

# Association of Work Related Musculoskeletal Wrist Pain and Carpel Tunnel Syndrome among Painters in Lahore

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## ABSTRACT

**Background:** Carpal tunnel syndrome is the neurological disorder caused by the compression of the median nerve at the wrist and the symptoms are numbness and tingling sensations in the thumb, index, and middle finger or in lateral half of ring finger.

**Aim:** To determine the association of work related musculoskeletal wrist pain and carpal tunnel syndrome among the painters in Lahore.

**Study design:** Cross sectional.

**Sampling technique:** Non probability sampling.

**Methodology:** Using non probability sampling technique, a calculated sample of 187 painters irrespective of gender and age was approached. Subjects with previous history of wrist &/or hand surgery, trauma, congenital anomaly, nerve injury and/or cervical radiculopathy were excluded from the study group. Data was collected through a self administered questionnaire. Wrist pain was assessed on the basis of pain rating Visual Analog Scale (VAS). Painters were categorized into different categories viz painters who were Normal/Healthy (having no pain and/or numbness and tingling sensation in wrist or hand), Painters having only pain without any numbness and tingling sensation in wrist or hand, painters having any numbness and tingling sensation in wrist or hand alone without any pain.

**Results:** Mean age of the study subjects was 37.73±12.3 years. The results of this study have shown that the prevalence of wrist pain among painters is 93(49.7%). 24(12.8%) painters were reported to have only symptoms of numbness and tingling sensations while 37(19.8%) were having pain, numbness and tingling sensation at the same time. 33(17.6%) subjects were identified as healthy in terms of wrist pain, numbness and tingling. CTS was detected in 37(19.8%) painters and it was significantly associated with painters having pain, numbness and tingling sensation at the same time, as Reverse Phalen's test was positive in all these subjects.

**Conclusion:** CTS was significantly associated with painters in terms of work related musculoskeletal wrist pain as Reverse Phalen's test was positive in all subjects presented with wrist pain, numbness and tingling sensation at the same time but it was not associated with pain only as Reverse Phalen's test was negative in all subjects that were reported to have wrist pain only.

**Keywords:** Occupational disorder, public health, carpal tunnel syndrome, physical therapy.

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## INTRODUCTION

Carpal tunnel syndrome is the pathological peripheral mononeuropathy which is caused by the increase in the tissue pressure in the carpal tunnel leading towards pressure damage of median nerve which ultimately results in sensory as well as motor failures in the affected area<sup>1</sup>. There are nearby rising experimental facts which tells that the development of the Carpal tunnel disorder was accelerated through extremely repeated physical work including uncomfortable hands/wrists posture in which there is flexion along with extension of hand, vigorous applications or else hands/limb shaking throughout job.<sup>2</sup> There are numerous intrinsic plus extrinsic risk components which are recognized but most commonly reported are increased age, body mass index and gender female.<sup>3</sup> In the work related risk components it is found that association of force with frequency plus the period of physical exertion are the main risk factors that increased the risk of carpal tunnel syndrome<sup>4,5,6</sup>. Carpal tunnel disorder have been noted in terms of work related disorder with amount of 506.45 into a British societies which is seen from the list of work

related disorders and on such instant Carpal tunnel disorder was ranked 6<sup>th</sup> amongst the identified work related disorders.<sup>7</sup> This study is an attempt to find the association of work related musculoskeletal wrist pain and carpal tunnel syndrome among painters so not only to identify the burden in this high risk group but also to guide our planning to take proper management adaptation which consist of splint, corticoid injections plus surgical treatment and having rest<sup>6</sup>.

## MATERIALS & METHODS

A cross sectional study, involving 187 subjects, from different areas in Lahore was conducted. Using non probability (Convenience) sampling technique, a calculated sample of 187 painters (estimated proportion: 0.61, desired precision of estimate: 0.07, confidence level: 0.95), irrespective of gender and age was approached. Subjects with previous history of wrist and/or hand surgery, trauma, congenital anomaly, nerve injury and/or cervical radiculopathy and involved in any other profession in addition to painter's job, were excluded from the study group.

