RESEARCH PAPER

Prevalence of Positive Phalen's Test and Symptoms Suggestive of Carpal Tunnel Syndrome Among Computer Users in Nationalised Banks of Latur City: an Observational Study

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ABSTRACT

Background: Carpal tunnel syndrome (CTS) arises when the median nerve is squeezed as it passes through the wrist, giving rise to numbness, tingling, pain and weakness in the hand. Repetitive wrist movements, awkward postures and long hours of keyboard and mouse use are recognised occupational risk factors, yet bank employees have received little attention in the Indian literature.

Objective: To estimate the proportion of computer-using employees of nationalised banks in Latur city with a positive Phalen's test, and to describe their symptom severity and functional status.

Methods: This observational study recruited 100 of 160 approached bank employees aged 25–45 years by convenience sampling. Participants completed the Boston Carpal Tunnel Questionnaire (BCTQ; symptom severity and functional status scales) in a face-to-face interview and underwent Phalen's test. Data were summarised as frequencies and percentages, and the association between years of work experience and Phalen's test result was examined with the chi-square test.

Results: Seventy participants were men and 30 were women. Phalen's test was positive in 27% of participants. Symptom severity scores showed no symptoms in 55%, slight symptoms in 21%, medium in 22% and severe in 2%; for functional status, 83% reported no difficulty, 13% little difficulty and 4% moderate difficulty. Test positivity rose from 9.5% among those with up to 5 years of experience to 66.7% among those with more than 20 years ($\chi^2 = 14.34$, df = 4, $p = 0.006$).

Conclusion: More than one in four computer-using bank employees in this sample had a positive Phalen's test, and positivity increased with length of service. Ergonomic education and early screening are advisable in this occupational group. Confirmation by nerve conduction studies is needed in future work.

Keywords: Carpal Tunnel Syndrome; Median Nerve; Phalen's test; Boston Carpal Tunnel Questionnaire; Computer Users; Bank Employees; Occupational Health..

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1.INTRODUCTION

At the wrist, the median nerve runs through a tight, unyielding channel of bone and fibrous tissue that functions like a sealed compartment. Pressure on the nerve inside this channel produces CTS, whose hallmarks are altered sensation and muscle weakness in the hand [1]. The condition is linked to repeated or sustained wrist flexion and extension and to gripping tasks [1]. Workers whose jobs involve repetitive actions or prolonged fixed postures are known to carry a higher risk of work-related musculoskeletal disorders [2]. Such movements raise the pressure within the carpal tunnel, which can reduce blood supply to the median nerve and impair its conduction [3].

Computer work exposes the wrist to many of these conditions. A poorly positioned monitor, keyboard or mouse forces the wrist into awkward angles and is a recognised ergonomic contributor to musculoskeletal complaints [4]. Even ordinary activities such as reaching and gripping can become harmful when rest and recovery time are inadequate [5,6]. The principal risk factors are forceful exertion, repetition, awkward posture and localised contact stress. They are usually divided into occupational factors, relating to the task and its environment, and personal factors such as age, sex, body build and medical history. Earlier work reported that workers in repetitive jobs more often had pain, paraesthesia and night pain, and more often had a positive Phalen's sign, than workers in non-repetitive jobs [1].

CTS has been studied in several occupational groups in India, including auto-rickshaw drivers, diamond jewellery workers and factory workers, but bank employees, who work at computers for most of the day, have been examined much less. Because CTS arises from cumulative trauma and its early features are subtle and overlap with other conditions, early recognition is difficult. The present study therefore set out to estimate how often a positive Phalen's test occurs among computer-using employees of nationalised banks in Latur city and to describe their symptom severity and functional limitation using the BCTQ.

Objectives

To determine the proportion of computer users in nationalised banks of Latur city with a positive Phalen's test. To describe symptom severity using the symptom severity scale (SSS) of the BCTQ & describe functional status using the functional status scale (FSS) of the BCTQ.

2. REVIEW OF RELATED STUDIES

Kadam and colleagues surveyed 100 auto-rickshaw drivers in a validated self-designed questionnaire combined with a special test and estimated the prevalence of CTS at 23% [1]. Ganjave and Ganatra studied 100 diamond jewellery workers in Mumbai by questionnaire and found CTS symptoms in 37% [2]. In a study of manufacturing workers in Haryana (n = 90), Kumar and co-workers found that a higher body mass index and a lower pinch strength were associated with a greater likelihood of CTS symptoms [4]. Tanaka and colleagues used a nationwide survey of working adults to relate work-related and other personal risk factors to self-reported CTS [11]. Among bank staff, Aslam and colleagues used the BCTQ in a Pakistani bank and found 61% of computer users to be positive, and reported a strong relationship between computer use and CTS [8].

