

FUNCTIONAL OUTCOME IN LATERAL EPICONDYLITIS PATIENT

Md. Aminul Hoque Rasel

Bachelor of Science in Physiotherapy (B.Sc. PT)

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Bangladesh Health Professions Institute (BHPI)

Department of Physiotherapy

CRP, Savar, Dhaka-1343

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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

FUNCTIONAL OUTCOME IN LATERAL EPICONDYLITIS PATIENT

Submitted by **Md. Aminul Hoque Rasel**, for partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B. Sc. PT).

.....
Muhammad Rezaul Karim
Lecturer
Department of physiotherapy &
Coordinator
School of Prosthetics and Orthotics
BHPI, CRP, Savar, Dhaka
Supervisor

.....
Mohammad Anwar Hossain
Associate Professor & Head
Department of Physiotherapy
CRP, Savar, Dhaka

.....
Mohammad Habibur Rahman
Assistant Professor
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

.....
Md. Shofiqul Islam
Assistant Professor
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

.....
Md. ObaidulHaque
Associate Professor & Head
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

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 the Department of Physiotherapy, Bangladesh Health professions Institute (BHPI).

Signature: Md. Aminul Hoque Rasel

Date: 22-02-2017

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Accronyms

BHPI	:	Bangladesh Health Professions Institute
BMRC	:	Bangladesh Medical and Research Council
CRP	:	Centre for the Rehabilitation of the Paralysed
ECRL	:	Extensor Carpi RadialisLongus
IRB	:	Institutional Review Board
LE	:	Lateral Epicondylitis
MFR	:	Myofascial release
MSD	:	Musculoskeletal disorder
MVT	:	Movement
MWM	:	Mobilization with movement
NPRS	:	Numeric Pain Rating Scale
PRTEE	:	Patient-Rated Tennis Elbow Evaluation
SPSS	:	Statistical Package for the Social Science
TE	:	Tennis Elbow
US	:	Ultrasound
WHO	:	World Health Organization

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Abstract

Background: Lateral Epicondylitis can often be effectively treated in a primary care environment. In Lateral Epicondylitis daily activities and occupation are hampered because of severe pain and dysfunction. It is not a cause of disability, pain may limit productivity. **Objectives of the study:** The objectives were to find out the functional outcome in lateral epicondylitis. **Methodology:** It was a quasi- experimental, pretest-posttest design of quantitative research. In this research, total 18 participants were selected and data was collected by using convenience sampling method. Patients were allocated for 6 weeks treatment sessions. The assessment was done again on a post- test on the same group by the same scales and changes between pre and posttest of the same groups were compared. Pain and dysfunction was measured by scale; Numerical pain rated scale (NPRS), Patient rated tennis elbow evaluation (PRTEE). **Result and Discussion:** In this study, the result shows significant improvement of Pain (At rest, doing a task, carrying bag of groceries, at its worst) ($P < 0.05$) and functional disability ($p < 0.05$). However, Physiotherapy treatment was more effective, especially for the outcomes of lessening symptom severity and pain reduction. **Conclusion:** Therefore, hypothesis can be proved that 6 weeks Physiotherapy intervention was effective in treating patients resulted in better outcomes. For long term effectiveness, the treatment program should be started as early as possible as part of the best practice for Lateral epicondylitis patients.

Key words: Outcomes, Dysfunction, Frequency of physical therapy, Lateral epicondylitis.

1.1 Background

One of the most significantly occurring conditions of the upper limb is tennis elbow (Thurston, 1998). Lateral epicondylitis (Tennis Elbow) is a common soft tissue condition, treated by many physical therapists in a variety of clinical setting. The purpose of this paper is to review the relevant anatomy, clinical examination, diagnosis, neurochemical changes, conservative care and surgical treatment for patients with tennis elbow. The Lateral Epicondylitis was first introduced by Runge in 1873 as “writer’s cramp”. The official taxonomy of the “Lateral epicondylitis”’s term was declared in 1883 by H. P. Majors in the article of The British Journal of the Sports Medicine titled as “Lawn Tennis Elbow” (Cortazzo, 2011).

Lateral epicondylitis is a painful condition affecting the tendinous tissue of 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 personal life (De Smedt et al., 2007).

Lateral epicondylitis or tennis elbow is a painful condition characterized by pain at the lateral side of the elbow (Bisset et al., 2005). Lateral epicondylitis was first described in 1873 by Mr. Runge (Trivedi et al., 2014). The etiology of tennis elbow is poorly understood (Jones, 2009). It most commonly occurs due to damage to the common extensor tendon of the forearm (Trivedi et al., 2014).

Rheumatic disorders are one of the most common health problems in both developed and developing countries. The prevalence of rheumatic disorders globally is between 11% to more than 50%. 28% of these condition result in disability. In Bangladesh, a study on the prevalence of rheumatic diseases in the adult population showed that musculoskeletal complaints was 26.1%, and the incidence of tennis elbow is 2.77% (Hasan et al., 2009). Tennis elbow affect lateral epicondylitis 1% to 3% of the adult population and only 5% of people suffering from tennis elbow actually play tennis (Smidt et al., 2003). The prevalence of tennis elbow in Sweden is 1% to 3%, which

increases to 19% in men between 40 and 50 years of age. The incidence rate increases to 10% in women with the age range between 42 to 46 years (Buchbinder et al., 2007). It is reported that 7.4% of industrial workers and 40% to 50% of tennis players in the USA are affected with tennis elbow (Labelle & Guitbert, 2004). The incidence of tennis elbow is between 4 and 7 per 1000 patients per year (Buchbinder, et al., 2001). In western societies lateral epicondylitis is a significant economic burden resulting in a high rate of sick level (Shmushkevich et al., 2013).

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 (Stasinopoulos et al., 2005).

Wong et al. (2015) 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 provide to muscle.

In spite of the nonattendance of fiery cells the condition is agonizing. Late reviews indicated tangible strands containing substance-P and CGRP (calcitonine quality related peptide)- like immunoreactivity in the inception of the ECRB. (Fedorczyk, 2006)

The duration of a typical episode of lateral epicondylitis is between 6 months to and 2 years (Smidt et al., 2003). Lateral epicondylitis become chronic when symptoms persist more than three months (Khuman et al., 2013).

Tennis elbow is a common disorder amongst tennis players because all individuals are exposed to repetitive stress on the wrist extensors and they are at risk for developing the condition. The diagnosis of tennis elbow is based on clinical examination. However, in chronic cases, ultrasound, radiographic examination, and MRI may be useful to exclude other causes of lateral elbow pain (Olaussen et al.,2009). The conventional treatment protocol for lateral epicondylitis consists of many physical therapies in a variety of clinical settings, such as stretching, strengthening, Deep

Transverse Friction Massage (DTFM) and mobilization. These treatments of tennis elbow generally aim to relieve pain, control inflammation, promote healing, improve local and general fitness, and control force loads (Noteboom et al., 2005).

The most common conservative treatments given for lateral epicondylitis are rest, ice, non-steroidal anti-inflammatory drugs, corticosteroid injections, DTFM, range of motion exercises, stretching, strengthening exercises and ultrasound (Jones, 2009). Therapists considered to use mulligan concept procedure (Teacher, 2000).

1.2 Rationale

Lateral epicondylitis or tennis elbow is a painful debilitating condition of the elbow, which creates a disturbance in functional activities. The Literature suggests that pain and dysfunction are very common with tennis elbow, and this can interfere with the person's ability to function at work & recreation. So it is very important to manage the cases of tennis elbow. In Bangladesh, tennis elbow represents a challenge to the clinician, because considering the context of our country; patients often struggle to follow the evidenced-based treatment recommended.

The purpose of this study is to find out the functional outcome of physiotherapy intervention for the patient with tennis elbow. There has been some research articles published about physiotherapy interventions for patients with tennis elbow. But very few research articles published regarding functional outcomes. However, research helps to improve the knowledge of health professionals, as well as to develop the profession. The results of this study may help to guide physiotherapists 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.

1.3 Aims

The aim of this study is to evaluate functional outcome in patients with lateral epicondylitis.

1.4 Objectives

1.4.1 General objective

To identify possible functional outcome in lateral epicondylitis patients.

