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A Study on Risk Factors of Tennis Elbow among the Badminton Players of Gono Bishwabidyalay, Bangladesh

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Abstract

The present study was a study on risk factors of tennis elbow among the badminton player of Gono Bishwabidalay. This research prepared for the partial fulfilment of the requirements of the Bachelor of Physiotherapy (BPT) Degree of Gono Bishwabidyalay. A total of 34 respondents of patient with Tennis elbow in Gono Bishwabidalay and it was a cross-Sectional Study. Inclusion criteria was both male and female was selected, Age between 20 to 65 years, Subjects with chronic lateral epicondylitis, Who, are willing to give consent and participate for interview.34 patients confirmed with tennis elbow analyzed where the male group were more affected in tennis elbow and 20-24 age group were more affected in tennis elbow 57.1% married group affected, 60% student affected in tennis elbow, 51.4% no warm up group affected of tennis elbow. It is possible to back the patient to normal life through proper treatment and controlled life.

Keywords: Risk factors, Tennis elbow, Badminton player, Gono Bishwabidyalay, and Controlled life.

1. Introduction

Lateral epicondylitis (LE) is a common condition characterized by pain in the lateral side of the elbow with tenderness on lateral epicondyle, caused by repetitive overuse of extensor muscles of the wrist (Resa *et al*., 2018). Tennis Elbow was first described by Runge1 in 1873 and eventually given the label 'Lawn Tennis Arm' by Henry Morris, writing in the Lancet in 1882.2 It has, however, acquired a number of other names including tendonosis, lateral epicondylitis and angiofibroblastic hyperplasia. As the most popular term suggests, it tends to occur in regular tennis players where there is a clear association with the late back hand and forced wrist extension (Akter *et al*., 2025).

Lateral epicondylalgia affects 1-3% of the population, only 5% of all patients seen are recreational tennis players. Although the syndrome has been identified in patients ranging from 20 to 60 years old, it predominantly occurs in the fourth and fifth decades. Male and female prevalence rates are reportedly equal. Seventy-five percent of patients are symptomatic in their dominant arms (Cuttsa *et al*., 2020). These are major symptoms, pain on the outside of the elbow (lateral epicondyle), tenderness at the lateral epicondyle, a distinct part of the bicep outside the dorsiflexion, pain due to wrist grip and movement, wrist extension (e.g. turning the screwdriver) and lifting movements, Symptoms of

tennis elbow include but are not limited to: pain from the forearm and ankle outside the elbow, stretching of the wrist pain, weakness of the forearm, shaking the hand or throwing a torch to a door knocker, painful grip and relegation of relatively heavy items. The pain is similar to what is known as a golfer's elbow, but the second is seen in the medial aspect of the elbow. Tennis elbow is a type of recurrent stretch injuries resulting from tendon overuse and failure of the tendon to heal. In addition, the extensor carpi radials brevis plays an important role in tennis elbow (Ashish *et al*., 2020).

Lateral epicondylitis most commonly occurs in persons between 30 and 60 years old. Both male and female are equally affected but this condition becomes more severe in women (Adeel *et al*., 2019). The average period of an episode of lateral epicondylitis ranges between 6 months and 2 years. The main clinical presentation and the chief complaints tennis elbow are decreased grip strength, decreased functional activities, and increased pain, which may have significant impact on activities of daily living. Although the sign and symptoms of tennis elbow are clear; to date no ideal treatment has emerged. A myriad of conservative treatment has been used with a same aim to reduce pain and improve function (Stasinopoulos *et al.,* 2005). The treatment is that usually tennis elbow will heal on its own. Just need to give your elbow a break and do what you can to speed the healing. Types of treatment that help are: Icing, Using an elbow strap, nonsteroidal anti-inflammatory (NSAIDs), Performing range of motion exercises, strengthen and stretch exercise, injections of steroids .Most of the time, these treatments will do the trick. But if you have a severe case of tennis elbow that doesn't respond to two to four months of conservative treatment, you may need surgery. In the procedure, the damaged section of tendon usually is removed and the remaining tendon repaired (Bhagyashri *et al*., 2018; Rahman *et al*., 2026).

Justification of the Study

Tennis elbow is the inflammation of the tendons that join the forearm muscles on the outside of the elbow. Tennis elbow, or lateral epicondylitis, is a painful condition of the elbow caused by overuse of arm, forearm and the muscles of the hand. The forearm muscles and tendons become damaged from overuse or repeating the same motions again and again. This leads to pain and tenderness on the outside of the elbow.

Lateral epicondylitis mainly occurs after minor and often unrecognized trauma of the extensor muscles of the forearm and so is considered to be an overload injury. As the tendons fail to heal properly after injury or repetitive trauma it is considered to be a form of repetitive strain injury. The activities of daily living of the patient in this disorder are adversely hampered as wrist extensors play an important role in maintaining wrist in extension during various ADLs. The clinical profile of the condition encompasses pain over the lateral humeral epicondyle which may radiate to the forearm, manifesting during excessive, quick, repetitive activities involving the hand in gripping or manipulating an object. The main complaint is of pain and decreased function which may affect activities in daily living (holding tools, shaking hands, lifting a cup of coffee, dressing and desk or household work, hitting a backhand stroke in tennis, etc) (Trivedi *et al.,* 2014). Tennis elbow is often an overuse injury primarily due to repetitive strain from tasks and activities that involve loaded and repeated gripping and/or wrist extension. It historically occurs in tennis players but can result from any sports that require repetitive wrist extension, radial deviation, and forearm supination. It is also seen in athletes who play squash and badminton and other sports or activities that require similar movements. As it relates to athletes, this condition is often precipitated by poor mechanics and technique or improper equipment (Kachanathu *et al.,* 2014). The results of this study may help to guide physio-therapists to give evidence-based treatments to patients with tennis elbow, which will be beneficial for both the patient with tennis elbow, and for developing the field of physiotherapy.

Operational Definition

Risk factor

Something that increases a person's chances of developing a disease. For example, cigarette smo-king is a risk factor for lung cancer, and obesity is a risk factor for heart disease (Patiño *et al.,* 2018).

