

Adult population awareness of carpal tunnel syndrome (CTS) in eastern province

Abstract

Introduction: Carpal tunnel syndrome (CTS) is a constellation of symptoms and signs resulting from median nerve entrapment or compression by the surrounding structures as it travels through the wrist. CTS symptoms can range from numbness and tingling to pain in the hand and arm, sometimes even affecting the patient's sleep and social activity as the symptoms worsen at night.

Aim: This study aimed to assess the general population's awareness of CTS and its associated factors.

Materials and methods: This cross-sectional study was conducted among the adult population in the Eastern Province of Saudi Arabia. A self-administered questionnaire was distributed among the general population using an online platform. The questionnaire includes socio-demographic characteristics (i.e., age, gender, marital status, etc.), the incidence of CTS, and a 22-item questionnaire to measure the participant's awareness of CTS symptoms, causes, treatment, prevention, and general information about CTS.

Results: Eight hundred twenty-five respondents took part (59.7% females vs 40.3% males). 30.3% had associated chronic disease, with diabetes (37.9%) and hypothyroidism (36.6%) being the most common. 16.3% were previously diagnosed with CTS. The overall mean awareness score was 10.9 (SD 3.16) out of 22 points. Nearly half (48.3%) were considered to have poor awareness of CTS, 46.9% were moderate, and only 4.8% had good levels. Being younger, living in other cities in ER, single, and with chronic disease were associated with better awareness of CTS.

Conclusion: The general population's awareness of CTS was deficient. However, better awareness levels were more prevalent among younger single respondents with no underlying diseases. There is a need to increase the knowledge of CTS. Awareness campaigns are key to improving knowledge in society.

Keywords: carpal tunnel syndrome, awareness, adult population, eastern province

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Questionnaire

The awareness of CTS was assessed using a 22-item questionnaire, with the correct answer for each question being identified and coded with 1 while the incorrect answer was coded with 0. The total awareness score has been calculated by adding all 22 items. A score ranging from 0 to 22 points has been achieved. The greater the score, the greater the awareness about CTS. Cutoff points 50%, and 75% thresholds were used to determine the level of awareness such that respondents were classified as having poor awareness if the score was less than 50%, scores of 50% to 75% were moderate, and above 75% were classified as good awareness levels.

Statistical analysis

All categorical variables were presented as numbers and percentages (%), while continuous variables were shown as means and standard deviations. The total awareness score was compared with the socio-demographic characteristics by using the Mann-Whitney Z-test and Kruskal Wallis H-test.

The normality test was performed using the Shapiro-Wilk test and the Kolmogorov-Smirnov test. According to the result, the awareness score follows the non-normal distribution. Thus, the non-parametric tests were applied. Post hoc analysis was conducted to determine the multiple mean differences of awareness score in relation to age group by using the Dunn Bonferroni test. A P-value of less than 0.05 was considered statistically significant. All statistical data were analyzed using Statistical Packages for Social Sciences (SPSS) version 26 (Armonk, NY: IBM Corp., USA.).

Results

In total, 1045 residents living in the Eastern Region of Saudi Arabia were enrolled. Table 1 presents the socio-demographic characteristics of participants. The most common age group was 18 – 39 years old (56%), with nearly sixty percent being females. Approximately 35.6% lived in Dammam, and 23.7% lived in Al Khobar. More than half of the respondents were married (53.7%). The proportion of respondents who had associated comorbidities was 30.3%.

Table 1 Socio-demographic characteristics of participants (n=1045)

Study variables	N (%)
Age group	
• 18 – 39 years	585 (56.0%)
• 40 – 60 years	374 (35.8%)
• >60 years	86 (08.2%)
Gender	
• Male	421 (40.3%)
• Female	624 (59.7%)
Place of residence in the Eastern Region (ER) (n=825)	
• Al Khobar	278 (23.7%)
• Dammam	294 (35.6%)
• Jubail	28 (03.4%)
• Al Ahsa	70 (08.5%)
• Qatif	70 (08.5%)
• Hafr Al-Batin	40 (04.8%)
• Hofuf	10 (01.2%)
• Dhahran	35 (04.2%)
Marital status	
• Single	484 (46.3%)
• Married	561 (53.7%)
Associated chronic diseases	
• Yes	317 (30.3%)
• No	728 (69.7%)

In Figure 1, the prevalence of the previous history of CTS was 16.3%, while 83.7% did not experience CTS.

