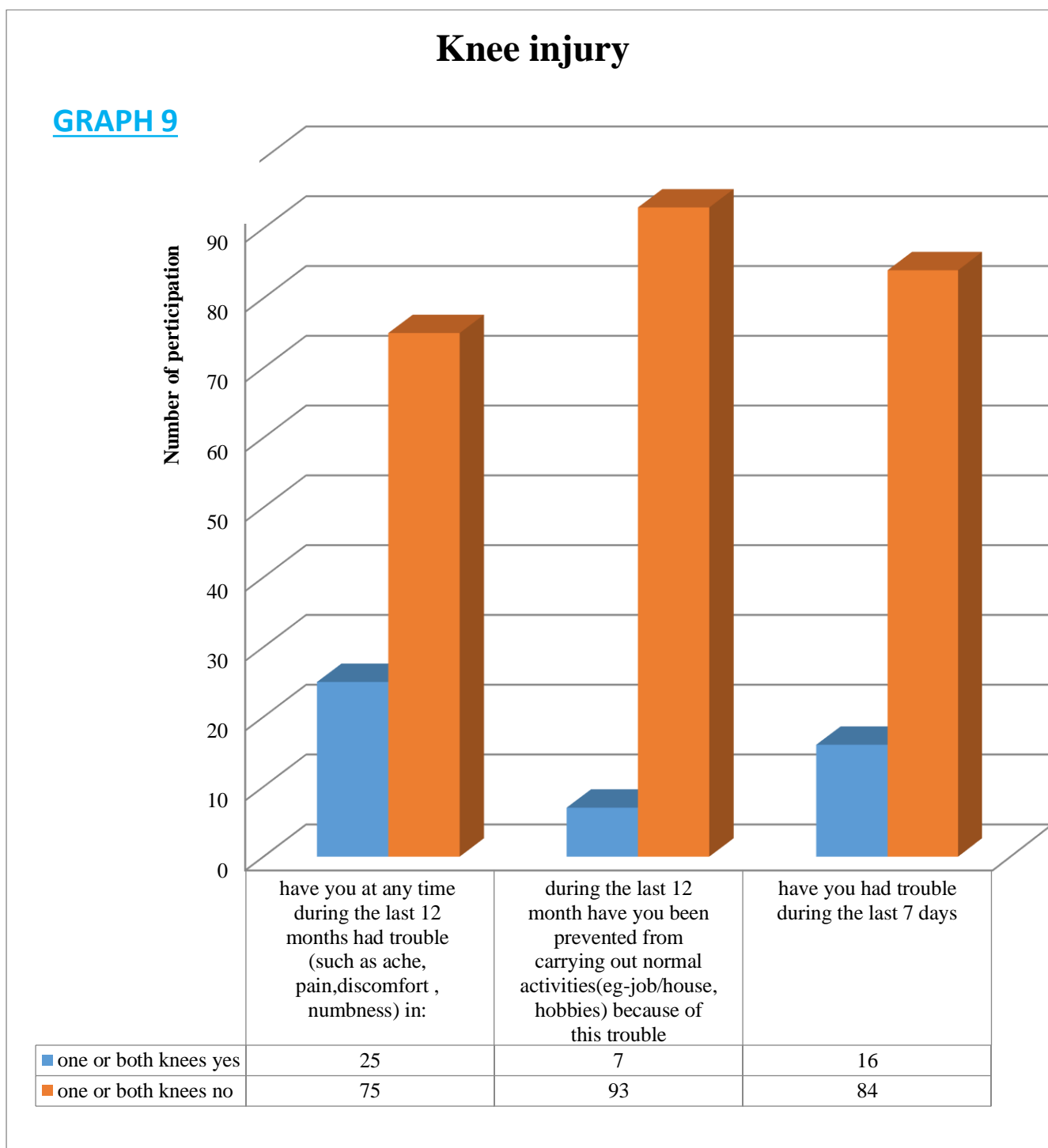


Fig. 9: Prevalence of Knee disorder

The study shows that 25 out of 100 re-creational badminton players have trouble on knee during past 12 months. Out of 25 only 07 of them have been prevented from

carrying out normal activities during past 12 months. On further, we found 16 out of 100 players complain of repetitive knee pain within past 1 week.