Tennis Elbow

Lateral epicondylitis, also known as "Tennis Elbow", is the most common overuse syndrome in the elbow. It is a tendinopathy injury involving the

extensor muscles of the forearm. These muscles originate on the lateral epicondylar region of the distal humerus. In a lot of cases, the insertion of the extensor carpi radialis brevis is involved.

Tenderness

Tenderness is pain or discomfort when an affected area is touched. It should not be confused with the pain that a patient perceives without touching. Pain is patient's perception, while tenderness is a sign that a clinician elicits.

Musculoskeletal disorder

A popular term for disorders of the muscles, nerves, tendons, ligaments, joints, cartilage and spinal disks; it may also in compass work-related injuries.

Activities of daily living

Activities of daily living, the tasks of everyday life and basic ADLs include eating, dressing, getting into or out of a bed or chair, taking a bath or shower, and using the toilet. Instrumental activities of daily living (IADL) are activities related to independent living and include preparing meals, managing money, shopping, doing housework, and using a telephone. Also called activities of daily living.

Pain

Pain is an unpleasant feeling that is conveyed to the brain by sensory neurons. The discomfort signals actual or potential injury to the body. However, pain is more than a sensation, or the physical awareness of pain.

Stretching

Stretching is a form of physical exercise in which a specific muscle or tendon (or muscle group) is deliberately flexed or stretched in order to improve the muscle's felt elasticity and achieve comfortable muscle tone.

Strengthening exercises

Strengthening exercises are exercises which are designed to increase the strength of specific or groups of muscles. Strengthening exercises overload the muscle until the point of muscle fatigue. This force and overload of a muscle encourages the growth, increasing the strength.

Muscle

Muscle is a soft tissue found in most animals. Muscle cells contain protein filaments of actin and myosin that slide past one another, producing a contraction that changes both the length and the shape of the cell. Muscles function to produce force and motion.

Tendon

The soft tissue by which muscle attaches to bone. Tendons are somewhat flexible, but tough. When a tendon becomes inflamed, the condition is referred to as tendonitis.

Physiotherapy

A branch of rehabilitative health that uses specially designed exercises and equipment to help patients regain or improve their physical abilities. Abbreviated PT. PT is appropriate for many types of patients, from infants born with musculoskeletal birth defects, to adults suffering from sciatica or the after effects of injury or surgery, to elderly post stroke patients.

Research Question

What was the risk factor associated with tennis elbow among the badminton player of Gono Bishwabidalay?

Study Objectives

General Objective

To identify risk factors tennis elbow among the badminton player of Gono Bishwabidalay.

Specific Objective

1) To identify the socio demographic characteristic Tennis elbow.
2) To identify the associated risk factor of Tennis elbow of badminton players.
3) To identify the disease related variables.

2. Review of Literature

Adeel Khalida *et al*. (2019) Tennis elbow or lateral epicondylitis is a condition in which the outer part of the elbow at the lateral epicondid is throated and tendered. The forearm muscles and tendons are repeatedly damaged overuse. This leads to pain and sensitivity outside the elbow. The main objective of this study was to found the prevalence of tennis elbow in badminton players in Lahore badminton club and badminton players in University of Lahore. Cross Sectional study was conducted. Sample was chosen using convenient sampling technique. 150 subjects were involved in this study. "Visual Analogue Scale (VAS) was use to check the intensity of elbow pain" and questionnaire was used for

data collection. 76% respondents said that they did not felt pain in Arm and Wrist remaining 23.3% said they had pain. 83% respondents said that they did not felt stiffness when they play badminton and remaining 16.7% said they felt stiffness. These two factors were used to check the prevalence of tennis elbow in badminton players. Here 111(74%) respondents said that they did not felt pain while playing badminton. The other 39(26%) respondents said that they felt pain while they playing badminton.

Steven Barr *et al.* (2009) All English-language randomized controlled trials (RCTs) that included participants with a clinical diagnosis of lateral epicondylitis, comparing corticosteroid injections with physiotherapeutic interventions, and used at least one clinically relevant outcome measure were included. The review authors extracted and analysed the data independently, using the PEDro scale to assess the methodological quality of each eligible study. Five RCTs were identified and included in the review. Four of the studies included the measurement of pain-free grip strength. Standardized mean differences (effect sizes) were calculated for this outcome measure and assessor's rating of severity at 3, 6, 12, 26 and 52 weeks for two of the RCTs. Large effect sizes were demonstrated in favour of corticosteroid injections at short-term follow-up. At intermediate- and long-term follow-up, medium-to-large effect sizes were demonstrated in favour of physiotherapeutic interventions compared with corticosteroid injections. However, at long-term follow-up, the research suggests that there is a small benefit of physiotherapeutic interventions compared with a 'wait and see' policy.

Małgorzata Kawa *et al*. (2015) the study investingated the analgesic effectiveness, the reduction in the intake of painkillers and an improvement in physical activity after local cryotherapy in tennis elbow (TE). The research group comprised patients of the Physiotherapy Patients diagnosed with so- -called tennis elbow were referred to physical therapy treatments by specialist doctors. 34 patients were examined (26 women, 8 men), aged 36-59 years, who were then divided into two groups: Group X (17 persons) – treated with local cryotherapy (10 treatments over 2 weeks), Group Y (17 persons) – the control group with no therapeutic procedures conducted for a period of 2 weeks. Materials for the quantitative analysis in the study were obtained by means of the Laitinen questionnaire and the VAS scale. Results of the analysis showed significant differences between the intensity of the pain experienced by the subjects, the range of received analgesics, and the difference in physical activity before the therapy and after its completion. Tests of scheduled comparisons showed a substantial decline in values among the subjects for both the combined therapy ($p = 0.000$) and local cryotherapy ($p = 0.000$).