**Data Collection:** Data was collected through a self administrated questionnaire. After taking informed verbal consent from the painters the demographic data was obtained. In the second part of questionnaire the wrist pain was assessed on the basis of pain rating Visual Analog Scale (VAS). Painters were categorized in different categories viz Painters who were Normal/Healthy (having no pain and/or numbness and tingling sensation in wrist or hand), Painters having only pain without any numbness and tingling sensation in wrist or hand, Painters having any numbness and tingling sensation in wrist or hand alone without any pain and Painters having pain as well as numbness and tingling sensation at the same time.

Subjects were inquired about average duration of pain during the day time. Subjects were also asked about interference with daily activities (such as eating or bathing) while having wrist pain.

In conjunction with Tinel's test Reverse Phalen's test was applied in all subjects (as respondents were unable to properly report their feeling of being normal or having any pain, numbness and tingling sensation) to diagnose Carpal tunnel syndrome (CTS) in which hand or wrist pain with symptoms of numbness and tingling sensations occurs in the thumb, index, middle finger and lateral half of ring finger<sup>9</sup> when the test is applied.

**Statistical analysis:** Data was entered and analyzed using SPSS version 25. The results were shown in the form of graphs and charts. Qualitative data were presented in the form of % ages and graphs while mean±S.D was used for quantitative analyses. Fisher's exact test and Pearson Chi-square test was used to see any significant association. P-value ≤ 0.05 was considered significant.

**RESULTS**

The mean age of the study subjects was 37.73±12.3 years with minimum age of 18 years and maximum of 65 years. Histogram of visual analog scale (VAS) shows mean of 3.43±2.8 (Fig. 2). The results of this study have shown that the prevalence of wrist pain among painters is 93(49.7%). 24(12.8%) painters were reported to have only symptoms of numbness and tingling sensations while 37(19.8%) were having pain, numbness and tingling sensation at the same time. 33(17.6%) subjects were identified as healthy in terms of wrist pain, numbness and tingling.

Fig1: Histogram of Visual Analog Scale (VAS)

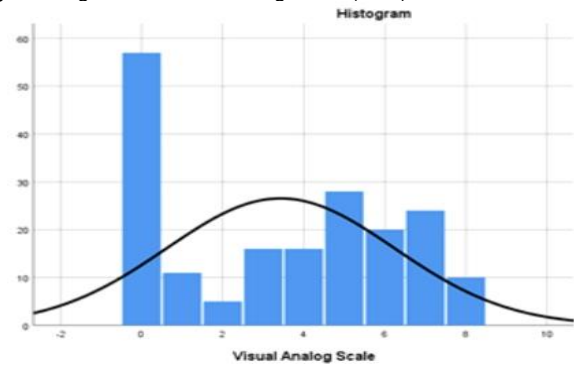


Table 1 shows the association of different categories of Subjects with Reverse Phalen's Test in terms of work related wrist pain and CTS. P-value <0.01 shows that significant association exists that mean CTS is significantly associated with painters in terms of work related musculoskeletal wrist pain as Reverse Phalen's test is positive in all subjects presented with wrist pain, numbness and tingling sensation at the same time. More over it was also observed that painters diagnosed with CTS were having repeated movement at the wrist and working for long duration of time.

Fig 2: Categories of Subjects

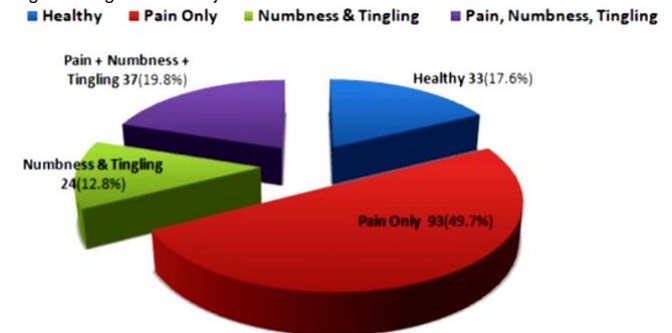


Table1: Association of different Categories of Subjects with Reverse Phalen's Test

