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Original Article

Prevalence of Carpel Tunnel Syndrome among IT Professionals of Rawalpindi and Islamabad

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Abstract

Carpal tunnel syndrome is a common problem that is caused by the pressure exerted on the medial nerve which causes pain, tingling, weakness, and numbness in the arm and hand. This syndrome is mostly related to repetitive movement of the hand and wrists. The current study aimed to find out the prevalence of carpal tunnel syndrome and its associated symptoms among IT professionals. The main objective of this study was to identify the incidence of carpel tunnel syndrome and its associated symptoms among IT professionals. This Cross-Sectional Survey was conducted on 400 IT professionals working at the IT departments of Pak China Investment Company Limited, Attock Refinery Limited, and Pakistan Statistical House of Data. The sampling technique for the selection of research subjects was purposive sampling. The data was collected through a self-structured questionnaire for carpal tunnel syndrome. Data were analyzed by SPSS 23. Out of 400 participants the total numbers of males reported were 212 (53%) and the total number of female reported in this study was 188 (47%). The mean age ± SD of participants reported in this study was 43.05 ±7.71 years. For mean ± SD of total working hours came out to be as 9.2 ± 1.5 hours per day. Out of 400 participants, 108(18.2%) reported tingling and numbness in their hands. The mean ± SD for the right and left wrist joint flexion range of motion was 64o± 12.8. For the extension range of motion mean ±SD for extension in both right and left wrist joints was 64o± 12.8. For ulnar deviation in both the right and left wrist joints of the individuals mean ± SD was 24o± 8.30. For radial deviation in both the right and left wrist joints of the individuals mean ± SD was 20o± 5.53. It was concluded that a relatively low prevalence of carpal tunnel syndrome was found among IT professionals. However, IT professionals were also experiencing discomfort and pain in their wrist/hand region due to their work. This unpleasant experience of pain and discomfort could be a future predictor of carpal tunnel syndrome.

Keywords: Carpal tunnel syndrome, Grip strengthening, IT professionals, Regional Pain, wrist range of motion

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1. INTRODUCTION

Carpal tunnel syndrome (CTS) is specifically associated with median nerve compression which causes pain, weakness, numbness and tingling at the base of the hand (Bland & Rudolfer, 2003; Tanaka & McGlothlin, 1993). It is diagnostic and symptomatic compression neuropathy that is directly linked with the median nerve that is characterized by hand pain, tingling, and numbness which also includes the index, thumb, radial, and middle, sides of the ring finger. Carpal tunnel syndrome also r educed grip power and impaired hand function in CTS patients. It is the most prevalent condition that impairs the functional ability of the hand, and with time, the muscles around the base of the thumb gradually weaken (Kamondi, et al., 2011).

In Carpal tunnel syndrome, the space for the median nerve is reduced by the multiple stress factors at the base of the hand. Injury or trauma to the wrist joint or hand can also lead to swelling and irritation of carpal tunnel. Stress-related to the work, altered biomechanics of the wrist joint, repetitive use of hand tools,

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edema during pregnancy, menopause, and any abnormal growth or tumor at the wrist joint can lead to the compression of the median nerve. Women are generally more affected than men are as the carpal tunnel is naturally smaller in them as compared to men. Adults are usually affected by Carpal tunnel syndrome than adolescents. At first, more severe pain and other symptoms of CTS are generally produced at the dominant hand (Marshall, et al., 2007).

Carpal tunnel syndrome is also linked with other pathophysiological problems that includes diabetes, fluid retention from pregnancy, thyroid dysfunction, menopause, high blood pressure, rheumatoid arthritis, trauma or fractures of the wrist, positioning of wrists while using mouse and keyboard, prolonged exposure to vibrating tools. Diabetes and other metabolic disorders usually directly affect the nerves making CTS-related symptoms more prevalent (Phalen, et al., 1950). Movements that involve the grasping of objects along with holding partly or entirely by the whole hand is known as prehensile movement while movements that involve no grasping but pushing or lifting of objects by abrupt hand movements is known as non-prehensile movements. Daily, human perform multiple purposeful activities by hand that involves securely holding the object precisely or even freely mobile activity that only involves pushing. In relation to that human grip is classified as a power grip and precision grip (Napier, 1956; Edin & Abbs, 1991).