1.4.2 Specific Objectives

- To identify the socio demographic characteristic (age, sex, occupation) of professional lateral epicondylitis.
- To find out the pain intensity at rest, doing a task with repeated arm movement, carrying a plastic bag of groceries, at its least, at its worst before and after introducing physiotherapy intervention.
- To evaluate functional outcome of specific activities like Turn a doorknob, Carry a grocery bag, Lift a full coffee cup to mouth, open a jar, Pull up pants, Wring out a washcloth or wet towel.
- To evaluate functional outcome of usual activities before and after introducing physiotherapy intervention.

1.5 Null hypothesis

Physiotherapy intervention can not change the outcome of post-test in the management of lateral epicondylitis.

1.6 Hypothesis

Physiotherapy intervention there is change the outcome of post-test in the management of lateral epicondylitis.

1.7 List of variables

Independent variables

Physiotherapy intervention

Dependent variable

Functional outcome and lateral epicondylitis.

1.8 Operational definition

Tennis elbow: Tennis elbow or lateral epicondylitis is a clinical condition characterized by pain and tenderness over the lateral side of the elbow, difficulties in functional activities and with positive Mill's test, Cozen test or resisted middle-finger extension test when examined clinically.

Physiotherapy intervention: Physiotherapeutic interventions that are widely accepted and commonly practiced by the medical community.

TENS: Evidence from two small trials suggests that Transcutaneous Electrical Nerve Stimulation (TENS) or pulsed electromagnetic field therapy may provide relief from neck pain in the short term (Boggioet al., 2009).

Lateral epicondylitis or Tennis elbow refers to a syndrome of pain centered 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& Turner, 2005). Typically, patients develop these symptoms between the ages of 35 and 55 (Lalenti et al., 2014). Ahmad 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. The most common lesion of the elbow is lateral epicondylitis (Trivedi et al., 2014). Tennis elbow is a painful debilitating musculoskeletal condition and this is a challenge for the health care industry (Bisset et al., 2005).

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.

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 overexertion of the wrist extensors of the forearm. It is often associated with individuals who have repetitive occupations and/or hobbies, affelateralepicondylitis, 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.

It is a pathological condition that is described as an inflammation at the origin of the Extensor Carpi Radialis Braves (ECRB), and an inflammation of the extensor communisaponeurosis at the lateral epicondyle of the elbow, characterized by repetitive micro tear and fibrosis (Baker et al., 2009). It is reported that 64% of patients with tennis elbow involves Extensor Carpi Radialis Braves muscle and approximately 35% of patients involves Extensor Digitorum Communes muscle (Raman et al., 2012).

Noteboom et al. (2005) proposed that, the anterior aspect of the lateral epicondyle and the lateral forearm exhibits significant tenderness. Many individuals may experience pain at the head of the radius during pronation due to irritation of the underlying bursa (Trivediet al., 2014). The grip strength is affected due to wasting of the affected muscles and due to voluntary decline of effort to avoid pain (Khuman et al., 2013).

This bursa has been recognized and implicated by several authors (Carp, 2001). In the etiology of lateral epicondylitis (McVay,1984)indicated that radioulnar bursitis may occur from the irritation of repeated or violent extension of the wrist with the forearm pronated. However found no involvement of the bursae in elbows examined. His investigation identified the presence of a subtendinous space near the extensor carpi radialisbrevis attachment to the lateral epicondyle that was filled with granulation of the muscle tissue, hypervascularized and edematousin patients with tennis elbow (Labelle & Guitbert, 2004).

According to Cyriax (1936), the classifications of tennis elbow are as follows - acute, meaning acute pain following indirect trauma. The second type is sub-acute, pain following indirect trauma which occurs gradually and follows vigorous exercise with the arm. The third one is chronic occupational pain. This type usually develops over one or more months and is usually found in older patients. The fourth one is pain following direct trauma, which is due to direct injury over the lateral epicondyle.

According to the site of involvement there are four types of tennis elbow. These are – Type 1: inflammation at the supracondylar ridge, Type 2: tenoperiosteal junction, Type 3: body of the tendon, Type 4: muscle belly (Kesson et al., 1998).

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. 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.

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).

Myofascial trigger points in the muscles attached to the lateral epicondyle may also be a source of pain (Bui, 2014). It is usually caused by very quick, monotonous, repetitive, eccentric contractions and gripping activities of the wrist (Stasinopoulos et al., 2005). The main cause of tennis elbow is thought to be the degeneration of the common extensors tendon of the wrist (Silvestrini et al., 2005). Tennis elbow may occur due to tearing the tendon at the musculotendineous junction, and the healing process becomes delayed due to the lack of the overlying periosteal tissue (Khumanet al., 2013). The most common symptoms of tennis elbow are pain, decrease muscle strength and dysfunction in the arm. The pain and dysfunction decrease the work capacity and quality of life (Lee et al., 2014).

The pathology of lateral epicondylitis involves a tear of tendon at origin of the extensor muscles from lateral epicondyle (Trividi et al., 2014). Macroscopic and microscopic tears may be superficial or deep and situated at the tendinous origin of the Extensor Carpi Radialis Bravis into the periosteum of the lateral humeral epicondyle (Faisal et al., 2013). The tear occurs at the junction between muscle and bone leading to slow healing due to lack of overlying periosteal tissue. Repetitive micro trauma from overuse may overload the repairing tissue, mechanically twist scar tissue and thus excite free nerve ending to inducing mechanical nociceptive pain (Khuman et al., 2013). In this position the tendon is further stretched over the prominence of the radial head (Trividi et al., 2014).

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. The exact cause of tennis elbow is unknown, but it is generally thought to be repetitive micro trauma due to over use of wrist and hand (Bui, 2014).

With repeated micro trauma, an inflammatory condition of the periosteum may develop, which can lead to formation of granulation tissue and adhesion. Swelling is rare, except in cases of external trauma. The arm is painless at rest and during passive range of motion. Granulation tissue contains a large number of free nerve ending which may be responsible for increased tenderness on palpation (Cyriax, 1936). Tenderness is most notable at the anterior aspect of the lateral epicondyle and the lateral forearm. Palpation of the radial collateral ligament may elicit exquisite tenderness and is usually increased with varus stress to the elbow. Grip strength may be decreased, but the articular and neurological signs are normal. In severe cases, pain at rest occurs along with varying decreases of motion at the extremes of flexion and extension.

In most cases, the lesion will involve the junctional tissue at the common extensors muscle origin of the lateral epicondyle, specifically the extensor carpi radialisbrevis (Cyriax, 1936). Radial extension will more specifically indicate extensor carpi radialisbrevis or extensor carpi radialislongus. Pain with resisted extension of the middle finger is present when the extensor carpi radialisbrevis is involved (Wadsworth et al., 1987). Tenderness above the epicondyle will indicate that the extensor carpi radialislongus is involved, while anterolateral tenderness would arise from extensor carpi radialis brevis tissue inflammation. Ulnar extension will provoke the extensor carpi ulnaris. Radial and ulnar extensions involve the extensor digitorum

communis, but most authors agree that involvement of the extensor digitorum communis and extensor carpi ulnaris is rare (Cyriax , 1936).

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: Radio capitellar, 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.

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 interphalangeal 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 radialisbrevis. Miller et al. (2002) showed that Ultrasound, in the hands of an experienced ultrasonographer, 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 goal for the treatment of lateral epicondylitis are – reduction of pain, relief of inflammation, promotion of healing, reducing the overload forces, improve function,

preservation of motion, increase flexibility, strength and development of endurance (Lee et al., 2014). Physiotherapy treatment initially consists of assessment, modification of activity, and application of ice and lateral epicondylitis modalities (Faisal et al., 2013). 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 effect on lateral epicondylitis (Zhou et al., 2014). More recent methods include denervation, percutaneous tenotomy (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 & Guitbert (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 lateral

epicondylitis 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 epicondylitis (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 programmers, 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.

