

# **WORK RELATED FACTORS AFFECTING THE DEVELOPMENT OF LATERAL EPICONDYLITIS**

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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled

**WORK RELATED FACTORS AFFECTING THE DEVELOPMENT  
OF LATERAL EPICONDYLITIS**

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## **Declaration**

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation or dissemination of information of the study. I would be bound to take written consent from my supervisor & Head of the Physiotherapy department, Bangladesh Health Professions Institute (BHPI).

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## Acronyms

<b>BHPI</b>	:	Bangladesh Health Professions Institute
<b>CRP</b>	:	Centre for the Rehabilitation of the Paralyzed
<b>ECRL</b>	:	Extensor Carpi Radialis Longus
<b>LE</b>	:	Lateral Epicondylitis
<b>MSD</b>	:	Musculoskeletal disorder
<b>TE</b>	:	Tennis Elbow
<b>SPSS</b>	:	Statistical Package for the Social Science
<b>WRMDs</b>	:	Work related musculoskeletal disorders
<b>WHO</b>	:	World Health Organization
<b>OR</b>	:	Odds Ratio
<b>MVT</b>	:	Movement
<b>BMRC</b>	:	Bangladesh Medical and Research Council
<b>IRB</b>	:	Institutional Review Board

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## Abstract

*Purpose:* The purpose of the study was to identify work related factors affecting the development of lateral epicondylitis.

*Objectives:* To identify associated work related factors affecting the development of lateral epicondylitis, to determine the socio-demographic (age, sex, occupation) information of the affected group, to examine and interpret how the job experience and duration of work, overuse hand and clarify the interruption of work & repetitive movement, notice of working pain.

*Methodology:* The prospective quantitative case-control research was carried out to accomplish the objective of the study. Total 50 samples were selected by convenient sampling from (CRP)-Savar and Mirpur; Tennis Federation. The investigator used a mix of both structured and semi-structured questionnaire and participants were requested to give opinion based on the structure of the question. Data were numerically coded and put in both Excel and SPSS 20.0 version software program. Descriptive statistics was performed to obtain the result of the study, Pie Chart and bar chart.

*Results:* A total 50 participants with lateral epicondylitis minimum age was 20 years and maximum age was 60 years. Among case the mean age of the participants was 42.1 % years and control group was 57.9%. The frequency of lateral epicondylitis was highest in between the 31-40 Years that is 41.20% (n=21). A total of 50 participants 11 (42.3%) of the cases were male and 14 (58.3%) were female whereas 15 (57.7%) of the controls were male and 10 (41.7%) were female. 3.90% of the affected respondents have at least some primary education. The factors significantly associated with the development of lateral epicondylitis were overuse hand (OR 1.23; 95%CI, .347-.4371), Weight lifting by hand (OR 1.195; 95%CI, .315-3.174.12), Repetitive movement of elbow (OR 1.01; 95%CI, .330-3.033), Type of pain (OR .722; 95%CI, .235-2.215) & Notice pain (OR 3.77; 1.170-12.194). *Conclusion:* The important way for prevention of lateral epicondylitis including the modification of over use of hand, weight lifting & repetitive movement for reduce risk factors and it is also important to take comprehensive preventive measures like sports by modification of the working position and correction the hand during playing and the daily living activities.

*Key words:* Musculoskeletal disorder, Work related factors, lateral epicondylitis.

## 1.1 Background

“Musculoskeletal disorders” include a wide range of inflammatory and degenerative conditions affecting the muscles, tendons, ligaments, joints, peripheral nerves, and supporting blood vessels. These include clinical syndromes such as tendon inflammations and related conditions, tenosynovitis, epicondylitis, bursitis, nerve compression disorders carpal tunnel syndrome, sciatica and osteoarthritis, as well as less well standardized conditions such as myalgia, low back pain and other regional pain syndromes not attributable to known pathology (Punnett and Wegman, 2004). Work-related musculoskeletal disorders are a group of painful disorders of muscles, tendons, and nerves. Work activities which are frequent and repetitive, or activities with awkward postures cause these disorders which may be painful during work or at rest.

*Lateral epicondylitis* or Tennis elbow, is a painful condition of the elbow caused by overuse. Not surprisingly, playing tennis or other racquet sports can cause this condition. But several other sports and activities can also put at risk. Lateral epicondylitis is the medical term for the condition commonly known as “Tennis Elbow.” In the past, this condition was called “Lawn Tennis Arm.” Despite these popular terms, over 90% of patients diagnosed with lateral epicondylitis do not play tennis. Lateral epicondylitis is a common disease that affects a different range of people (Lalenti et al., 2014).

On the lateral outside aspect of the elbow, a group of muscles originate from the lateral epicondyle bony prominence of the humerus arm bone. These muscles aid in extending straightening the wrist and the fingers. The beginning of these muscles is commonly referred to as the “common extensor origin.” These muscles, along with the ligaments of elbow, help to provide stability to the elbow joint. One of these muscles, the extensor carpi radialis brevis, is most commonly affected by lateral epicondylitis.

In approximately 50% of patients, the extensor digitorumcommunis is also affected (Buller et al., 2014). Work-related upper extremity disorders are a major cause of complaints and

disability in working populations (Staal et al., 2007). Elbow pain and associated disorders, mostly lateral epicondylitis, are known to be one of the most common disorders of the arm in the general population (Bot et al., 2005), as lateral epicondylitis is a major arm disorder with an estimated prevalence of 0.7-4.0% in the general population ( Shiri & Juntura, 2011). Walz et al. (2010) mention that Lateral epicondylitis is the result of overuse of the extensor muscles, leading to inflammation or irritation of the tendon insertion. The prevalence of lateral epicondylitis in workers whose job requires repetitive work ranges from 1.3% to 12.2% (Rijn et al., 2009).

Furthermore, some psychological (depression) and psychosocial work factors ( job strain, social support ) have been reported to influence elbow symptoms ( Walker et al., 2011), but these associations do not always remain significant after adjustment for physical work factors and no clear relationship has been demonstrated between psychosocial factors and musculoskeletal pain (Macfarlane et al., 2009).

The evidence for specific risk factors for tennis elbow has been discussed in several reviews. Hagberg et al. (2005) mentioned that in spite of an association with occupational exposure, based on the epidemiological literature there was no convincing evidence that lateral epicondylitis is work related. Another review, from NIOSH, concluded that there is strong evidence of an association between the occurrence of tennis elbow and exposure to the combined risk factors of force, repetition, and posture. Furthermore, evidence was found for an association with forceful work alone. NIOSH found insufficient evidence for an association between repetitive work, postural factors, and epicondylitis. Other possible risk factors were increasing age, 9–13 longer duration of employment in strenuous jobs, 13–15 female gender. The effect of leisure time activities, including sports, is seldom elucidated even found fewer symptoms among those performing racket sports (Dimberg et al., 2000).

Smedt et al. (2007) mentioned that tennis elbow is a painful condition affecting the tendinous tissue of the origins of the wrist extensor muscles at the lateral epicondyle of the humerus, leading to loss of function of the affected limb. Therefore it can have a major

impact on the patient's social and professional life. Rayan et al. (2010) showed that Lateral epicondylitis or tennis elbow is one of the most regularly encountered disorders of the elbow that can cause significant pain and dysfunction. This disorder was first described by Runge in 1873 and the term tennis elbow was coined in 1883 by Major. Lateral epicondylitis is characterized by localized pain over the origin of extensor muscles of the finger and wrist at the lateral epicondyle. Ellenbecker et al. (2009) stated that Injuries to the elbow region in elite tennis players primarily involve repetitive overuse and center on the tendon us structures inserting at the medial and lateral humeral epicondyle.

Hennig et al. (2002) showed that Common injuries in tennis players have been associated to the asymmetric hypertrophy of the upper extremity, epicondylitis. Smedt et al. (2007) showed that tennis elbow is a common disorder of the elbow. A recent demographic study described the epidemiology of this condition and investigated its risk factors in a sample of 4783 people aged 30– 64 years. The prevalence in this group was 1.3% and did not differ between men and women. The condition was most prevalent in the age group of 45–54 years.

Rijn et al. (2009) stated that Epicondylitis, lateral epicondylitis and medial epicondylitis is one of the most prevalent disorders, with an estimated prevalence of 5% in the general population, 8.9% among meat cutters and 14.5% among workers in the fish processing industry. A claim incidence rate for epicondylitis of 11.7/10000 full-time workers per year. Low job control and low social support at work were positively associated with the occurrence of lateral epicondylitis in the general workforce with ORs of 2.2 and 1.8, respectively. Depressive symptoms and high job demands were not clearly related with an increased risk to develop lateral epicondylitis.

Shiri et al. (2011) mentioned that recent data suggests that the prevalence of lateral epicondylitis in the general population is approximately 1.0% to 1.3% in men and 1.1% to 4.0% in women. Prevalence rates as high as 2% to 23% have been reported within occupational populations. Leclerc et al. (2001) he want to show that the scientific literature has attempted to identify risk factors associated with LE and the working population.

Gallwey et al. (2002) mentioned that the tendon is frequently and heavily loaded during many everyday upper-limb activities, as the ECRB acts as a stabilizer for grasping activity involving pronation and supination, and a prime mover for wrist extension. Wang et al. (2006) stated that an additional factor which makes it at risk of injury, its susceptibility to fatigue as a mismatch between the tendon's metabolic supply and the physiological demand on the muscle has been found. Although the tendon can bear large loads of up to 10 times an individual's body weight, it receives only 13% of the oxygen supply provided to muscle.

## 1.2 Rational

Lateral epicondylitis is clinically characterized by pain over the lateral aspect of the elbow, aggravated by extension of the wrist, and by tenderness over the lateral epicondyle or the radio humeral joint, or both. Now a days the rate of work related musculoskeletal disorder lateral epicondylitis patient are increasing day by day. For this reason of lateral epicondylitis patient who has pain on Elbow and cannot move and perform any work properly. However, there are only few attempts to inquire this site of health service Life become threatens for them. Anyone who uses repeated hand motions is at risk. Examples include painters, meat cutters, carpenters, musicians, manicurists and dentists. People who work on an assembly line or use computers also are at risk. Playing tennis is one of the ways of can get tennis elbow. Other sports that can lead to tennis elbow include other racquet sports such as racquetball or squash and fencing. Tennis elbow can occur at any age, but is most common in people 25 years to 60 years of age. It affects both men and women. From the study lateral epicondylitis will be able to identify the musculoskeletal problem related to their work that can influence their activities. They may provide proper recommendation for every problem which will be helpful for them. This study will also help to discover the lacking area of a lateral epicondylitis, especially about their posture before doing any activities. Beside this it will be help to professional development which is mandatory for current situation. Physiotherapy is a developing health profession in Bangladesh. As a specialized health profession in musculoskeletal disorder, physiotherapy is one of the responsible health professions for treating and managing WMSD. Physiotherapists work in large spectrum including musculoskeletal phenomenon. They can also work in the Information technology Farm as consultant or visiting therapist to evaluate and provide advocacy and treatment to lessen the suffering (Buckle, 2005). They can work in promoting preventive program regarding associated risk factors in lateral epicondylitis tasks. Occupational health and safety regarding work-related musculoskeletal disorder will be a new side to establish and promoting professional competence and development. It is an emerging area in perspective of Bangladesh where physiotherapist can work to gather information about percentage, prevalence and severity of work related musculoskeletal symptoms. Research in this area can establish the skills of physiotherapists be a base for

spreading the profession in a new dimension in Bangladesh. For considering these issues researcher is keen to conduct the research in this area. By conducting this research it is expected that some of these risk factor can be identified to minimize the cost treatment, morbidity, absent from risk of work, however physical and psychosocial distress. Much other Health professional will get update knowledge about factors which causing lateral epicondylitis and this knowledge also number of population will be benefited. No one can conduct this type of research in Bangladesh as this as limited evidence of work related factors affecting the development of lateral epicondylitis. Identification of the risk factors of lateral epicondylitis will give us evidence by which we take necessary measure to manage this condition as well as it can help to take preventive measures to minimize the sufferings of this condition.



