

Assessment Of Pain In Shoulder, Elbow And Wrist In Recreational Badminton Players.

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ABSTRACT

Background: As badminton is most commonly played in India and the fastest racquet sport it demands for quick movements. The injuries are common in recreational players because they are not trained as compared to professional players. Badminton has an injury rate of 1 to 7/1000 hours per person of playing time. In badminton, players are more susceptible to certain musculoskeletal problems due to the sport's dynamic character, abrupt accelerations and decelerations. In the course of the game both, severe traumatic events and overuse injuries fall under this category. The game requires participants to accomplish challenging motions with frequent posture adjustments causing pain in upper limb.

Objective: The objective of the study was To assess the shoulder , elbow, wrist injuries in recreational badminton players and to find the most prevalent region of disorder among recreational badminton players

Method: recreational badminton players were selected bases on inclusion criteria and then an consent was taken from all the players participation in the study Out of which 68% were male and 32% were females. The consent form was filled and. The demographic data was collected for each participant and the purpose of the study was explained to all the participants. Their responses were collected using western Ontario shoulder instability index, patient rated elbow evaluation an patient rated wrist evaluation which was administered to the players using google forms on a 10 point rating scale ranging from no pain as 0 and severe as 10. And the responses were noted down.

Results: Out of total 100 participants 45% players had moderate pain and 40% had severe pain at wrist joint causing pain as compared to shoulder and elbow.

Conclusion: The study concludes that in recreational badminton players wrist is the most prevalent region of pain as compared to shoulder and elbow

Keywords: Badminton players, upper limb pain, recreational players.

INTRODUCTION

Badminton is a structured sport for two or four players that emphasizes forceful, fast motions. The five events in this sport are men's and women's singles, men's and women's doubles, and mixed doubles. Different levels of technique, control, and physical fitness are required for each event^[1]. Matches in badminton have been getting more intense over time. lengthier rallies and more strokes per second result in lengthier bouts. Every 1000 hours of badminton play result in between 0.9 and 7.4 injuries; the rates are higher during matches than during training. The axial skeleton, lower limb, and upper limb are the main areas affected by overuse injuries. Though new study suggests that upper limb injuries on the dominant shoulder are on the rise, lower limb injuries remain the most common. Shoulder injuries account for the majority of injuries. ^[2]

Individual factors like of strength which is common in recreational players, competitive years played, as well as female gender, have been explored as potentially linked to an increased risk of significant upper as well and lower limb pain. Meanwhile in upper limb shoulder, elbow and wrist being significantly causing pain in badminton players, and previous injury is associated with a greater risk of sustaining a recurrent pain and discomfort. ^[3,4]

Recreational athletes engaged in overhead sports have a skeletal structure that is still developing and is susceptible to the excessive stresses generated by the powerful overhead motion that they do repeatedly. Given that many are prepared to compete despite discomfort, they ought to be safeguarded^[5] One of the most commonly reported signs of discomfort in the upper limb joints is elbow pain (EP). It usually leaves my arm muscles sore. Tendinitis, golf elbow, tennis elbow, and other inflammation-related pains could develop if the athlete ignores pain or keeps up training and competing in spite of it. ^[6,7] In the hand, wrist, and forearm regions, tendinopathies are prevalent. Forceful and repetitive shoulder movements, wrist flexion and extension, forceful ulnar deviation, rapid wrist rotation, and repetitive finger flexion can all lead to tendinopathy in the shoulder, elbow, wrist, and hand. Problems with the leading wrist might arise from excessive wrist use. ^[8]

The repeated usage of overhead, backhand, and forehand strokes causes severe stress in the upper extremities. The smashing component, which is also essential to winning the game and is seen to be employed frequently, especially by younger players, requires accuracy and velocity and can cause upper limb injuries in recreational badminton players. Therefore, the goal of this study is to outline how pain from injuries to the wrist, elbow, and shoulder is assessed in recreational badminton. to determine the steps that need be taken to prevent pain that causes discomfort during play and daily activities. Additionally, to organize the training strategies and help players and coaches come up with potential training plans .

