

Original Article

## Awareness and Knowledge of Carpal Tunnel Syndrome among Adult Saudi Population

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### Abstract:

**Introductions:** The median nerve's occasional or persistent compression or entrapment in the carpal tunnel from the wrist to the hand causes carpal tunnel syndrome (CTS). The main symptoms are pain, tingling, swelling, and loss of grip strength and function in the thumb, index finger, middle finger, and thumb of thumb. This study examined Saudi adults' awareness and understanding of Carpal Tunnel Syndrome and its link with demographics and chronic conditions.

**Material and Methods:** This cross-sectional study examined adults' knowledge, attitudes, and practices regarding carpal tunnel syndrome from 2021 to 2022 in different Saudi Arabian regions. This study used a researcher-created questionnaire. In the awareness category, general public questions included CTS clinical aspects, etiology, and effects on daily life. Practice questions covered CTS preventive and chronic diseases. Volunteers were selected following informed consent.

**Result:** 420 participants aged  $34.8 \pm 13.49$  years. 280 (66.6%) were male, 140 (33.3%) females. 38 (9.04%) were non-Saudi workers, while 384 were Saudis. 235 (55.9%) individuals knew about wrist CTS and 161 (38.3%) about pain. 157 (37.3%) individuals experienced thumb tingling or numbness, while 117 and 142 agreed that CTS may produce thumb weakness (27.8%) and hand grip (35.2%). The older age group reported more thumb numbness or tingling than the other groups, although there was no statistical difference ( $p=0.09$ ). CTS was not associated with chronic disease; however, diabetes was the main comorbidity in all age groups (44; 45.3%), especially in the middle age group (21; 60%). 5.4% had CTS. CTS was rare during pregnancy (0.7%), however all age groups agreed that it could influence their employment and social life ( $p=0.014$  and  $<0.00001$ ). The average knowledge score was  $43.3 \pm 40.5$ , whereas the awareness score was  $50.1 \pm 44.2$ . These findings indicate that Saudis were aware of CTS clinical symptoms.

**Conclusion:** The study examined Saudi adults' awareness and understanding of CTS and estimated the association between CTS and demographics and chronic conditions. The study found that adult CTS awareness and knowledge were sufficient and associated with age and quality of life. CTS awareness campaigns may lower risk and raise knowledge of prevention and treatment. People who work with discomfort or use computers for long periods of time without breaks are more prone to develop CTS. Larger research is needed to understand how physical exercise causes CTS.

**Keywords:** Covid-19; Infection; Periodontitis; Risk predictor; HRCT score.

*Bangladesh Journal of Medical Science Vol. 22: Special Issue 2023 Page : 157-166  
DOI: <https://doi.org/10.3329/bjms.v22i20.66324>*

### Introduction:

Carpal Tunnel Syndrome (CTS), which was first

identified by Paget in 1854, is a disorder that is frequently seen by rheumatologists and orthopedic

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hand specialists. CTS continues to be an enigma and can be disabling.<sup>1</sup> Carpal tunnel syndrome (CTS) is caused by intermittent or persistent compression or entrapment of the median nerve as it travels from the wrist to the hand through the carpal tunnel. The median nerve goes, with nine extrinsic digital flexors, through the tunnel limited by the carpal bones and transverse ligament, which is related to the scaphoid, trapezoid, and hamate. Anatomically, the cross section of the carpal tunnel narrows 2.0 to 2.5 cm distal to the entrance.<sup>2</sup> Patients with CTS have an excessively high intracarpal tunnel pressure that peaks at this level.<sup>3</sup> Pain, tingling, and swelling of the thumb, index finger, middle finger, and thumb of thumb, as well as a loss in grip strength and function of the affected hand, are the most prominent symptoms.<sup>4,5</sup> Typically, they begin gradually and overnight. The discomfort can lengthen the arm. Weak muscle strength is possible, and the subcutaneous tissue may disappear with time.<sup>4</sup>