Jonathan H. Dunn *et al.* (2007) the mean age of the study group was 46 years (range, 23–70 years) with 45 men and 38 women. Eighty-seven of the procedures were primary, and 5 were revision tennis elbow surgeries. Concomitant procedures were performed in 30 patients including ulnar nerve release in 24 patients, medial tennis elbow procedures in 23 patients, shoulder arthroscopy in 2 patients, carpal tunnel release in 1 patient, and triceps debridement and osteophyte excision in 1 patient. The mean duration of preoperative symptoms was 2.2 years (range, 2 months to 10 years). The mean Nirschl tennis elbow score improved from 23.0 to 71.0, and the mean American Shoulder and Elbow Surgeons score improved from 34.3 to 87.7 at a minimum of 10-year follow-up ($P < .05$). The Numeric Pain Intensity Scale pain score improved from 8.4 preoperatively to 2.1 ($P < .05$). Results were rated as excellent in 71 elbows, good in 6 elbows, fair in 9 elbows, and poor in 6 elbows by the Nirschl tennis elbow score. By the criteria of the results were excellent in 45 elbows, good in 32 elbows, fair in 8 elbows, and poor in 7 elbows. Eighty-four percent good to excellent results were achieved using both scoring systems. Ninety-two percent of the patients reported normal elbow range of motion. The overall improvement rate was 97%. Patient satisfaction averaged 8.9 of 10.Ninety-three percent of those available at a minimum of 10-year follow-up reported returning to their sports.

A. P. D'Vaz *et al*. (2006) Pulsed low-intensity ultrasound therapy (LIUS) has been found to be beneficial in accelerating fracture healing and has produced positive results in animal tendon repair. In the light of this we undertook a randomized, double-blind, placebo-controlled trial to assess the effectiveness of LIUS *vs* placebo therapy daily for 12 weeks in patients with chronic lateral epicondylitis (LE). Patients with LE of at least 6 weeks'

duration were recruited from general practice, physiotherapy and rheumatology clinics, and had to have failed at least one first-line treatment including non-steroidal anti-inflammatory drugs (NSAIDs) and corticosteroid injection. Participants were assigned either active LIUS or placebo. Treatment was self-administered daily for 20 min over a 12-week period. The primary end-point was a 50% improvement from baseline in elbow pain measured at 12 weeks using a patient-completed visual analogue scale. Fifty-five subjects aged 18–80 was recruited over a 9-month period. In the active group 64% (16/25) achieved at least 50% improvement from baseline in elbow pain at 12 weeks compared with 57% (13/23) in the placebo group (difference of 7%; 95% confidence interval −20 to 35%). However, this was not statistically significant (χ^2 = 0.28, *P* = 0.60).

Mohamed Faisal *et al*. (2013) convenient sample of 40 patients with lateral epicondylitis were recruited for this study. They were assigned equally either to a laser (n=20) or a Phonophoresis (n=20) group. Laser group received the treatment with Ga-As (904nm) IR semiconductor diode laser. For Phonophoresis group a gel containing 1% sodium diclofenac was used as coupling agent. Each group was treated 3 times a week, for a total of 8 treatments, and was evaluated subjectively and objectively before and at the end of the treatment, by using VAS, pain free grip strength and functional pain scale as variables. Comparison between laser group and Phonophoresis group is done using Mann Whitney U test. Comparison between pre- and post-is done using Wilcoxon's signed rank sum test. Form selection to the post treatment assessment, a significant decrease in symptoms was found in both laser and phonophoresis groups. But it is concluded that statistically; low level laser therapy was not significantly better than phonophoresis with the results of VAS (P=0.53), FPS (P=0.253), pain free grip strength. (P=0.426).

Amrish O Chourasia *et al*. (2011) Twenty-eight participants with LE (13 unilateral and 15 bilateral LE) and 13 healthy controls participated in this study. A multiax is profile dynamometer was used to evaluate grip strength and rapid grip force generation. The ability to rapidly produce force is composed of the electromechanical delay and rate of force development. Electromechanical delay is defined as the time between the onset of electrical activity and the onset of muscle force production. The Patient-rated Tennis Elbow Evaluation (PRTEE) questionnaire was used to assess pain and functional disability. Magnetic resonance imaging was used to evaluate tendon degeneration. LE-injured upper extremities had lower rate of force development (50 lb/sec, confidence interval [CI]: 17, 84) and less grip strength (7.8 lb, CI: 3.3, 12.4) than non-injured extremities. Participants in the LE group had a longer electromechanical delay (- 59%, CI: 29, 97) than controls. Peak rate of force development had a higher correlation (r = 0.56; p<0.05) with PRTEE function than grip strength (r = 0.47; p<0.05) and electromechanical delay (r = 0.30; p>0.05) for participants with LE. In addition to a reduction in grip strength, those with LE had a reduction in rate of force development and an increase in electro-mechanical delay.

Ruby Grewal *et al*. (2009) we treated 36 patients with chronic lateral epicondylitis with an arthroscopic release. A standardized protocol was used to measure strength, motion, and outcomes (American Shoulder and Elbow Surgeons Elbow [ASES-e] score, Short Form-12, Patient-Rated Tennis Elbow evaluation [PRTEE], and Work Limitations Questionnaire-26). The mean duration of symptoms before surgery was 30 months. A total of 25 of 36 patients were employed in heavy or repetitive occupations and 23 of 36 were involved in a workers' compensation claim. The final overall results were favorable, with 30 of 36 subjects reporting improvement with surgery.

The final mean Mayo Elbow Performance Index score was 78.6 +/- 16.5 (22 = good to excellent, 9 = fair, and 5 = poor). The average total PRTEE was 26.2 +/- 24.3 out of 100. The average ASES-e pain score was 16.1 +/- 15.0 and the average ASES-e function score was 27.9 +/- 8.8. Patients in heavy or repetitive occupations and those with workers' compensation claims had significantly worse outcome scores (Mayo Elbow Performance Index, ASES, and PRTEE). Based on Work Limitations Questionnaire-26 scores, patients with workers' compensation claims had significantly greater difficulties with physical (36.8 vs 3.2, p < .001), output (40.8 vs 3.1, p = .002), mental (36.0 vs 9.0, p = .05), and social (27.7 vs 6.3, p = .05) workplace demands.