METHODOLOGY

The inclusion and exclusion criteria served as the basis for the selection of each participant. Prior to the study, the subjects were given their informed consent regarding the procedure. 100 participants took part in this study. There was documented demographic data. The survey was conducted to assess the pain in shoulder, elbow and wrist in recreational badminton players. The study design is designed and ethical clearance was obtained from the IEC. The survey was conducted to assess the are in shoulder, elbow and wrist [upper limb] among recreational badminton players, a survey was done. The questionnaire (western Ontario shoulder instability index, patient rated elbow evaluation and patient rated wrist evaluation) were distributed to all the representatives through google forms. Players were requested to recollect any injuries they had received in the previous year, and they were also prohibited from engaging in their regular activities at the following anatomical sites (shoulder, elbow and wrist). The data analysis summaries the collected data, analytical and logical reasoning determined the patterns and inter-relationships between the subjects, promoting the deviation of conclusion. In order to develop conclusion, the outcome measures were determined by deriving the score from the questionnaire, and then correlating the percentage score obtained in the questionnaire with the digital well-being function present in their respective smart phones.

RESULT

In this study statistical analysis was done using SPSS software windows 28.0.1.0 version (Statistical Package for Social Science). The confidence interval was 95%. Chi square test was done to compare inter group differences of the outcome measures in the result obtained. The result from the statistical analysis of this study supported the alternative hypothesis which stated that there is a beneficial effect to the subjects.

The mean and SD of age of the sample of 100 recreational Badminton player according to gender, the male were ranging within the age of 18-25 with mean and SD of 21.06 ± 1.93 and female were in the age of 18-25 with mean and SD of 21.00 ± 2.30 . Both male and female players were more or less similar in the age. The parametric test for comparison of measurable variable of age, the unpaired t-test was carried out and it was found to be not significant ($p > 0.05$). The mean and SD of height in meters for the sample of 100 badminton players according to gender. the male was ranging within 1.57-1.82 with mean and SD of 1.82 ± 0.06 and female were in the range of 1.52 -1.72 with the mean and SD of 1.58 ± 0.08 . The parametric test for comparison of height variable, unpaired t-test was carried out and it was found to be significant $p < 0.05$.

The mean and SD of weight in kgs for the sample of 100 badminton players according to the gender. The male was ranging within 54-76 with the mean and SD of 67.84 ± 4.36 and female were in the range of 50-72 with the mean and SD of 60.72 ± 5.90 . The parametric test for comparison of weight variable, unpaired t-test was carried out and it was found to be not significant $p > 0.05$.

The mean and SD of BMI for the sample of 100 badminton players according to the gender. The male were ranging within 19.13-28.46 with the mean and SD of 24.31 ± 2.14 and female were in the range of 19.05-29.43 with the mean and SD of 24.11 ± 2.64 . The parametric test for the comparison of BMI variable, unpaired t-test was carried out and it was found to be not significant with $p = 0.698$, NS.

The prevalence of level of pain on shoulder, wrist and elbow of badminton players. The proportion of players with moderate pain was 45% and severe pain was 40%, which was found to comparably more than moderate pain and severe pain of shoulder and elbow. The Chi-square test for testing the significance of proportion was carried out and it was found that the prevalence of pain on wrist was significantly more than the prevalence in shoulder and elbow.

DISCUSSION

Given that badminton is India's second most popular sport, it's critical to understand the frequency of injuries in order to identify risk factors and implement preventative measures. to increase coaches' awareness of the necessity of developing more effective training programs in order to reduce the risk of injuries and improve training efficiency.

Despite not being a contact sport, badminton nonetheless sees a high injury rate. These include both overuse injuries and recent traumatic events. The game calls for deft manoeuvres including lunges, reaches, retrievals, and hops along with

frequent postural adjustments. It requires a lot of physical exertion. Furthermore, repetitive overhead forehand and backhand strokes with a very short striking movement and combined trickery can contribute to upper extremity overuse. The investigation's goal was to determine the frequency of wrist, elbow, and shoulder pain among casual badminton players. The aim of the study was to evaluate the degree of pain experienced by recreational badminton players following a game.

The study's subjects experienced musculoskeletal issues associated to badminton for a minimum of a year. The elbow, wrist, and shoulder—regions that badminton players are more likely to experience pain in—were among those taken into account.

After the game, our investigation revealed that 45% of participants had moderate pain and 40% had severe pain, which was determined to be significantly more than the moderate and severe pain of the elbow and shoulder combined. A comparable study by P Sathya and Labdhi Doshi found that wrist pain was the most common location of discomfort. The repetitive wrist flexion and extension actions required to make different types of shots during the game are the etiology behind this. The study found that upper limb injuries are more common among badminton players. This is due to the rapid transition between the cocking and accelerating phases of these joints, which puts a great deal of strain on the shoulder complex as it swiftly switches from external to internal rotation. The paper went on to explain that badminton players must execute over-shoulder motions, which cause repeated wrist flexion in addition to external rotation and abduction at the shoulder joint^[9].