### **1.3 Research question**

What are the work related factors affecting the development of lateral epicondylitis?

## **1.4 Aim of study**

Identify the work related factors affecting the development of lateral epicondylitis.

## **1.5 Objectives**

### **1.5.1 General objective**

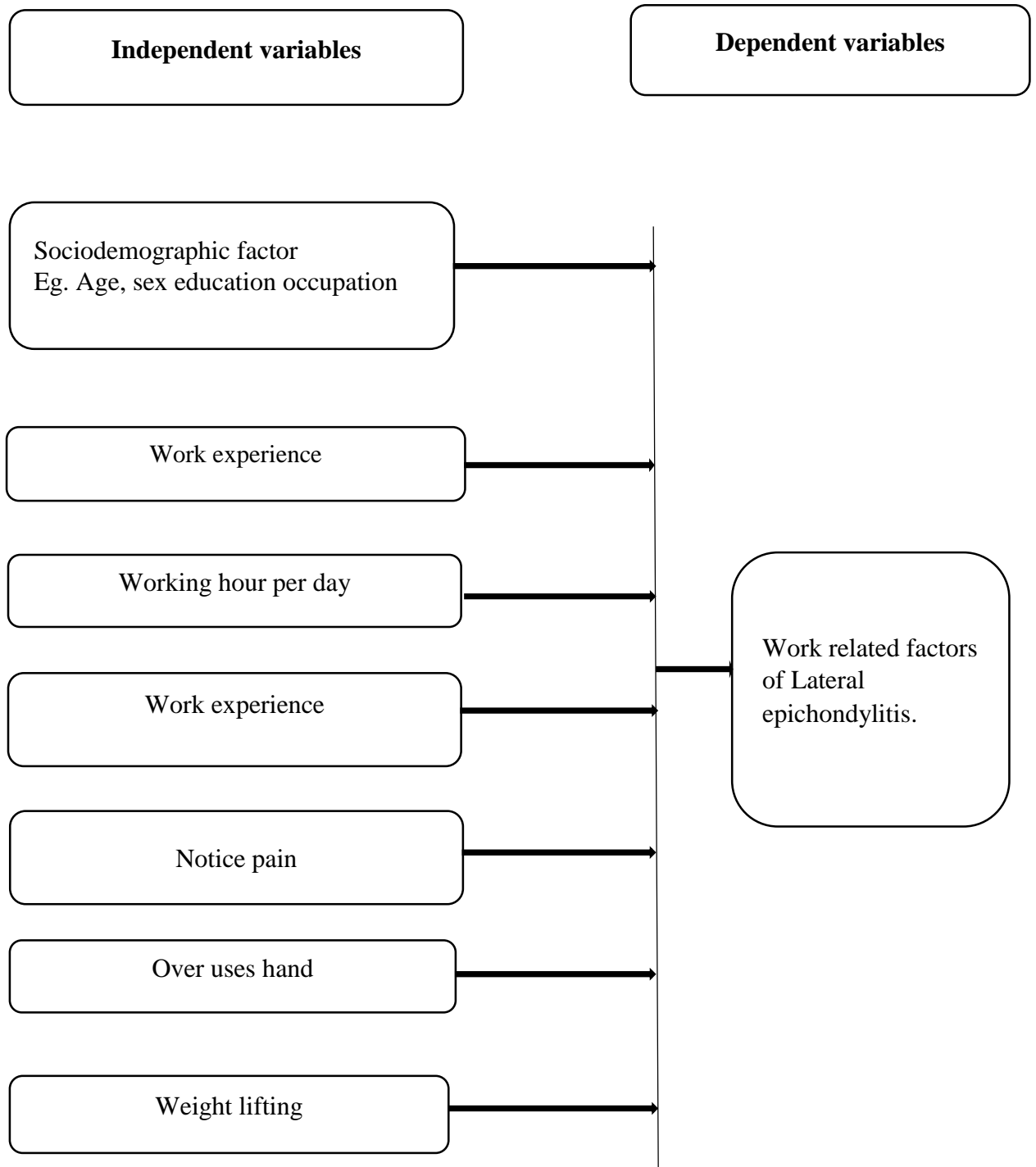
To identify possible work related factors affecting the development lateral epicondylitis.

### **1.5.2 Specific objectives**

1. To identify the socio demographic characteristic (age, sex, education) of professional lateral epicondylitis with work related problem.
2. To examine the association between job experiences, duration of work and Lateral Epicondylitis.
3. To interpret how taking rest between works, recurrent injury and Lateral Epicondylitis.
4. To identify the association between type of pain and Lateral Epicondylitis.
5. To identify the association between weight lifting and Lateral Epicondylitis.
6. To find out the association between overuse hand and Lateral Epicondylitis.
7. To investigate the association between repetitive movement and Lateral Epicondylitis.

## 1.6 List of Variables

### CONCEPTUAL FRAMEWORK



## **1.7 Operational definition**

### **Work related musculoskeletal disorder**

Work-related musculoskeletal disorders (WRMD) are the disorders of muscles, tendons, ligaments and nerves that develops due to work related factors such as repetitive work or activities with awkward postures with symptoms of pain, aches, paraesthesia, tingling, numbness and stiffness etc. Some examples of musculoskeletal disorders include back pain, neck pain, carpal tunnel syndrome, lateral epicondylitis, tendonitis and tenosynovitis etc.

### **Lateral epicondylitis**

Lateral epicondylitis is the most common overuse syndrome in the elbow. Lateral epicondylitis or tennis elbow is an injury involving the extensor muscles of the forearm. These muscles originate on the lateral epicondyles region of the distal of the humerus. The most common type of lateral elbow pain is lateral epicondylitis. In occupations requiring repetitive upper extremity activities and particularly those involving computer use, heavy lifting, and forceful forearm pronation and supination, and repetitive vibration, lateral epicondylitis is repeatedly seen.

**Activities of Daily Living** - The essential functional activities, those have to be done independently from morning to evening.

**Stressful Job Pattern** - Has to perform repeated work for more than 6 hours.

**Over use Hand** - Over use hand more than 3 hours.

**Heavy weight lifting** - Lifting objects at least 10 Kg or more.

## 2.1 Literature Review

Lateral epicondylitis or Tennis elbow refers to a syndrome of pain centred over the common origin of the extensor muscles of the fingers and wrist at the lateral epicondyle. It was first reported in the literature in 1873 by Runge (Yerger, 2005). Typically, patients develop these symptoms between the ages of 35 and 55 (Buller et al., 2014). Malik et al. (2013) showed that men and women are affected equally; however, there is a higher frequency of lateral epicondylitis among manual laborers who use heavy tools (e.g., construction workers). The dominant arm is most commonly affected.

Barr et al. (2009) showed that Lateral epicondylitis (tennis elbow) is a painful musculoskeletal condition which is considered to be due to over-use, over-stress or over-exertion of the wrist extensors of the forearm. It is often associated with individuals who have repetitive occupations and/or hobbies, affects the dominant hand and primarily occurs between the ages of 35 and 64 years. Dalyan et al. (2006) stated that forceful repetitive activity does not need to be work-related to cause tennis elbow. For example, wheelchair users are also at risk for developing tennis elbow, although shoulder tendinopathies and carpal tunnel syndrome are more prevalent. Functional activities such as pressure reliefs, transfers, and wheelchair propulsion are the commonly reported aggravating activities associated with elbow pain.

Piligian et al. (2000) showed that Tennis elbow is considered the most prevalent work-related musculoskeletal disorder of the elbow and sufficient evidence exists for a strong association between its prevalence and a combination of physical risk factors including force, repetition, and posture. (Haahr & Andersen, 2003) have both shown job classifications with high force demands and manually intensive work have a high prevalence of tennis elbow including construction workers, mechanics, butchers, and others. The prevalence of tennis elbow ranges from 6-15% in specific jobs identified in the meat and fish processing industries. Chourasia et al. (2013) showed that the relationship

between function, grip strength and rapid force generating capacity was also assessed. A better understanding of the impact of LE on grip function may lead to improved therapeutic interventions for LE as well as possibly reducing the risk of recurrence of LE by addressing deficits in rapid force generating capacity. Roquelaure et al. (2002) showed that the worker's history of exposure is an important feature to evaluate the incidence of epicondylitis or musculoskeletal disorders in general, as exposure generally varies over time and the effect of exposure may depend on its duration and the time at which it is measured.

The prevalence of TE is described to be 1-2 % in a general population between 30 and 64 years of age. The highest incidence is between 40 and 60 years of age and, there are no differences between men and women (Shiri et al., 2006). In occupational populations the prevalence is between 2-23% (Leclerc et al., 2001). Differences in the prevalence in different studies may be related to different definitions; self-reported symptoms or clinical examination (Kryger et al., 2007). Tennis players appear to be affected even at younger age, 16-36 years and there are reports of a prevalence of up to 35-42 % among tennis players (Silva, 2008).

Huisstede et al. (2007) mentioned that the CANS model distinguishes the following specific tendinopathies and neuropathies at the elbow: lateral epicondylitis, medial epicondylitis, cubital tunnel syndrome and radial tunnel syndrome. Of these, epicondylitis (i.e. lateral epicondylitis and medial epicondylitis) is one of the most prevalent disorders, with an estimated prevalence of 5% in the general population, 8.9% among meat cutters and 14.5% among workers in the fish processing industry (Shiri et al., 2006). Silverstein et al. (2007) reported a claim incidence rate for epicondylitis of 11.7/10 000 full-time workers per year. Epicondylitis can be divided into lateral epicondylitis, known as tennis elbow, and medial epicondylitis, which is known as golfers elbow. Park et al. (2008) mentioned that Lateral epicondylitis and medial epicondylitis are the result of overuse of the extensor and flexor muscles, respectively, which lead to inflammation or irritation of the tendon insertion. Certain workers are reported to be at increased risk for these disorders. The prevalence of lateral epicondylitis and medial epicondylitis in workers whose job required repetitive work varied from 1.3 to 12.2% and from 0.2 to 3.8%, respectively. Shiri et al.

(2006) have concluded that occupational physical factors such as repetitive movements of hands or wrists, handling loads heavier than 5 kg, activities demanding high hand grip forces and the use of vibrating tools were risk factors for lateral epicondylitis and medial epicondylitis. Most of the patients suffering from TE are treated by general practitioners; the incidence has been shown to be 4-7/1000 per year in general practice (Assendelft et al., 2008). Although, only 55% of all persons with TE are treated by physicians (Verhaar, 2005). From epidemiological studies the increase in computer and mouse use has been associated with an increased prevalence of pain disorders like TE in the upper extremity (Gerr et al., 2006).