CTS is one of the most prevalent entrapment neuropathies affecting the upper limb and has a major impact on everyday activities and job.<sup>6</sup> The presence of sensory symptoms like paraesthesia or dysaesthesia, with or without pain, followed by a loss of sensation and weakening in a median nerve-innervated area, are what make it distinctive.<sup>7</sup> Although the research on its frequency differs greatly, it is estimated that 8.0% of individuals in the general population, especially those between the ages of 30 and 60, have CTS.<sup>1,8</sup> Additionally, women are two to three times more likely to have the condition than men are, particularly around the menopause.<sup>9,10</sup> In Mexico, there are about 99 cases of CTS per 100,000 people per year, with a prevalence of about 3.4% in women and 0.6% in males.<sup>11</sup> Compared to the 5% prevalence in the United States, the prevalence of CTS in the United Kingdom (UK) is 7-16%.<sup>12,13</sup> It is estimated that 17.5% of the general population in Iran has chronic thoracic syndrome based on physical tests; hence, CTS has a significant incidence in Iran.<sup>14</sup> Due to hormonal fluctuations, women are more susceptible than men to develop CTS.<sup>15</sup>

A higher incidence of CTS is linked to personal variables such advanced age, female gender, a higher BMI, and smoking.<sup>16</sup> Hand bending and twisting, working with vibratory equipment, and using one's hands in the same way on a regular basis are all

examples of occupational risk factors.<sup>17</sup> Patients who suffer from systemic disorders such as hypothyroidism, diabetes mellitus, rheumatoid arthritis, and high blood pressure are at an increased risk of developing CTS.<sup>18</sup> According to several studies, there is a strong link between CTS and specific occupations, particularly for high-risk positions involving forceful manual labor, repetitive hand motions, hand-arm transmitted vibration, and wrist bending and twisting.<sup>19-21</sup>

The Phalen's and Tinel's tests, as well as a comprehensive patient history and physical examination, are mostly used to make diagnoses.<sup>22</sup> The gold standard for identifying and assessing the severity of CTS is electrodiagnosis.<sup>23</sup> The severity of the condition determines the course of treatment. Conservative treatment for mild to severe cases, such as splinting, laser therapy, and local corticosteroid injections, can be beneficial.<sup>24</sup> But some people who are treated conservatively or who have severe or recurring symptoms will need surgery in the long run.<sup>25</sup> Surgery to open up the carpal tunnel can take up to a year to heal.<sup>25</sup> It is crucial to assess public knowledge of CTS and its risk factors in order to encourage people to seek medical attention and healthcare as soon as possible. As a result, the ideal medical care plan can be established. In spite of this, the Kingdom of Saudi Arabia offers virtually little study. Hence this study was aimed to assess the awareness and knowledge about Carpal Tunnel Syndrome among adult population in Saudi Arabia and to identify the correlation between Carpal Tunnel Syndrome and other demographic characteristics and chronic diseases.

## **Materials and Method:**

### ***Study Design:***

This cross-sectional study was design to assess the knowledge, attitudes and practice toward awareness of Carpal tunnel syndrome among adults in different region of Saudi Arabia populations from 2021 to 2022. A researcher-made questionnaire was developed for this study. Questions related to CTS clinical features while in the awareness category causes of CTS and effect of CTS on daily life activities were asked from the general population. The practice category involved questions related to CTS prevention techniques and associated with chronic diseases. The participants were volunteers and were selected after an informed consent

was taken. The study was approved by the ethical committee.

**Inclusion Criteria:** Both male and female with Age more than 18 years were included in this study

**Exclusion Criteria:** Age less than 18 years and lack of consent were excluded in this study

**Sample Size:**

The sample size used in this study was determined using the following formula, with a significance level of  $p > 0.05$ :  $n = NZ^2P(1-P) / (D^2 + Z^2P(1-P))$ . Taking into account the expected rate of non-response, the total estimated sample size was 420.