Zeisig (2008) included that, stretching exercise is one of the standard physiotherapy treatment for tennis elbow. Static stretching exercise helps to reduce pain, increase grip strength and helps in recovery to normal range of motion (Lee et al., 2014). An overview of systematic review Jone (2009) found that, in a small study progressive stretching exercise was compared with ultrasound and both groups were improve after 6-8 weeks of treatment; while progressive stretching exercise was more effective than ultrasound (Jones, 2009). Static stretching exercise was recently compared with Cyriax physiotherapy and the treatment intervention was 3 times per week for 4 weeks. After 4 weeks intervention both groups experienced significant improvements in pain and function but static stretching was more effective than Cyriax physiotherapy (Viswas et al., 2011).

There are three forms of strengthening exercise for soft tissue structure such as isometric, concentric and eccentric exercise (Stasinopoulos et al., 2005). Park et al. (2009) assured that, isometric strengthening exercise is effective treatment during the initial period Eccentric exercise has most beneficial effect for the treatment of tennis elbow. Therapist advocates eccentric exercise only for the injured tendon (Stasinopoulos et al., 2005). There is some evidence to support the use of eccentric training programs in tennis elbow (Jones, 2009).

Strengthening exercise is very important to strengthen the affected tendon and improving the functional activities (Lee et al., 2014). A systematic review by Raman et al. (2012) found moderate research evidence to support isotonic eccentric exercise programed for improving pain, strength and function over time.

Thomas (2010) stated that, deep transverse friction massage (DTFM) is a soft tissue mobilization technique that use in lateral epicondylitis by releasing and stretching the impaired tissue causing dysfunction. Very few studies are done to look at the effectiveness of DTFM (Jones, 2009). Thomas (2010) did a study on deep transverse friction massage for treating tendinitis and found that DTFM is effective for promoting rehabilitation. Viswas et al. (2012) did a small randomized controlled trial of 4 weeks of supervised therapeutic exercise programed compared with Cyriax physiotherapy including DTFM and found that, supervised exercise programed is more effective than DTFM to reduce pain and improve function.

Manipulation is effective in cases where active use of extensor muscles produces. Mills manipulation in lateral epicondylitis by rupturing the adhesions to elongate the scar tissue (Alam, 2008). Stasinopoulos & Johnson (2004) did a literature review that purposes to describe Cyriax approach, its effectiveness and use in the treatment of tennis elbow and claimed that deep transverse friction in combination with mills manipulation is successful enough for treating tennis elbow.

Mobilization with movement is a manual therapy intervention which is most commonly used in the management of patient with tennis elbow (Slater et al., 2006)). MWM treatment technique may be applied in treating those patients who experience pain when elevating the arm, for example, swinging a tennis racket , reaching for shelves and working overhead (Vicenzino, 2003). Kochar & Dogra (2002) did a small study compared a 3 weeks trial of ultrasound and MWM, compared with ultrasound alone. Both groups then underwent a 10 weeks programed of progressive upper limb rehabilitation, including the use of weights & Findings of this study were a significant improvement in the MWM group in terms of pain and the weight test, but no difference in grip strength. The MWM group also had a faster recovery time compared with the ultrasound group.

Myofascial release is a soft tissue mobilization technique. Myofascial release is the application of a low load, long duration stretch to the Myofascial complex, this technique is applied to restore optimal length, decrease pain, and improve function. Myofascial release generally involves slow, sustained pressure applied to restricted fascial layers either directly or indirectly (Ajimsha et al., 2012). Myofascial Release Technique (MFR) is being used to treat patients with Lateral Epicondylitis, but there are few formal reports of its success rate (Trivedi et al., 2014).

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.

Therapeutic ultrasound (US) is most frequently used tool in the last decades as it has been applied to common musculoskeletal conditions such as LET by physiotherapists (Dimitrios et al., 2013). Half of physiotherapists use pulsed and continuous ultrasound for treating tennis elbow (Jones, 2009). Faisal et al. (2013) states that, application of continuous or pulsed mode upon tissue increases blood flow and reduce muscle spasm, increases extensibility of collagen fibers and decreases inflammatory response. The overall efficacy of this treatment for musculoskeletal disorders is in debate. In systematic review Jones (2009) found that, when pulsed ultrasound is compared with other treatments, such as injections and TENS, there were no significant differences in outcomes between groups, with weak evidence for its effectiveness. Its effectiveness has been evaluated in four previously published systematic reviews and the conclusion of these four systematic reviews was that there was a lack of scientific evidence supporting physiotherapy treatments such as ultrasound for LET. To our knowledge, there has been no review to establish only the effectiveness of ultrasound for LET (Dimitrios et al., 2013).

According to Zeisig (2008) application of shock wave therapy with single pulsed acoustic wave is helpful to reduce pain and to progress healing process (Dimitrios et al., 2013). Jones (2009) found that, about 10% of physiotherapists use pulsed shortwave diathermy in the treatment of tennis elbow. There is weak evidence for the effectiveness of pulsed shortwave diathermy. Low level laser therapy is very beneficial for enhancing healing process it is not so significantly used by physiotherapists for managing tennis elbow. At present, there is no evidence for long term effect of laser when compared with placebo treatment (Jones, 2009). Zeisig (2008) states that, TENS (Transcutaneous Electrical Nerve Stimulation) lateral epicondylitis to activate pain relieving systems in tennis elbow.

Only one study was identified the effect of ice therapy on tennis elbow (Jones, 2009). Manias & Stasinopoulos (2006) compared an exercise group and ice group with an exercise group alone, where the ice was being applied for 10 minutes after each exercise session. At 4 months follow-up no significant differences were seen between the two groups, which indicating that ice may be ineffective as a treatment in the management of tennis elbow.

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).

In about 21% of cases orthotic device are described for the treatment of tennis elbow (Jones, 2009). 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

It was a quasi- experimental design of quantitative research. This study was a single group and provides an intervention during the experiment. This design did not have a control group to compare with the experimental group.

Quasi experimental design differs from a true experimental design in that, although it contains an independent variable that is manipulated in order to look for an effect on a dependent variable, either control group or randomization is lacking. These designs are useful to researcher looking for validation of treatment method and techniques, (Bailey, 1997). In experimental design, all three of the components- manipulation, control and randomization-are required. (Bailey, 1997). But in this study all the three components were not present.

Therefore, this study was a quasi-experimental research design. Here, standard physiotherapy treatment was applied to the patients who were suffering at Lateral epicondylitis.

Pretest-Posttest design:

The Pretest-Posttest design is valuable in describing what occurs after the introduction of the independent variable.

This design can answer questions about change over time in that the pre test is given before the introduction of the independent variable. If the subject lateral epicondylitis are tested before the intervention, a change in scores on the dependent variable can be reported but cannot be attributed to the influence of the independent variable (Depoy & Gitlin, 1998).

3.2 Study area

The Researcher was conducted the patient with Lateral epicondylitis at Musculo-skeletal Unit of Centre for the Rehabilitation of the Paralyzed (CRP) - Savar and Dhaka-Mirpur.

3.3 Sampling

18 participants with TE were collected by using convenience sampling from musculoskeletal department of CRP (Savar & mirpur). TE is a rare case in Bangladesh.

The researcher established inclusion and exclusion criteria and selected those individuals who fit these factors and volunteer in the study (Depoy & Gitlin, 1998). The convenience sampling method is based on the judgments of the researcher, In that a sample is made of elements that embrace the most characteristics of the population to the study and after proper diagnosis by doctor and Occupational therapists then the samples were taken for this study (Hicks, 1999).

3.4 Participants

Researcher took 18thparticipants from Centre for the Rehabilitation of the Paralyzed (CRP), Savar, and Mirpur.

3.5 Data collection procedure

- Observation
- Interview
- Engage functional tasks such as power grip, button etc, Test and measures.

3.6 Measurement tools

Numeric pain rating scale- In this study researcher used visual analogue scale for measuring the intensity of pain. Numeric Pain Rating Scale is commonly use for the measurement of pain (Krebs et al., 2003). The Numeric Pain Rating Scale is an 11 point Scale for patient self-reporting of pain. NPRS consists of a straight line on which the individual being assessed marks the level of pain.