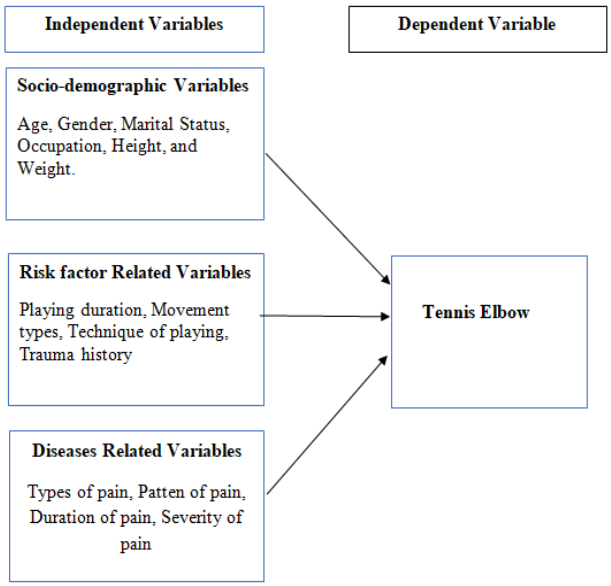
P. Ratan Khuman *et al*. (2013) Lateral epicondylitis (LE) is a chronic overuse injury commonly affecting the com-mon tendinous origin of the wrist extensors. The objective of the study was to find the effectiveness of Myofascial Release Technique (MFR) on pain; functional performance and grip strength in Chronic Lateral Epicondylitis (CLE) subjects.30 subjects with the CLE were included in the study. They were divided into two different groups; Group A: MFR and Conventional physiotherapy (n=15) and Group B: Conventional physiotherapy (n=15). The predefined treatment protocol was provided for four weeks. The pain, functional performance and grip strength were assessed at baseline and post treatment (4th week) using NPRS, PRTEE and HD. There was a signi-ficant decrease in pain, improvement in functional performance and grip strength ($p<0.05$) in both the groups. However, MFR group was found to have a greater effect on all outcome measures in CLE subjects.

Theodore T. Miller *et al*. (2002) the affected elbows of 11 patients with suspected epicondylitis were examined sonographically, and the contralateral (normal) elbow was also examined for comparison. In 10 of these patients, the affected elbow was also examined with MRI. In addition, both elbows of 6 volunteers without epicondylitis were examined sonographically; 1 elbow of each volunteer was designated as the "test" elbow and was examined with MRI. The sonograms of the patients' affected elbows and the volunteers' test elbows were paired with the sonograms of the contralateral elbows for comparison and were randomly shown twice to 2 readers. These readers, working independently and without knowledge of the findings of MRI, were instructed to state whether each elbow was normal or affected by epicondylitis.

The MRI scans were then shown to the readers for similar review. Sonographic features of epicon-dylitis included outward bowing of the common tendon, presence of hypoechoic fluid sub adjacent to the common tendon, thickening, decreased echo-genicity, and ill-defined margins of the common tendon. Sensitivity for detecting epicondylitis ranged from 64% to 82% for sonography and from 90% to 100% for MRI. Specificity ranged from 67% to 100% for sonography and from 83% to 100% for MRI.

3. Materials and Methods

Conceptual Framework



Study Design

It is a cross-Sectional Study.

Target Population & Sample Population

The sample was consisted of people who complain of Elbow pain

Study Site & Area

The study was conducted at Gono Bishwabidyalay, Nolam, Savar, Dhaka.

Study Period

1st September to 1st January 2020

Sample Size

Following formula was used determine the sample.

$$n = \frac{z^2 \propto pq}{d^2}$$

Here

n = the desire Sample Size

z = The Standard normal deviate set at 1.96 which correspondents to confidence level 95%

p = 24% {Estimated prevalence of Tennis Elbow}

q = 1-p=1-.24=.76

d = degree of accuracy desired, usually set at 0.05%

Now, required sample size

$$n = \frac{z^2 \propto pq}{d^2}$$

$$n = \frac{(1.96)^2 \propto .24 * 0.76}{(.05)^2}$$

n = 275.78

So, required sample size is 275.78

According to this formula actual sample size was about 275 but due to the limitation of time only 34 samples were selected conveniently from the population for this study.

Inclusion Criteria

- Both male and female was selected.
- Age between 20 to 65 years
- Subjects with chronic lateral epicondylitis
- Willing to give consent and participate for interview.

Exclusion Criteria

- Subjects with acute infection, history of trauma
- Subject with surgery and systemic disorders
- Recent steroid infiltration
- Neurological impairment
- Unwilling to attend all treatment session & assessment

Sampling Technique

Non randomized purposive sampling technique was applied.

Data Collection Tools

A questionnaire, consent form with structural questions was used for data collection. In that time some other necessary materials were used like weight machine, height tap, scale, pen, pencil, eraser, sharpener etc.

Data Management & Analysis Plan

Data analyzed in Microsoft office Excel using a SPSS software program. After collection of data of the respondents were organized. Data was entered into the computer into a data base in the software package. Statistical package for the social science (SPSS) Version 23.0 (Polar engineering & consulting, Chicago). Using descriptive statistics such as – frequency, distribution, range, mean & percentage. All score & percentage were computed & presented in tabular form, charts & graphs as appropriate. Further it was analyzed with the help of chi-square test & P-value. Finally, the data was interpreted on the basis of study findings.

Quality Control & Quality Assurance

This study had a number of limitations. The sample size was comparatively small due to COVID-19 crisis and the result does not reflect the whole scenario of elbow pain

Ethical Consideration

Prior to the commencement of this study, the research protocol was approved by research committee of the academic institution. All information and records will be kept confidential and used only for research purpose,

4. Results

Table 1: Distribution of Respondents by Age (n = 35).

Age in Years	Frequency	Percentage
20-24	17	48.2
25-29	8	23
30-34	7	20.1
35-40	7	8.7
Total	35	100
Mean±SD	26.714±4.719	

Table 1 revealed that the mean age of the respondents was 26.714±4.719 and more of the respondents felt more pain in 20-24 years.