Although pain around the lateral epicondyle is commonly referred to as tennis elbow, tennis players make up only 10% of the patient population (Smedt et al., 2007). Half of tennis players develop pain around the elbow, of which 75% represent true tennis elbow (Jong et al., 2007). Types of lateral epicondylitis are Supracondylar, Tenoperiosteal Body of the tendon, Muscle belly. Hadler, (2010) showed that the typical characteristics of epicondylitis (lateral or medial) are: localised pain which may radiate distally into the forearm, muscular tenderness and functional difficulties with tasks involving gripping. Appropriate symptoms, clinical signs and tests are: Pain in the vicinity of the lateral epicondyle, pain on palpation immediately distal to the lateral epicondyle (within 1-5cm), and either symptomatic pain reproduction on resisted active wrist extension, or symptomatic pain reproduction on resisted active extension of the middle finger. Health care providers should compare pain responses on the contralateral limb, as discomfort may ordinarily be experienced from palpation in this region. Hadler, (2010) showed that Pain in the vicinity of the medial epicondyle, and pain on palpation immediately distal to the medial epicondyle, and either symptomatic pain reproduction on resisted active wrist flexion, or symptomatic pain reproduction on resisted flexion of the fingers.

Roles et al. (2007) mentioned that differential diagnosis of tennis elbow are Radial Tunnel Syndrome, Posterior Elbow osteoarthritis, Fractures are most Fractures, Radial, Cervical. Tennis elbow uncertainty exists, imaging and diagnostic tests can be useful for exploring the potential for a differential diagnosis, including: Radiocapitellar, Chondromalacia,

Elbow Instability, Loose Bodies, Cervical Radiculopathy (C6 or C7), Compression of the Posterior Interosseous Nerve (Taylor, 2012). On other hand diagnosis is elbow arthritis. Cervical nerve root entrapment. Medial ligament strain golfer's elbow and Carpal tunnel syndrome.

The most common presenting symptom is pain over the lateral (outside) aspect of the elbow. Typically, the pain is worse with extension (cocking back) of the wrist. Also, repetitive activities that involve flexion and extension of the elbow often elicit the symptoms. A single, traumatic event causing pain is not often the cause. Patients may also complain of difficulty holding objects, pain moving down their arm, or a feeling of elbow instability. On physical examination, patients usually feel soreness over the prominence, slightly anterior in front of and distal closer to the hand to the lateral epicondyle the bony prominence on the outside aspect of the elbow (Ahmad et al., 2013). A systematic evaluation of the elbow includes inspection, palpation, range of motion testing, neurologic assessment, examination of related areas and various special tests. A complete review of the elbow examination is beyond the scope of this article but is available in a number of texts (Magee, 1997). The tennis elbow test is performed with the patient's extended elbow stabilized in the physician's hand and the thumb of that hand positioned on the patient's lateral epicondyle. The patient makes a fist, pronates the forearm and radially deviates and extends the wrist while the physician applies a resisting force at the fist. The test is positive if pain is elicited in the area of the lateral epicondyle. In the patient with more advanced tennis elbow, pain is elicited when the same maneuver is performed with the elbow flexed to 90 degrees. Flexion force applied against long finger (third digit) extension distal to the proximal inter-phalangeal joint may provoke pain over the extensor muscle mass in the proximal forearm. This finding is suggestive of radial tunnel syndrome, which is often misdiagnosed as resistant lateral tennis elbow (Green et al., 2006). The neck, shoulder and wrist should be examined carefully in the patient with elbow pain. This examination excludes elbow symptoms secondary to referred pain resulting from the body's attempts to compensate for dysfunction elsewhere (e.g., tennis elbow secondary to rotator cuff dysfunction).

To diagnose lateral epicondylitis, the physician performs a battery of tests in which he places pressure on the affected area while asking the patient to move the elbow, wrist, and



fingers. X-rays can confirm and distinguish possibilities of existing causes of pain that are unrelated to tennis elbow, such as fracture or arthritis. Medical ultrasonography and magnetic (MRI) are other valuable tools for diagnosis but are frequently avoided due to the high cost (Bisset et al., 2005). MRI screening can confirm excess fluid and swelling in the affected region in the elbow, such as the connecting point between the forearm bone and the extensor carpi radialis brevis. Miller et al. (2002) showed that Ultrasound, in the hands of an experienced ultra-sonographer, has been shown to help diagnose lateral epicondylitis in approximately 70% of cases.

Valdes et al. (2013) mentioned that to perform Cozen's test, the therapist stabilizes the patient's elbow in 90 degrees of flexion with one hand while palpating over the lateral epicondyle. The other hand positions the patient's hand into radial deviation and forearm pronation while the patient is asked to resisted wrist extension in this position against manual resistance of the therapist. The test is considered positive if it produces pain or reproduction of other symptoms in the area of the lateral epicondyle. 'Mill's test' are the clinician palpates the patient's lateral epicondyle with one hand, while pronating the patient's forearm, fully flexing the wrist, the elbow extended. A reproduction of pain in the area of the insertion at the lateral epicondyle indicates a positive test Geoffroy, (2009). Tuomo et al. (2002) showed that the "Mudsley's test" examiner resists extension of the 3rd digit of the hand, stressing the extensor digitorum muscle and tendon, while palpating the patient's lateral epicondyle. A positive test is indicated by pain over the lateral epicondyle of the humerus. Field et al. (2014) showed that Electromyography and nerve conduction studies are used to evaluate suspected nerve compression syndromes. Although these studies can be helpful in confirming a diagnosis, they are somewhat insensitive. Thus, clinical judgment should prevail in making treatment decisions.

The treatment of lateral epicondylitis aims at reducing pain, increasing strength and improving the quality of life of the patient, while minimizing the possible side effects of treatment (Thomas et al., 2007). The mainstay of treatment is non-surgical. Currently, widely accepted methods of treatment include activity modification (avoiding the activities that cause pain), bracing, non-steroidal anti-inflammatory drugs (i.e. Ibuprofen), physical

therapy, injections, and shockwave therapy (D'Vaz et al., 2006). Other methods, such as acupuncture, low level laser treatment and massage, have aided in pain-control anecdotally, but there is no scientific evidence of their effects (Zhou et al., 2014). More recent methods include denervation, percutaneoustenotomy (tiny incision with cutting of the tendon) and ultrasonic percutaneous tenotomy. (Stiefel & Field, 2014) mentioned that the surgical treatment is the last resort in regards to treatment of lateral epicondylitis. Surgery is indicated if pain and disability persist after at least six months, and many times twelve months, despite attempting non-operative modalities.

Labelle et al. (2004) stated that the anti-inflammatory medications target inflammation both in the elbow joint (synovitis) and within the surrounding tissues. Controlling this inflammation helps to reduce pain. One large study looked at 129 patients who received 28 days of either anti-inflammatory medications or a placebo. Those who received anti-inflammatories had better pain relief, but had more gastrointestinal complications. Overall, there was no improvement in long-term functions. Other studies have shown that rest and medication, although helpful in the short-term, do not alter the natural course of lateral epicondylitis (Ahmad et al., 2013).

Smedt et al. (2007) mentioned that the use of injections in the treatment of lateral epicondylitis remains controversial. In regards to corticosteroid injections, published results are mixed. One study, looking at 185 patients treated with injection, observation, or physical therapy, showed significant improvements in the steroid-treated group at six weeks. Long-term follow-up, however, demonstrated that those treated with physical therapy or observation had lower rates of recurrence (9% and 17%, respectively) compared to steroid injection (48%). Other studies showed no benefit at one and six months (Rodriguez, 2014). Common side effects of corticosteroid injection include skin color changes and the death of protective fat under the skin. Corticosteroid injections can also weaken tendons over time and may cause tendon rupture. Wong et al. (2015) mentioned that the Botulinum toxin (Botox) has also been used in the treatment of lateral epicondylitis. Botox works by blocking the release of important neurotransmitters acetylcholine that enable muscles to contract. Like corticosteroids, the results are mixed. One study showed pain improvement with Botox injections over 3 months. Other studies have shown no

improvement when compared to placebo. Since Botox works by paralyzing the muscle, the most common side effect is weakness with wrist extension and finger extension (Hayton et al., 2005).

Tyler et al. (2010) showed that the physical therapy remains one of the most commonly prescribed, and most effective, treatment options. Classically, physical therapy focused on increasing forearm strength, flexibility and endurance, as well as stretching of the affected muscles. Recently, it has been shown that the addition of a different form of exercise, termed eccentric exercises, aid in the reduction of symptoms. These exercises focus on using various flexible bars to increase the strength and length of muscles and tendons of the forearm. One study showed that the addition of eccentric exercises improved pain, strength, and overall functional scores.

Cyriax advocated the use of deep transverse friction massage in combination with mill's manipulation in treating lateral epicondylalgia (Stasinopoulos et al., 2004). Prabhakar et al. (2013) mentioned that Cyriax Physiotherapy Position of the patient-the patient sits with elbow bent to right angle and full supination. The physiotherapist places one hand at the patient's wrist and holds the forearm in supination. The pad of the index finger, middle finger or thumb is placed directly over the involved site, the remaining fingers should be used to provide further stabilization of the therapists hand, no lubrication is used, the patient's skin must move along with the therapist's fingers. Beginning with light pressure, the therapist moves the skin over the site of the lesion back and forth in a direction perpendicular to the normal orientation of the fibers of the involved part. The massage is given for 2 minutes then stopped for 1 to 2 minutes then repeated of 2 minutes, working up to 12 to 15 minutes, followed by the manipulation.

Viswas et al. (2012) suggested that treatment of a Lateral Epicondylitis suggests that strengthening and stretching exercises are the most important components of exercise programmers, for the reason that tendons should not only be strong but also flexible. The stretching exercises are intended to improve the flexibility of the extensor group of the wrist. These exercises ought to be instituted and continued until the range of motion of the wrist is the same as that of the uninvolved side. These programmers should occur early in

the treatment, to facilitate correct tissue remodeling. Early strength training should focus on low load and high-repetition training programmes, to prevent symptom aggravation. The best stretching position for the Extensor Carpi Radialis Brevis tendon is reached with the elbow in extension, forearm in pronation, wrist in flexion and with ulnar deviation of the wrist, according to the patient's tolerance. This stretching should be held for 30- 45 s and 3 times before and after the eccentric exercises, during each treatment session with a 30 s rest interval.

Phil, (2010) mentioned that the Flex bar is an effective and beneficial eccentric exercise for patients with lateral epicondylitis. This resistance device is easy to use at home and is an excellent example of true evidence-based practice in physical therapy. Instructions for the 5 steps of the exercise are performed each day for 3 sets of 15. It takes 4 seconds to complete each repetition and between each set of 15 repetitions there is 30 seconds of rest. Once the patients can perform 3 sets of 15, they progress to another color Flex Bar with a higher intensity of eccentric resistance. After an average of 7 weeks with 10 clinic visits the patient will have a resolution of symptoms. The treatment should be continued until this resolution occurs.

Grewal et al. (2009) mentioned that the surgical treatment is reserved for those patients who have failed non-operative treatment modalities and continue to have symptoms at least six months from the onset of symptoms. Some surgeons will wait twelve to eighteen months before proceeding to surgery. Surgical treatment entails debriding cleaning up the origin of the ECRB muscle. This procedure can be done through an open incision, percutaneous very small holes, or arthroscopically with the aid of a camera. Overall, the results of surgery are good. One study demonstrated improvement in 97% of patients whom underwent open debridement, with 93% of patients returning to athletic participation (Dunn et al., 2008). One study of forty patients whom underwent arthroscopic debridement showed that 77% felt much better after surgery, and 93% would have surgery again. Comparing open debridement to arthroscopic debridement, some studies suggest that patients have better functional scores and overall results following arthroscopic debridement (Solheim et al., 2013).