3. METHODS

3.1 Design, setting and participants

This observational (cross-sectional) study was carried out over six months in nationalised banks in Latur city. Approximately 160 employees were approached, and 100 who satisfied the eligibility criteria were enrolled by convenience sampling. Men and women aged 25–45 years who worked on computers in nationalised banks were eligible. Those with a recent wrist fracture, structural deformity of the hand or wrist, other soft-tissue hand injuries, collagen or metabolic disorders, or pregnancy were not included.

3.2 Outcome measures

Boston questionnaire. The BCTQ is a self-reported tool made up of two scales: the SSS has 11 items and the FSS has 8, each rated from 1 (no symptom or difficulty) to 5 (most severe symptom, or unable to perform the activity). Test–retest reliability of both scales is high, with correlation coefficients of 0.8–0.9 [12].

Phalen's test. Phalen's test is a provocative manoeuvre used to help identify CTS. The participant holds both wrists in full flexion, with the backs of the hands pressed together, for one minute. Reproduction of numbness, tingling or pain is recorded as a positive result.

3.3 Procedure

The study topic was approved by the Institutional Ethics Committee. Each eligible employee was briefed on the aims and steps of the study and signed a written consent form, with the understanding that they could withdraw at any time without giving a reason. Participants were then interviewed face to face, and a paper proforma and the BCTQ were completed for each of them. The BCTQ was then scored and Phalen's test was performed.

3.4 Statistical analysis

Data were entered in Microsoft Excel and analysed with SPSS version 20. Categorical variables are reported as frequencies and percentages. The association between years of experience (five categories) and Phalen's test result was tested with the chi-square test, and a p value below 0.05 was taken as significant.

4. RESULTS

4.1 Participant characteristics

All 100 participants completed the assessment. Seventy were men and 30 were women, and the sample was divided equally between those aged 25–35 years (n = 50) and those aged 36–45 years (n = 50) (Table 1, Figure 1). Length of service was 6–10 years in 38% of participants, up to 5 years in 21%, 11–15 years in 21%, 16–20 years in 17% and more than 20 years in 3% (Figure 2a). Most participants (71%) worked 8 hours a day, 15% worked 10 hours, 12% worked 9 hours and 2% worked 7 hours (Figure 2b).

Characteristic	n	%
Gender		
Male	70	70
Female	30	30
Age group (years)		
25–35	50	50
36–45	50	50
Work experience (years)		
≤5	21	21
6–10	38	38
11–15	21	21
16–20	17	17
>20	3	3
Working hours per day		
7	2	2
8	71	71
9	12	12
10	15	15

Table 1. Demographic and work characteristics of the participants (N = 100)

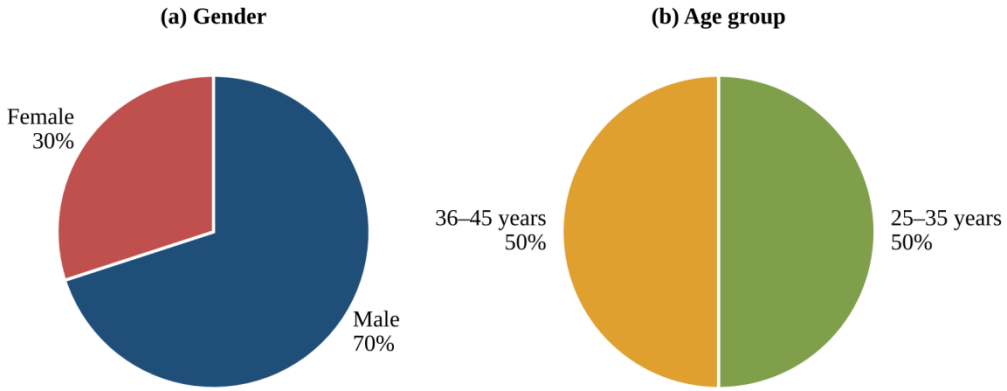


Figure 1. Distribution of participants by (a) gender and (b) age group.