**Data Collection Tools and Instruments:**

A validated pre-tested questionnaire was used for data collection. The questionnaire included questions about sociodemographic factors, knowledge about clinical features, awareness about causes, prevention, effect on their daily activities, relationship with pregnancy and relationship with chronic diseases of Carpal Tunnel Syndrome among adult population. All question were categorized as yes or no or I don't know based on the responses from the participants.

**Data Analysis:**

The Statistical Package for the Social Science (SPSS) version 25 was used to code the data, enter the data, and analyze the data. Employing both descriptive statistics (such as mean, standard deviation, and percentage), as well as inferential statistics (comparing independent groups and analysis of variation). The chi-square test was used to investigate whether or not there was a correlation between socio-demographic factors and the categories of awareness and knowledge. We used the Kruskal-Wallis test to analyzed the comparison of awareness, knowledge and prevalence. A p-value  $< 0.05$  was considered statistically significant.

**Result:**

For this study, we classified our questionnaire into three major categories; knowledge, awareness and practice. In the knowledge category, we recruited questions related to CTS clinical features while in the awareness category causes of CTS were asked from the general population. The practice category involved questions

related to CTS prevention techniques while the relationship between CTS and its association with chronic diseases was discussed. In the end, we discussed the opinion of the general population related to the effect of CTS on daily life activities.

**Socio-Demographic Information:**

This survey was conducted to evaluate the awareness and knowledge of carpal tunnel syndrome among the adult Saudi population. We appreciated voluntary participation from all occupations. We recruited 420 participants with a mean age of  $34.8 \pm 13.49$  years. Among these 280 (66.6%) were male while 140 (33.3%) were female. Total of 38 (9.04%) were immigrated for working and considered as non-Saudis while rest 384 were Saudi nationals living in central region (83; 19.76%) participants belong to the central part of the country, Eastern region (84; 20%), Western region (88; 20.9%), Northern region (83; 19.76%) and Southern region (82; 19.5%) were living in Southern part of the country. Detailed socio-demographic information is mentionable Table 1.

**Table 1: Socio-demographic data**

Variables		p-value
Age in years (Mean $\pm$ SD)	34.8 $\pm$ 13.49	0.919
Gender		
Male	280 (66.6%)	
Female	140 (33.3%)	
Nationality		0.90
Saudi	382 (90.9%)	
Non-Saudi	38 (9.04%)	
Marital status		0.002
Single	193 (45.9%)	
Married	214 (50.9%)	
Divorced	13 (3.09%)	
Level of Education		0.08
Illiterate	5 (1.19%)	
School	101 (24%)	
College	260 (61.9%)	
Higher Education	54 (12.8%)	
Residential region		0.000027
Central	83 (19.76%)	
Eastern	84 (20%)	
Western	88 (20.9%)	
Northern	83 (19.76%)	
Southern	82 (19.5%)	

**Prevalence of Knowledge (Clinical Features) in General Population:**

**Table 2** disclosed the prevalence of knowledge about the clinical features of CTS among general population. Overall 235 (55.9%) participants had information about CTS in the wrist, and 161 (38.3%) knew about pain. Knowledge about tingling or numbness in the thumb was reported by 157 (37.3%) participants, while 117 and 142 participants agreed that CTS may cause weakness in the thumb (27.8%), decreasing hand grip (35.2%). A total of 92 (21.4%) participants agreed that muscle wasting may be experienced by CTS patients, and 133 (31.6%) accepted that pain intensity may vary in CTS patients. These eight knowledge-based

questions were further divided into three categories; Young age (18 to 35 years), middle age (36 to 53 years), and older age (54 to 71) years age group. Although the young age group was higher in number still the older age group had equal information about CTS (41.8 vs 41.8) with a significant statistical difference (p= 0.001). Significant differences were observed while comparing the knowledge about pain, weakness in thumb muscle, losing hand grip, muscle wasting, and changes in pain intensity (p= 0.005, 0.0019, 0.000093, 0.002888, and 0.00042). We observed that the older age group had more information about numbness or tingling in the thumb than the other groups (30.9% 14.4% and 20.5%) but no statistical difference was found between groups (p= 0.09).

