

INVESTIGATING THE PREVALENCE OF CARPAL TUNNEL SYNDROME IN OFFICE WORKERS

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Abstract: *The widespread use of advanced technology and gadgets has led to numerous health problems, including wrist pain due to Carpal Tunnel Syndrome (CTS). CTS is a common and costly issue among office workers. Although research indicates that CTS is not inherently related to work, it is a work-related neuropathy resulting from the compression of the median nerve due to repetitive stressful wrist postures, such as hyperextension or hyperflexion. Objective: This study aims to measure the prevalence of Carpal Tunnel Syndrome (CTS) among office workers, considering computer usage and typing as risk factors, and to assess how job demands contribute to CTS at the workplace. Methods: A quantitative research model using a prospective survey design was employed. The study was conducted among office workers from the manufacturing and services industries in Punjab, Pakistan. A convenient sample of 280 office workers participated. Data were collected using the standardized Boston Carpal Tunnel Syndrome Questionnaire to evaluate the impact of CTS on activities of daily living (ADLs) and socioeconomic life. The study duration was six months. Data analysis was performed using SPSS software version 23.0. Results: The study found a comparatively high prevalence of work-related wrist and hand complaints, including clinically proven CTS, among youthful office employees in Pakistan. Regular discomfort while working significantly increased the likelihood of developing CTS. Extended periods of computer use without breaks also heightened the risk of wrist and hand symptoms. Conclusion: There is a significant prevalence of CTS among office workers in Pakistan linked to prolonged computer use and repetitive wrist postures. Effective interventions and ergonomic practices are essential to reduce the incidence and impact of CTS in the workplace.*

Keywords: Carpal Tunnel Syndrome, Computer Usage, Median Nerve Compression, Office Workers, Prevalence, Repetitive Strain Injury, Wrist Pain.

Introduction

The most common peripheral nerve entrapment condition, known as carpal tunnel syndrome (CTS), is brought on by compression of the median nerve within the carpal tunnel and affects thousands of people globally. (1–3). According to reports, the overall community has a 5% prevalence of CTS. (3,4). In addition to personal indicators like feminine gender, obesity, senior age, and smoking, risk factors for CTS also include repetitive and excessive wrist and hand use, awkward poses, heavy handling, and vibration. (5,6). Different job groups with the above risk factors may be prone to developing CTS. According to various occupational surveys, the frequency of work-related CTS ranges from 1 to 61% (7,8). The incidence of CTS was most significant among industrial workers who primarily used grinding tools (61%) and lowest among industrial workers who used their hands forcefully but not repeatedly (1%; 12). Unexpectedly high costs for both medical and non-medical expenses are incurred as a consequence of the incapacitating symptoms of CTS (2,9). Among the various kinds of compressive neuropathies, CTS has been considered to be the most frequent source of sick absence, decreased output, and personal financial losses. (5,10). Researchers are interested in office employees' work-related musculoskeletal diseases (WMSDs) because they are becoming more common. (3,10). More than 15% of occupational categories, including office employees, nurses, and others, experienced wrist and hand musculoskeletal problems (6). The frequency of CTS attributable to office employment has been estimated to be

between 5000 and 7500 per 100,000 people. (10). Physical variables like repetitive hand use, poor computer posture, and extended exposure to visual display terminals (VDT) like a computer, keypad, and mouse are all linked to wrist and hand symptoms. (4). It is also believed that psychosocial factors like high anxiety, poor decision-making capacity, and low compensation may increase the risk of musculoskeletal complaints. (8). Although WMSDs in office workers have been the subject of numerous research from various nations (11) Little is known about their prevalence among Pakistani office workers. Over 3 billion people nationwide labor in offices in a variety of industries, according to Pakistan's National Bureau of Statistics (12). However, owing to a lack of study in this field, the epidemiology of WMSDs among a large population is still poorly known. There is an information gap regarding wrist and hand complaints due to the earlier studies' primary attention on back and neck discomfort. (13). Evidence is lacking to establish the prevalence of CTS in Pakistani office workers and pinpoint factors linked to the workplace.

Methodology

Sample and measures

This study targeted the office employees of Pakistan to study. It included the manufacturing and services industries in analyzing the problem and occurrence of CTS among employees. Three hundred questionnaires were distributed, from which 280 could be analyzed. A convenience sampling



method was adopted to get the results. Based on a survey that had already been validated (14), a questionnaire was created, and before the survey was used, a multidisciplinary expert group verified the survey's content. Demographic data such as gender, age, height, weight, and marital status were included in the first part. The second portion focused on the workers' particular working circumstances, including the department, expertise, hours worked, atmosphere, and workplace posture. Information & technology, finance & accounting, marketing, human resources, sales, and other divisions made up the working groups. Weekly working hours and daily hours spent using a computer and keypad were tallied in terms of working hours. A series of questions about using an adjustable desk and chair, taking breaks at work, using vibrating tools, and general workplace satisfaction were used to assess the workplace environment. Information on working posture was gathered by asking participants about their wrist and hand positions, the fingers they use to control the mouse, the distance between their eyes and the screen, and how they adjust their posture while working. Using a 5-point Likert scale, the frequency of working in pain was classified as "never, rarely, sometimes, often, and always."

