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Work Related Factors Affecting the Development of Lateral Epicondylitis

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Abstract:

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

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; Tennis Federation, Bangladesh. 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 bar chart and table.

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 to reduce risk factors, 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.

1. Introduction

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).

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).

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. 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. 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.

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

Objectives To identify possible work related factors affecting the development lateral epicondylitis. **Specific objectives** to identify the socio demographic characteristic (age, sex, education) of professional job experiences, duration of work and Lateral Epicondylitis. To interpret how taking rest between works, recurrent injury and Lateral Epicondylitis. To identify the association between types of pain, weight lifting, overuse hand and repetitive movement and Lateral Epicondylitis.

2. 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.

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. 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. 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). Types of lateral epicondylitis are Supracondylar, Tenoperiosteal Body of the tendon, Muscle belly. 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. 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. Smedt et al. (2007) mentioned that the use of injections in the treatment of lateral epicondylitis remains controversial. 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. 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.

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.

3. Methodology

Study design quantitative research model in the form of a case control-study design is used. **Study site** conducted in musculoskeletal unit of outdoor physiotherapy department of Center for the Rehabilitation of the Paralysed (CRP) and Tennis federation, Bangladesh. **Sample size** study was conducted with 50 samples that had meet the inclusion & exclusion criteria and 25 case groups and 25 control group. **Inclusion criteria** both male and female were included, objective of the study to explore the relationship between age and work related musculoskeletal disorders, and Subjects were selected from only CRP hospitals and Tennis federation, Bangladesh. **Exclusion criteria** Subjects who had major accident or major surgery in any part of the body. **,** Subject who was unconscious, cognitive problem and mentally changes people. **Data analysis** the data analysis was performed in SPSS version 20. 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.

4. RESULT

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. Among the 50 participants mean age 34.11 years and minimum age was 20 years and maximum age was 60 years and 48% participants were female and 52% were male. Occupation 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

Distribution of work related factors

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-1).

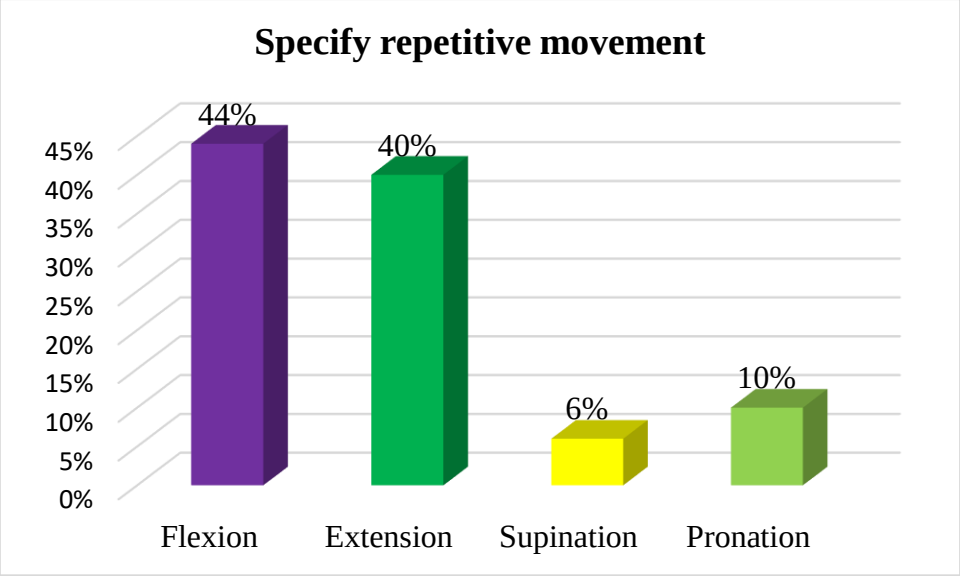

Figure-1: Specify repetitive movement of the participants

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.

Table-1: Work related factors of lateral epichondylitis.

variable	Case	Control	OR	95% CI	
				Lower	Upper
Sex					
Male	11	15	0.524	.170	1.612
Female	14	10			
Age					
40 years or less	17	23	0.185	.035	.983
More than 40years	8	2			
Work hour					
Six hours or less	8	12	0.510	.161	1.610
More than six hours	17	13			
Work experience					
Two years or less	2	9	0.155	0.29	.813
More than two years	23	16			
Repetitive MVT of Elbow					
More hand involved on occupation	12	12	1.01	.330	3.033
Less hand involved on occupation	13	13			
Weight lifting					

Wt. 10 kg or less Wt. more than 10 kg	9 16	8 17	1.195	.315	3.174
Overuse hand Less than 3 hour More than 3 hour	 19 6	 18 7	1.23	.347	.4371
Types of pain Acute pain Chronic pain	 13 12	 15 10	0.722	.235	2.215
Notice pain During work After work	 16 9	 8 17	3.77	1.170	12.194
Received treatment Medication Physiotherapy	 15 10	 19 6	0.474	.140	1.601

Repetitive movement of elbow 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 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 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, 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, 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.

DISCUSSION

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 incidences 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. 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.

Conclusion

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. Like other countries, Lateral Epicondylitis to be an upcoming burden for Bangladesh. For this reason, it is important to develop research based evidence of healthcare service in this area.

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