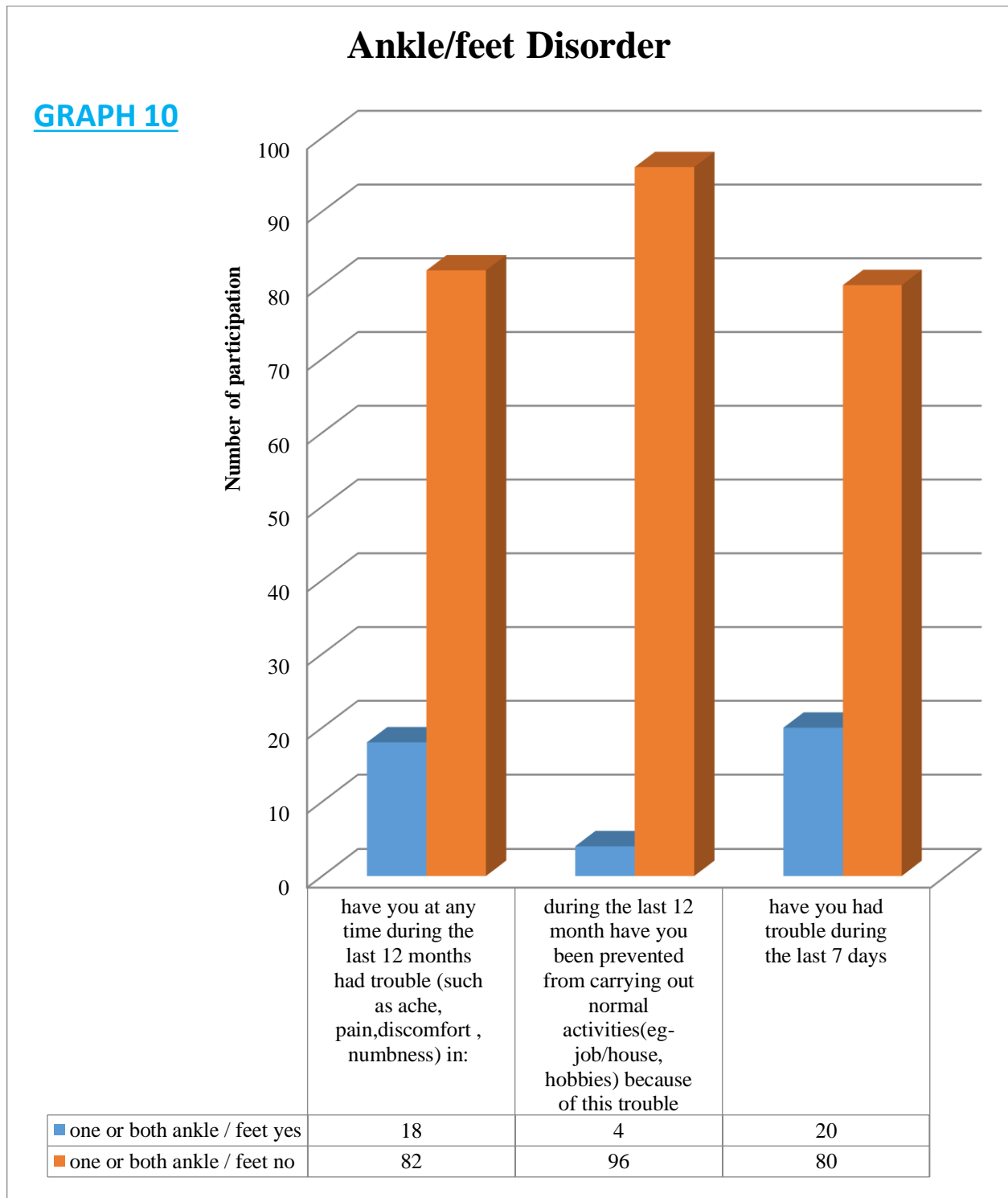


Fig. 10: Prevalence of Ankle/feet Disorder

The study shows that 18 out of 100 re-creational badminton players have troubled on ankle/feet during past 12 months. Out of 18 only 04 of them have been prevented from

carrying out normal activities during past 12 months. On further, we found 20 out of 100 players complain of repetitive ankle/feet pain within past 1 week.