Dr. Vardharajulu and Alvin Anto carried out a study to determine the frequency of wrist tendonitis in sub-elite badminton players. The study indicates that the most likely cause of wrist pain in recreational badminton players may be their highly sophisticated training regimens for competition, which causes their tendons to adapt. According to the study, injuries sustained during rotating movements, side line smashes, retrieving drop shots, and abrupt direction changes during play could possibly be the cause of pain^[10].

Consistent with the results of the earlier research, badminton players who had previously experienced shoulder pain were significantly more likely to do so in the future. Prior studies on sports involving overhead motion have demonstrated that abnormal kinetic chain induced by incorrect overhead motion is the cause of shoulder pain and injury.

A review of studies on sports involving overhead motion revealed that poor coordination in shoulder elevation exercises was the root cause of shoulder injuries in athletes who played baseball, football, cricket, handball, volleyball, and other sports involving overhead motion^[11].

Our investigation's results were consistent with earlier studies that found those with shoulder problems had notably wider arm slot angles. Similar to throwing motion, the forehand overhead motion in badminton, also known as a kinetic chain, requires multi-limb coordination to perform trunk rotation, upper limb rotation, and body core mass transfer all at once. The complex mechanics of the overhead action may cause tensile stress on the shoulder. Shoulder problems are definitely more likely to arise while doing above motions frequently during badminton plays, such as smash and clear.

The result from the statistical analysis of this study supported the alternative hypothesis which stated that in recreational badminton players wrist is the most prevalent region of pain as compared to shoulder and elbow.

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DECLARATION:

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Conflict of Interest: None

Ethical Approval: Ethical Approval on 7th April, 2023 by IEC

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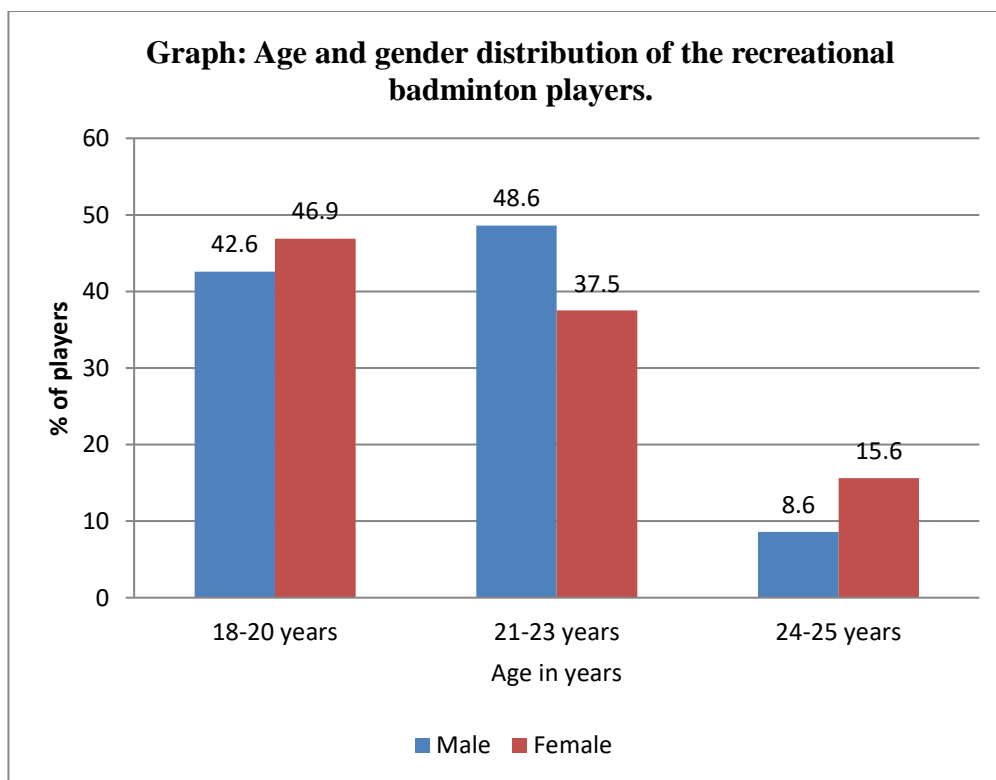
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Tabel-1.1: Frequency distribution of recreational badminton players according to age and gender.