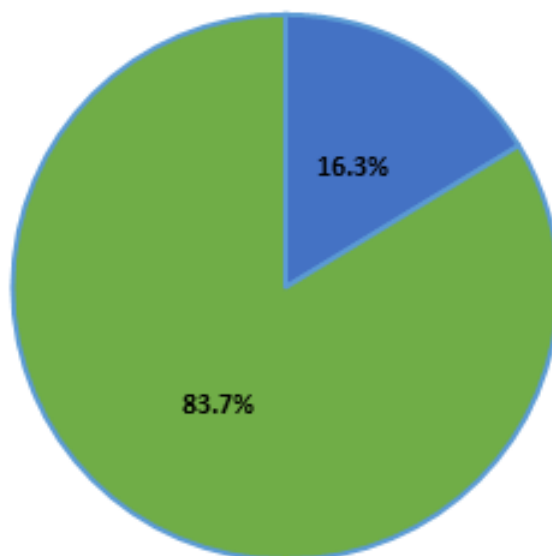


Figure 1 Previous history of CTS.

In Figure 2, among those with associated chronic disease (N=317), the most common of them was diabetes (37.9%), followed by rheumatoid arthritis (36.6%) and hypothyroidism (35%).

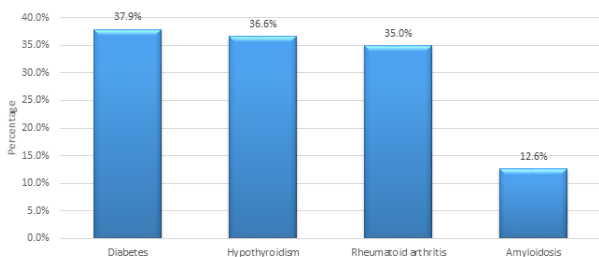


Figure 2 Associated chronic diseases.

Regarding the assessment of CTS awareness (Table 2), respondents believed that the most common symptom of CTS was weakness in the muscles of the hand (60.3%), followed

by pain and paralysis at the wrist (60%), while changes in the severity of pain with hand motion was less rated (5.9%). Regarding CTS causes, repetitive physical activity, such as using a computer or typing on a keyboard, was the most rated cause (64.2%), while bone tumors were the lowest (17.2%). For CTS treatment, painkillers were the highest rated (88.9%), whereas brace was the least (30%). For prevention, repetitive motion avoidance was the highest (53.9%), and wearing a case during the night was the lowest (26.7%). Regarding the general information on CTS, 90.6%, 84.7%, and 68.2% believed that CTS affects patient’s job performance, sleep, and social life. The total mean awareness score was 10.9 (SD 3.16), with poor, moderate, and good awareness levels constituting 48.3%, 46.9%, and 4.8%, respectively.

Table 2 Assessment of awareness about CTS (n=1045)

Awareness items	N (%)
<i>Which of the following clinical symptoms can happen with CTS?</i>	
1. Weakness in the muscles of the hand [yes]	630 (60.3%)
2. Pain and paralysis at the wrist [yes]	627 (60.0%)
3. Feeling pins and needles in the thumb, index finger, and middle finger [yes]	536 (51.3%)
4. Weakness in the muscles of the thumb [yes]	381 (36.5%)
5. Change in the severity of pain with hand motion [yes]	62 (05.9%)
<i>Which of the following causes can lead to CTS?</i>	
6. Bruise [no]	809 (77.4%)
7. Repetitive physical activity, such as using a computer or typing on a keyboard [yes]	671 (64.2%)
8. Inflammation of the joints (arthritis) [yes]	521 (49.9%)
9. A fracture or dislocation of the wrist [yes]	325 (31.1%)
10. Bone tumors [yes]	180 (17.2%)
<i>Which of the following is used in treating CTS?</i>	
11. Painkillers [yes]	929 (88.9%)
12. Surgical intervention [yes]	575 (55.0%)

Table 2 Continued...