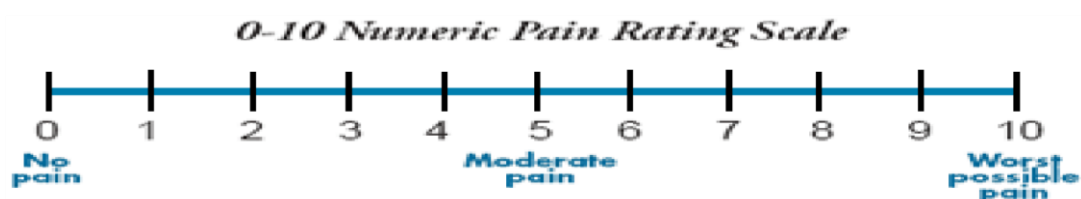


Fig-1: Numeric Pain Rating Scale

Rating	Pain Level
0	No pain
1-3	Mild pain
4-6	Moderate pain
7 – 10	Severe pain

Table-1: Numeric Pain Rating Scale

3.7 Physiotherapy Intervention

All subject of lateral epicondylitis received general physical therapy consisting of heat therapy for 20 min, ultrasound (1 MHz, 1.5 W/ cm² continuous mode) for 5 min, and TENS (100 Hz).

After the pretest, we applied the exercise program in 2 stages for treating the lateral epicondilitis.

The first stage of the program was comprised of pain control, stretch exercise for recovery to normal range of motion, isometric contraction exercises and stretch exercise as the final exercise.

The second stage consisted of wrist extensor stretching, eccentric contractions, concentric contractions and stretch exercise as a final exercise. The concentric

contractions of the wrist were implemented with the elbow flexed and pronated, and the eccentric contractions were implemented with the elbow extended and pronated using a Thera Band. In total, tests were repeated 3 times, and we provided a 1-minute break per set; we then computed the mean (Mathiowet et al., 1984).

3.8 Data Collection process

The data collector fixed a date and time with the participant to his available time. At first the data collector informed the participant about the contents of the consent form. All participant names coded to maintain confidentiality, diagnosed and referred by qualified physiotherapist and doctor. Each participant received physiotherapy intervention for Lateral epicondylitis.

Participant evaluated by Numeric pain rating score and PRTEE score. The participants of the research chosen purposively for the experiment. Then the data collector measured pain, specific activities and usual activities of patient with Lateral epicondylitis.

The participant received treatment as regular patients in the MS department of CRP; they continue their treatment as per their schedule. Each participant received 3 days per week. Treatment program arranged for 6 weeks by the researcher with the permeation from the musculo skeletal department

Before started the treatment there did the initial assessment where the researcher assessed pain, specific activities and usual activities of patient with Lateral epicondylitis that carried out in each area that provides the pretest score.

After receiving 2 days in 6 weeks intervention program, researcher was collect subjective and objective information including the pain, specific activities, usual activities in PRTEE score but the treatment applied by qualifies Physiotherapist. And the data collector instructed the appointee about the treatment protocol. During this time, the participants were continued their treatment as per their schedule. The SPSS version 20.0 software was used in performance of statistical analyses for the mean and standard deviation. The normality of the distributions was tested with the T-test.

3.9 Inclusion criteria

- Age group: 29-65 years old
- Both male & female patients are include
- Subject who had no history of taking physiotherapy intervention, oral NSAID or corticosteroid injection previously.
- Pain at more than 2 physical examinations in Cozens test (resistance test for the wrist extensor), Mill's test (maximal passive flexor test for the wrist), and resisted middle finger test (resistance test for the middle finger) (Magee, 1997).
- Tenderness on palpation over the lateral epicondyle of humerus.
- The participants who had no any deformity of the affected elbow and wrist.
- Voluntary participants.

3.10 Exclusion criteria

- Patients with clinical disorder which may became worsen with neurological manifestations, medial epicondylitis in the ipsilateral elbow, or cervical, shoulder, or wrist functional disability.
- Subject of lateral epicondylitis who had undergone surgery.
- Who had rheumatism, fracture, arthritis, osteoporosis, or pain due to calcium deposition or other causes neurological impairments.
- Cervical radiculopathy & any other upper limb dysfunction ,Osteoporosis.

3.11 Data Analysis

Data analysis was done with statistical calculation using inferential statistical parametric paired T-test which is perform during numerical data system as conveniently selected of the subject lateral epicondylitis for the participants. A quantitative research data analysis occurs at the conclusion of data collection (Bailey, 1997).

In this study, during the data analysis these sequence data was converted into numerical data by giving a specific value for specific sequence data. In this study there were eight variables .The every variables may come different score in this research. The researcher took the average of those sub division and makes them into one variable. In this study there were 4 variables that were categories and they are

socio demographic characteristic (age, sex, education), pain specific activities, usual activities.

All the participants told about different variables before starting treatment and after completing the 3 weeks treatment sessions and were scored by the data collector.

In this study, using a same- subject groups were conveniently allocated to the treatment program group. The same – subject lateral epicondylitis were used for each level of the independent variable (Thomas *et al*, 1979). Outcomes were measured by collecting the scores of different variables and the scores of the interval data were considered. The pretest and post-test comparison group design is one of the most extensively used methods to evaluate clinical research (Harmon, 2003). The common methods of analyzing data form a pretest and post-test research design that are related T- test on the different score between pre test and post test. So, for this study were used paired samples T- test to calculate the significance level of the study. The „t“ test was used to find out whether the „t“ values were represented differences between the results from before received treatment and after received treatment of the same group of the participants.

The ‘t’ formula:
$$\frac{\sum d}{\sqrt{\frac{n \sum d^2 - \sum (d)^2}{N-1}}}$$

Where,

$\sum d$ = the total of the differences

$\sum d^2$ = the total of the differences squared

N= Number of participants

N-1= number of subjects from control group which refers to the extent to which data have the capacity to vary one certain limit has been Imposed (Hicks, 1999).

$\sqrt{}$ = The square root of the final calculation of everything under the square root sign. In this study, the hypothesis was one tailed as it was predicting a specific direction to the results (Hicks, 1999). To support the hypothesis and/or to reject the null hypothesis the researcher used related t“ test to find out the „p“ value so that the result can be significant.

3.12 Significant level

In order to find out the significance of the study, the researcher calculated the „p“value. The „p“ values refer the probability of the results for experimental study. The Word probability refers to the accuracy of the findings. A „p“ value is called level of significance for an experiment and a „p“ value of <0.05 was accepted as significant result for health service research. If the „p“ value is equal or smaller than the significant levels, the results are said to be significant.

3.13 Ethical consideration

Research proposal was submitted for approval to the institution of Review Board (IRB) of Bangladesh Health Professions Institute (BHPI) and after defense the research proposal approval was taken from the IRB. A written/ verbal consent was taken from the participant before collecting data. The World Health Organization (WHO) and Bangladesh Medical Research Council (BMRC) guideline was followed to conduct the study. Again before beginning the data collection, researcher was obtained the permission from the concerned authorities ensuring the safety of the participants. In order to eliminate ethical claims, the participants were set free to receive treatment for other purposes as usual. Each participant was informed about the study before beginning and given written consent.

Socio-demographic Information

4.1 Age of the participants

Among the 18 participants 5 participants were between 29-40 years, 8 were between 40-50 years and 5 were between years >50 years. There mean age 45.39 years and minimum age was 29 years and maximum age was 65 years. In percentage 27.8% participants were between 29-39 years, 44% were between 40-50 years and 27.8% were >50years .