Pain in body parts		Prevalence (%) of disorder during past 12 months	Prevalence (%) of disorder during past 7 days	Prevalence (%) of disorders affecting ADLS during past 12 months
Neck		18	15	13
Shoulder	Right	30	21	22
	Left	6	3	
	Both	9	5	
Elbow	Right	15	11	11
	Left	2	4	
	Both	0	1	
Wrist	Right	44	25	28
	Left	3	4	
	Both	0	1	
Upper Back		15	20	6
Lower Back		24	27	8
Hips		10	6	2
Knee		25	16	7
Ankle		18	20	4

Table 1: The Prevalence of Musculoskeletal Disorders in recreational badminton players during last 12 months

Table 1 shows that maximum players were affected in wrist/hand with 44% during the last 12 months. 27 out of 100 players reported having low back pain during the past 7 days and highest numbers of players' ADLs were affected by wrist pain during the past 12 months with 28% followed by shoulder with 22%.

The result showed highest numbers of participants were between the age groups of 22-25 years with 38 players and prevalence of musculoskeletal disorder of re-creational badminton players were highest in wrist/hand with 44% in past 12 months as compare to any other joints/musculoskeletal pain. The study also showed that maximum difficulty in performing activity of daily living during the past 12 months among the participants were due to wrist/hand disorder with 28%. And 27 players had complaint of low back disorder during past 7 days.

## V. DISCUSSION

In this study, the result showed highest prevalence of musculoskeletal disorder of re-creational badminton players in wrist/hand and shoulder as compare to any other joints/musculoskeletal disorders during the past 12 months. A similar study on common injuries in Re-creational badminton players were conducted by A Muttalib et al and it was concluded that the most common injuries sustained by recreational badminton players were shoulder and back injuries<sup>4</sup>.

Musculoskeletal problems in badminton players under 17 were conducted by P Sathya and Labdhi Doshi, and the study concluded that the prevalence of musculoskeletal problems is more in club level and school level players. Wrist/ Hands were the most commonly injured region followed by Shoulder and Neck which is similar to the result of this study. The study also concluded that in the type of injury majority of players had other type of injury (53%) in the body parts which includes Muscle Catch and Muscle Cramp followed by Strain (23%) and Sprain (20%)<sup>6</sup>.

In our study we focused on every joint of the body but in this similar study they focused on the joints of lower limb. A study on Risk factors for lower extremity injuries in young badminton players was conducted by Ang Lin Kang, Vinodhkumar Ramalingam, a total of 106 Malaysian young badminton players (83 males, 23 females) were recruited. Players were from national level (n=4), state level (n=41), district level (n=4), clubs (n=13), high school (n=21) and recreational players (n=23). Forty-two players with reported injuries were included in the case group, and 64 players with no reported injuries were included in the control group. Data analysis reported the occurrence of 60 lower extremity injuries among the 42 case group players. Ankle joint injury was the most common lower extremity injury (63.3%) amongst the participants<sup>14</sup>.

## VI. CONCLUSION

The most common injuries sustained by recreational badminton players were Wrist/hand and shoulder injuries followed by low back, knee injuries. Other type of injury which includes muscle cramp and muscle catch was the most common type of injuries. These were followed by strain/sprain. Most of the injuries are not serious enough to warrant any form of surgical intervention. Most badminton players were knowledgeable about the appropriate ways to prevent these injuries. In general, badminton is a sport of relatively low risk and its related injuries are generally chronic overuse injuries.

## VII. LIMITATION OF THE STUDY

- During this study it was found that there are higher number of footballer players than a badminton player in the districts of Arunachal Pradesh. Therefore it was difficult to find subjects for the study.
- Female are less in players as compare to male.
- Current study was only determine to find the prevalence of musculoskeletal disorder among re-creational badminton player and did not include management to prevent musculoskeletal disorder.

• **Ethical clearance-** An approval was obtained from Registrar, Indira Gandhi Technology and Medical Science University, Ziro to initiate the research project.

• **Source of Funding-** Self.

• **Conflict of Interest-** Nil

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