**Table 2: Population knowledge about clinical features of CTS**

	Total number (N, %)	Age group			Chi square	P-value
		18 to 35 years (N=263)	36 to 53 years (N=102)	54 to 71 years (N= 55)		
Do you know details about CTS in the wrist?					13.6074	0.001
Yes	235 (55.9%)	110 (41.82%)	22 (21.5%)	23 (41.8%)		
No	178 (42.3%)	153 (58.13%)	80 (78.4%)	32 (58.18%)		
Do you have an idea about CTS in the wrist?					23.0708	<0.00001
Yes	158 (37.6%)	122 (46.3%)	23 (22.5%)	13 (23.6%)		
No	262 (62.3%)	141 (53.6%)	79 (77.4%)	42 (76.3%)/		
Does CTS cause pain in the wrist?					14.689	0.005
Yes	161 (38.3%)	124 (47.1%)	23 (22.5%)	14 (25.4%)		
No	39 (9.2%)	24 (9.1%)	10 (9.8%)	5 (9%)		
I don't know	220 (52.3%)	148 (56.2%)	69 (67.6%)	36 (65.4%)		
Does CTS cause tingling or numbness in thumb, index or middle finger?					7.8982	0.09
Yes	157 (37.3%)	38 (14.4%)	21 (20.5%)	17 (30.9%)		
No	38 (9%)	22 (8.3%)	15 (14.7%)	1 (1.8%)		
I don't know	195 (46.4%)	92 (34.9%)	66 (64.7%)	37 (67.2%)		
Does CTS cause weakness in the thumb muscle?					16.9357	0.0019
Yes	117 (27.8%)	87 (33%)	15 (14.7%)	15 (27.2%)		
No	48 (11.4%)	33 (12.5%)	14 (13.7%)	1 (1.8%)		
I don't know	265 (63%)	153 (58.17%)	73 (71.5%)	39 (38.2%)		
Does CTS cause decrease in overall hand grip?					23.6588	0.000093
Yes	148 (35.2%)	113 (42.9%)	21 (20.5%)	14 (25.4%)		
No	40 (9.5%)	27 (10.2%)	11 (10.78%)	2 (3.6%)		
I don't know	232 (55.2%)	123 (46.7%)	70 (68.6%)	39 (70.9%)		
Does CTS cause muscle wasting in the hand?					16.1001	0.002888
Yes	92 (21.4%)	73 (27.7%)	11 (10.78%)	8 (14.5%)		
No	55 (13%)	38 (14.4%)	15 (14.7%)	2 (3.6%)		
I don't know	303 (72.1%)	182 (69.2)	76 (74.5%)	45 (81.8%)		

Does CTS cause change of pain intensity while moving the wrist?					20.3799	0.00042
Yes	133 (31.6%)	100 (38.02%)	20 (19.6%)	13 (23.6%)		
No	39 (9.2%)	28 (10.6%)	10 (9.8%)	01 (1.8%)		
I don't know	248 (59%)	135 (51.3%)	71 (69.6%)	42 (76.3%)		

**Awareness of CTS Causes in General Population:**

In the awareness category, we measured trauma as a major cause of CTS, a total of 184 (43.8%) participants agreed upon this. A huge response was noted from the young population (123; 46.7%) to middle age (39; 38.2%) and old population (22; 40%). A total of 143 (34%) participants acknowledged computer tapping as a cause while 208 (49.5%) participants agreed that wrist fracture is associated with CTS. The majority of the

participants perceived (231; 55%) bone tumour as a major reason while only 35.9% (151) participants agreed that arthritis is the major cause (Table 3). Regarding prevention methods, a total of 79 (18.8%) participants agreed that avoiding repetitive movement can prevent CTS, 90 (21.4%) agreed that keeping your wrist straight while at rest can prevent CTS, 98 (23.3%) agreed to wear a splint will help to reduce CTS, 137 (32.6%) and 87 (20.7%) reported that avoiding falls and wearing warm will help avoid CTS incidents. Only 98 (23.3%) knew about the treatment options (Table 4).