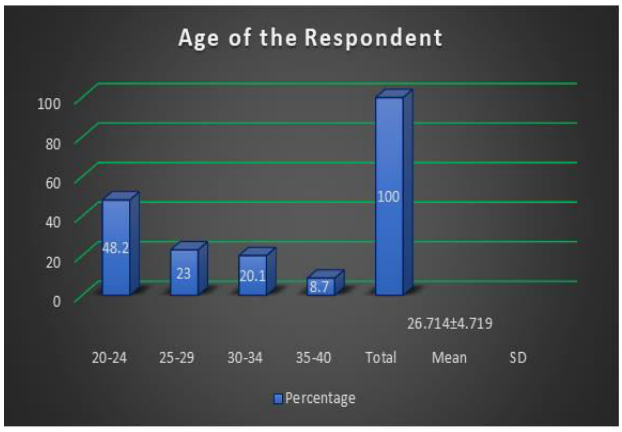


Fig. 1: Distribution of respondents by age.

Table 2: Distribution of Respondents by Gender (n = 35).

Gender	Frequency	Percentage
MALE	28	80
FEMALE	7	20
Total	35	100
Mean±SD	1.20±0.405	

Table 2 revealed that the mean gender of the respondents were 1.20±0.405 with a range of male & female. It was found that 80%, 20% of the respondents belonged to male & female. **Table 2** found that male groups were more affected in lateral epicondylitis.

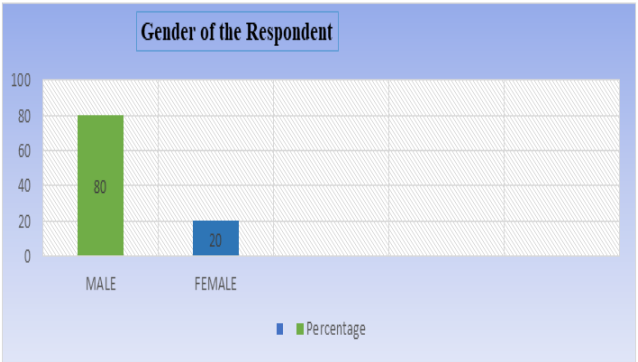


Fig. 2: Shows the percentage of male and female by different specific color and found that male is more affected than female.

Table 3: Distribution of Respondents by Marital Status (n = 35).

Marital Status	Frequency	Percentage
MARRIED	15	42.9
UNMARRIED	20	57.1
Total	35	100
Mean±SD	1.571±0.502	

Table 3 revealed that the mean marital status of the respondents was 1.571±0.502 and It also found that unmarried groups have more pain in lateral epicondylitis.

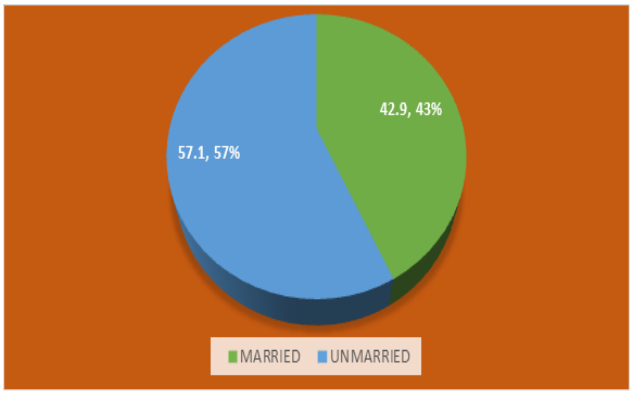


Fig. 3: Distribution of respondents by marital status.

Table 4: Distribution of Respondents by Occupation Status (n = 35).

Occupation	Frequency	Percentage
Student	21	60
Teacher	9	25.7
Staff	5	14.3
Total	35	100
Mean±SD	1.542±.741	

Table 4 revealed that the mean occupation of the respondents were 1.542±.741. It was found that 60% 25.7% 14.3% of the respondents belonged to occupational group student, teacher, and staff. **Table 4** found that student groups were more affected in this condition.

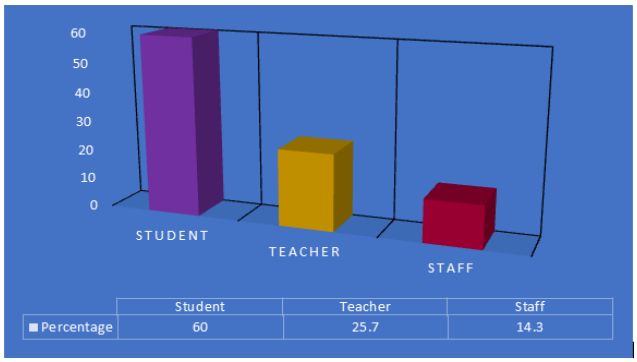


Fig. 4: Distribution of respondents by occupation.

Table 5: Distribution of respondents by height (n = 35).

Weight in kg	Frequency	Percentage
50-59	8	22.9
60-69	12	34.5
70-79	15	42.6
Total	35	100
Mean±SD	65.571±7.875	

Table 5 revealed that the mean height of the respondents was 65.600±2.557 and it also found that 64-67inch group felt more pain in lateral epicondylitis.

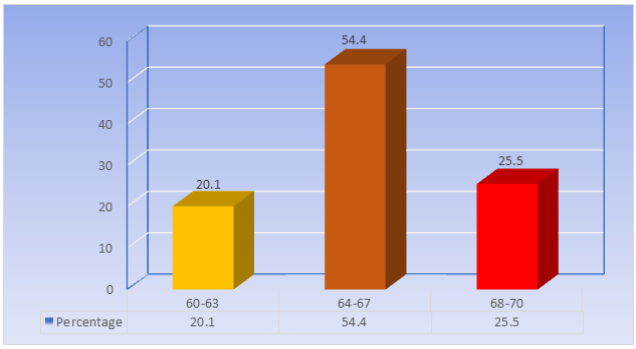


Fig. 5: Distribution of respondents by height.

Table 6: Distribution of respondents by weight (n = 35).

Height of Inch	Frequency	Percentage
60-63	7	20.1
64-67	19	54.4
68-70	9	25.5
Total	35	100
Mean±SD	65.600±2.557	

Table 6 revealed that the mean weight of the respondents was 65.571±7.875 sand It also found that 70-79 kg group felt more pain in lateral epicondylitis.

