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Prevalence of Carpal Tunnel Syndrome Among Two and Four Wheeler Drivers in Chennai – a Cross Sectional Study

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ABSTRACT

Background: Carpal tunnel syndrome is a condition caused by compression of median nerve which runs from fore arm into the palm of the forehand. The etiologies can include trauma, repetitive maneuvers, certain diseases, and pregnancy. The most common repetitive maneuver is driving of the vehicles which have become an inevitable cause for the people who are residing in metropolitan cities. Methodology: This study was done with the objectives of finding out the prevalence of carpal tunnel syndrome among vehicle users at Chennai during January to March 2013 as a cross sectional study. Results and Discussion: The results showed that 18.4% of the study participants were having symptoms of carpal tunnel syndrome and the factors associated were bad condition of road, more mechanical vibrations, traffic congestion and wrist discomfort while driving. The prevalence was found to be more among the general population, which needs immediate action by the government to reduce the traffic congestion and improvement of roads.

KEYWORDS: Carpal tunnel syndrome, vehicle users, road condition

Introduction

Carpal tunnel syndrome (CTS) is a median entrapment neuropathy, that causes paresthesia, pain, numbness, and other symptoms in the distribution of the median nerve due to its compression at the wrist in the carpal tunnel. The pathophysiology is not completely understood but can be considered compression of the median nerve that travels through the carpal tunnel. It appears to be caused by a combination of genetic and environmental factors (1). Some of the predisposing factors include: diabetes, obesity, pregnancy, hypothyroidism, and heavy manual work or work with vibrating tools, repetitive job related movements which involves wrist most commonly like computer operators, IT professionals, Call centre employees and chronic vehicle drivers. There is, however, little clinical data to prove that lighter, repetitive job related tasks can cause carpal tunnel syndrome (2). Most common lighter repetitive task involving wrist movements among general population is vehicle driving. These vehicle drivers constitute a bulk of the general population who exposed to the risk of carpal tunnel Syndrome silently. Although several studies were done among occupational drivers, the large scale studies among vehicle users of general population are much limited. So this study was done with the aim of finding out the prevalence of carpal tunnel syndrome and its associated risk factors among vehicle users in general population.

METHODOLOGY

This study was done as a cross sectional study among vehicle drivers in Chennai, during January to March 2013 among the adults of 18 years and above in both sexes. The study populations were randomly selected in different places of Chennai and the data was collected with the preformed and pretested questionnaire. The inclusion criteria used were, age above 18years, without history of any chronic medical illness like Diabetes and other predisposing factors and those who were driving the vehicle for at least 1 year and above duration. After getting the informed consent the questionnaire was applied to the study participants and they have been told about the purpose of the study and the maintenance of confidentiality. The informations in the questionnaire was on socio demographic profile (including occupation), total years of driving the vehicles, kind of vehicle (two or four wheeler), total kilometers of driving per day, driving hours per day, condition of the vehicle, road conditions, traffic congestion, wrist discomfort felt and the symptoms of carpal tunnel syndrome. The test for carpal tunnel syndrome like Tinel's sign and Phalen's test were also performed on the study participants. The sensitivity and specificity of the Tinel's and Phalen's test are 36%, 75% and 57% and 58% respectively (3). The study participants who were positive for both the test in either of the hand were considered to have carpal tunnel syndrome. The data were entered in MS excel sheet and the analysis of factors was done by Chisquare test using EPIINFO software.

RESULTS

A total of 500 study participants were interviewed of which 254 (50.8%) belonged to less than 18 to 40 years of age followed by 40 years and above 246(49.2%). Mean age of the study population was 40.3. Majority 461 (92.2%) were males and 200 (40%) were overweight and obese. Mean BMI of the study population was 25.03, mean hours of driving 5.04 per day and mean years of driving was 15.10. Two hundred and fifty six (51.2%) were drivers by occupation, 294 (58.8%) were driving the vehicle more than 10 years of duration, 165 (33%) were covering a mileage of above 100 kilometers per day and 216 (43.2%) were driving the vehicle more than five hours per day continuously or intermittently (Table 1). The most common vehicle driven was car 277 (55.4%), and majority 331 (66.2%) of them said that the condition of the vehicle was good. Most of the study participants 350 (70%) replied that the condition of the road was bad and the traffic was heavy 331 (66.2%) and also 238 (47.6%) were experiencing wrist discomfort while driving (Table 1). The symptoms perceived by the patient while or immediately after driving the vehicle were hand pain 81 (16.2%), numbness 74 (14.8%), tingling sensation 24 (4.8%) and colour change 15 (3%) (Figure 1). The prevalence of carpal tunnel syndrome was found to be 92 (18.4%) in our study based on the positivity of the Tinel's and phalen's tests. In our study, the bad condition of the road (p=0.01), condition of the vehicle (0.019), heavy traffic congestion (p=0.004), more mechanical vibration (p=0.0003) and presence of wrist discomfort (p=0.000002) were significantly associated with carpal tunnel syndrome (Table 2). But the factors like daily mileage, duration of driving, hours of driving per day and obesity were not significantly associated.