Kim et al. (2011) showed that the risk of complications from surgery remains very low. There is a risk of producing elbow instability, as well as nerve damage, with an open debridement. Percutaneous debridement carries a very small risk of nerve damage. Arthroscopic debridement also carries a small risk of nerve damage and elbow instability. Overall, these risks are less than 1%.

### **3.1 Study design**

This study aimed to find out the work related factors affecting the development of lateral epicondylitis. For this reason a quantitative research model in the form of a case control-study design is used. Case-control study is selected because in this way it is possible to identifying a defined population at a particular point in time .Through the case-control study easily comparing results among those of different ages, gender, or ethnicity. All individual cases were match control group. In other hand Quantitative research method helps to use a large number of participants and therefore collect the data objectively through this way data was reduced to numbers for statistical analysis in order to draw conclusion (Hicks, 2009).

### **3.2 Study site**

The study was conducted in musculoskeletal unit of outdoor physiotherapy department of Center for the Rehabilitation of the Paralyzed (CRP), Savar and Mirpur and Tennis federation. This area had chosen because it was convene for the study and there were the samples which meet inclusion & exclusion criteria of the study. This place comes to lateral epicondylitis patients for physiotherapy treatment from different area of Bangladesh, and the Tennis club where tennis elbow player are available so that this place was selected.

### **3.3 Study population and sample population**

The study populations were people with lateral epicondylitis and sample population were those who came to CRP to receive treatment and the Tennis player of Tennis Federation who have present tennis elbow or lateral epicondylitis.

### **3.4 Sampling Procedure**

In the study where used convenient sampling technique because considering the inclusion – exclusion criteria and the number of patients coming to musculoskeletal unit: it would be

difficult to find the expected number of subjects. This technique was more feasible, less time consuming and expensive to obtain relevant information.

### 3.5 Sample size

According to the equation the sample size required 384 people but due to lack of study time the study was conducted with 50 samples that had meet the inclusion & exclusion criteria and 25 case group and 25 control group.

### 3.6 Formula

The investigator will select 50 lateral epicondylitis from CRP hospital, tennis federation and the formula is

$$n = \frac{[Z_{\alpha}\sqrt{(1+m)p'(1-p')} + Z_{\beta}\sqrt{p_1(1-p_1)+mp_o(1-p_o)}]^2}{(p_1 - p_o)^2}$$

$$p' = \frac{p_1 + p_o/m}{1 + 1/m}$$

$$p_1 = \frac{p_o\Psi}{1 + p_o(\Psi - 1)}$$

Where,

$Z_{\alpha}$  = alpha = 95% confidence level = 1.96

$Z_{\beta}$  = 1 - power = 80% power = 0.84

$\Psi$  = odds ratio = 3.1 (Haahr, J.P & Andersen, J. 2003)

$p_o$  = Prevalence of lateral epicondylitis= 3.8% (Tajika et al., 2007)

Using the above formula and the parameter that samples size calculation is given below

$$p_1 = \frac{0.038 \times 3.1}{1 + 0.038(3.1 - 1)} = 0.109$$

$$p' = \frac{0.1090 + 0.038/1}{1 + 1/1} = 0.073$$

$$n = \frac{[1.96 \sqrt{(1+1)0.073(1-0.073)} + 0.84 \sqrt{0.109(1-0.109) + 0.038(1-0.038)}]^2}{(0.1090 - 0.038)^2} = 76$$

Considering 10% non-response rate the final sample size became 50 (25 Case and 25 Control).



### **3.7 Inclusion criteria**

1. Both male and female was included.
2. All age group are selected- as there is objective of the study to explore the relationship between age and work related musculoskeletal disorders, so samples are selected from all age group.
3. Subjects were selected from only CRP hospitals and Tennis federation - Because this study focused on work related factors affecting the development of lateral epicondylitis.
4. Subject who are willing to participate in the study- Otherwise they will not give exact information that is helpful to the study.

### **3.8 Exclusion criteria**

1. Subjects who had major accident or major surgery in any part of the body.
2. Subject who was unconscious, cognitive problem.
3. Mentally change people.

### **3.9 Data collection instrument and tools**

Questionnaire, pen, papers, pencil consent form were the tools of data collection.

### **3.10 Data collection procedure**

Data was collected direct interview using questionnaire. The questions was divided into five sections which almost covered all issues regarding work related factor of lateral epicondylitis including age, sex, occupation, residential area, injury, dominant arm, occupation, repetitive movement and sports. Then a face to face interview was conducted with the consent of the sample.

### **3.11 Data analysis**

After completing the initial data collection every questionnaire had been checked again to find out any mistake or unclear information. The data analysis was performed in SPSS version 20. The variables were labelled in a list in order. The researcher put the name of the variables on the variable view of SPSS and defined the types, values, decimal, label

alignment and measurement level of data. Then the inputted data was checked to ensure that all data has been transferred from the questionnaire.

The odds ratio (OR) was measured by the relative magnitude of the odds of exposure among individuals who have the disease (cases) and the odds of exposure among individuals who do not have the disease (controls) from a typical 2 x 2 table as below:

	<b>Case</b>	<b>Control</b>
<b>Exposure</b>	a	b
<b>N Exposure</b>	c	d

Odds of exposure among cases:  $a/c$

Odds of exposure among controls:  $b/d$

Odds ratio =  $(a/c) / (b/d)$

95% confidence interval was used to identify significance of the OR the work related factors by using following formula:

$$e^{\ln OR \pm z \cdot SE_{\ln OR}}$$

Where e is the base on the natural logarithms ( $e \approx 2.71828\dots$ ), z is a Standard normal deviate corresponding to the desired level confidence ( $z = 1.96$  for 95%), and

$$SE_{\ln OR} = \sqrt{\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}}$$

Confidence interval having 1 between its ranges was considered to be a non-significant work related factor.

### **3.12 Ethical considerations**

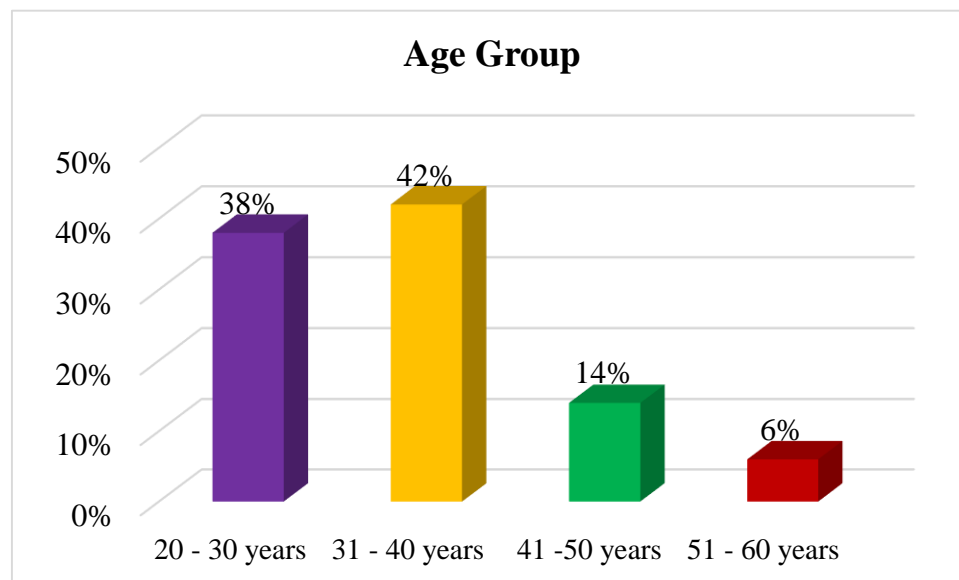
Ethical issues were followed by World Health Organization (WHO) and Bangladesh Medical and Research Council (BMRC). At first to conduct study, the research project was submitted to the Physiotherapy Department of BHPI and obtained approval from the ethical board. The research was approved by Institutional Review Board (IRB). During the course of the study, the samples who were interested in the study had given consent forms and the propose of the research and the consent form were explained to them verbally. The study did not interfere with their jobs. They were informed that their participation was fully voluntary and they had the right to withdraw or discontinue from the research at any time. They were also informed that confidentiality was maintained regarding their information. Here gave the consent form to the subject and explained them. The subjects had the rights to withdraw themselves from the research at any times. It should be assured the participant that his or her name or address would not be used. The information of the subjects might be published in any normal presentation or seminar or writing but they would not be identified.

In this study there were 50 participants. Among them 25 participants were in case group and 25 participants were in control group. The analysis was done by the SPSS 20 version.

#### 4.1 Socio-demographic Information

##### 4.1.1 Age of the participants

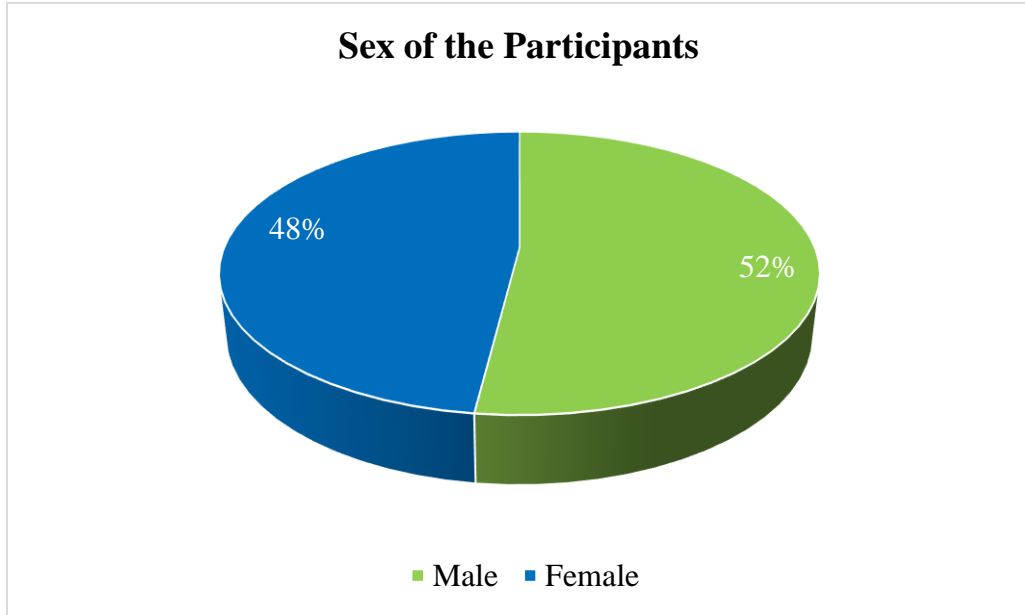
Among the 50 participants 19 participants were between 20-30 years, 21 were between 31-40 years, 7 were between years 41-50 years and 3 were 51-60 years. There mean age 34.11 years and minimum age was 20 years and maximum age was 60 years. In percentage 38% participants were between 20-30 years, 42% were between 31-40 years, 14% were between 41-50 years and 6% were 51-60 years (Figure-1).



**Figure-1: Age group of the participants**

#### 4.1.2 Male Female ratio

The study find out the 50 participants 24 were female and 26 were male. In percentage 48% participants were female and 52% were male (Figure -2).



**Figure-2: Sex of the participants**

### 4.1.3 Educational Status of the participants

The study observed the 50 participants no participants never attended school, 2 participants had some primary education, 3 participants completed primary education, 5 participants had some secondary education, 8 participants completed secondary education, 8 participants had higher secondary education, 13 participants completed secondary education, 19 participants have Bachelor or above. In percentage 4% participants had some primary education, 6% participants completed primary education, 10% participants had some secondary education, 16% participants completed secondary education, 26% participants had higher secondary education, and 38% participants have Ba (Figure-3).