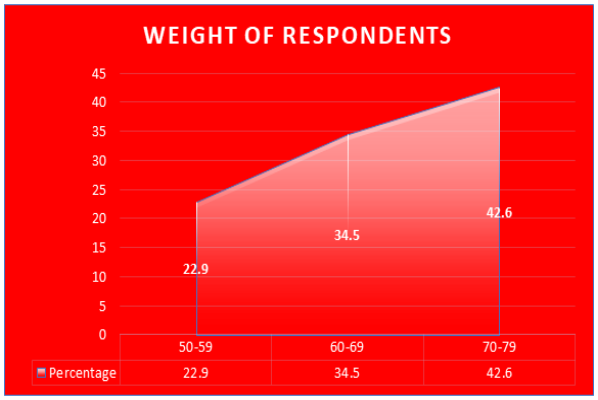


Fig. 6: Distribution of respondents by weight.

Table 7: Distribution of respondents by daily work duration (n = 35).

Daily play duration	Frequency	Percentage
(1-2) hour	16	45.7
(3-4) hour	12	34.3
(5-6) hour	5	14.3
more	2	5.7
Total	35	100
Mean±SD	1.800±.900	

Table 7 revealed that the mean of daily play duration of the respondents was 1.800±.900 and it also found that (1-2) hour group felt more pain in lateral epicondylitis.

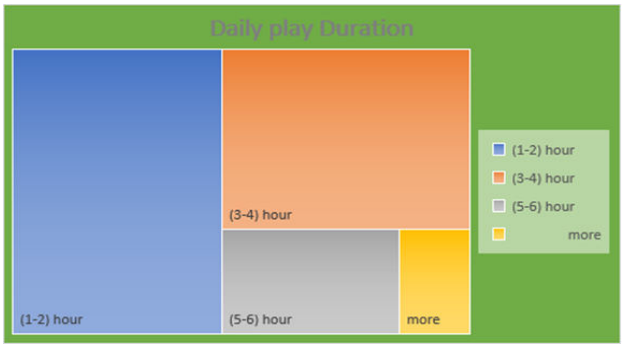


Fig. 7: Distribution of respondents by daily work duration.

Table 8: Distribution of respondents by Warm up exercise (n = 35).

Warm up exercise	Frequency	Percentage
YES	17	48.6
NO	18	51.4
Total	35	100
Mean±SD	1.514±.5070	

Table 8 revealed that the mean of warm up exercise before play start of the respondents were 1.514±.5070 and it also found that no groups were more affected in lateral epicondylitis.

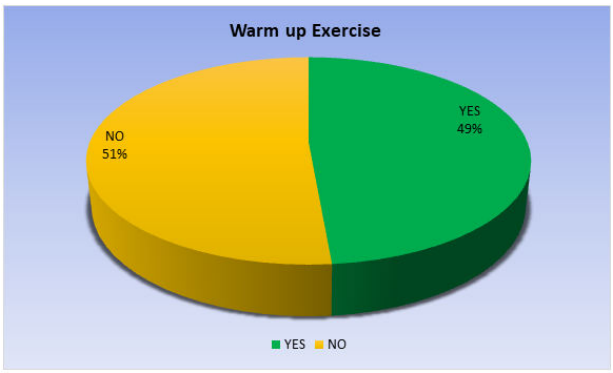


Fig. 8: Distribution of respondents by Warm up exercise.

Table 9: Distribution of respondents by the Use Technique Use Mostly (n = 35).

Technique Names	Frequency	Percentage
Power Stokes	19	54.3
Forehand over jump smash	7	20
Back hand overhead stokes	4	11.4
Forehand Serves	5	14.3
Total	35	100
Mean±SD	1.8571±1.1152	

Table 9 revealed that the mean Technique use mostly of the respondents was 1.8571±1.1152 sand it also found that power stokes group felt more pain in lateral epicondylitis.

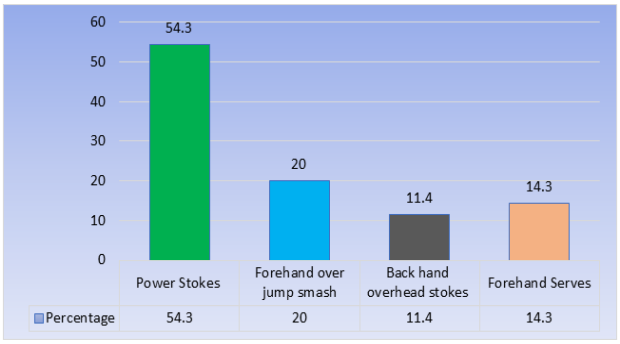


Fig. 9: Distribution of respondents by Use Technique Use Mostly.

Table 10: Distribution of respondents by any history of trauma (n = 21).

Any history of trauma	Frequency	Percentage
YES	11	31.4
NO	24	68.6
Total	35	100
Mean±SD	1.685±.4710	

Table 10 revealed that the mean of any history of trauma of the respondents were 1.685±.4710 and it also found that no groups were more affected in lateral epicondylitis.

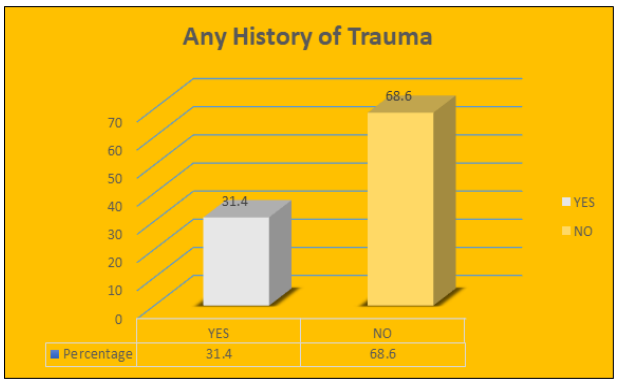


Fig. 10: Distribution of respondents by any history of trauma.

Table 11: Distribution of respondents by Types of Badminton Racket (n = 21).

Type of Badminton Racket	Frequency	Percentage
Light	12	34.3
Heavy	23	65.7
Total	35	100
Mean±SD	1.657±.4815	

Table 11 revealed that the mean type of badminton racket use of the respondents was 1.657±.4815 and it also found that heavy groups were more affected in lateral epicondylitis.