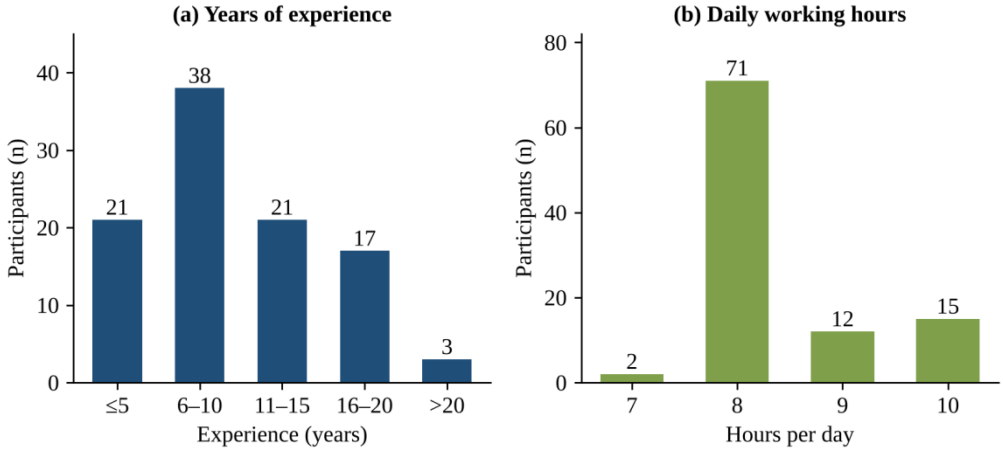


Figure 2. Distribution of participants by (a) years of work experience and (b) daily working hours.

4.2 Symptom severity and functional status

On the SSS, 55 participants (55%) scored 1 (no symptoms), 21 (21%) scored 2 (slight), 22 (22%) scored 3 (medium) and 2 (2%) scored 4 (severe); none scored 5 (Table 2, Figure 3a). In total, 45% reported symptoms of some degree. On the FSS, 83 participants (83%) had no difficulty, 13 (13%) had little difficulty and 4 (4%) had moderate difficulty, and no one reported intense difficulty or inability to perform an activity (Table 2, Figure 3b)

Table 2. Distribution of BCTQ symptom severity (SSS) and functional status (FSS) scores (N = 100)

Score category	SSS n	%	FSS n	%
1 (normal / no difficulty)	55	55	83	83
2 (slight / little difficulty)	21	21	13	13
3 (medium / moderate difficulty)	22	22	4	4
4 (severe / intense difficulty)	2	2	0	0
5 (very severe / cannot perform)	0	0	0	0

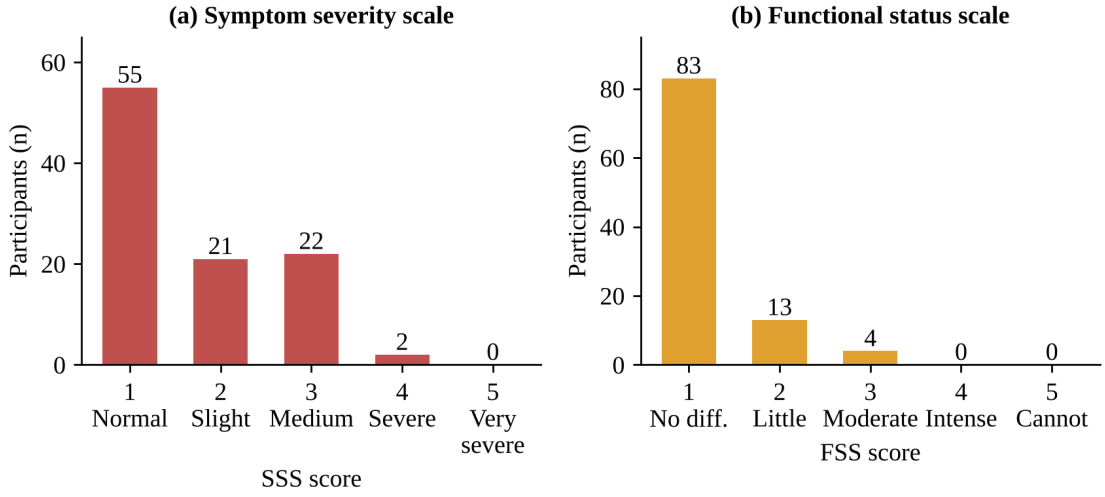


Figure 3. BCTQ results: (a) symptom severity scale and (b) functional status scale.