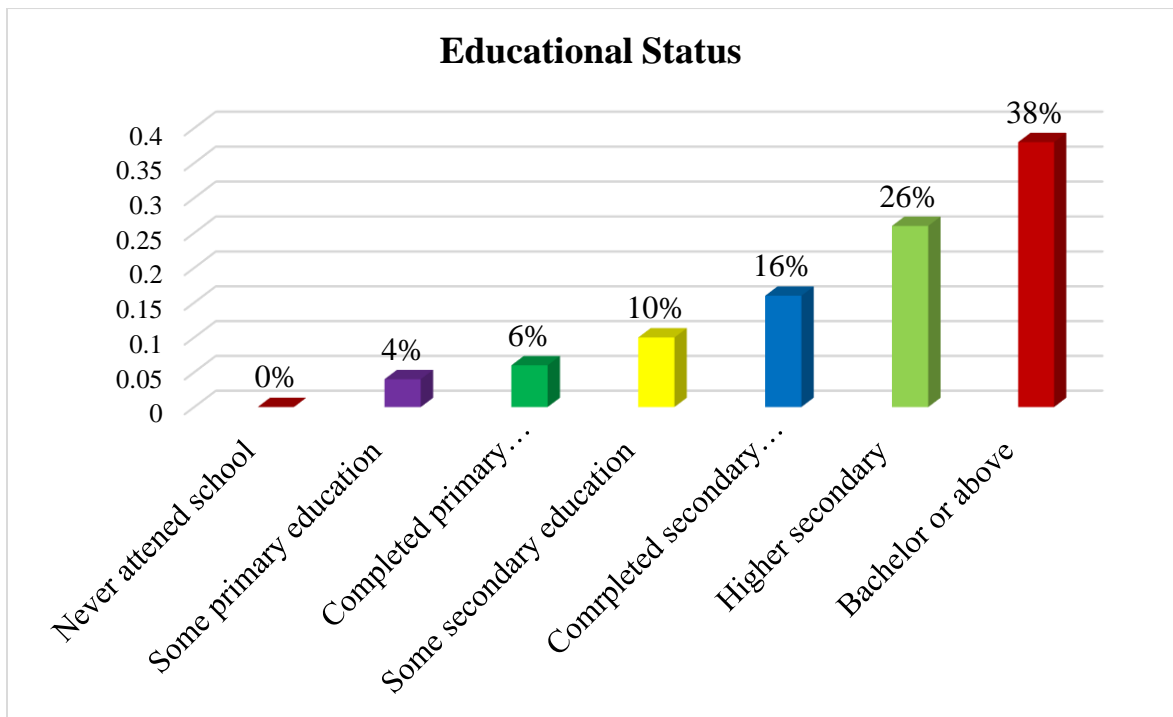
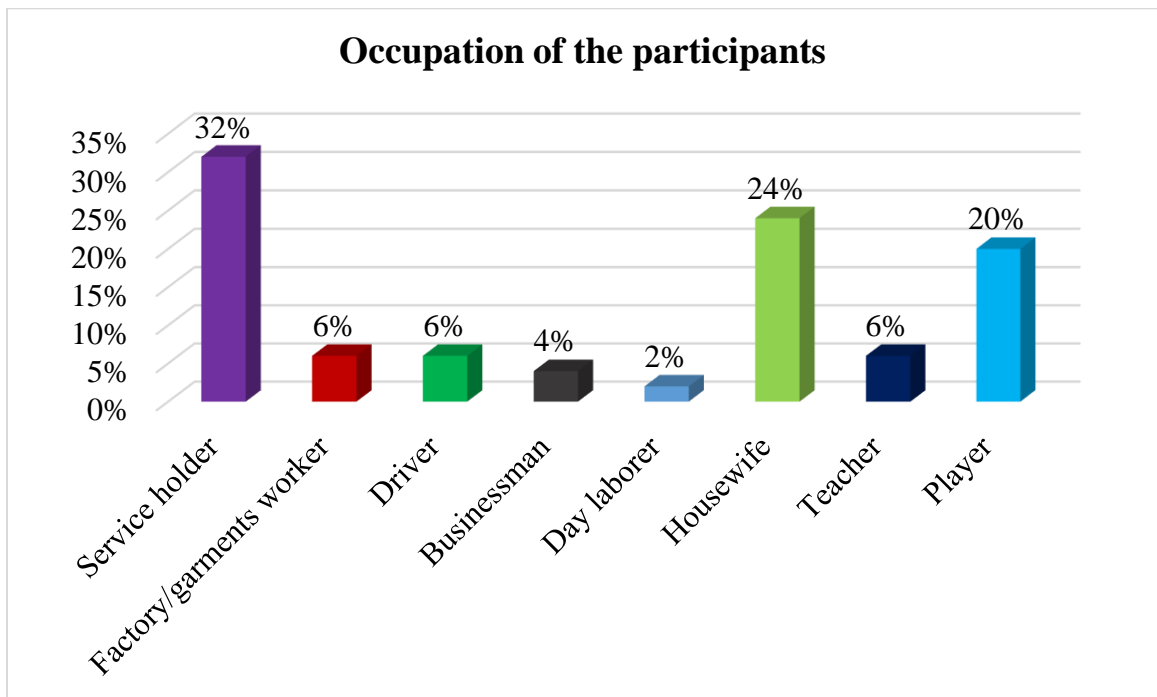


Figure -3: Educational status of the participants

#### 4.1.4 Occupation

The study identify the 50 participants there is no participant was rickshaw puller & farmer , 16 participants were service holder, 2 participants were businessman, 1 participants were day labour, 12 participants were housewife, 3 participants was teacher, 3 participants were garments worker and 10 participants was player . In percentage 32% participants were service holder, 20% participants were player, 4% participants were businessman, 2.0% participants were day labour, 24.0% participants were housewife, 6% participants was teacher, 6% participants were garments worker (Figure-4)

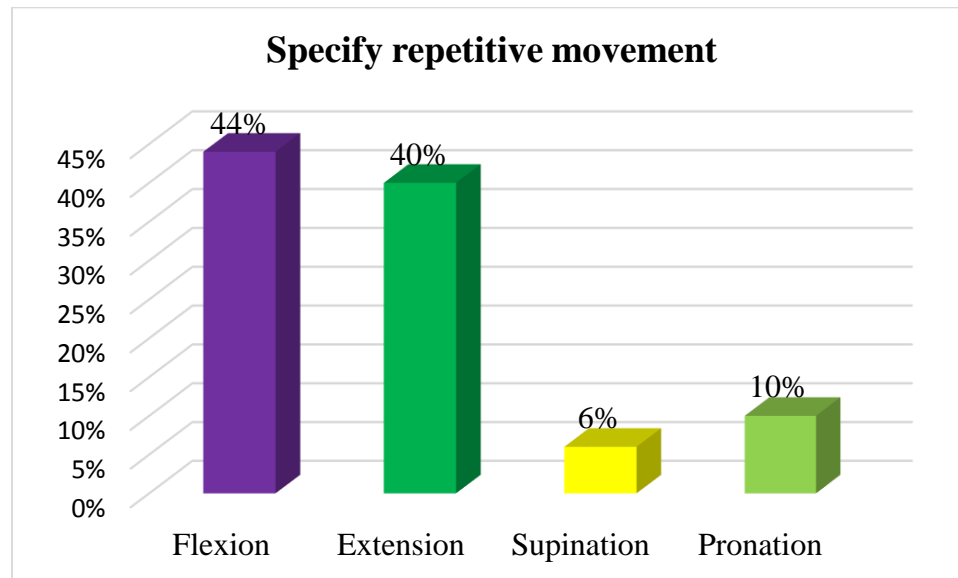


**Figure-4: Occupation of the participants**

## 4.2 Distribution of work related factors

### 4.2.1 Work related repetitive movement

All the cases and controls performed repetitive 44.0% flexion, 40% extension, 6% supination and 10.0% pronation movement of their affected elbow. Repeated circumduction was not performed by any respondent. (Figure-5)

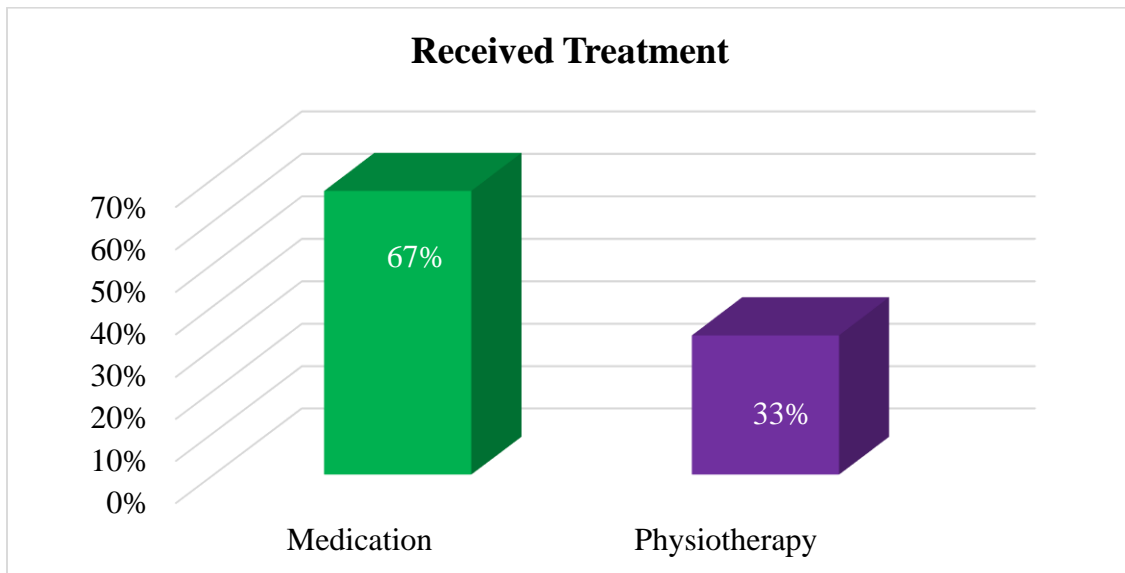


**Figure-5: Specify repetitive movement of the participants**



#### 4.2.2 Received treatment of the Participant

All the cases and controls performed received treatment 67.0% medication, 33.0% physiotherapy treatment taken affected elbow. Repeated circumduction was not performed by any respondent. (Figure-6)



**Figure-6: Received treatment of the Participant**

<b>Table-1: Work related factors of lateral epichondylitis.</b>					
<b>variable</b>	<b>Case</b>	<b>Control</b>	<b>OR</b>	<b>95% CI</b>	
				<b>Lower</b>	<b>Upper</b>
<b>Sex</b>					
Male	11	15	0.524	.170	1.612
Female	14	10			
<b>Age</b>					
40 years or less	17	23	0.185	.035	.983
More than 40years	8	2			
<b>Work hour</b>					
Six hours or less	8	12	0.510	.161	1.610
More than six hours	17	13			
<b>Work experience</b>					
Two years or less	2	9	0.155	0.29	.813
More than two years	23	16			
<b>Repetitive MVT of Elbow</b>					
More hand involved on occupation	12	12	1.01	.330	3.033
Less hand involved on occupation	13	13			
<b>Weight lifting</b>					
Wt. 10 kg or less	9	8	1.195	.315	3.174
Wt. more than 10 kg	16	17			
<b>Overuse hand</b>					
Less than 3 hour	19	18	1.23	.347	.4371
More than 3 hour	6	7			
<b>Types of pain</b>					
Acute pain	13	15	0.722	.235	2.215
Chronic pain	12	10			
<b>Notice pain</b>					
During work	16	8	3.77	1.170	12.194
After work	9	17			
<b>Received treatment</b>					
Medication	15	19	0.474	.140	1.601
Physiotherapy	10	6			

### **Sex**

From the table 1 it is observed that the total participants of this study were 50 where 25 were case and 25 were control, among them had 14 female and 11 had male in the case group. On the other hand 10 participants had female and 15 had male in the control group. Calculated odds ratio for the sex of the participants is .524 (Table-1) which means there was association between sex of the participants and lateral epicondylitis was not significant and 95% confidence interval (CI) was .170 and 1.612.