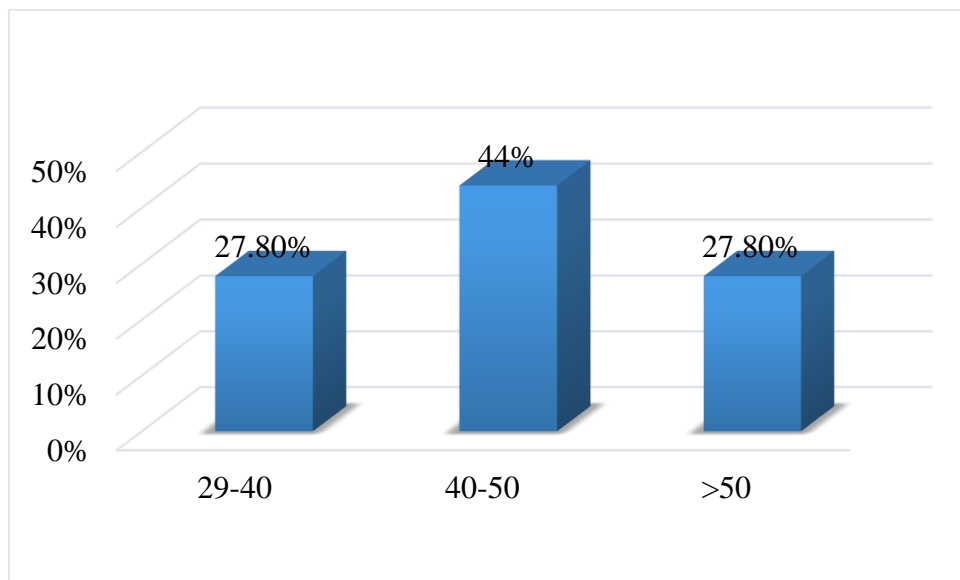


Figure-2: Age of the participants

4.2 Male Female ratio

The study find out the 10 participants were male and 8 Participants were female. In percentage 55.6% participants were male and 44.4% were female.

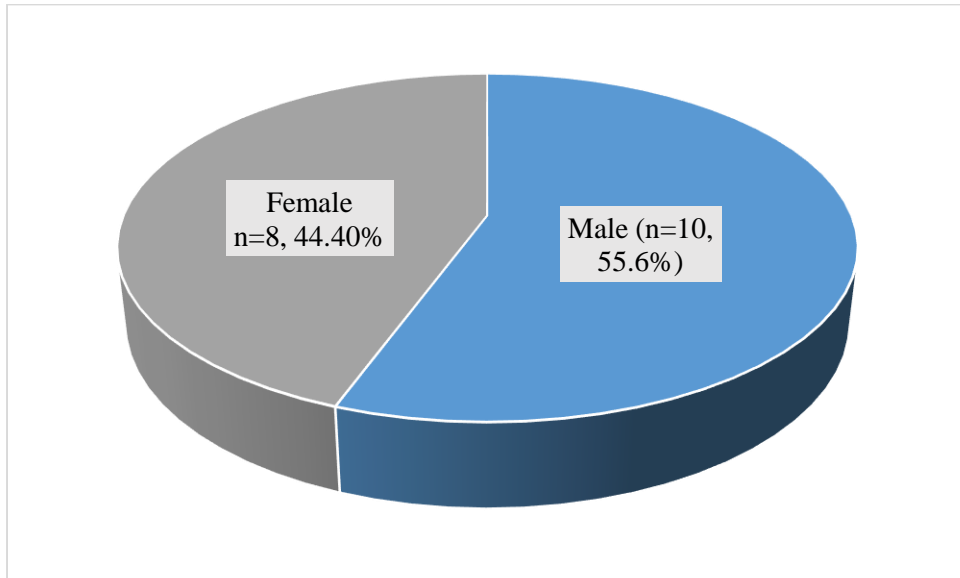


Figure-3: Male and Female ratio of participants

4.3 Occupational Status of the participants

The study find out the 7 participators was house wife,2 participators was teacher,4 was service holder,2 was business person,2was day labour,1was farmer. In percentage 38.9% participators was house wife, 11.1% participators was teacher,22.2% was service holder,11.1% was business person,11.1% was day labour,5.6% was farmer.

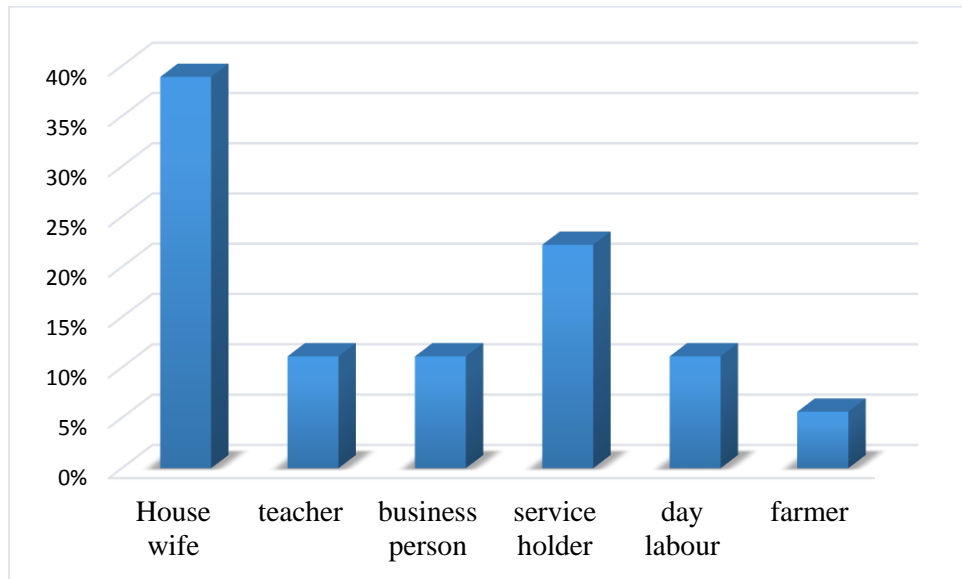


Figure-3: Patient Occupation

Table 2: shows variables in the study statistically significant at the following level of significance:

Variables	Mean pretest	Mean post-test	Mean difference	„t“ value	„p“ value
Pain in affected arm:	23.944	11.833	12.111	12.947	0.001
Pain at rest	2.33	.8333	1.500	10.292	0.002
doing a task with repeated arm movement	5.44	2.611	2.833	8.694	0.003
carrying a plastic bag of groceries	6.1667	3.167	3.000	7.141	0.009
at its least	1.667	0.500	1.667	5.772	0.168*
at its worst	8.333	4.667	3.667	16.035	0.000
specific activities:	19.8889	8.8889	11.00000	11.184	0.000
Turn a doorknob	1.611	.333	1.278	7.20	0.000
Carry a grocery bag	4.444	2.111	2.333	9.127	0.000
Lift a full coffee cup to mouth	1.833	0.389	1.44	4.914	0.001
Open a jar	3.556	1.833	1.722	8.166	0.000
Pull up pants	1.778	0.667	1.111	4.893	0.000
Wring out a washcloth or wet towel.	6.667	3.556	3.111	7.714	0.005
Usual activities:	17.3333	9.2778	8.05556	11.625	0.000
Personal activities (dressing, washing)	4.389	2.500	1.889	7.080	0.000
Household work (cleaning, maintenance)	4.444	2.222	2.222	7.466	0.000
Work (your job or everyday work)	4.833	2.500	2.333	8.332	0.000
Sporting activities	3.667	2.056	1.611	5.122	0.002

*Not significant

From the above we can see the difference before and after receiving treatment

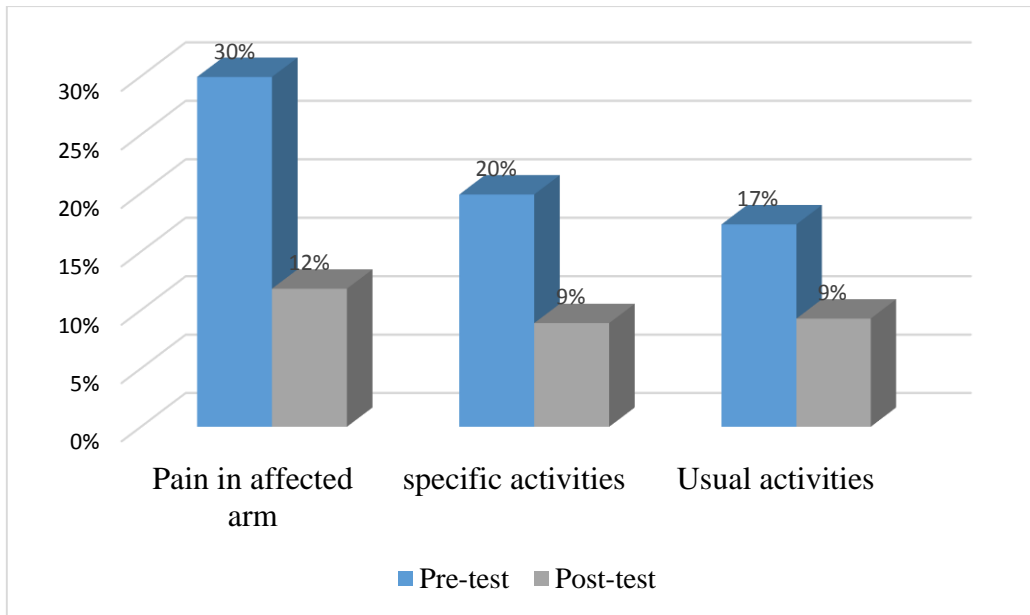


Figure-5: The mean improvement in different variables between pre test and post test