Awareness items	N (%)
13. Steroid injections [yes]	338 (32.3%)
14. Brace [yes]	313 (30.0%)
<i>Which of the following can be used to prevent CTS?</i>	
15. Avoiding repetitive motion [yes]	563 (53.9%)
16. Avoiding falls or direct hits [no]	560 (53.6%)
17. Keeping your hands warm [yes]	297 (28.4%)
18. Keeping your hands straight throughout the day [yes]	293 (28.0%)
19. Wearing a cast during the night [yes]	279 (26.7%)
<i>General information on CTS</i>	
20. Believe that CTS affects patient's sleep [yes]	885 (84.7%)
21. Believe that CTS affects the patient's job performance [yes]	947 (90.6%)
22. Believe that CTS affects the patient's social life [yes]	713 (68.2%)
Total Awareness score (mean±SD)	10.9±3.16
Level of awareness	
• Poor	505 (48.3%)
• Moderate	490 (46.9%)
• Good	50 (04.8%)

Measuring the differences in awareness score in relation to participants' socio-demographic characteristics found that a higher awareness score was more associated with being younger (H=20.255; p<0.001), living in another city in ER (H=6.824; p=0.033), being single (Z=5.365; p<0.001) and with having chronic disease (Z=6.503; p<0.001) (Table 3).

Table 3 Differences in the score of awareness and the Socio-demographic characteristics of participants (n=1045)

Factor	Awareness Score (22) Mean±SD	H/Z-test	P-value
Age group ^a			
• 18 – 39 years	11.3±3.26		
• 40 – 60 years	10.7±3.03	20.255	<0.001 **
• >60 years	9.94±2.81		
Gender ^b			
• Male	10.8±3.34		
• Female	11.0±3.04	1.311	0.190
Place of residence in the Eastern Region (ER) (n=825) ^a			
• Al Khobar	10.7±3.11		
• Dammam	10.7±3.05	6.824	0.033 **
• Other Cities in ER (i.e., Al Ahsa, Jubail, etc.)	11.3±3.13		
Marital status ^b			
• Single	11.5±3.27		
• Married	10.5±2.99	5.365	<0.001 **
Associated chronic diseases ^b			
• Yes	10.1±3.16		
• No	11.3±3.09	6.503	<0.001 **
Previously diagnosed with CTS ^b			
• Yes	11.1±3.03		
• No	10.9±3.19	0.343	0.732

^aP-value has been calculated using Kruskal Wallis H-test.

^bP-value has been calculated using Mann Whitney Z-test.

**Significant at p<0.05 level.

When conducting post hoc analysis for the multiple mean differences in awareness score in relation to age group (Table 4), it was revealed that there was a significant mean difference in awareness score between age group the younger age group versus middle age group (p=0.013) and between the younger age group versus the older age group (p=0.001).

Table 4 Multiple mean Differences of awareness in relation to age group (n=1045)

(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower bound	Upper bound
18-39	40-60	0.59480**	0.20798	0.013	0.0961	1.0935
	>60	1.32139**	0.36280	0.001	0.4515	2.1913
40-60	18-39	-0.59480**	0.20798	0.013	-1.0935	-0.0961
	>60	0.72659	0.37568	0.160	-0.1742	1.6274
>60	18-39	-1.32139**	0.36280	0.001	-2.1913	-0.4515
	40-60	-0.72659	0.37568	0.160	-1.6274	0.1742

Post hoc analysis has been conducted using the Dunn-Bonferroni test.

**The mean difference is significant at the 0.05 level.

Discussion

The present study is carried out to evaluate the general population's awareness regarding CTS and determine its related factors. The findings of this study are an important contribution to the literature, given the increasing trend of this syndrome. Thus, measuring the awareness levels of the general population is crucial to society.

Level of CTS awareness

The findings of this study revealed that the adult population's awareness of CTS was inadequate. Almost half of the respondents were assumed to have unsatisfactory knowledge (mean score: 10.9 out of 22 points). This is consistent with the study of Alqunai (2021), reporting that 74.8% of the adult population in the Al-Jouf Region demonstrated a lack of knowledge about CTS.¹¹ Consistent with these reports, the Indian population also showed illiteracy in this subject, with at least 72% unaware of CTS basic facts.¹² In contrast, better public awareness of CTS was reported by the studies of Alyousef et al.,⁷ Umakanth et al.,¹³ and Mirghani et al.¹⁴ General understanding of the disease could lead to better action in case of experiencing symptoms. Emphasizing the importance of information dissemination initiated by the authorities could improve the population's knowledge of the condition.