### **Age**

From the table 1 it is observed that the total participants of this study were 50 where 25 were case and 25 were control, among them 17 participants was 40 years of age or less and 8 was more than in the case group. On the other hand 23 participants was 40 years of age or less and 2 were more than 40 years in the control group. Calculated odds ratio for age group is .185 (Table-1) which means there was association between age group was not significant for lateral epicondylitis and 95% CI was .035 and .983.

### **Work hour**

From the table 1 it is observed that the total participants of this study were 50 where 25 were case and 25 were control, among them 25 participants was doing work hour for less than six hours and among them 8 participants was work six hour or less and 17 was more than in the case group. On the other hand 23 participants was work six hour or less and 2 were more than work six hour in the control group. Calculated odds ratio for the duration of work hour is .510 (Table- 1) which means there was no association between the duration of work hour was not significant for work related factors for lateral epicondylitis and 95% CI was 0.161 and 1.610.

### **Work experience**

From the table 1 it is observed that the total participants of this study were 50 where 25 were case and 25 were control, among them 2 participants work experience two years or less and 23 was more than two years in the case group. On the other 9 participants work experience two years or less and 16 more than two years in the control group. Calculated

odds ratio for the work experience is .155 (Table- 1) which means there was association between the work experiences was not significant for lateral epicondylitis and 95% CI was 0.29 and .813.

### **Repetitive movement of elbow**

From the table 1 it is observed that the total participants of this study were 50 where 25 were case and 25 were control, among them 12 participants was doing more hand involved on occupation and 13 was less hand involvement in the case group. On the other 12 participants was doing more hand involved on occupation and 13 was less hand involvement in the control group. Calculated odds ratio for the duration of heavy activity is 1.01 (Table- 1) which means there was association between the repetitive movement of elbow on occupation and lateral epicondylitis that is 1.01 times more possible chance to occur lateral epicondylitis due to repetitive movement & association was significant and 95% CI was 0.330 and 3.033.

### **Weight lifting**

From the table 1 it is observed that the total participants of this study were 50 where 25 were case and 25 were control, among them 9 participants was doing weight lifting 10 kg or less and 16 was more than ten kg in the case group. On the other 8 participants was doing weight lifting 10 kg or less and 17 was more than 10 kg in the control group. Calculated odds ratio for the weight lifting is 1.195 (Table- 1) which means there was association between weight lifting of elbow and lateral epicondylitis that is 1.195 times more possible chance to occur lateral epicondylitis due to weight lifting & association was significant and 95% CI was 0.315 and 3.174.

### **Overuse hand**

From the table 1 it is observed that the total participants of this study were 50 where 25 were case and 25 were control, among them 19 participants was doing more overuse hand less than three hour and 6 more than three hour in the case group. On the other 18 participants was doing more overuse hand less than three hour and 13 was more than three

hour in the control group. Calculated odds ratio for the overuse hand is 1.23 (Table- 1) which means there was association between the overuse hand of elbow and lateral epicondylitis that is 1.23 times more possible chance to occur lateral epicondylitis due to overuse hand & association was significant and 95% CI was 0.347 and 0.4371.

### **Types of pain**

From the table 1 it is observed that the total participants of this study were 50 where 25 were case and 25 were control, among them 13 participants acute pain and 12 chronic pain in the case group. On the other 15 participants acute pain and 10 chronic pain in the control group. Calculated odds ratio for type of pain is .722 (Table- 1) which means there was association between the types of pain was not significant for lateral epicondylitis and 95% CI was 0.235 and 2.215.

### **Notice pain**

From the table 1 it is observed that the total participants of this study were 50 where 25 were case and 25 were control, among them 16 participants was doing pain during work and 9 was notice pain after work in the case group. On the other 8 participants was doing pain during work & 17 was notice pain after work in the control group. Calculated odds ratio for the notice pain is 3.77 (Table- 1) which means there was association between notice pain of elbow and lateral epicondylitis that is 3.77 times more double chance to occur lateral epicondylitis due working pain & association was significant and 95% CI was 1.170 and 12.194.

### **Received treatment**

From the table 1 it is observed that the total participants of this study were 50 where 25 were case and 25 were control, among them 15 participants take medication and 10 participant take physiotherapy in the case group. On the other 19 participants take medication and 6 participant take physiotherapy in the control group. Calculated odds ratio for received treatment is .474 (Table- 1) which means there was association between the received treatments was not significant for lateral epicondylitis and 95% CI was 0.140 and 1.601.

In this study there were 25 cases and 25 number of control that means case: control was 1:1 and hospital based unmatched setting. Intended of this study to determine the work related factors affecting the development of lateral epicondylitis with considering the variables like socio-demographic and residential area ,occupation, work experience , weight lifting, overuse hand, repetitive movement , recurrent injury, dominant arm, racket weight and what is the behavior of the pain and when do you notice the pain. In this study found the positive association of the lateral epicondylitis and weight lifting, overuse hand, repetitive movement, recurrent injury, dominant arm, racket weight, what is the behavior of the pain and when do you notice the pain.

Smedt et al. (2007) observed that lateral epicondylitis is occurring most often in the age group of 40-60 years except in tennis players who are generally younger and it affects men and women to the same degree. In addition to age, work related factors for developing lateral epicondylitis include repetitive and forceful motions of wrist and arm, participating in racket sports, using a faulty tennis playing technique and weight lifting. In this study found the similar age group more incidence of the lateral epicondylitis. He found that most age frequency of the case group of the study was more than 31-40 years that was 41.20%. Shiri et al. (2006) observed that repetitive movements and forceful activities were also positively correlated with lateral epicondylitis in this study found the relation between lateral epicondylitis and repetitive movement of elbow. The presence of repetitive movement in this study Odds ratio was 1.01 and 95% CI was .330 and 3.033. This means that, based on the data obtained from the sample, presence of repetitive movement has occurred lateral epicondylitis incidence that is 1.01 times higher than less repetitive movement. In this study found the strong relation between Tennis Elbow and recurrent injury. Weight lifting by hand. This study mentions Weight lifting by hand in this study because the Odds ratio was 1.195 and 95% CI was .315 and 3.174. This means that, based on the data obtained from the sample, Weight lifting by hand has occurred forceful work and the combination of repetitive movements of the arm and forceful activities are associated with the occurrence of Lateral Epicondylitis. Lateral Epicondylitis naturally

resolves over a period of 1 to 2 years in 80% to 90% of cases (Mens et al., 1999) .In this study found the strong relation between lateral epicondylitis and overuse of hand. This study mentions overuse of hand in this study because the Odds ratio was 1.23 and 95% CI was .347 and 4.374. This means that, based on the data obtained from the sample, overuse of hand has occurred lateral epicondylitis incidence that is 1.23 times higher than light use of hand.

Herquelot et al. (2013) mention that estimate of the incidence of lateral epicondylitis in larger population of workers and highlights the role of physical work-related risk factors for the development of lateral epicondylitis. Lateral epicondylitis find out pain during work odds ratio of notice pain was 3.77 and 95% CI was 1.170 and 12.190.This means that, based on data obtained from the sample ,overuse hand in working hour has occurred lateral epicondylitis incidence that is 3.77 time higher than during rest time.

Bouter et at. (2002) suggested that Lateral epicondylitis is generally considered a self-limiting problem best treated with a course of non-operative treatment since most patients improve within one year. Knutsen1 et al., (2015) mentioned that the treatment for lateral epicondylitis can be long and frustrating for patients, especially since there is not a standard superior treatment & 16% of patients ultimately need surgery, the risk of needing surgery to relieve symptoms is significantly higher among patients with concomitant radial tunnel syndrome, a prior injection, history of prior orthopedic surgery, or a workers' compensation claim.

Limitation of the study was the expected sample size was 384 for this study but due to resource constrain researcher could manage just 50 samples which is very small to generalize the result for the population of the lateral epicondylitis. There are a no literatures about work related factors affecting the development of lateral epichondylitis of Bangladesh so it is difficult to compare the study with the other research. The researcher was able to collect data only Musculoskeletal Department, CRP and Tennis Federation for a short period of time which will affect the result of the study to generalize population. The questionnaire was developed only through searching sufficient literature but considering

the context of the demography of the population a pilot study would be substantial before developing a questionnaire.



### 6.1 Conclusion

In this case control study there was 25 cases and the same number of control that means case: control was 1:1 and conducted in hospital based unmatched setting. The objective of this study to determine the work related factors affecting the development of lateral epicondylitis with considering the factor like socio-demographic and residential area, occupation, weight lifting, overuse hand, work experience, repetitive movement, dominant arm, racket weight and what is the behavior of the pain and when do you notice the pain.

The overuse hand, repetitive movement, weight lifting, working pain had found the positive work related factors with the lateral epicondylitis. The important way for prevention of lateral epicondylitis including the modification of overuse hand and weight lifting for reduce risk factors. This study suggested careful about the occupational activities during work which might be reduced the risk of Lateral Epicondylitis. Always maintain the correct working position during daily living activities and correct the use of hand which also reduces the risk of Lateral Epicondylitis. So this study wishes to correct the over use of hand, weight lifting, light racket weight. This study also suggests reducing occupational injuries by modification of the working position and correction the posture during the daily living activities. It is crucial to develop research based findings about the work related factors of Lateral Epicondylitis.

This study can be considered as a ground work for the physiotherapy service provision for the Lateral Epicondylitis. Proper physiotherapy can reduce the complication of Lateral Epicondylitis. Like other countries, Lateral Epicondylitis to be an upcoming burden for Bangladesh. For this reason, it is important to develop research based evidence of physiotherapy practice in this area. Physiotherapist's practice which is evidence based in all aspect of health care. There are few studies on musculoskeletal area in the Tennis Elbow region. These cannot cover all aspect of the vast area.

## **6.2 Recommendation**

A recommendation evolves out of the context in which the study was conducted. It is recommended that if possible someone would overcome the existing limitation for further study. If it is possible than conducted further studies in this area. Though the research has some limitations but it identified some further step that might be taken for the better accomplishment of further research. For ensuring of the generalizability of the research it is recommended that a larger sample should be chosen randomly for the case control study. The sample should be representative from the whole population. In this study, sample only had taken from Savar CRP, Mirpur-CRP (Musculoskeletal Department) and from Tennis Federation. It is recommended that the next generation of physiotherapy members continue study regarding the area, of large sample size and participants form different districts of Bangladesh. Conduct research on other musculoskeletal problems in Lateral Epicondylitis area where physiotherapist can work. So it is very important to conduct such type research in this area. If the researcher will take long term study, the result will be more significant. Last of all entire researcher recommended to take setting in whole Bangladesh to generalize this study.