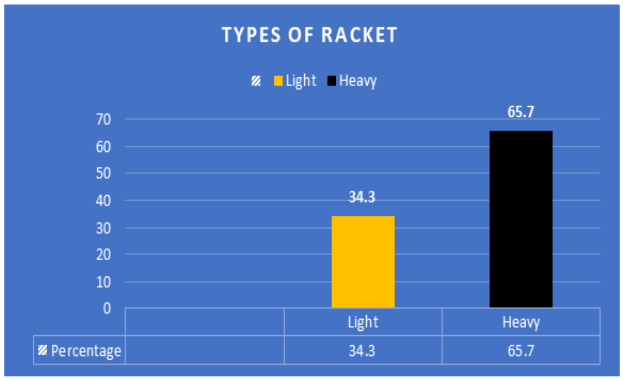


Fig. 10: Distribution of respondents by Types of Badminton Racket.

Table 12: Distribution of respondents by Types of Racket Use in Badminton Racket (n = 21).

Type of Grip	Frequency	Percentage
Soft	12	42.9
Hard	20	57.1
Total	35	100
Mean±SD	1.571±.5021	

Table 12 revealed that the mean types of badminton racket grip use of the respondents were 1.571±.5021 and it also found that hard groups were more affected in lateral epicondylitis.

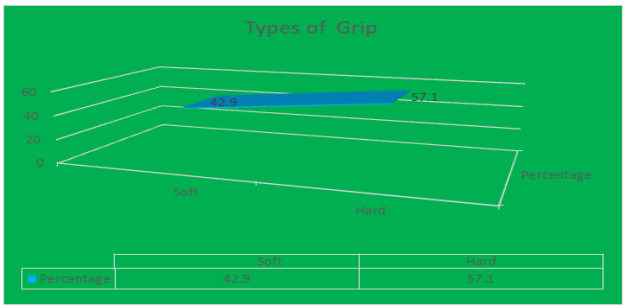


Fig. 12: Distribution of respondents by Types of Racket grip.

Table 13: Distribution of Respondents by Smoking (n = 35).

Smoking	Frequency	Percentage
YES	17	48.6
NO	18	51.4
Total	35	100
Mean±SD	1.514±.5070	

Table 13 revealed that the mean Smoking of the respondents were 1.685±.4710 and it also found that no groups were more affected in lateral epicondylitis.

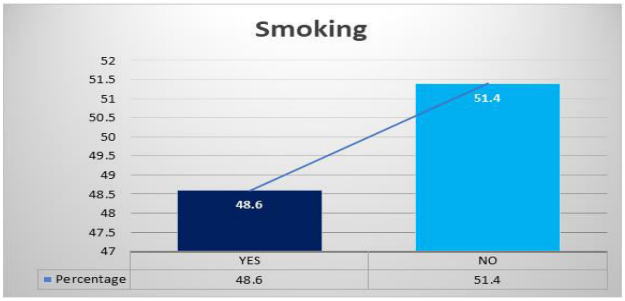


Fig. 13: Distribution of Respondents by Smoking.

Table 14: Distribution of Respondents by Severity of Pain (n = 21).

Smoking	Frequency	Percentage
YES	17	48.6
NO	18	51.4
Total	35	100
Mean±SD	1.514±.5070	

Table 14 revealed that the mean severity of pain was 1.685±.631 and it also found that moderate groups felt more pain in lateral epicondylitis.

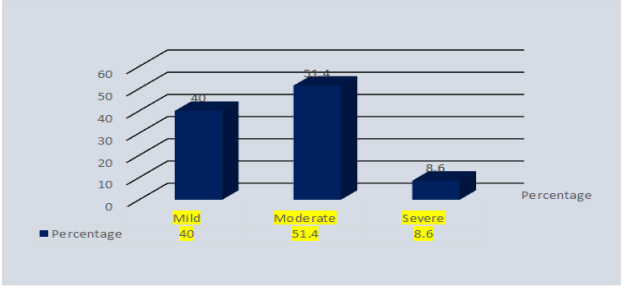


Fig. 14: Distribution of Respondents by Severity of Pain.

Table 15: Distribution of Respondents by Pattern of Pain (n = 35).

Pattern of pain	Frequency	Percentage
Tingling	19	54.3
Numbness	3	8.6

Table 15 revealed that the mean pattern of pain was 2.0286±1.2481 and it also found that tingling groups felt more pain in lateral epicondylitis.

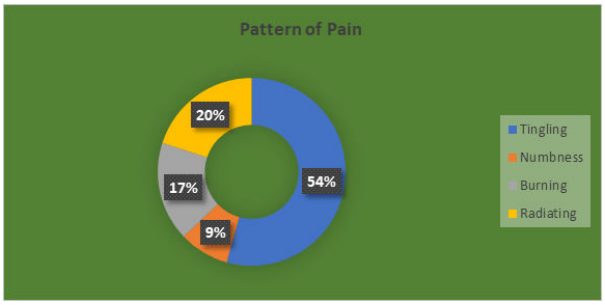


Fig. 15: Distribution of respondents by the pattern of pain.

Table 16: Distribution of respondents by suffer of pain (n = 35).

Suffer of pain	Frequency	Percentage
Near about 3 months	14	40
Near about 6 months	17	48.5
Near about 9 months	1	2.9
More	3	8.6
Total	35	100
Mean±SD	1.800±.867	

Table 16 revealed that the mean suffer of pain were 1.800±.867 and it also found that near about 6-month groups felt more pain in lateral epicondylitis.

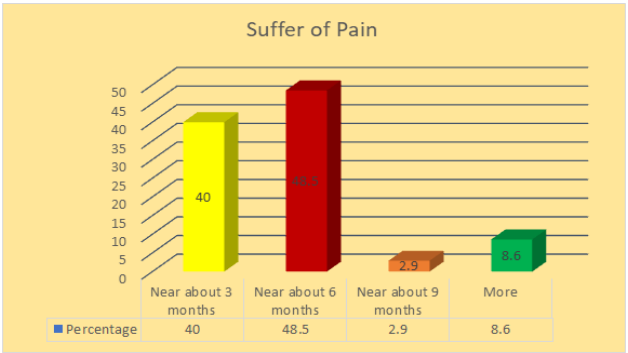


Fig. 16: Distribution of Respondents by Suffer of Pain.

Table 17: Distribution of Respondents by times of more pain (n = 35).