4.3 Phalen's test and work experience

Phalen's test was positive in 27 participants (27%) and negative in 73 (73%) (Figure 4a). The proportion with a positive result differed significantly across experience groups ($\chi^2 = 14.34$, df = 4, p = 0.006). Positivity was 9.5% (2/21) among those with up to 5 years of experience, 15.8% (6/38) at 6–10 years, 47.6% (10/21) at 11–15 years, 41.2% (7/17) at 16–20 years and 66.7% (2/3) beyond 20 years (Table 3, Figure 4b). The group with more than 20 years of service contained only three people, so its percentage should be interpreted with caution.

Table 3. Positive Phalen's test according to years of work experience

Experience (years)	Participants (n)	Positive (n)	Positive (%)
≤5	21	2	9.5
6–10	38	6	15.8
11–15	21	10	47.6
16–20	17	7	41.2
>20	3	2	66.7
Total	**100**	**27**	**27.0**

$\chi^2 = 14.34$, df = 4, p = 0.006.

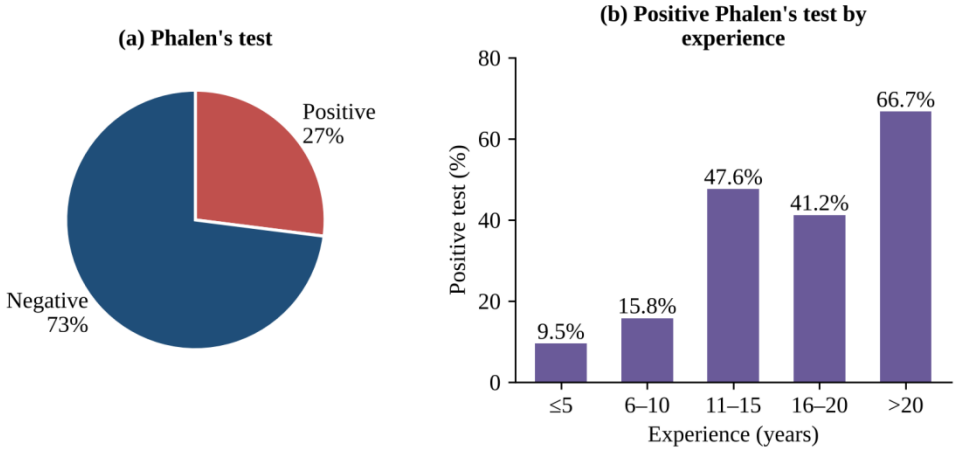


Figure 4. (a) Phalen's test result in the whole sample and (b) percentage of participants with a positive test in each experience category.

5. DISCUSSION

This study examined the occurrence of a positive Phalen's test, together with BCTQ symptom and function scores, in computer-using employees of nationalised banks in Latur. Just over a quarter (27%) tested positive. Although slightly under half of the sample reported some symptoms, almost all of these were slight or medium, and only 2% had severe symptoms. Functional limitation was uncommon: 83% had no difficulty with daily activities and none had more than moderate difficulty.

Earlier literature supports an association between prolonged computer use and CTS. CTS has been described as common among computer professionals, particularly those who use a computer for more than four hours a day [7]. In a Pakistani bank, Aslam and co-workers found 61% of computer users to be BCTQ-positive and linked this to computer use [8]. That figure is much higher than ours, which probably reflects the different case definition (a questionnaire alone versus a provocative test) and differences in workload and workstation set-up. They attributed the risk to poor placement of the mouse and keyboard and to awkward postures, and noted that repetitive hand movements with excessive wrist bending and twisting predispose to strain injury [9].

Our estimate is of a similar order to that in other occupational groups in Maharashtra. Kadam and colleagues reported a 23% prevalence in auto-rickshaw drivers using a self-designed questionnaire, with pain in 23%, tingling in 23%, numbness in 23%, weakness in 16%, restricted movement in 4% and night pain in 11% [1]. Ganjave and Ganatra found wrist pain in 47% of diamond jewellery workers and a positive Phalen's test in 37% [2]. Differences between occupations, tools and diagnostic definitions mean that these figures can be compared only broadly.