Sr. No.	Age in years	Male (68%)		Female (32%)		Chi-square value and p-value
		Frequency	Percentage	Frequency	Percentage	
1	18-20 years	29	42.6	15	46.9	1.692, df=2, p=0.451, NS
2	21-23 years	33	48.6	12	37.5	
3	24-25 years	6	8.6	5	15.6	

Note: NS-Not significant (p>0.05)



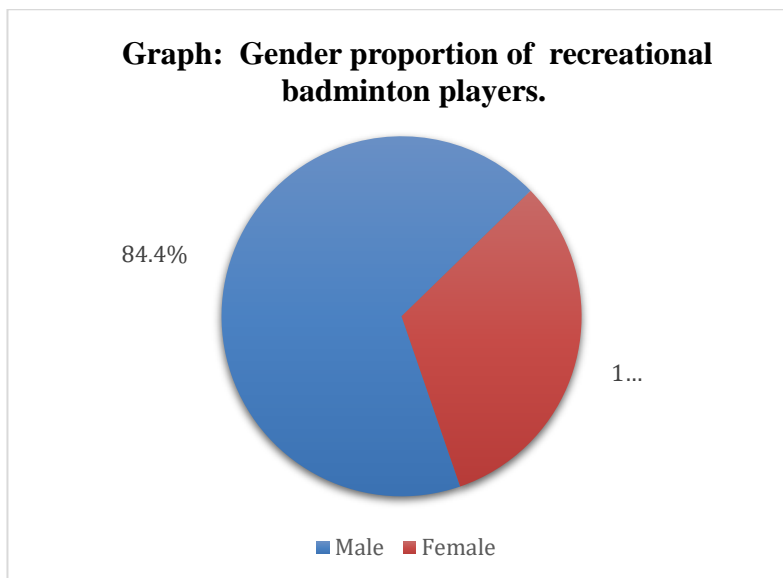


Table-1.2: Range, mean and SD of background variables of recreational badminton players. n=64

Sr.no.	Variable	Male (68.0%)		Female(32.0%)	
		Range	Mean ± SD	Range	Mean ± SD
1	Age in years	18-25	21.06±1.93	18-25	21.00±2.30
2	Height (mtrs)	1.57-1.82	1.82±0.06	1.52-1.72	1.58±0.08
3	Weight(cm)	54-76	67.84±4.36	50-72	60.72±5.90
4	BMI	19.13-28.46	24.31±2.14	19.05-29.43	24.11±2.64

NS-Not significant. ie., $p>0.05$. S-Significant ($p<0.05$)

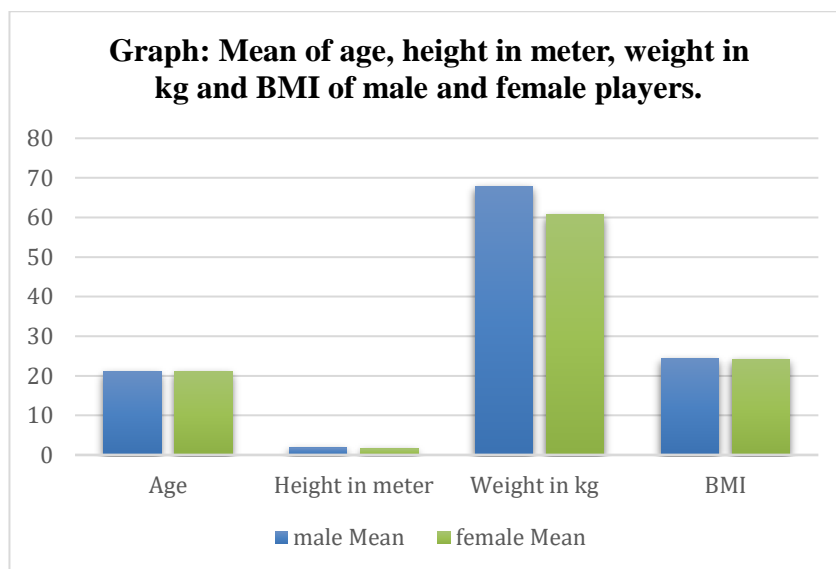


Table-1.3: Range, mean and SD of scores of all three scales.