Reverse Phalen's Test	Healthy (No Pain, Tingling, & Numbness)	Pain	Numbness & Tingling	Pain, Numbness, Tingling	Total
Positive	00	00	00	37	37(19.8%)
Negative	33	93	24	00	150 (80.2%)
Total	33(17.6%)	93(49.7%)	24(12.8%)	37(19.8%)	187

P value<0.01

**DISCUSSION**

This study was conducted to find the Association of workrelated musculoskeletal wrist pain and carpal tunnel syndrome among the painters in Lahore. According to the results of Thomas Heilskov-Hansen et .al<sup>9</sup> which was conducted among the Danish males and females house paintersit isconcluded that the high velocity plus repeated wrist motion was the workrelated risk factor for the carpal

tunnel disorder as well as there was no association of the carpal tunnel disorder by a non-neutral wrists posture plus exposure duration.

These results are quite comparable with that of the results of this study. In this study we found that the repeated movement at the wrist as well as those painters that were working for long duration of time is at the risk factor for the development of carpal tunnel syndrome. This study found that there is positive association of the carpal

tunnel syndrome with the repeated movement at the wrist as well working prolong period of time.

In a study conducted by Carisa Harris-Adamson et.al<sup>10</sup> out of 881 males 51 had carpal tunnel syndrome and in 717 females 58 had carpal tunnel syndrome so the total prevalence of carpal tunnel syndrome was 109(67%) with the mean age of 40.3±10.8 years. The results of the study have concluded that the high job strain in which there is force full repetition rate along with the percentages of time in which there is hands force full exertions are the independent risk factors for the Carpal tunnel disorder and dominance of carpal tunnel syndrome were shown in both right and left handed. These results are comparable with this study in terms of gender and age as in our community this particular profession predominantly involves males so all of our participants in this study were males. While in context of age this study was able to compare the results with the results of Carisa Harris-Adamson et.al<sup>10</sup> as mean age of the study participant is 33.64±12.3.

According to the study of Susan Burt et.al<sup>11</sup> which was done to find the work place and individual risk factors for carpal tunnel syndrome, they concluded that quantitative and ratings based job exposures were associated with the carpal tunnel syndrome and obesity increased the association between the frequency of exertion and carpal tunnel syndrome. While in comparison the results of this study has concluded that occupational factors that lead to development of carpal tunnel syndrome are the repetitive movements as well as working for long duration of time. The association of obesity and body mass index (BMI) was not found in this study as these variables were not noted in this study.

Carisa Harris-Adamson et.al<sup>12</sup> conducted a study to find out the personal and workplace psychosocial risk factors for carpal tunnel syndrome. The results of this study have concluded that the Personal factors associated with an increased risk of developing Carpal tunnel syndrome were body mass index, age and being a woman. Workplace risk factors were high job strain, while social support was protective. High job strain increased risk (HR=1.86; 95% CI 1.11 to 3.14) with social support was protective (HR=0.54; 95% CI 0.31 to 0.95). Although our results are comparable with the results of Carisa Harris-Adamson et.al<sup>12</sup> in context of age and gender but psychosocial factors and personal factors were not analyzed so this study is unable to draw any conclusions regarding psychosocial and/or personal factors like BMI and obesity. These variables can be considered in future prospects to identify and elaborate the association of these variables with CTS. Moreover assessment of severity of symptoms and functional status in carpal tunnel syndrome should also be assessed to rehabilitate these subjects so they can adopt measures which help them to improve their occupational health and their efficiency of work.

## CONCLUSION

CTS was significantly associated with painters in terms of work related musculoskeletal wrist pain as Reverse Phalen's test was positive in all subjects presented with wrist pain, numbness and tingling sensation at the same

time. Although 93 (49.7%) of the painters were reported to have pain but CTS was not associated with pain only as Reverse Phalen's test was negative in all subjects that were reported to have wrist pain only. So it is concluded that presence of CTS must be confirmed not only through proper and effective diagnostic modality but also by the presence of related symptoms of CTS which not only include pain but numbness and tingling sensation as well.

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