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**Appendix- I**

**Informed consent**

Assalamualaikum\ Namashker,

I am Md.Saddam Hossain, 4<sup>th</sup> Professional B.Sc. in Physiotherapy student of Bangladesh Health Professions Institute (BHPI) under the Faculty of Medicine, University of Dhaka. To obtain my Bachelor degree, I have to conduct a research project and it is a part of my study. The participants are requested to participate in the study after a brief the following. The study entitled “**Work related factors affecting the development of lateral epicondylitis**” is a research project.

The aim of the research topic is to determinants the Work related factors affecting the development of lateral epicondylitis at CRP in Bangladesh. This will be a Case control type of study and will helpful for patients.

For the kind information Bangladesh Health Professions Institute (BHPI), CRP has permitted the researcher to do the research. The conversation time will be 20-30 minutes. The participant reserves the right to refuse the study at any time. The information obtained from the study would be kept confidential and at the time of publishing the result of the study, personal identification of the participants would not be published.

I am declare that giving my consent to participating in the study after being informed about all the information in details.

Name of the Interviewer.....  
Signature of the Interviewer..... Date.....  
Name of the Investigator.....  
Signature of the Investigator..... Date.....  
Name of the Care giver (Witness).....  
Signature of the Care giver (Witness)..... Date.....

## সম্মতিপত্র

আসসালামুআলাইকুম \ নমস্কার,

আমি মোঃ সাদ্দাম হোসেন, ৪র্থ পেশাগত বি এসসি ইন ফিজিওথেরাপি, মেডিসিন অনুষদের অধীনে বাংলাদেশ হেলথ প্রফেশন্স ইন্সটিটিউট (বিএইচপিআই), ঢাকা বিশ্ববিদ্যালয়ের একজন ছাত্র। আমার ব্যাচেলর ডিগ্রী প্রাপ্ত, আমি একটি গবেষণা প্রকল্প পরিচালনা করতে হবে এবং এটা আমার গবেষণার একটি অংশ। অংশগ্রহণকারীদের একটি সংক্ষিপ্ত অনুসরণ পরে গবেষণায় অংশগ্রহণের জন্য অনুরোধ করা হয়। “লেটারল ইপিকণ্ডালাইটিস হওয়ার জন্য কাজ সম্পর্কিত প্রভাব সমূহ” শিরোনামের গবেষণায় একটি গবেষণা প্রকল্প। নিম্নোক্ত তথ্যাদি পাঠ করার পর অধ্যয়নে অংশগ্রহণ করার জন্য আপনাকে অনুরোধ করা হচ্ছে।

এই অধ্যয়নের লক্ষ হল “লেটারল ইপিকণ্ডালাইটিস হওয়ার জন্য কাজ সম্পর্কিত প্রভাব সমূহ” খুঁজে বের করা। এই গবেষণার উদ্দেশ্য হল বাংলাদেশে সি আর পি তে টেনিস এলবো রোগের ঝুঁকিপূর্ণ বিষয়সমূহ খুঁজে বের করা। এটি একটি কেইস-কন্ট্রল স্টাডি এবং এটি রোগীদের জন্য উপকারি।

বাংলাদেশ হেলথ প্রফেশন্স ইন্সটিটিউট, সিআরপি গবেষক কে এই গবেষণা করার অনুমতি প্রদান করেছে। তথ্য সগ্রহের জন্য গবেষক অংশগ্রহণকারীর কাছ থেকে ২০-৩০ মিনিট সময় নেবেন। অংশগ্রহণকারী যে কোনো মুহূর্তে তার সম্মতি প্রত্যাহার করতে পারেন। এই গবেষণা প্রকল্প হতে প্রাপ্ত সকল তথ্যাদির গোপনীয়তা রক্ষা করা হবে এবং গবেষণার ফলাফল প্রকাশের সময়ে অংশগ্রহণকারীদের কোনো ব্যক্তিগত পরিচয় প্রকাশিত হবে না।

আমি (অংশগ্রহণকারী) উক্ত গবেষণার সকল তথ্যাদি সম্পর্কে বিস্তারিত ভাবে অবগত হয়ে অংশগ্রহণ করার জন্য সম্মতি জ্ঞাপন করছি।

অংশগ্রহণকারীর নাম .....

অংশগ্রহণকারীর স্বাক্ষর ..... তারিখ .....

গবেষকের নাম .....

গবেষকের স্বাক্ষর ..... তারিখ .....

সহযোগীর (সাক্ষী) নাম .....

সহযোগীর (সাক্ষী) স্বাক্ষর ..... তারিখ .....

## Questionnaire- English

**Title: Work related factors affecting the development of lateral epicondylitis.**

<b>Part-1: Patient's Identification</b>	
1.1	Identification Number:
1.2	Name of respondents:
1.3	Address:
1.4	Date of interview:
1.5	Consent Taken: <input type="button" value="Yes"/> <input type="button" value="No"/>
1.6	Contract no:

### **Section 2: Patient's Socio-demographic Information**

QN	Questions	Responses	Code
2.1	Age (in year)?	_ _  yrs.	01
2.2	Sex?	Male	01
		Female	02
2.3	Marital status?	Married	01
		Unmarried	02
		Separated	03
		Divorced	04
		Widow	05
		Widower	06
2.4	What is your religion?	Islam	01

		Hinduism	02
		Christian	03
		Buddhist	04
2.5	What is your education?	Never attended school	01
		Some primary education	02
		Completed primary education	03
		Some secondary education	04
		Completed secondary education	05
		Higher secondary	06
		Bachelor or above	07
		Other (Specify): _____	99
2.6	What is your profession (occupation)?	Rickshaw puller	01
		Farmer	02
		Service Holder	03
		Factory/garments worker	04
		Driver	05
		Businessman	06
		Day laborer	07
		Unemployed	08
		Housewife	09
		Teacher	10
		Player	11
		Other(Specify): _____	99
2.7	Residential area	Rural	01
		Urban	02
2.8	What is your work experience?	One - Two year	01
		Three - Five years	02
		Others (Specify) _____	99
2.9	How many hours do you work per day?	Six hours	01
		Eight hours	02
		Others (Specify): _____	99



2.10	Which type of repetitive activity you are doing on your profession?	Cleaning	01
		Cooking	02
		Cutting	03
		Swing cloth	04
		Writing	05
		Driving	06
		Playing	07
		Other (specify): _____	99
2.11	How many time you have perform repetitive activity?	5-10 times	01
		11-15 times	02
		Other (specify): _____	99

### Section 3: Past history related to Lateral Epicondylitis:

	Questions and filters	Responses	
3.1	Past History of acute or major elbow injury.	No	01
		Yes	02
3.2	Past History of painful swelling of elbow joint.	No	01
		Yes	
3.3	Weight lifting by the hand.	(.....) kilograms	01
3.4	Past Medical History:	DM	01

		Hypertension	02
		Previous elbow injury	03
		NSAID	04
		Manual Treatment(DF,US, massase)	05
		Exercise	06
		Others (Specify): _____	99

#### Section 4: Pattern of physical activities

4.1	Does it involve repetitive activity of elbow?		No	01
			Yes	02
4.2	If yes Please specify which movement		No	Yes
	a.	Flexion	01	02
	b.	Extension	01	02
	e.	Supination	01	02
	f.	Pronation	01	02
4.3	Does your occupation involves overhead activity?		No	01
			Yes	02
4.4	Which is your dominant side?		Right	01
			Left	02
			Both	03
4.5	Do you have any hobby that involves repetitive activity of elbow?		No	01
			Yes	02
4.6	If yes Please specify which movement		No	Yes
	a.	Flexion	01	02
	b.	Extension	01	02
	e.	Supination	01	02
	f.	Pronation	01	02

#### Section 5: Characteristics of lateral epicondylitis (for case only)

QN	Questions	Responses	Code
5.1	When did your problem start?	Three months	01

			More than three months		02
			More than one years		03
5.2	In which side?		Right		01
			Left		02
			Both		03
5.3	What are your present symptoms				
	Symptom	Status		Duration in months	Movement
		No	Yes		
a.	Pain	01	02		
b.	Stiffness	01	02		
c.	Movement Loss	01	02		
d.	Swelling	01	02		
5.4	Overuse Hand :- How long?	15-30 minutes			01
		1-3 hours			02
		More than 3 Hours			03
5.5	How severe is your pain on VAS Scale?				
		Mild pain (1-3)			01
		Moderate pain( 4-6)			02
		Severe pain (7-10)			03
5.6	What type of pain your suffering?	Acute			01
		Chronic			02
5.7	When you feel the pain most?	Day			01
		Night			02
5.8	What is the behaviour of pain?	Occasional			01
		Intermittent			02

		Constant	03
5.9	When do you notice the pain?	During work	01
		After work	02
		During rest	03
5.10	Recurrent injury	No	01
		Yes	02
5.11	If you playing tennis what is your racket weight?	No	01
		Yes,(.....)gm.	02
5.12	How long time you forceful grapping object?	5-10 minutes	01
		11-20 minutes	02
		Others (Specify):—————	99
5.13	Have you got any trauma in your elbow?	No	01
		Yes	02
5.14	What type of trauma occurring on your elbow?	Direct blow	01
		Forceful pull	02
		Forceful extension	03
		Other(specify): —————	99
5.15	Do you ever referred to the Physician or other health profession due to pain?	No	01
		Yes	02
5.16	If yes what was the diagnosis?	—————	01
5.17	What kind of treatment you receive?	Medication	01

		Physiotherapy	02
		Other (Specify): _____	03

প্রশ্নাবলী- বাংলা

শিরোনাম: লেটারল ইপিকগুলাইটিস হওয়ার জন্য কাজ সম্পর্কিত প্রভাব সমূহ ।

অংশ ১ : রোগীর সনাক্তকারী	
১.১	সনাক্তকারী নাম্বার :
১.২	অংশগ্রহনকারী নাম :
১.৩	ঠিকানা :
১.৪	সাক্ষাতকার গ্রহন তারিখ :
১.৫	সম্মতি গ্রহন করা হয়েছে : <input type="checkbox"/> হ্যাঁ <input type="checkbox"/> না
১.৬	মোবাইল নাম্বার :

সেকশন ২: আর্থ-সামাজিক ও জনসংখ্যাভিত্তিক প্রশ্ন

প্রশ্ন নং	প্রশ্ন	উত্তর	কোড
২.১	আপনার বয়স কত?	_____  বছর	০১
২.২	আপনার লিঙ্গ কি?	পুরুষ	০১
		মহিলা	০২
২.৩	আপনার বৈবাহিক অবস্থা কি?	বিবাহিত	০১
		অবিবাহিত	০২
		আলাদা	০৩
		তালাকপ্রাপ্ত	০৪
		ডবধাব	০৫
		বপত্ত্বিক	০৬

২.৪	আপনার ধর্ম কি?	ইসলাম	০১
		হিন্দু	০২
		খ্রিষ্টান	০৩
		বৌদ্ধ	০৪
২.৫	আপনার শিক্ষাগত যোগ্যতা কি?	কখনো স্কুলে যাইনি	০১
		কিছু প্রাথমিক শিক্ষা	০২
		প্রাথমিক শিক্ষা সম্পন্ন করেছি	০৩
		কিছু মাধ্যমিক শিক্ষা	০৪
		মাধ্যমিক শিক্ষা সম্পন্ন করেছি	০৫
		উচ্চ মাধ্যমিক শিক্ষা সম্পন্ন করেছি	০৬
		স্নাতক/স্নাতকোত্তর	০৭
		অন্যান্য (উল্লেখ করুন): .....	৯৯
২.৬	আপনার পেশা কি?	রিম্বাচালক	০১
		কৃষক	০২
		চাকরিজীবী	০৩
		ফ্যাক্টরী/গার্মেন্টস কর্মী	০৪
		গাড়ীচালক	০৫
		ব্যবসায়ী	০৬
		দিনমজুর	০৭
		বেকার	০৮
		গৃহিনী	০৯
		শিক্ষক	১০
		খেলোয়ার	১১
		অন্যান্য (উল্লেখ করুন): .....	৯৯
		২.৭	আবাসিক এলাকা
শহুরে	০২		
২.৮	আপনার কাজের অবিজ্ঞতা কত ?	এক - দুই বছর	০১
		তিন - পাঁচ বছর	০২
		অন্যান্য (উল্লেখ করুন): .....	৯৯
২.৯	আপনি কত ঘন্টা কাজ করেন ?	ছয় ঘন্টা	০১