Sr. No.	Scales (100)	Range	Mean ±SD
1.	Shoulder	0-70.05	33.13±20.02
2.	Wrist	0-84.5	44.17±21.20
3.	Elbow	0-39	18.90±12.29

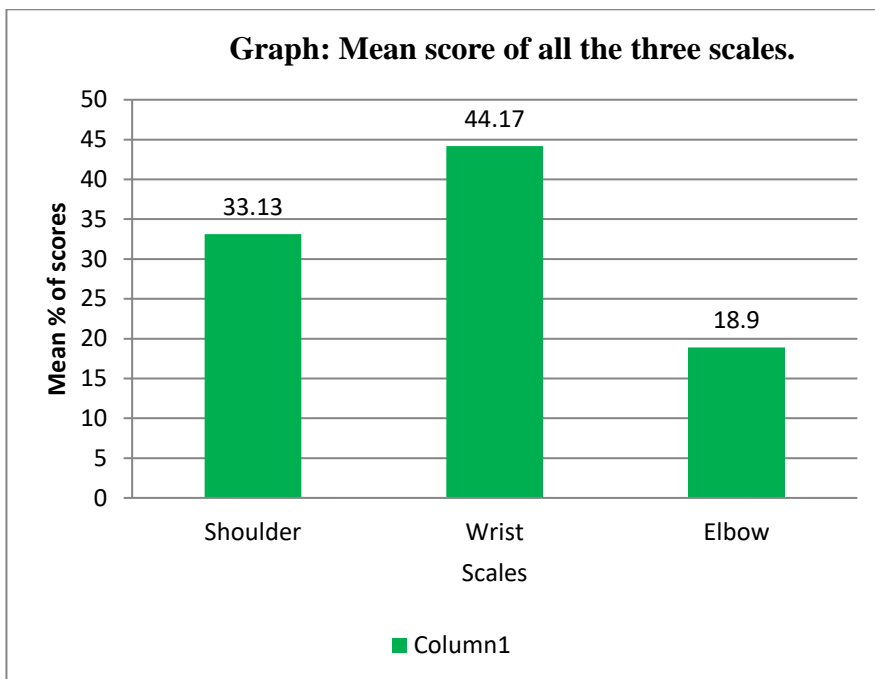


Table-1.4: Range , mean and SD of scores of patient rated wrist evaluation scale.

Sr. No.	Wrist	Range	Mean \pm SD
2.	Pain(50)	0-33	17.08 \pm 9.73
3.	Function(50)	0-26.25	13.44 \pm 6.12

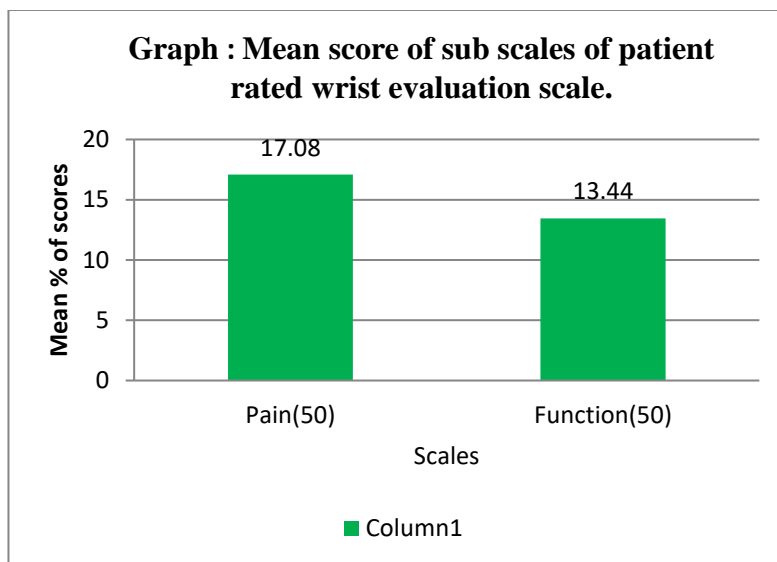


Table-1.5: Distribution of recreational badminton players according to level of Shoulder disability scale (WOSI scores)

Sr. No.	Scales(100)	No.& %
1.	No pain	10
2.	Mild pain	24
3.	Moderate pain	40
4.	Severe pain	26