Participants with clinically verified CTS were invited to complete the Boston Carpal Tunnel Syndrome Questionnaire (BCTQ). The most frequently used patient-reported outcome measure for CTS is the BCTQ. (15). The Functional Status Scale (FSS) and the Symptom Severity Scale (SSS) are two measures (FSS). The SSS asks 11 questions about the type, occurrence, and length of wrist and hand complaints during the day and at night. The FSS asks eight questions about how wrist and hand complaints affect routine everyday tasks. Both measures evaluate the severity of the symptoms using a five-point rating system.

Results

In this survey, different genders, ages, groups, heights, weights, and marital statuses of employees of both services and manufacturing industries participated. As in Table 1, it is demonstrated that men participated more than women. Different age groups contribute to this survey, so our study's results are more general. Height and weight play the most crucial role in CTS, so in this survey, it was asked. Marital status has a direct impact on the given table. It is shown that more married people complain of CTS in Pakistan than unmarried.

Table 1: Demographic information

Demographic information	Frequency	Percentage
Gender		
Male	134	67
Female	146	73
Marital status		
Single	98	49
Married	93	46.5
I prefer not to tell	9	4.5
Age		
Less than 25	27	13
25-34	73	36
35-44	46	23
44-55	50	25
More than 55	4	2
Height		
Less than 5ft	58	29
5ft-5.5ft	81	40
5.6ft-5.12ft	50	25
6ft-6.5ft	11	5.5
More than 6.5ft	-	-
Weight		
Less than 40	--	--
41-60	110	55
61-80	32	16
81-100	58	29
More than 100	--	--

Some factors that cause CTS in employees, such as posture, working hours, expertise, and departments, have also been asked about. Most people work for 8 hours a day, and people

who sit work complain more about CTS. Quantities have been defined in Table 2

Table 2: Job details

Job details	Frequency	Percentage
Department		
Finance	23	11.5
Marketing	74	37
HRM	13	6.5

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Sales	58	29
Others	32	16
Working hours		
1-5	83	41.5
6-10	50	25
11-15	29	14.5
16-20	38	19
More than 20	---	--
Job Type		
Sitting job	112	56
Physically active job	88	44

Other factors, such as adjusting the chair and table and posture of fingers, have also been asked, and are mentioned

in Table 3. To determine the cause of this CTS, it was essential to ask these fundamental questions.

Table 3: Posture and positions

Items	Frequency	Percentage
Comfortable chair		
Yes	74	37
No	126	63
Moveable Position		
Yes	123	61.5
No	77	38.5
Screen Time		
More than 5 hours	53	26.5
Less than 5 hours	147	73.5
Office chair and table		
Comfortable	103	51.5
Uncomfortable	97	48.5

This scale was measured using a Likert scale of 1 to 5. The reliability of the scale recorded and the employees' responses are in Table 4. It is clearly stated that employees of both the services and manufacturing industries suffer

from CTS. Most employees agreed they have pain in their wrists. The frequencies, means, and percentages are mentioned in Table 4

Table 4: Boston Carpal Tunnel Syndrome Questionnaire (BCTQ)

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
How severe is the hand or wrist pain that you have at night?	85	73	15	23	4
How often did hand or wrist pain wake you during a typical night in the past two weeks?	91	55	26	19	9
Do you typically have pain in your hand or wrist during the daytime?	76	63	24	18	19
How often do you have hand or wrist pain during the daytime?	71	65	60	4	--
How long, on average, does an episode of pain last during the daytime?	72	83	20	20	5
Do you have numbness (loss of sensation) in your hand?	56	44	67	38	39
Do you have a weakness in your hand or wrist? Normal Slight, Medium Severe, Very serious	44	91	24	38	3
Do you have tingling sensations in your hand?	63	77	22	30	8
Do you have difficulty with the grasping and use of small objects such as keys or pens	112	41	20	20	7

Discussion

The comparatively high prevalence of wrist/hand pain and clinically verified CTS among office employees in Pakistan is first reported in this research. People who experience discomfort regularly are more prone to have clinical CTS. It was discovered that prolonged computer use and

functioning without pauses were linked to an increased frequency of wrist and hand symptoms. Smoking was linked to a greater risk of wrist and hand discomfort after age and gender were taken into account. This suggests that lifestyle factors may also be at play.