DISCUSSION:

In our study the prevalence of carpal tunnel syndrome among the general population was found to be 92 (18.4%) which is more, when compared to a study done in New Orleans, Louisiana showing the prevalence of 2.7 to 5.8% among the adult general population (4). But in contrast to a study conducted by university of Maryland Medical centre in 2005 showed that 40% of the study participants were having carpal tunnel syndrome and it's five times more among women than men. Older adults were at high risk of carpal tunnel syndrome than younger adults (5). In our study there was no association between carpal tunnel syndrome and age and sex. But our study showed mechanical vibration (p = 0.0003), presence of wrist discomfort (p=0.000002) were associated with carpal tunnel syndrome. Similarly a meta-analysis study conducted by National institute for occupational health and safety showed a significant positive association between carpal tunnel syndrome and use of vibratory tools, repetitive movements and hand force (6).

Limitations:

The study was conducted as a cross sectional study with the help of self declaration of symptoms and physical examination and not followed by EMG or diagnostic procedures.

Conclusion:

This study showed that even non Occupational exposure to excess

vibration, increased hand force and repetition while driving increases the risk of developing Carpal tunnel syndrome. Our study also explored that the road condition and condition of vehicle increases the risk of carpal tunnel syndrome which shows that immediate action to be taken by the government.

TABLE – 1
FREQUENCY DISTRIBUTION OF THE STUDY PARTICIPANTS

VARIABLE	N (500)	PERCENTAGE
Age		
Less than 40	254	50.8
41 and above	246	49.2
Physical exercise		
Yes	193	38.6
No	307	61.4
Gender		
Male	461	92.2
Female	39	7.8
Education		
Some schooling	260	52.0
Diploma	20	4.0
Graduate/Post Graduate	220	44.0
BMI		
Normal	300	60
Overweight and Obese	200	40
Doing Sports activities		
Yes	68	13.6
no	432	86.4
Smoking		
Yes	91	18.2
no	409	81.8
Kind of Vehicle		
Bike	223	44.6
Car	277	55.4
Daily mileage		
Above 100	165	33
Less than 100	335	67
Duration of Driving in years		
One to 10 years	206	41.2
More than 10 years	294	58.8
Condition of road		
Bad	350	70
Good	150	30
Condition of vehicle		
Good	337	67.4
Normal	163	32.6
Traffic		
Heavy	331	66.2
Normal	169	33.8
Wrist Discomfort while driving		
Present	238	47.6
Absent	262	52.4
Mechanical vibrations		
Present	182	36.4
Absent	318	63.6
Shift duty		
yes	102	20.4
no	398	79.6
Tinel's sign		
Positive	159	31.8
Negative	341	68.2
Phalen's test		
Positive	154	30.8
Negative	346	69.2
Both (Tinel's and Phalen's)		
Positive	92	18.4
Negative	408	81.6

Table – 2
ANALYSIS AMONG VARIABLES AND CARPAL TUNNEL SYNDROME

Variable	Carpal tunnel syndrome (Total N = 500) N=92 (18.4%)		Chi square test	P value
Condition of road	Present	Absent		
Bad	75(81.5)	275(67.4)		
Good	17(18.5)	133(32.6)	6.47	0.01(S)
Mechanical vibrations	Present	Absent		
Present	49(53.3)	133(32.6)	12.96	0.0003(S)
Absent	43(46.7)	275(67.4)		
Wrist Discomfort (drivin	Present			
Present	65(70.7)		22.90	0.000002 (S)
Absent	27(29.3)			
Traffic Congestion	Present			
Heavy	73(79.3)		8.005	0.004 (S)
Normal	19(20.7)			
Age	Present			
41 and above	41(44.6)		0.75	0.38 (NS)
Less than 40	51(55.4)			
BMI	Present			
Normal	55(59.8)		0.005	0.9436 (NS)
Overweight and obese	37(40.2)			
Condition of vehicle	Present			
Good	72(78.3)		5.46	0.019 (S)
normal	20(21.7)			
Daily mileage (kms)	Present			
Above 100	31(33.7)		0.0012	0.9725 (NS)
Less than 100	61(66.3)			
Gender	Present			
Male	87(94.6)		0.52	0.4707 (NS)
Female	5(5.4)			
Kind of Vehicle	Present			
Bike	42(45.7)		0.0118	0.9134 (NS)
Car	50(54.3)			
Occupation group	Present			
Occupational	49(53.3)		0.1039	0.7472 (NS)
Non occupational	43(46.7)			
Physical Exercises	Present			
No	53(57.6)		0.5018	0.4787 (NS)
Yes	39(42.4)			
Shift	Present			
No	69(75)		1.14	0.2851 (NS)
Yes	23(25)			
Smoking Habit	Present			
Present	75(81.5)		0.005	0.9418 (NS)
Absent	17(18.5)			
Sports Activity	Present			
Present	11(12)		0.11	0.7333 (NS)
Absent	81(88)			
Duration of driving in yr	Present			
One to 10 years	42		0.9225	0.33 (NS)
More than 10 years	50			
Hours of driving per day	Present			
Less than 5 hours	57		1.22	0.269 (NS)
More than 5 hours	35			

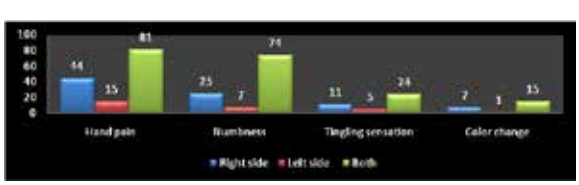

Figure – 1 SYMPTOMS PERCEIVED BY THE STUDY PARTICIPANTS WHILE OR IMMEDIATELY AFTER DRIVING THE VEHICLE

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