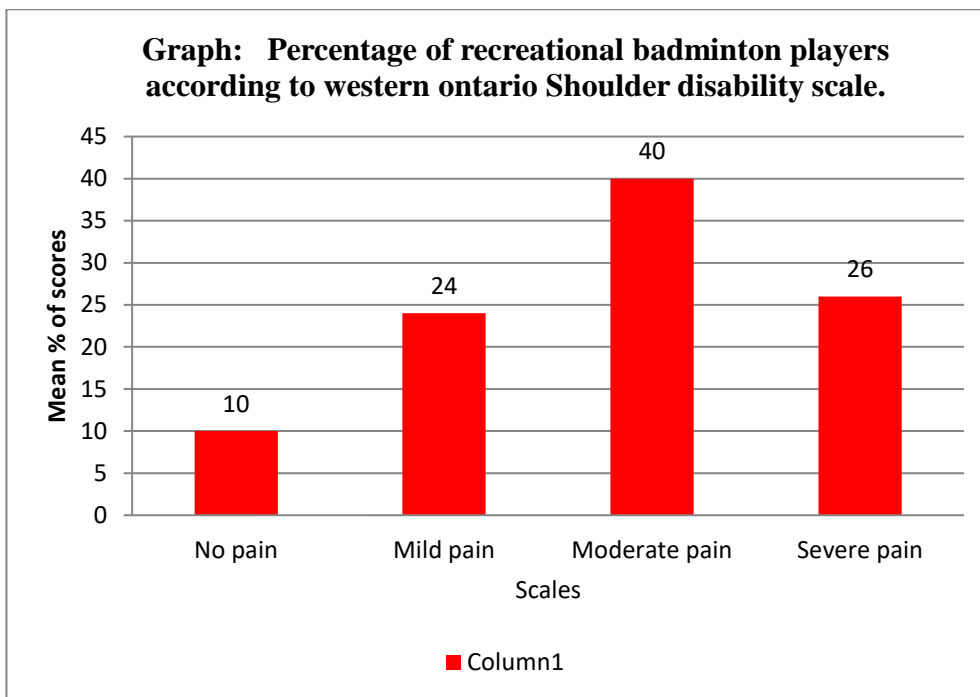


Table-1.6: Distribution of recreational badminton players according to the patient rated wrist evaluation scale (PRWE) scores.

Sr. No.	Scales(100)	No.&%
1.	No pain	7
2.	Mild pain	8
3.	Moderate pain	45
4.	Severe pain	40

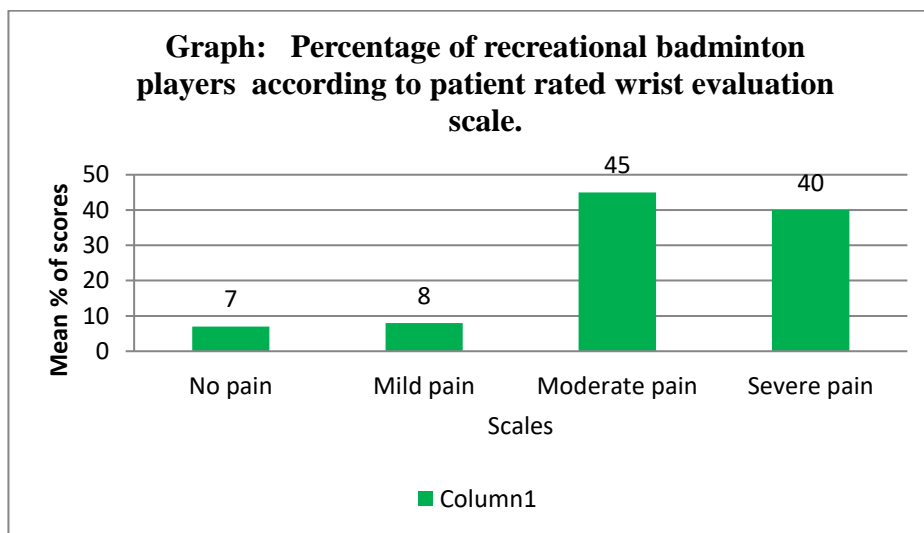


Table-1.8: Distribution of recreational badminton players according to level of Shoulder, Wrist and Elbow pain

Sr.No.	Scales(100)	Shoulder	Wrist	Elbow	Chi-square value & p-value
1.	No pain	10	7	15	74.65, df=6,, p=0.000, S
2.	Mild pain	24	8	50	
3.	Moderate pain	40	45	35	
4.	Severe pain	26	40	0	

Note: S-significant p<0.05