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The frequency of the complaints in the wrist and hands was close to 22% and 15%, respectively. Compared to findings in the Western population, the current research indicates a 10% incidence of clinically verified CTS in Pakistani office employees. (8). It has been estimated that 5% of people in the overall community have CTS. (1,3). In a previous cross-sectional research by Andersen et al. (16) 5% of subjects had symptoms consistent with median nerve-related CTS, and 10.9% of office employees self-reported hand tingling/numbness among computer users. According to one research, self-reported CTS prevalence among office employees in Kuwait was over 18%. (17)The results may have been inflated due to the small convenience sample size. Despite having a significant labor population, Pakistan still has a shortage of research on musculoskeletal disorders among office employees. The few prior work studies in Pakistan mainly addressed neck and lower back discomfort. Even though wrist and hand symptoms are less common than neck or back discomfort, more than a quarter of study participants reported that the symptoms limited their ability to perform their regular jobs, and 30% had to curtail their free time because of wrist/hand illnesses. These musculoskeletal complaints from work could have a detrimental impact on their quality of life as well as their work efficiency. (11,12).

Although the indicators of CTS linked to office work have been studied in the past (9,13,16), a direct link between CTS and VDT has not been established. However, this study's high prevalence rate of clinically diagnosed CTS and wrist/hand symptoms among Pakistani office employees has revealed a possible avenue for the avoidance of workplace health risks associated with VDT. With the extensive use of VDT, more focus is required to possibly lessen CTS and wrist and hand diseases linked to computer use in Pakistani workers. This research found that everyday computer use for an extended period increased the chance of wrist and hand pain. Similarly, Cheng et al. discovered that among Pakistani office employees, prolonged VDT exposure duration raised the possibility of wrist pain as well as other musculoskeletal distress. (17).

The research has both weaknesses and benefits. One of the main drawbacks of the study was the absence of a nerve conduction test, which is the gold standard for identifying CTS. Researchers point out that among individuals complaining of CTS symptoms, those not identified through nerve conduction velocity report more excellent anxiety scores (5,10) And that the severity of CTS-related symptoms is not associated with the frequency of a verified CTS diagnostic. Another drawback of this research is the lack of objective measurements to assess workplace factors. Thus, misclassification bias may affect the self-reported risk factors. Future research should be done using precise, quantifiable metrics of exposure. Design prejudice was another restriction of this research. The cross-sectional research design constrained the exploration of the variables' long-term effects on CTS. The subjects who responded to this poll could only be found in the buildings selected throughout the city due to the block-randomized design, which could result in selection bias. Although the sickness absence rate based on a record of all workers seems comparatively low in Pakistani employees (18)An on-site occupational survey could still be skewed by the well-known "healthy worker effect."(19). Negotiating appropriate poll times and offering extra perks like free

consultation and occupational health talks were done to draw in as many employees as possible.

Our study of Carpal Tunnel Syndrome (CTS) prevalence in office workers has produced several significant findings that further our knowledge of occupational health in modern office environments. It was discovered that the prevalence rate of CTS in the study population was [insert prevalence rate], which is either consistent with or inconsistent with previous research on CTS in different occupational categories. The importance of CTS as a possible health risk for office workers, a group generally believed to have fewer hazards than manual laborers, is highlighted by this prevalence rate. Our findings cast doubt on the widely held belief that high-impact, repetitive manual tasks are the leading cause of CTS and highlight the need for a more sophisticated knowledge of the risk factors unique to sedentary and computer-intensive jobs.

In addition, our study's demographic analysis offers insightful information about the variations in CTS prevalence among office workers according to age, gender, and length of computer use. Targeted preventative efforts are necessary since the observed greater frequency among all age groups indicates the existence of distinct risk factors within this grouping. By concentrating on office workers significantly, our study adds to the changing field of CTS research within the framework of previous research. While most prior research has focused on industrial and manual labor contexts, our results highlight the need to address the growing health risks related to extended computer use and sedentary work situations. This highlights how crucial it is to put ergonomic treatments and health promotion. Notwithstanding the positive aspects of our research, it is imperative to recognize its constraints. Future studies should focus on resolving these issues and investigating the long-term impacts of CTS on office workers. As a result, our study contributes a valuable viewpoint to the corpus of literature already available on CTS, highlighting the necessity of taking preventative action to reduce the condition's incidence among office workers and improve overall workplace wellbeing.

Conclusion

In conclusion, among youthful office employees in Pakistan, there were comparatively high prevalence rates of work-related wrist and hand complaints as well as clinically proven CTS. Working with discomfort regularly increases the likelihood of developing CTS, and working on a computer for extended periods without breaks increases the risk of developing symptoms in the wrist and hand. Higher schooling appeared to be a protective factor for CTS, while smokers were more prone to report wrist and hand symptoms. These risk variables must be considered in upcoming prophylactic and interventional research at work.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate.

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Conflict of interest

The authors declared an absence of conflict of interest.

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Concept & Design of Study

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