Significant factor of awareness

Being younger, living in other cities in ER, being single, and without having associated chronic disease were identified as significant predictors for increased awareness. These findings do not agree with the study done in Riyadh,¹⁵ suggesting that better CTS and prevalence levels were associated with older males, non-Saudis, better monthly income, and some occupations. In Tabuk,¹⁴ better knowledge was seen in females than in males, and the younger age group demonstrated higher awareness of CTS causes than the older ones. However, a paper conducted in the Al-Jouf Region found no significant relationship between the level of CTS awareness in terms of gender, education, marital status, nationality, and occupation awareness,¹⁶ of which did not coincide with our reports.

Awareness of CTS clinical symptoms

There were deficiencies in terms of awareness of the symptoms of CTS. According to our results, despite the majority being aware that weakness in the hand muscles and pain or paralysis at the wrist represents the most important clinical symptoms, they were less aware of the symptoms brought by the weakness in the muscles of the thumb and the changes in the severity of pain with hand motion. The general public in Majmaah City supported this scenario.⁷ 30% of them knew that wrist pain was the main symptom of CTS, followed by tingling and numbness of fingers (26.7%). However, these accounts did not fare well compared to adult Saudis living in the Northern Border.¹⁷ The majority (60%) were aware of the CTS symptoms, particularly tingling and numbness in the thumb, index, and middle fingers.

Awareness of CTS risk factors

Most of our respondents knew that bruises do not lead to CTS, but concurrent physical activities, such as keyboard typing, could result in experiencing CTS symptoms. Other causes that led to CTS yielded poor ratings, including joint inflammation, fracture or wrist dislocation, and bone tumors. In Makkah,¹⁸ respondents showed better awareness levels regarding the causes and features of CTS, but there were knowledge discrepancies in management and effects.

Awareness of treatment and prevention

Regarding the awareness of treatment and prevention, most respondents were aware that painkillers were the most prominent treatment method; however, their knowledge of CTS prevention needs more improvement. In particular, prevention such as keeping hands warm, keeping hands straight forward, and wearing a cast during the night did not achieve satisfactory ratings. Among the public in Majmaah,⁷ the knowledge about the use of painkillers for CTS treatment was also prevalent, including oral analgesics and NSAID, while splint and surgical intervention were also mentioned by many. However, among Indian respondents,¹² the natural method without using drugs were more preferred such as rotating of wrists.

Awareness of the general information of CTS

Most respondents from our study were of the opinion that CTS influences patients' job performance (90.6%), sleep (84.7%), and social life (68.2%). This is consistent with the study of Tawakul et al.¹⁸ Those previously mentioned factors were also affected by CTS, though their ratings were slightly lower than our reports, with 51.1%, 28.4%, 20.5%, for job performance, sleep, and social life, respectively.

Prevalence of CTS

Another important finding of this study was the prevalence of CTS. Data in this study showed that the prevalence rate of CTS was 16.3%, consistent with the studies done in Kuwait,¹⁹ and Iran,²⁰ but higher than that in Makkah,¹⁸ and Japan,²¹ and lower than the prevalence reported in India.¹³ Further, our results detected no significant association between the awareness score and CTS prevalence ($p=0.732$). More investigations are required to confirm this finding.

Conclusion

There was a lack of CTS awareness among residents living in the Eastern Region of Saudi Arabia. Increasing age, being married, and chronic disease diagnosis were less likely to be aware of CTS as compared to the rest of the groups. Further, previous diagnoses of CTS have no relevant effect on CTS awareness among this population group. There is a need to address the gaps in CTS understanding among the general population. Authorities should exert more effort to educate the public about the general information of CTS. In addition, awareness campaigns are crucial to people's awareness of this type of disease, and social media may play an important role in information dissemination on the basic facts of CTS.

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Conflicts of interest

The authors declare no conflicts of interest.

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