**Table 3: Awareness of causes lead to CTS**

	Total number (N, %)	Age group				P-values
		18 to 35 years (N= 263)	36 to 53 years (N=102)	54 to 71 years (N=55)		
Do you think that trauma may lead to CTS?					3.59	0.46
Yes	184 (43.8%)	123 (46.7%)	39 (38.2%)	22 (40%)		
No	75 (17.8%)	48 (18.2%)	18 (17.6%)	9 (16.3%)		
I don't know	161 (38.3%)	92 (34.9%)	45 (44.1%)	24 (43.6%)		
Do you think that repeated physical activities like using computer or tapping may lead to CTS?					16.7492	0.002
Yes	143 (34%)	103 (39.1%)	22 (21.5%)	18 (32.7%)		
No	67 (15.9%)	41 (15.5%)	23 (22.5%)	3 (5.4%)		
I don't know	210 (50%)	119 (45.2%)	57 (55.8%)	34 (61.8%)		
Do you think that wrist fracture or dislocation may lead to CTS?					13.2405	0.01
Yes	208 (49.5%)	136 (51.7%)	40 (39.2%)	30 (54.5%)		
No	91 (21.6%)	59 (22.4%)	28 (27.4%)	4 (7.2%)		
I don't know	121 (28.8%)	66 (25%)	34 (33.3%)	21 (38.1%)		
Do you think that arthritis may lead to CTS?					21.1241	0.0002
Yes	151 (35.9%)	114 (43.3%)	21 (20.5%)	16 (29%)		
No	85 (20.2%)	48 (18.2%)	29 (28.4%)	8 (14.5%)		
I don't know	184 (43.8%)	101 (38.4%)	52 (50.9%)	31 (56.3%)		
Do you think that tumor of bone may lead to CTS?					5.5638	0.23
Yes	231 (55%)	152 (57.7%)	55 (53.9%)	24 (43.6%)		
No	65 (15.4%)	43 (16.3%)	14 (13.7%)	8 (14.5%)		
I don't know	127 (30.2%)	71 (26.9%)	33 (32.2%)	23 (41.8%)		

**Table 4: Awareness about prevention strategies of CTS**

	Total number (N, %)	Age group			P-value	
		18 to 35 years	36 to 53 years	54 to 71 years		
Do you think that avoiding repetitive movement can prevent CTS?					9.9302	0.04
Yes	79 (18.8%)	48 (18.2%)	19 (18.6%)	12 (21.8%)		
No	66 (15.7%)	52 (19.7%)	11 (10.7%)	3 (5.4%)		
I don't know	275 (65.4%)	162 (61.5%)	73 (71.5%)	40 (72.7%)		
Do you think that keeping your wrist straight while at rest can prevent CTS?					3.7744	0.43
Yes	90 (21.4%)	61 (23.1%)	19 (18.6%)	10 (18%)		
No	34 (8.09%)	25 (9.5%)	6 (5.8%)	3 (5.4%)		
I don't know	296 (70.4%)	177 (67.3%)	77 (75.4%)	42 (76.3%)		
Do you think that wearing splint while sleeping can prevent CTS?					4.3074	0.36
Yes	98 (23.3%)	69 (26.2%)	19 (18.6%)	11 (20%)		
No	47 (11.1%)	30 (11.4%)	9 (8.8%)	8 (14.5%)		
I don't know	275 (65.4%)	165 (62.7%)	74 (72.5%)	36 (65.4%)		
Do you think that avoiding falls or direct impact can prevent CTS?					9.6886	0.04
Yes	137 (32.6%)	98 (37.2%)	25 (24.5%)	14 (25.4%)		
No	29 (6.9%)	21 (7.9%)	5 (4.9%)	3 (5.3%)		
I don't know	254 (60.4%)	144 (54.7%)	72 (70.5%)	38 (69%)		
Do you think that staying warm or using hot compress can prevent CTS?					11.7494	0.019
Yes	87 (20.7%)	59 (22.4%)	14 (13.7%)	14 (25.4%)		
No	46 (10.9%)	32 (12.1%)	13 (12.7%)	1 (1.8%)		
I don't know	287 (68.3%)	162 (61.5%)	85 (83.3%)	40 (72.7%)		
Do you know about the treatment options for CTS?					18.4688	0.00009
Yes	98 (23.3%)	78 (29.6%)	12 (11.76%)	6 (11%)		
No	322 (76.6%)	185 (70.3%)	90 (88.2%)	49 (89%)		