4.4 Interpreting the Result

The total findings of the outcome measures represent that, the mean score of pre- test of participants that applying treatment protocol for lateral epicondylitis patients and after applying that protocol (data is presented in table 1). Therefore the mean score of participants of total findings decreased after applying treatment protocol for lateral epicondylitis patients for this improved of Pain in affected arm, Specific activities, usual activities. The study shows that the average score after receiving treatment is lesser than before receiving treatment. Statistical analysis of the data represented that the probability of the random error and the usual cut-off point for claiming support for significant level of the experimental hypothesis is 5% (Hicks, 1999) therefore it can be said that the findings of the study is significant.

The overall findings in the area of Pain in affected arm, Specific activities, usual activities represent that, the mean score of participants before applying treatment protocol for lateral epicondylitis patients and after applying treatment protocol for lateral epicondylitis patients. The overall finding is showing in table 1. Therefore the mean score of participants in the area of Pain in affected arm, Specific activities, usual activities after applying treatment protocol. The study showed that the average/mean scores were better after receiving treatment protocol for lateral epicondylitis patients

than before receiving treatment protocol for lateral epicondylitis patients. Statistical analysis of the data represented in this area. This means that the probability of the random error is less than 1 person among 100 people. The usual cut-off point for claiming support for significant level of the experimental hypothesis is 5% (Hicks, 1999) therefore it can be said that the findings of the study is significant. The bar chart (figure 1) is representing the improvement rate of each of 18 participants before and after applying treatment protocol for lateral epicondylitis patients.

This result demonstrates that the average score after receiving treatment was lesser than before receiving treatment.

The purpose of the study was to find out the functional outcome of an Physiotherapy intervention for lateral epicondylitis and the objectives were To identify the socio demographic characteristic (age, sex, occupation),To find out the pain intensity ,To evaluate functional outcome of specific activities and to evaluate functional outcome of usual activities in case of lateral epicondylitis.

In this experimental study 18 patients with tennis elbow were who received specific physiotherapy intervention. Attended for 2days per week within 6 weeks in the physiotherapy outdoor department of CRP Savar in order to demonstrate the improvement. The outcome was measured by using numeric pain rating scale for pain intensity and PRTEE score for functional disability in different functional situation.

This research found significant improvement of pain.Pre test and post test, mean difference of pain at rest is 1.500 and their p value ($p < 0.05$), Also there was significant improvement of Pain at rest doing a task with repeated arm movement, carrying a plastic bag of groceries, at its least, at its worst, as the pretest and post test mean difference were consecutively 2.833,3,1.667,3.667 and there p value is ($P < 0.05$).Most significant improvement of pain is, while patient at its worst. Which P value is($P = 0.000$).

This research also found significant improvement of functional disability of the participators. After 6 weeks treatment session, specific activities of the participators improve highly. Highly significant specific activities are Turn a doorknob, Carry a grocery beg, Open a jar, Pull up pants and there p value is ($P = 0.00$) which is bellow ($P < 0.05$).Also highly improve usual activities after taken 6 weeks of physiotherapy intervention are Personal activities (dressing, washing), Household work (cleaning, maintenance), Work (your job or everyday work) and there p value is ($P = 0.000$).

Lee et al. (2014) conducted a randomized controlled trial to investigate the effect of physiotherapy interventions on Pain, Dysfunction, and Grip Strength of Patients with acute lateral epicondylitis and All groups received conventional physical therapy for

40 minutes and therapeutic exercises for 20 minutes per session during 6 weeks, The dysfunction score according to the interval was assessed with a PRTEE , The 3 days per week group showed a significant decrease after 3 and 6 weeks of intervention ($p<0.05$), and there was a significant decrease at 6 weeks ($p<0.05$).the decreases from 3 weeks to 6 weeks were greatest in the 6 days per week group.

Fyfe & Stanish et al. (1992) reported that strengthening exercise is effective for treating diseases or protecting injuries resulting from increases in the threshold of pain in stressful situations. Glazebrook et al. (1994) also reported that an exercise program with appropriate stretching and strengthening exercise for the lateral epicondylitis is very important in strengthening the tendon region and improving the functional activities.

Smedt et al. (2007) observed that lateral epicondylitis 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.

This research found most often age group of lateral epicondylitis is between 40-50 years and Male are mostly affected then female and among female most of them was house wife.

Limitation:

It was the first study in Bangladesh, so there were some limitations and barriers during conducting the research project. In this study the participant get only 6 weeks treatment sessions due to lack of time limitation. Though the treatment was effective but it could not check the long term effect and data was collected only from CRP for a short period of time which will affect the result of the study to generalize for wider population. It was very difficult to keep confident the aim of the study for blinding procedure. There was no available research done in this area in Bangladesh. This study was use only 18 participants ,due to lack of number of the participants the external validity of the study decreased, and there might be lack of agreement about distributing of confounding variables e.g. Socio-economic status, age, time of onset and severity of the condition.

The rate of education is very poor in Bangladesh, besides Government and non-Government activities in Health sectors are not sufficient, now a day's Government Health policy is yet to meet the demand of the population and different private clinic and hospitals are trying to bring latest medical services in our country.

Most of the people do not know about physiotherapy. But in the other development country physiotherapy is considered as an important treatment. As a developing medical profession, it is the duty of the physiotherapy in Bangladesh should make a strong evidence for practice which will increase strength and improve the skill of the physiotherapy as well as developed our physiotherapy profession.

Lateral picondylitis or tennis elbow is a painful condition characterized by pain at the lateral side of the elbow, which increases during gripping, squeezing, repeated twisting movement, resisted wrist extension and it usually affects the dominant arm .The result of this study have identified the effect of specific physiotherapy intervention for reducing pain and disability in tennis elbow patients. Participants in this showed a greater benefit, which indicate that physiotherapy intervention there is change the outcome of post-test in the management of lateral epicondylitis.

The study examined the effectiveness of physiotherapy treatment program for 6 weeks helpful to reduce pain and improve functional ability. Because of the above-mentioned limits, this study lacks generalize ability. This study should be replicated and expanded to confirm the validity of findings.

Recommendations:

By conducting this study the researcher found significant result about the effectiveness of Physiotherapy intervention for lateral epicondylitis patients. Significant result for reducing pain, specific functions and usual functions were found by physiotherapy treatment program for the patients with lateral epicondylitis of hand.

But following things should be done in future; this study should be conducted with longer duration to evaluate long term effect of Physiotherapy intervention for lateral epicondylitis patients. Another study should be done with large number of participants so that the result can be generalized for lateral epicondylitis patients in Bangladesh. In future, in this type of study during sample selection randomization should be done and as control group should be taken to compare the effectiveness of Physiotherapy intervention for lateral epicondylitis patients, so that this treatment can be more evidence based for this kind of the patients.

As physiotherapy intervention is most recommended treatment so in future research is need in this area. On the basis of the result, in future this research can be implemented on patients. It will be beneficial for the patients with the lateral epicondylitis.

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বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)
(The Academic Institute of CRP)

Ref.

CRP-BHPI/IRB/04/17/76

Date: 05/04/17

To

Md. Aminul Hoque Rasel
Bachelor of Science in physiotherapy (B. Sc.PT)
Session: 2011-2012, DU Reg. No: 1708
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal – “Functional Outcome in Lateral Epicondylitis Patient” by ethics committee.