		আটি ঘন্টা	০২
		অন্যান্য (উল্লেখ করুন): .....	৯৯
২.১০	পুনরাবৃত্তিমূলক কার্যকলাপ কোন ধরনের আপনি আপনার পেশা করছেন ?	পরিস্কারের	০১
		রান্নার	০২
		কাঁটা	০৩
		সুইং কাপড়	০৪
		লেখা	০৫
		ড্রাইভিং	০৬
		খেলা	০৭
		অন্যান্য (উল্লেখ করুন): .....	৯৯
২.১১	কত সময় আপনি পুনরাবৃত্তিমূলক কার্যকলাপ সম্পাদন আছেন ?	৫-১০ বার	০১
		১১-১৫ বার	০২
		অন্যান্য (উল্লেখ করুন): .....	৯৯

সেকশন ৩ : ইপিকগুলাইটিস এর সাথে সম্পর্কিত অতীত ইতিহাস:

প্রশ্ন নং	প্রশ্ন	উত্তর	কোড
৩.১	তীব্র বা প্রধান কনুই আঘাতের অতীত ইতিহাস.	না	০১
		হ্যাঁ	০২
৩.২	কনুই যুগ্ম বেদনাদায়ক ফুলে অতীত ইতিহাস.	না	০১
		হ্যাঁ	০২



৩.৩	হাত দ্বারা ভারোত্তলন.	(.....)কিলোগ্ রাম	০১
৩.৪	পূর্বের চিকিৎসা ইতিহাস:	ডিএম	০১
		উচ্চরক্তচাপ	০২
		পূর্ববর্তী কনুই আঘাতের	০৩
		এন এস এ আই ডি	০৪
		ম্যানুয়ালচিকিত্ সা(ডিএফ,উ এস , মেসসাস )	০৫
		ব্যায়াম	০৬
		অন্যান্য (উল্লেখ করুন): .....	৯৯

সেকশন ৪ : শারীরিক কার্যক্রম প্যাটার্ন

৪.১	এটা কি কনুই পুনরাবৃত্তিমূলক কার্যকলাপ সাথে জড়িত ?	না	০১	
		হ্যাঁ	০২	
৪.২	যদি হ্যাঁ হয় উল্লেখ কোরন দয়া করেন	না	হ্যাঁ	
	a.	ভাঁজ	০১	০২
	b.	প্রসার	০১	০২
	c.	সুপাইনেশন	০১	০২
	d.	প্রনেশন	০১	০২
৪.৩	আপনার পেশা ওভারহেড কার্যকলাপ জড়িত থাকে?	না	০১	
		হ্যাঁ	০২	
৪.৪	আপনার প্রভাবশালী পাশ কোনটি?	ডান	০১	
		বাম	০২	
		উভয়	০৩	
৪.৫	আপনি কনুই পুনরাবৃত্তিমূলক কার্যকলাপ জড়িত যে কোনো শখ আছে কি?	না	০১	

		হ্যাঁ	০২
৪.৬	যা আন্দোলনের হ্যাঁ উল্লেখ করেন	না	হ্যাঁ
	a. ভাঁজ	০১	০২
	b. প্রসার	০১	০২
	c. সুপাইনেশন	০১	০২
	d. প্রনেশন	০১	০২

সেকশন ৫ : ইপিকগুলাইটিস এর সাথে সম্পর্কিত বৈশিষ্ট্য (যদি কেবল থাকে)

প্রশ্ন নং	প্রশ্ন	উত্তর		কোড		
৫.১	যখন আপনার সমস্যা শুরু হয় ?	তিন মাস		০১		
		তিন মাসের বেশি সময়		০২		
		একাধিক বছর		০৩		
৫.২	যে পার্শ্ব ?	ডান		০১		
		বাম		০২		
		উভয়		০৩		
৫.৩	আপনার বর্তমান উপসর্গ কি কি ?					
		উপসর্গ	অবস্থা		মাসে স্থিতিকাল	মুভমেন্ট
			না	হ্যাঁ		
	a.	ব্যথা	০১	০২		
	b.	কঠিনতা	০১	০২		
	c.	মুভমেন্ট লস	০১	০২		
d.	ফোলা	০১	০২			
৫.৪	বার বার ব্যবহার হাত কতক্ষণ?	১৫-৩০মিনিট		০১		
		১-৩ ঘন্টা		০২		
		প্রায় ৩ ঘন্টা		০৩		
৫.৫	কত তীব্র ব্যাথা আপনার ভাস স্কেল এ ?	0   _____   10				
		হালকা ব্যাথা ( ১-৩)		০১		
		সহনীয় ব্যাথা (৪-৬)		০২		
		তীব্র ব্যাথা ( ৭-১০)		০৩		

৫.৬	ব্যথা আপনার যন্ত্রণা কি ধরনের?	তীব্র	০১
		দীর্ঘকালস্থায়ী	০২
৫.৭	আপনি কখন ব্যথা অনুভব করেন ?	দিন	০১
		রাতে	০২
৫.৮	ব্যথা আচরণ কেমন ?	অনিয়মিত	০১
		সবিরাম	০২
		সব সময়	০৩
৫.৯	আপনি ব্যথা যখন লক্ষ্য করেছেন ?	কাজের সময়	০১
		কাজের পর	০২
		বাকি সময়	০৩
৫.১০	বার বার আঘাত প্রাপ্ত	না	০১
		হ্যাঁ	০২
৫.১১	আপনি যদি রেক্বেট খেলেন আপনার রেক্বেটর ওজন কত ?	না	০১
		হ্যাঁ, (.....) জিএম.	০২
৫.১২	কতক্ষণ সময় আপনি বস্তুটি শক্ত করে ধরে রাখেন ?	৫-১০ মিনিট	০১
		১১-২০ মিনিট	০২

		অন্যান্য (উল্লেখ করুন): .....	৯৯
৫.১৩	আপনি কি আপনার কনুই আঘাত পেয়েছেন?	না	০১
		হ্যাঁ	০২
৫.১৪	আপনার কনুই উপর ট্রমা কি টাইপ ঘটছে?	ডাইরেক্ট পেশার	০১
		জবরদস্ত পুল	০২
		জবরদস্ত এক্সটেনশন	০৩
		অন্যান্য (উল্লেখ করুন): .....	৯৯
৫.১৫	ব্যথা জন্য আগে কখনও কোন ফিজিসিয়ান অথবা ডাক্তার কাছে গিয়েছিলেন ?	না	০১
		হ্যাঁ	০২
৫.১৬	যদি গিয়ে থাকেন, তাহলে রোগ নির্ণয় কি ছিল ?	_____	০১
৫.১৭	আপনি কোন ধরনের চিকিৎসা নিয়ে ছিলেন ?	ঔষুধ	০১
		ফিজিওথেরাপী	০২
		অন্যান্য (উল্লেখ করুন):.....	০৩

## Appendix - II

### Permission letter

September 7, 2015

Head

Department of Physiotherapy

Centre for the Rehabilitation of the Paralysed (CRP)

Chapain, Savar, Dhaka-1343.

**Through:** Head, Department of Physiotherapy, BHPI.

**Subject:** Seeking permission of data collection to conduct my research project.

Dear Sir,

With due respect and humble submission to state that I am MD.Saddam Hossain, student of 4<sup>th</sup> Professional B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). The ethical committee has approved my research project entitled on **“Work related factors affecting the development of lateral epicondylitis”** under the supervision of Md. Ehsanur Rahman, lecturer, Department of Physiotherapy, CRP. Conducting this research project is partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. I want to collect data for my research project from the patients of CRP. So, I need permission for data collection from the Musculoskeletal outpatient unit of Physiotherapy department of CRP- Savar and Mirpur campus. I would like to assure that anything of my study will not be harmful for the participants.

I, therefore, pray & hope that you would be kind enough to grant my application & give me permission for data collection and oblige thereby.

Sincerely Yours

Saddam Hossain

MD.Saddam Hossain

4<sup>th</sup> Professional B.Sc. in Physiotherapy

Roll-09, Session: 2010-2011

Bangladesh Health Professions Institute (BHPI)

(An academic Institute of CRP)

CRP, Chapain, Savar, Dhaka-1343.

E. Rahman  
21/9/15  
He may be allowed for data  
collection  
7/9/15

Md. Obaidul Haque  
Associate Professor & Head of the Department  
Department of Physiotherapy  
Bangladesh Health Professions Institute (BHPI)  
CRP, Chapain, Savar, Dhaka-1343

Approved

Anwar Hossain  
Head  
Physiotherapy Dept.  
CRP, Chapain, Savar, Dhaka-1343



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সিআরপি-বিএইচপিআই/০৯/১৫/৬২০

তারিখ : ২২.০৯.২০১৫

প্রতি  
সাধারণ সম্পাদক  
বাংলাদেশ টেনিশ ফেডারেশন  
ঢাকা।

বিষয় : রিসার্চ প্রজেক্ট এর জন্য আপনার প্রতিষ্ঠান সফর ও তথ্য সংগ্রহ প্রসঙ্গে।

জনাব,

আপনার সদয় অবগতির জন্য জানাচ্ছি যে, পক্ষাঘাতগ্রস্তদের পুনর্বাসন কেন্দ্রে-সিআরপি'র শিক্ষা প্রতিষ্ঠান বাংলাদেশ হেল্থ প্রফেশন্স ইনষ্টিটিউট (বিএইচপিআই) ঢাকা বিশ্ববিদ্যালয় অনুমোদিত বিএসসি ইন ফিজিওথেরাপি কোর্স পরিচালনা করে আসছে।

উক্ত কোর্সের ছাত্রছাত্রীদের কোর্স কারিকুলামের অংশ হিসাবে বিভিন্ন বিষয়ের উপর রিসার্চ ও কোর্সওয়ার্ক করা বাধ্যতামূলক।

বিএইচপিআই'র ৪র্থ বর্ষ বিএসসি ইন ফিজিওথেরাপি কোর্সের ছাত্র সাদ্দাম হোসেন আগামী ৩০.০৯.২০১৫ তারিখ থেকে ৩১.১০.২০১৫ তারিখ পর্যন্ত তার রিসার্চ সংক্রান্ত কাজের তথ্য সংগ্রহের জন্য আপনার প্রতিষ্ঠানে সফর করতে আগ্রহী। তার রিসার্চ শিরোনাম “ Work related factors affecting the development of lateral epicondylitis.”

তাই তাকে আপনার প্রতিষ্ঠান সফর এবং প্রয়োজনীয় তথ্য প্রদান সহ সার্বিক সহযোগিতা প্রদানের জন্য অনুরোধ করছি।

ধন্যবাদান্তে

মোঃ ওবায়দুল হক  
সহযোগী অধ্যাপক ও বিভাগীয় প্রধান  
ফিজিওথেরাপি বিভাগ  
বিএইচপিআ, সিআরপি।