Several mechanisms may explain the findings. Wrist postures near the end of range, uneven loading and sustained static muscle activity increase mechanical stress on the muscles and surrounding joint tissues, and can lead to hand pain, tingling or numbness in the median nerve distribution and reduced grip strength [3]. When force is applied repeatedly to the tendons within the carpal tunnel over long periods, cumulative loading may cause small tears in soft tissue. Fatigue and high muscle tension add to the risk because the muscles become weaker and more prone to failure [10].

The most notable finding was the relationship between length of service and test positivity, which was statistically significant. Positivity was low in the first ten years of work, rose sharply after ten years, and was highest in the most experienced group. The rise was not strictly continuous, since the 16–20-year group was slightly lower than the 11–15-year group, and the oldest group was very small. Even so, the overall pattern is consistent with cumulative exposure: the longer the exposure to repetitive keyboard and mouse work, the greater the chance of a positive result. Length of service is partly confounded with age, which was not analysed separately.

Limitations

Several limitations should be noted. The sample was drawn conveniently from a single city and was fairly small, which limits generalisation. The age range was restricted to 25–45 years. Phalen's test is a screening manoeuvre and was not confirmed by nerve conduction studies, so the figure reported here indicates a positive screening result and not confirmed CTS. Some experience categories had few participants, particularly those with more than 20 years of service. Body mass index, diabetes, handedness and workstation ergonomics were not recorded and could not be adjusted for.

Future scope

Larger, multicentre studies covering other age groups and locations are warranted, preferably with sex-specific analysis, recording of ergonomic and anthropometric variables, and confirmation of cases by nerve conduction studies to grade severity.

6. CONCLUSION

In this sample of computer-using employees of nationalised banks in Latur city, 27% had a positive Phalen's test. Most symptoms were slight to medium and functional impairment was minimal, but test positivity increased significantly with years of service. Ergonomic education, workstation modification and periodic screening of long-serving employees are recommended, and electrodiagnostic confirmation should be included in future studies.

7.DECLARATIONS

Ethics: The study was approved by the Institutional Ethics Committee and all participants gave written informed consent. [Approval No - IEC/2022/UG-17/2022]

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REFERENCE

1. Kadam A, Bhalekar G, et al. Prevalence of carpal tunnel syndrome in auto-rickshaw drivers. Int J Health Sci Res. 2021. [volume, issue and pages to be added]
2. 2. Ganjave PD, Ganatra M. Prevalence of carpal tunnel syndrome in diamond jewellery workers. Int J Health Sci Res. 2020;10(6):57–61.
3. 3. Occupational Health Clinics for Ontario Workers Inc. Carpal tunnel syndrome: prevention through intervention.
4. 4. Kumar R, Kumar M, Beri R, Arora SA. Analysis of risk factors in carpal tunnel syndrome among automotive glass channel rubber assembly line workers. In: International Conference on Advances in Mechanical Engineering; 2011. p. 395–407.
5. 5. O'Connor D, Page MJ, Marshall SC, Massy-Westropp N. Ergonomic positioning or equipment for treating carpal tunnel syndrome. Cochrane Database Syst Rev. 2012;(1).
6. 6. Giersiepen K, Spallek M. Carpal tunnel syndrome as an occupational disease. Dtsch Arztebl Int. 2011;108:238–42.
7. 7. Ali KM, Sathiyasekaran BW. Computer professionals and carpal tunnel syndrome (CTS). Int J Occup Saf Ergon. 2006;12:319–25.
8. 8. Aslam K, et al. Prevalence of carpal tunnel syndrome in computer users working in MCB bank of Faisalabad, Pakistan. Rawal Med J. [year, volume and pages to be verified]
9. 9. Tamrin SB, Zakaria NS. The prevalence of carpal tunnel syndrome among counter workers in a telecommunication company. HFEM. 2016;1:68–76.
10. 10. Becker J, Nora DB, Gomes I, Stringari FF, Seitensus R, Panosso JS, Ehlers JA. An evaluation of gender, obesity, age and diabetes mellitus as risk factors for carpal tunnel syndrome. Clin Neurophysiol. 2002;113:1429–34.
11. 11. Tanaka S, Wild DK, Cameron LL, Freund E. Association of occupational and non-occupational risk factors with the prevalence of self-reported carpal tunnel syndrome in a national survey of the working population. Am J Ind Med. 1997;32:550–6.
12. 12. J Physiother. 2017;63:119. [full citation of the BCTQ appraisal to be added]