We observed that the middle age group of this study had more awareness about the CTS causes and preventions but no statistical differences were found between groups when they associated trauma and tumor to the bone with CTS, using a splint sitting posture to avoid CTS-related discomfort (p= 0.46, 0.23, 0.43, and

0.36). This statistical insignificance indicated that people had less awareness of the medical conditions and treatment modalities. (Tables 3 and 4). people of all age groups agreed that CTS may affect their job experience and social life (p= 0.014 and < 0.00001) (Table 5).

**Table 5: Population awareness of CTS effect in their daily activities**

	Total number (N, %)	Age group			P-value	
		18 to 35 years	36 to 53 years	54 to 71 years		
Do you think that CTS can affect sleep pattern?					9.4133	0.05
Yes	167	119 (45.2%)	35 (34.3%)	14 (25.4%)		
No	29	25 (9.5%)	2 (1.9%)	2 (1.9%)		
I don't know	280	176 (66.9%)	65 (63.7%)	39 (70.9%)		
Do you think that CTS can affect job performance?					12.4704	0.014
Yes	220	151	49 (48%)	20 (36.3%)		
No	17	13	2 (1.9%)	2 (3.6%)		
I don't know	183	99	51 (50%)	33 (60%)		
Do you think that CTS can affect social life?					38.9927	< 0.00001
Yes	216 (51.4%)	146 (55.5%)	49 (48%)	21 (38.1%)		
No	19 (4.5%)	16 (6%)	2 (1.9%)	1 (1.8%)		
I don't know	185 (44%)	101 (38.4%)	51 (50%)	33 (60%)		

**Relationship between Chronic Diseases and CTS:**

No significant association of CTS was found with CTS however, diabetes was the major comorbidity in all age groups (44; 45.3%) especially targeting the middle age group (21; 60%). Only 5.4% population experienced CTS in their lifespan. Prevalence of CTS was observed

during pregnancy was 0.7%, while people of all age groups agree that CTS may affect their job experience and social life (p= 0.014 and < 0.00001).. The overall mean score of knowledge was reported as 43.3 ± 40.5 without showing any statistical difference between all groups (p=0.99).

Table 6: The relation between chronic diseases and CTS

	Total number (N, %)	Age group			Chi square	p-value
		18 to 35 years (N= 263)	36 to 53 years (N= 102)	54 to 71 years (N=55)		
Have you been diagnosed with CTS?					0.4416	0.8
Yes	23 (5.4%)	17 (6.4%)	5 (5%)	1 (1.8%)		
No	397 (94.5%)	246 (93.5%)	97 (95%)	54 (98.1%)		
Do you have any chronic diseases?					82.4939	< 0.00001
Yes	97 (23%)	27 (27.8%)	35 (36%)	35 (36%)		
No	323 (77%)	236 (73%)	67 (20.7%)	20 (6.1%)		
Diabetes mellitus	44 (45.3%)	9 (23.3%)	21 (60%)	17 (48.5%)		
Hypothyroidism	14 (14.4%)	8 (29.6%)	3 (8.5%)	3 (8.5%)		
Rheumatoid arthritis	22 (22.6%)	10 (37%)	7 (20%)	5 (14.2%)		
Others	17 (17.5%)	0 (0%)	4 (11.4%)	10 (28.5%)		