Time of more pain	Frequency	Percentage
Playing time	22	62.9
Resting time	13	37.1
Total	35	100
Mean±SD	1.371±.4902	

Table 17 revealed that the mean times of more pain were 1.371±.4902 and it found that playing time groups were more pain in lateral epicondylitis.

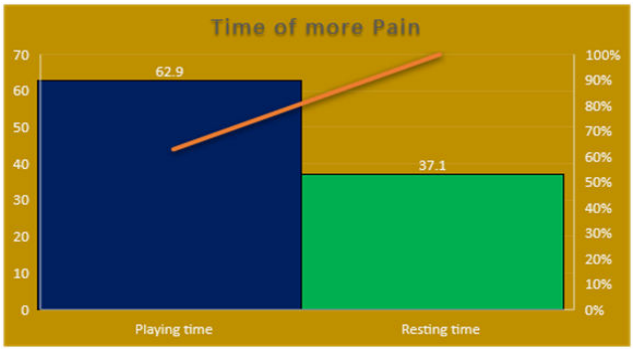


Fig. 17: Distribution of Respondents by time of more pain.

Table 18: Distribution of Respondents by Starting of Pain (n = 35).

Starting of Pain	Frequency	Percentage
Suddenly	11	31.4
Gradually	24	68.6
Total	35	100
Mean±SD	1.686±.4710	

Table 18 revealed that the mean starting of pain were1.686±.4710 and it also found that gradually groups felt more pain in lateral epicondylitis.

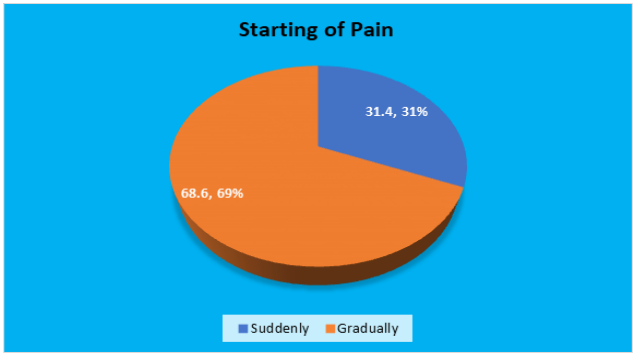


Fig. 15: Distribution of respondents by starting of pain.

5. Discussion

This study focused on identifying the risk factors associated with Tennis elbow among the badminton player of Gono Bishwabidyalay with considering the variables like socio-demographic, factors related variables, disease related variables. The mean age of the respondent's was 26.714±4.719. Here more of the respondents felt more pain in 20-24 age groups and the mean gender of the respondent's were1.20±0.405. Here also male groups have more pain in lateral epicondylitis. The mean marital status of the respondent's was1.571±0.502. Here also

found that unmarried groups have more pain in lateral epicondylitis and the mean occupation of the respondent's were1.542±.741. Here more of the student group felt more pain in lateral epicondylitis and the mean height of the respondents were 65.600±2.557. Here also found that most of the 64-67inch group felt pain in lateral epicondylitis and the mean weight of the respondents were 65.571±7.875. Here also found that 70-79kg group felt more pain in lateral epicondylitis.

The, mean of daily play duration of the respondent's was1.800±.900. Here also found that (1-2) hour group felt more pain in lateral epicondylitis and the mean of warm up exercise before play start of the respondents were 1.514±.5070. Here also found that no group felt more pain in lateral epicondylitis and the mean technique use mostly of the respondents were 1.8571±1.1152. Here also found that power stokes group felt more pain in lateral epicondylitis and the mean of any history of trauma of the respondents were 1.685±.4710 and it also found that no groups were more affected in lateral epicondylitis. The mean of type of badminton racket use of the respondents was 1.657±.4815. Here also found that heavy group felt more pain in lateral epicondylitis.

The mean of type of badminton racket grip use of the respondent's was1.571±.5021. Here also found that hard group felt more pain in lateral epicondylitis and the mean smoking of the respondent's was 1.514±.5070. Here also found that no group felt more pain in lateral epicondylitis. The, mean severity of pain was 1.685±.631. Here also found that moderate groups felt more pain in lateral epicondylitis and the mean pattern of pain were 2.0286±1.2481. Here also found that tingling groups felt more pain in lateral epicondylitis and the mean suffer of pain were 1.800±.867. Here also found that near about 6-month groups felt more pain in lateral epicondylitis and the mean time of more pain were 1.371±.4902. Here also found that playing time groups were more pain in lateral epicondylitis and the mean starting of pain were1.686±.4710. Here also found that gradually groups felt more pain in lateral epicondylitis.

6. Conclusion and Recommendations

Conclusion The study conducted the selected to the risk factor that responsible for tennis elbow among the badminton player. The important way for prevention of tennis elbow including the modification of over use of hand for reduce risk factors and it is also important to take comprehensive preventive measures like decrease daily play duration and modification of the ploy technique and correction of badminton racket use light racket and avoid hard grip of racket and do warm up exercise before starting the game. Base on the study findings, the following recommendations are made with view to prevent and minimize the tennis elbow, recommenddation for program implication.

- To create awareness of tennis elbow among the badminton player.
- Information about tennis elbow specially causes and risk factors.
- Practice some physical exercise regularly, such as towel twist, fist squeeze, elbow bend, wrist lift (palm up), and wrist turn with weight.
- Avoid activities that aggravate elbow pain.
- Avoid repetitive movement.
- Avoid to lifting heavy weight or bag.
- Avoid smoking.
- Avoid heavy badminton racket.
- Avoid hard grip badminton racket.
- Use an arm brace or wrist splint when using the arm.
- There also need to focus on health planning and health education for badminton players.

7. Author Contributions

S.H.; and U.K.D.: contributed to the conceptualization, methodology, data analysis, and drafting of the manuscript. M.M.: contributed to the review and interpretation of data. T.F.R.: guided the research methodology, reviewed the manuscript, and contributed to the critical interpretation of the results. H.D: assisted in data collection, contributed to the literature review, and helped in the finalization of the manuscript.

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9. Conflicts of Interest

The author(s) declare that they have no conflicts of interest to publish the work.

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