Dear Md. Aminul Hoque Rasel,

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application on February 17, 2016 to conduct the above mentioned thesis, with yourself, as the Principal investigator. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Thesis Proposal
2	Questionnaire (English and Bengali version)
3	Information sheet & consent form.

Since the study involves answering a Patients Rated Tennis Elbow evaluation questionnaire that takes 10 to 15 minutes and measuring pain and functional disability with Numeric Pain Rating Scale, have no likelihood of any harm to the participants and have possibility of benefit patients in their pain management and functional disability prevention, the members of the Ethics committee has approved the study to be conducted in the presented form at the meeting held at 08:30 AM on February 25, 2016 at BHPI.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

Muhammad Millat Hossain

Muhammad Millat Hossain
Assistant Professor, Dept. of Rehabilitation Science
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ, ফোন : ৭৭৪৫৪৬৪-৫, ৭৭৪১৪০৪ ফ্যাক্স : ৭৭৪৫০৬৯

CRP-Chapain, Savar, Dhaka-1343, Tel : 7745464-5, 7741404, Fax : 7745069, E-mail : contact@crp-bangladesh.org, www.crp-bangladesh.org

Permission Letter

3rd September 2016

Head of the Department

Department of the Physiotherapy

Center for the Rehabilitation of the Paralyzed (CRP), Chapain, Savar, Dhaka, 1343

Through: Head of the Department, Department of Physiotherapy,
Bangladesh Health Professions Institute (BHPI).

Subject: Permission for data collection.

Dear Sir,

I respectfully to state that I am a 4th year B.Sc in Physiotherapy student at Bangladesh Health Professions Institute (BHPI). In 4th year we have to do a research project and I have chosen a title that is **"Functional Outcome of Lateral Epicondylitis patients"** and my supervisor is M Rezaul Karim Rajib, coordinator, school of Prosthetics and Orthotics(PNO). I want to collect data from the patients attending at Musculoskeletal(MS) outpatient department CRP Savar and Mirpur.

I, therefore, pray and hope that you would be kind enough to give me the permission to make this research projects successful.

Yours faithfully

Md. Aminul Hoque Rasel
Md. Aminul Hoque Rasel.

4th year B.Sc in physiotherapy, BHPI.

Class roll: 06.

Session: 2011-2012

Approved
03/09/16
Mohammad Anwar Hossain
Associate Professor &
Head of Physiotherapy Dept.
CRP, Chapain, Savar, Dhaka-1343

Forwarded
03.09.16
Md. Obaidul Haque
Associate Professor & Head of the Department
Department of Physiotherapy
Bangladesh Health Professions Institute (BHPI)
CRP, Chapain, Savar, Dhaka-1343

Forwarded for kind permission
03/09/16

INFORM CONSENT

Assalamu-alaikum /Namaskar,

I am Md. Aminul Hoque Rasel,4th year student of B.Sc. in physiotherapy at Bangladesh Health Professions Institute (BHPI), CRP. I shall have to conduct a research and it is a part of my academic activity. The participants are requested to participate in the study after reading the following.

My research title is “Functional outcomes in Lateral Epicondylitis patients.” The objective of my study is to identify the functional outcome of specific physiotherapy intervention in Lateral Epicondylitis patient. If I can complete this study successfully, patient may get the benefits who have been suffering from tennis elbow and it will be an evidence based treatment. To fulfil my research project, I need to collect data. Considering the area of my research, which criteria is necessary for my research is present of you. So, you can be a respected participant of my research and I would like to request you as a subject of my study.

I assure that all data will be kept confidential and would like to inform you that this is a purely academic study and will not be used for any other purpose. Your participation will be voluntary. You may have the right to withdraw consent and discontinue participation at any time of the experiment. If you have any query about the study or right as a participant, you may contact with me.

Do you have any questions before I start?

So may I have your consent to proceed with the interview?

Yes

No

Signature of the Interviewer.....

Signature of the participant

Signature of the witness.....

Signature of the informer (if required).....

Questionnaire (English)
SECTION-A (1): Subjective Information

This questionnaire is developed to measure the pain of the patient with tennis elbow, this portion will be filled by physiotherapist/researcher using a pencil.

1. Code No:
2. Patients name:
3. Occupation:
4. Age:
5. Address: Village: P.O.:

Thana: District:

Email:.....

6. Mobile Number:.....

7. Sex:

M

F

8. Economic status(each month):

9. Hand dominant:
Right

Left

10. What is the main issue that brought you in today ?
(circle all that are appropriate)

- i. Pain in elbow
- ii. Weakness of the forearm muscle
- iii. Numbness or tingling in your arm:
- iv. Deformity
- v. Recent injury

11. How long has the current problem been going on?

Years..... Months..... Weeks.....

12. Which side is involved? (Encircle the side)

- i. Right/Left/Both

13. What part of your elbow hurts?

- i. Front /medial/lateral/Back

14. Do you perform any repetitive or forceful tasks or movements?

- i. Yes:

- i. No:

MacDermid,2005,used a scale to rate the pain status and functional disability experienced by patients.It is known as Patients Rated Tennis Elbow Evaluation Questionear.

SECTION-B(1):Pain Status

Basic activities:

0= No pain,1-3= Mild pain,5= Moderate pain,6-10=worst possible pain feeling experienced by patients.

This portion of questionnaire will be filled by the patient using a black or blue colour ball pen. If the patient struggles to understand the meaning of a question, physiotherapist is requested to clear the meaning of certain portions.

RATE YOUR PAIN											
No pain	Mostly		worst								
When you are at rest	0	1	2	3	4	5	6	7	8	9	10
When doing a task with repeated arm movement	0	1	2	3	4	5	6	7	8	9	10
When carrying a plastic bag of groceries	0	1	2	3	4	5	6	7	8	9	10
When your pains at its least	0	1	2	3	4	5	6	7	8	9	10
When your pains at its worst	0	1	2	3	4	5	6	7	8	9	10

SECTION-B(2): Functional Disability Status

Basic activities:

0= No functional difficulty,

1-3= Mild functional difficulty

5= Moderate functional difficulty

6-10=worst possible functional disability feeling experienced by patients.

This portion of questionnaire will be filled by the patient using a black or blue colour ball pen. If the patient struggles to understand the meaning of a question, physiotherapist is requested to clear the meaning of certain portions.

FUNCTIONAL DISABILITY											
A. SPECIFIC ACTIVITIES											
	No	Moderate			Unable			To Do			
		Difficulty			Difficulty						
Turn a doorknob or key.	0	1	2	3	4	5	6	7	8	9	10
Carry a briefcase by the handle.	0	1	2	3	4	5	6	7	8	9	10
Lift a full coffee cup or glass of milk to your mouth.	0	1	2	3	4	5	6	7	8	9	10
Open a jar.	0	1	2	3	4	5	6	7	8	9	10
Pull up pants.	0	1	2	3	4	5	6	7	8	9	10
Wring out a washcloth or wet towel.	0	1	2	3	4	5	6	7	8	9	10

B. USUAL ACTIVITIES:											
1. Personal activities (dressing, washing)	0	1	2	3	4	5	6	7	8	9	10
2. Household work (cleaning, maintenance)	0	1	2	3	4	5	6	7	8	9	10
3. Work (your job or everyday work)	0	1	2	3	4	5	6	7	8	9	10
4. Recreational or sporting activities	0	1	2	3	4	5	6	7	8	9	10

Comments:

Date:Signature of Examiner:.....