Edin and Abbs, (1991) reported in a cross-sectional survey at MCB bank of Faisalabad Pakistan to discern the prevalence of carpal tunnel syndrome (CTS) and any practical problems in computer users working. It was found that there was a strong association between computer use and CTS. Computer users were more suffering from problems in their functional status (Edin & Abbs, 1991). Another cross-sectional study was conducted on dentists working in Riyadh to find out the frequency of CTS-related symptoms and categorize factors associated with CTS. There was significant relationship was found between the occurrence of symptoms and marital status, age, exercise, and occupation period (Alhusain, et al., 2019).

Amir et al (2018) in Peshawar Naseer teaching hospital conducted a cross-sectional study to identify the demography and clinical features of patients with CTS bilateralism with sensory symptoms like weakness, tingling, nocturnal and daytime pain was frequently experiential. Malibary et al (2013) conducted a retrospective study at the Neuro-diagnostic laboratory at King Abdulaziz University Hospital, Saudi Arabia. CTS-related symptoms were confirmed in 640 of the patients with more dominance of symptoms in females. The overall age was considered in between 45- 55 years and most of the patients have bilateral CTS. Among unilateral 68% had right-hand CTS while the remaining had left. Only 14.6% had surgical decompression while the majority had conservative treatment.

2. MATERIALS AND METHODS

The present study was designed as a Cross-sectional survey. The sample comprised 400 IT professionals were included in the study. The study was conducted at the IT departments of Pak China Investment Company Limited, Attock Refinery Limited, and Pakistan Statistical House of Data. The duration set for the study was 6 months which included every part of the study. Individuals fulfilling the inclusion criteria were included in the study. The purposive sampling method was used for the selection of the sample. IT workers of both Genders with an Age limit of 30-50 years and doing 8 hours of duty per day were included in the study. Workers with a recent wrist fracture, pregnant ladies, Menopause, and Diabetes (type 1 and type 2) were excluded. A structured questionnaire, Phalen's test, Tinel sign, and Upper Limb Tension Tests (ULTT) for the median nerve was as data collection tools.

The study data was analyzed by using SPSS 23 software and inferential and descriptive statistic was applied. Mean and standard deviation was calculated for continuous variables. Frequencies and Percentages were calculated for dependent and categorical variables. Co-relations were calculated through bivariate Pearson. The results were analyzed in graphical and tabular form. The approval of the study was taken from the ethical review committee of Riphah International University Islamabad. No potential harm was given to the selected individual and their confidentiality was maintained.

3. RESULTS & FINDINGS

A total of 400 participants were selected from the IT departments of Pak China Investment Company Limited, Attock Refinery Limited, and Pakistan Statistical House of Data. Every participant provided a written consent form before the assessment for CTS. The results of different variables we concluded in this study (demographics, frequency of CTS, and associated risk factors) Out of 400 participants the total numbers of males reported were 212 (53 %) and females reported in this study were 188 (47%). The mean age ± SD of participants reported was 43.05 ±7.71 years. The mean age ± SD of male participants was 44.3± 7.36 years

and the mean age ± SD of female participants was 41.5± 7.83 years as shown in Table 1.

Table 1
Age variation between genders

Gender	Age (Mean± SD)	Frequency	%
Male	44.3±7.36	212	53%
Female	41.5±7.83	188	47%
Total	43.05 ±7.71	400	100.0%

The demographics of the participants were compared based on gender, department, and university which are further going to be described concerning other research variables and their graphical and tabular forms are going to be presented further in this study. The first component related to CTS is the total working hours of each individual. From the total of 400 individuals, 223(55.7%) were reported to work for 8 hours a day. Out of 400 total participants, 97(24.3%) participants reported that they work for 10 hours a day, whereas 80(20.0%) reported that they work for 12 hours a day. For mean ± SD of total working hours came out to be 9 ± 1.58 as total working hours per day.

Phalen's test was performed by the participants to check the CTS-related symptoms. Out of 400 147(36.8%) of the participants indicated symptoms of CTS in their right arm when performing this test while 211(52.8%) indicated no symptoms in their right arm. When the same test was performed for the left arm only 15(3.8%) reported abnormal sensations while 27(6.8%) reported no symptoms of CTS. The difference in right and left arms varies because right-handed people were more in number than left-handed people as shown in Table 2.