**Mean score of Knowledge and Awareness:**

When comparing the mean scores, we observed that both genders had a similar mean score of knowledge and prevalence (75.06 ± 34.9 vs 75.3 ± 34.1) with a significant p-value of the Kruskal-Wallis Test (0.0072). Comparing the mean scores separately we observed that males had higher knowledge scores than awareness (97.6 ± 36.08 vs 95.2 ± 33.5, p= 0.06) whereas females had higher awareness than knowledge 52.5 ± 10.9 vs 55.3 ± 20.4, p= 0.038. Comparing mean scores on the

behalf of education levels illiterate participants and college students had high knowledge scores ( 3 ± 0 and 99.6 ± 36.4 respectively) while school participants and higher education levels had more awareness levels (21.6 ± and 31.9 ± 12.94 respectively). The overall mean score of knowledge among all participants was noted as 43.3 ± 40.5 while the awareness score was observed as 50.1 ± 44.2. These results show that the Saudi population had high awareness of than clinical features of CTS (Table 7).

**Table 7: Mean score of knowledge, awareness and practice Kruskal-Wallis Test test analysis**

	Knowledge	Awareness	Kruskal-Wallis Test (H)	P-value
Gender	75.06 ± 34.9	75.3 ± 34.1	7.2223	0.0072
Male	97.6 ± 36.08	95.2 ± 33.5	3.4629	0.06
Female	52.5 ± 10.9	55.3 ± 20.4	4.2752	0.038
Overall	43.3 ± 40.5	50.1 ± 44.2	15.3537	0.00009
18 to 35 years	95.8 ± 27.23	104.5 ± 34.77	5.278	0.02
36 to 53 years	19.5 ± 4	29.8 ± 13.7	7.4741	0.00626
54 to 71 years	14.6 ± 3.9	16.5 ± 6.12	5.4912	0.01911
Level of education	37.5 ± 41.3	37.1 ± 38.08	15.1332	0.0001
Illiterate	3 ± 0	2.85 ± 0.63	2.4405	0.11
School	27.8 ± 5.06	31.9 ± 12.94	4.8642	0.02
College	99.6 ± 36.4	92.2 ±	3.5489	0.05
Higher education	19.6 ± 5.09	21.6 ±	3.5489	0.05

## Discussion:

Repetitive motion of the hand and wrist is linked to carpal tunnel syndrome.<sup>26</sup> Increased pressures in the carpal tunnel contributes to CTS by worsening ischemia or compression of the median nerve, which results in burning sensations, tingling, and trouble moving the fingers. Numerous studies have examined the prevalence of Carpel Tunnel Syndrome among various groups. The population in this study is sufficiently informed of CTS, as evidenced by their understanding of the condition.

This study recruited a total of 420 participants with a mean age of  $34.8 \pm 13.49$  years. Among them 280 (66.6%) and 140 (33.3%) were male and female respectively. 38 (9.04%) were non-Saudis who had immigrated for employment, while the remaining 384 were Saudi citizens living in the central area (83; 19.76%), eastern region (84; 20%), western region (88; 20.9%), northern region (83; 19.76%), and southern region (82; 19.5%) of Saudi Arabia. The study carried out in Saudi Arabia included a comparable number of individuals. 209 (49.8%) of them were men and 211 (50.2%) were women.<sup>4</sup> According to the sample's age distribution, 49.5% of participants were between the ages of 18 and 30. The majority of participants (97.3%) were Saudi citizens.<sup>4</sup> The research revealed a link between gender and CTS.<sup>10,27,28</sup> The existence of differences in wrist anthropometrics between males and females is one of the hypotheses put out to explain this association.<sup>29,30</sup> Additionally, sex hormones may contribute to a higher prevalence of CTS in women, particularly during menopause and pregnancy, according to certain studies.<sup>31-32</sup>