সম্মতিপত্র

আসসালামুয়ালাইকুম / নমস্কার,

আমি আমিনুল হক রাসেল ঢাকা বিশ্ববিদ্যালয়ের চিকিৎসা অনুষদের অধিভুক্ত বাংলাদেশ হেলথ প্রফেশনস্ ইন্সটিটিউট এর বি.এস.সি ইন ফিজিওথেরাপিকোর্সের চূড়ান্ত বর্ষের একজন শিক্ষার্থী। অধ্যয়নের অংশ হিসেবে আমাকে একটি গবেষণা সম্পাদন করতে হবে এবং এটা আমার প্রাতিষ্ঠানিক কাজের একটা অংশ। নিম্নোক্ত তথ্যাদি পাঠ করার পর আপনাকে গবেষণায় অংশগ্রহনের জন্য অনুরোধ করা হলো।

আমার গবেষণার বিষয় হল “কনুই এর প্রধাহের জন্য রোগীদের কাজের ফলাফল নির্ণয়”। এই পরীক্ষামূলক গবেষণার মাধ্যমে আমি একটি অনুমান পরীক্ষা করব যে, কনুই এর প্রধাহের ফলে আপনার কাজের সমস্যায়, ফিজিওথেরাপী চিকিৎসার উপকারিতা। গবেষণাটি সম্পাদনের জন্য, আমার তথ্য সংগ্রহ করা প্রয়োজন হবে। গবেষণার ক্ষেত্র বিবেচনা করে আপনার মাঝে আমার গবেষণায় অংশগ্রহণ করার জন্য প্রয়োজনীয় বৈশিষ্ট্য লক্ষ্য করা গেছে। এজন্য, আপনি আমার গবেষণার একজন সম্মানিত অংশগ্রহণকারী হতে পারেন এবং আমি আপনাকে আমার গবেষণায় অংশগ্রহন করতে অনুরোধ জানাচ্ছি।

আমি প্রতিজ্ঞা করছি যে, এই গবেষণা আপনার জন্য ঝুঁকিপূর্ণ হবে না অথবা আপনার কোন ক্ষতি করবে না। গবেষণা চলাকালীন সময়ে কোন রকম দ্বিধা বা ঝুঁকি ছাড়াই যেকোন সময়ে আপনি এটাকে বাদ দিতে পারবেন। এই গবেষণার প্রাপ্ত তথ্য সম্পূর্ণভাবে গোপনীয় থাকবে এবং অংশগ্রহণকারীর ব্যক্তিগত তথ্য অন্য কোথাও প্রকাশ করা হবে না।

যদি আপনার গবেষণা সম্পর্কে কোনো জিজ্ঞাসা থাকে তবে আপনি অনুগ্রহপূর্বক আমার সাথে যোগাযোগ করতে পারেন।

শুরু করার আগে আপনার কি কোন প্রশ্ন আছে ?

আমি কি শুরু করতে পারি ?

হ্যাঁ না

অংশগ্রহণকারীর স্বাক্ষর ও তারিখ

গবেষকের স্বাক্ষর ও তারিখ

সাক্ষীর স্বাক্ষর ও তারিখ

তথ্য সংগ্রহকারীর স্বাক্ষর ও তারিখ

প্রশ্নাবলী (বাংলা)

পর্ব-ক:ব্যক্তিগত তথ্যাবলী

এই প্রশ্নপত্রটি গড়ে তলা হয়েছে পার্শ্বিক কনুই প্রদাহ রোগীদের জন্য। ব্যক্তিগত তথ্যাবলী অংশটি রোগী কিন্তু বিশেষ বিবেচনায় ফিজিওথেরাপিস্ট কালো নীল/ কালি বলপেন দ্বারা পূরণ।

১।কোড নাম্বারঃ

২।রোগীর নামঃ

৩।পেশাঃ

৪।বয়সঃ

৫। ঠিকানাঃ

গ্রামঃ

পোস্ট অফিসঃ

থানাঃ

জেলাঃ

৬।মোবাইল নম্বরঃ

ইমেইলঃ

৭। লিঙ্গঃ

পুরুষ

নারী

৮।মাসিক আয় (বাংলাদেশ):

৯। আপনি কোন হাতে বেশী কাজ করেন:

ডান

বাম

১০। আপনার প্রধান সমস্যা কোনটি (যেগুলো সঠিক তা গোল করুন)

- I. কনুই ব্যাথা
- II. হাতের মাংশপেশীর দুর্বলতা
- III. আপনার হাত আবশ মনে করা
- IV. হাত বিকৃতি মনে করা
- V. সাম্প্রতিক হাতে আঘাত পাওয়া

১১। বর্তমান সমস্যা কতদিন ধরে চলছে?

বছর..... মাস..... সপ্তাহ.....

১২। কোন পার্শ্ব জড়িত? (গোল করুন)?

ডান/বাম/উভয়

১৩। আপনার কনুইর কোন অংশে ব্যাথা?

সামনে/ভিতরে দিকে /বাহিরের দিকে/ পিছনে

১৪। আপনি কি বার বার বা শক্তি প্রয়োগ করে কোন কাজ করেন?

হ্যাঁ

না

MacDermid, 2005, ব্যথার অবস্থা এবং ক্রিয়ামূলক অক্ষমতা, রোগীদের দ্বারা অভিজ্ঞতা পোরিমাপের জন্য একটি স্কেল ব্যবহার করেন. এর নাম Patients Rated tennis Elbow Evaluation Questioner.

পর্ব-খ(১) ব্যথার অবস্থা

স্বাভাবিক কার্যকলাপঃ

০= ব্যথা নেই ১-৩= সামান্য ব্যথা ৫= মাঝামাঝি ব্যথা ৬-১০= তীব্র ব্যথার অনুভূতি

প্রশ্নাবলী এই অংশে, রোগীর একটি কালো বা নীল রঙ বলপেন ব্যবহার দ্বারা পূরণ করতে হবে. রোগীর একটি প্রশ্ন এর অর্থ বুঝতে না পারলে, ফিজিওথেরাপিস্ট তা পরিষ্কার করবে।

আপনার ব্যথার পরিমাণ করুন	
ব্যথা নেই	
তীব্র ব্যথা	
স্বাভাবিক বিশ্রামে থাকাকালীন আপনার ব্যথার তীব্রতা কেমন?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
যখন বার বার হাত দিয়ে একই কাজ করেন তখন আপনার ব্যথার তীব্রতা কেমন?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
যখন বাজারের প্লাস্টিকের ব্যাগ বহন করেন তখন আপনার ব্যথার তীব্রতা কেমন?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
আপনার ব্যথা যখন সামান্য ছিল তখন আপনার ব্যথার তীব্রতা কেমন?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

আপনার ব্যথা যখন সবচেয়ে খারাপ ছিল তখন আপনার ব্যথার তীব্রতা কেমন ?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
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পর্ব-খ(২) কার্মিক অসুবিধা অবস্থা

স্বাভাবিক কার্যকলাপঃ

০= কার্মিক অসুবিধা নেই

১-৩= সামান্য কার্মিক অসুবিধা

৫= মাঝামাঝি কার্মিক অসুবিধা

৬-১০= তীব্র কার্মিক অসুবিধা

প্রশ্নাবলী এই অংশে, রোগীর একটি কালো বা নীল রঙ বলপেন ব্যবহার দ্বারা পূরণ করতে হবে. রোগীর একটি প্রশ্ন এর অর্থ বুঝতে না পারলে, ফিজিওথেরাপিস্ট তা পরিষ্কার করবে।

কার্মিক অসুবিধা			
১। নির্দিষ্ট কার্যকলাপঃ	অসুবিধা নেই	মাঝামাঝি অসুবিধা	কাজ করতে না পারা
দরজার হাতলের এবং চাবি চালু করতে?	০	১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০	
হাতল দ্বারা একটি ব্রিফকেস বহন করতে?	০	১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০	

আপনার হাত দিয়ে একটি পূর্ণ কফি কাপ বা দুধের গ্লাস উত্তোলনে কেমন অসুবিধা হয়?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
একটি পাত্র খুলতে কেমন অসুবিধা হয়?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
প্যান্ট পরতে কেমন অসুবিধা হয়?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
কাপড় কাছতে বা ভিজা গামছা মোচড় দিতে কেমন অসুবিধা হয়?	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
২। সাধারণ কার্যকলাপঃ	
ব্যক্তিগত কার্যক্রম (কাপড় পরতে, ওয়াশিং)	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
গৃহস্থালী কাজ (পরিষ্কার, রক্ষণাবেক্ষণ)	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
কাজ (আপনার চাকরী বা দৈনন্দিন কাজ)	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০
বিনোদনমূলক এবং ক্রীড়া কার্যক্রমে	০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০

মন্তব্যসমূহ:

তারিখ: পরীক্ষকের স্বাক্ষর:.....