Table 2
Phalen's test was performed by the participants to check the prevalence of Carpal Tunnel Syndrome (CTS)

Arm R/L	Frequency	%
Right Arm positive	147	36.8%
Right Arm Negative	211	52.8%
Left Arm Positive	15	3.8%
Lefts Arm Negative	27	6.8%
TOTAL	400	100

For Tinel signs 118(29.5%) reported abnormal sensation when done on the right arm while 193(48.3%) indicated no signs of CTS on their dominant hand. For the left arm, 22(5.5%) indicated numbness and tingling in their left arm as a result of the Tinel sign whereas 67(16.8%) indicated no pain and other symptoms as shown in Table 3.

Table 3
Tinel sign was performed by the participants to check the prevalence of Carpal Tunnel Syndrome (CTS)

Arm R/L	Frequency	%
Right Arm positive	118	29.5%
Right Arm Negative	193	48.3%
Left Arm Positive	22	5.5%
Lefts Arm Negative	67	16.8%
Total	400	100

When Upper Limb Tension Tests (ULTT) were performed passively bilaterally on both the right and left arm to check for the signs and symptoms of median nerve entrapment 145(36.3%) reported pain while 182(45.5%) reported no pain in the right arm. For the left arm, 22(5.5%) had positive ULTT for the median in the left arm while 51(12%) reported no signs and symptoms while performing this test as shown in Table 4.

Table 4
Upper Limb Tension Tests (ULTTs) were performed by the participants to check the prevalence of Carpal Tunnel Syndrome (CTS)

Arm R/L	Frequency	%
Right Arm positive	145	36.3%
Right Arm Negative	183	45.5%
Left Arm Positive	22	5.5%
Lefts Arm Negative	50	12.8%
TOTAL	400	100

Discussion

The use of modalities in carpal tunnel syndrome (CTS) can also be helpful to treat CTS to some extent. The modalities includes the use of cold or heat treatments to reduce pain. Night splint are used to decrease discomfort and pain. Conservative cure is advocated in the moderate and reasonable stage of CTS and contains steroid injections, splinting, oral steroids, and ultrasounds (Nordstrom, et al., 1998). Meanwhile, the effects of some lookup studies have depicted the recommended effect of photo bio modulation as well as nerve and tendon gliding workout routines in non-operative cure. Bartkowiak, et al., (2011) at Poznan University of Medical Sciences in March 2009 conducted research to find out the effectiveness of modalities in carpal tunnel syndrome. There were two groups of patients that were categorized as low-level laser therapy (LLLT) and ultrasound therapy. LLLT was administered to one group, while ultrasound therapy was administered to the other. Additionally, both groups received nerve and gliding exercises. The goal of this experiment was to evaluate and contrast the therapeutic effectiveness of low-level laser treatment and ultrasound therapy used in combination with tendon and nerve gliding exercises. Results showed that nerve and tendon gliding exercises were more beneficial to patients with CTS as compared to the use of modalities like ultrasound and laser therapy.

Work Site modifications are the most important in the context of CTS among IT professionals. A work site area must be modified for the IT professionals if they work by sitting on the seat at a desk and working on a computer, the keyboard needs to be in perfect alignment to assist keep away from working in a bent wrist position If an IT professional works while seated at a desk and using a computer, the workspace has to be adjusted. The keyboard must be perfectly aligned to help prevent working with a bent wrist (Östergren, et al., 2005). Increasing the size of tool and utensil handles by employing additional material for a more comfortable grip if vibration is a problem at work, wear anti-vibration gloves or wrap anti-vibration wraps around gadget handles. Consideration must be given to domestic and recreational activities, with advice like wearing gloves to keep the wrists and hands warm and avoiding sports that make the illness worse, including racquet sports, until signs and symptoms go away (Ohta, et al., 2007).

4. CONCLUSION

It was concluded that a relatively low prevalence of carpal tunnel syndrome was found among IT professionals. However, IT professionals were also experiencing transient discomfort and pain in their wrist/hand region due to their work. This unpleasant experience of pain and discomfort could be a future predictor of carpal tunnel syndrome.

Competing Interests

The authors have declared no competing interests.

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