In this study we reported 235 (55.9%) participants had information about CTS in the wrist, and 161 (38.3%) knew about pain. Studies conducted in Saudi Arabia and India reported 26.7% and 27.5% participants were

had information about CTS respectively<sup>4,33</sup> and which is approximately half of our study. When comparing the awareness of pain, weakness in the thumb muscle, loss of hand grip, muscular wasting, and changes in pain intensity, significant differences were found ( $p=0.005$ ,  $0.0019$ ,  $0.000093$ ,  $0.002888$ , and  $0.00042$ ). However, there was no statistically significant difference between

the groups ( $p=0.09$ ). We noticed that the older age group provided more information on numbness or tingling in the thumb than the other groups (30.9% 14.4% and 20.5%). According to Devi RG et al., the primary clinical sign of CTS is tingling and numbness in the thumb, index, and middle finger. The second most frequently reported clinical feature of CTS is wrist pain, followed by a gradual decline in hand grip strength.<sup>34</sup> A recent study in the Saudi population found that those who work with patents for more than eight hours experience greater hand pain and symptoms.<sup>35</sup> Additionally, past studies showed that CTS was more likely to develop in dentists who put in long hours of labor.<sup>36,37</sup>

Computer taping was reported as a contributing factor by a total of 143 (34%) individuals, while wrist fracture was reported as a contributing factor by 208 (49.5%) participants. 79 (18.8%) participants agreed that avoiding repetitive movement can prevent CTS, 90 (21.4%) agreed that keeping your wrist straight while at rest can prevent CTS, 98 (23.3%) agreed to wear a splint will help to reduce CTS, 137 (32.6%) and 87 (20.7%) reported that avoiding falls and wearing warm will help avoid CTS incidents. Similar findings were observed by Alqunai MS et al and Alyousef et al. in Saudi Arabia.<sup>4,38</sup>

Although there was no conclusive evidence linking chronic diseases to CTS, diabetes was the most common comorbidity across all age categories (44; 45.3%). Prevalence of CTS during pregnancy was very low (0.7%), although individuals across all age groups concur that CTS may have an impact on their social and professional lives ( $p=0.014$  and  $0.00001$ ). The overall mean knowledge score was recorded as 43.3 40.5, and there was no statistically significant difference between any of the groups ( $p=0.99$ ). A cross-sectional study discovered that women's domestic tasks were probably contributing factors to CTS, whereas an earlier study could not find evidence of this association.<sup>39,40</sup> Only 98 (23.3%) knew about the treatment options.

According to Raman et al Kuwait's study, which revealed that CTS was substantially associated with female gender, gender, nationality, status, education level, and occupation did not correlate with awareness level.<sup>41</sup> In this investigation, we found that both sexes had a comparable mean score of knowledge and



prevalence, and the Kruskal-Wallis test revealed that this difference was statistically significant (0.0072). By examining each group's scores independently, we were able to determine that males had higher levels of knowledge than awareness, whereas females had higher levels of awareness than knowledge. According to these findings, the Saudi population exhibited a high level of awareness regarding the clinical characteristics of CTS.

We suggest that future research should consist of a large-scale survey, as well as clinical trials that involve the application of ergonomic alteration, and an assessment of the degree to which the risk can be reduced. There is a need for interventional studies that look into the treatment and preventative measures that may be taken with this population. In addition, educational workshops and public awareness campaigns should be carried out as primary prophylactic measures against this illness. In addition to teaching the general public on the risks, healthcare professionals and the general public.

### Conclusion:

The aim of the study was to identify the awareness and knowledge of CTS among adult population in Saudi Arabia, and to estimate correlation between Carpal Tunnel Syndrome and other demographic characteristics and chronic diseases. The study concluded that the awareness and knowledge of CTS among adult population was sufficient and significant association between awareness, knowledge of CTS and the age, affect of quality of life. Improving the awareness campaign about CTS may potentially reduce the risk and increases the knowledge about the prevention and treatments. CTS is more likely to develop in people who regularly work with pain, such as those who use computers for long periods of time without breaks and those who work with pain. Larger-scale studies are needed to investigate and explain the role that physical activity plays in the onset of CTS.

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