

# Demographic pattern of carpal tunnel syndrome in western Saudi Arabia

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## ABSTRACT

**الأهداف:** دراسة الخصائص الديموغرافية للمرضى الذين يعانون من متلازمة النفق الرسغي في المملكة العربية السعودية.

**الطريقة:** شملت هذه الدراسة الاسترجاعية 135 حالة مصابة بمتلازمة النفق الرسغي، ولقد قمنا بمراجعة سجلات المرضى الذين راجعوا عيادة جراحة العظام في مستشفى جامعة الملك عبدالعزيز، جدة، المملكة العربية السعودية خلال الفترة من يناير 1999م إلى ديسمبر 2009م. لقد تم تشخيص المرضى سريرياً، وكذلك بالطرق الكهربائية العصبية، فيما جمعت البيانات الديموغرافية (العمر، والجنس، ومكان المرض) من السجلات الطبية.

**النتائج:** شملت الدراسة 135 مريضاً حيث كان عدد الإناث 112 أنثى، وعدد الذكور 23 ذكر، وكانت نسبة الذكور إلى الإناث 1:4.9. وكان متوسط العمر 45.5 عاماً لدى النساء (يتراوح ما بين 17-74 عاماً)، و48.5 عاماً لدى الذكور (يتراوح ما بين 20-77). لقد أظهر التوزيع العمري بالنسبة للجنس لهؤلاء المرضى نسبة عالية في الفئة العمرية 45-54 في كل من الذكور والإناث وذلك بنسبة 34.8% لدى الذكور، و33.9% لدى الإناث. ووقعت متلازمة النفق الرسغي في كلا الجانبين في 74 حالة (55%)، وفي جانب واحد في 61 حالة (45%)، مع تأثر 41 حالة بالمرض في الجانب الأيمن، و20 حالة في الجانب الأيسر.

**خاتمة:** أثبتت الدراسة تشابه النمط الديموغرافي لمرضى متلازمة النفق الرسغي في مختلف مناطق المملكة العربية السعودية، كما أن نتائج هذه الدراسة مشابهة لتلك التي أعلن عنها في الدول الغربية مع ارتفاع طفيف في نسبة الذكور إلى الإناث بين المرضى السعوديين.

**Objective:** To study the demographic characteristics of patients with carpal tunnel syndrome (CTS) in Saudi Arabia.

**Methods:** A retrospective collection of 135 cases with CTS, diagnosed clinically and electrophysiologically. The studied cases presented to the Orthopedic Clinic of King Abdulaziz University Hospital in Jeddah, Saudi Arabia, between January 1999, and December 2009. The demographic data (age, gender, and site

of involvement) were collected from the medical records.

**Results:** The 135 cases comprised 112 females, and 23 males, with a male:female ratio of 1:4.9. The mean age was 45.5 years in women (range 17-74 years) and 48.5 years in males (range 20-77). The age related gender distribution of the subjects were the highest among the age group 45-54 years in both males (34.8%) and females (33.9%). The CTS occurred bilaterally in 74 cases (55%), and unilaterally in 61 cases (45%), with 41 cases affected on the right side and 20 the left side.

**Conclusion:** The demographic pattern of CTS patients in the different provinces of Saudi Arabia is almost similar, and comparative to that reported in the western countries, with slightly higher male to female ratio among the Saudi patients.

*Neurosciences 2012; Vol. 17 (1): 44-47*

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*Received 5th May 2011. Accepted 18th October 2011.*

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In 1854, Sir James Paget first reported median nerve compression at the wrist following a distal radius fracture.<sup>1</sup> The carpal tunnel syndrome (CTS) is a clinical syndrome that results from median nerve compression within the carpal tunnel at the wrist. It is common in the general population. Females are more affected than males, involving people in their 50's. Most cases of CTS

**Disclosure.** The author declares no conflicting interests, and no funds were received in support of this study.

are idiopathic, although the risk of its development appears partly to be associated with different local and systemic factors, including genetic, medical, social, vocational, and demographic, such as malunion Colles' fracture, tumor, tumor-like lesion, inflammatory diseases, for example, rheumatoid arthritis, and systemic conditions, such as diabetes mellitus, hypothyroidism, renal failure with hemodialysis, also obesity, alcoholism, and pregnancy. Occupational risk factors in the form of repetitive, forceful flexion and extension of wrist and fingers may also contribute to CTS symptoms.<sup>1-3</sup> The diagnosis of CTS is based on meticulous history, physical examination, and electrophysiological studies. Clinically, patients present complaining of tingling, numbness, paresthesia and pain in the median nerve distribution of the hand with nocturnal exacerbation, which wakes them up from sleep, and improves by shaking of the hand. The pain also occasionally radiates to the forearm and shoulder. Thenar muscle atrophy with weakness of thumb opposition and autonomic nerve involvement (changes in temperature, skin color, and sweating pattern) could appear in long standing and severe cases. Different provocative tests are available to elicit CTS; the prominent ones include (1) Tinel's test - gentle tapping over the median nerve in the carpal tunnel region elicits tingling in the nerve's distribution, (2) Phalen's test - tingling in the median nerve distribution is induced by full flexion (or full extension for reverse Phalen) of the wrist for up to 60 seconds, (3) carpal compression test - applying firm pressure directly over the carpal tunnel, usually with the thumbs, for up to 30 seconds to reproduce symptoms, also the tourniquet test with sensitivity of 21-52%. To confirm the clinical diagnosis of CTS, electrophysiological studies are recommended, which include electromyography (EMG) and nerve conduction velocity (NCS). Patients with mild CTS could respond to conservative treatment, while patients with moderate to severe CTS, and in cases of failure of conservative treatment, require surgery.<sup>4,5</sup> The aim of this study to review the demographic characteristics of CTS in the western province of Saudi Arabia (KSA).

**Methods.** This study was retrospectively conducted in the Orthopedic Clinic of King Abdulaziz University Hospital, Jeddah, KSA from January 1999 to December 2009. Ethical approval to conduct this study was obtained from our institutional Bioethical & Research committee. One hundred and thirty-five subjects with CTS were included in the study. These included 112 females and 23 males. The demographic data of all patients were collected from the medical records. All patients were diagnosed with CTS clinically, based on history, physical examination, including the provocation tests (Tinel and Phalen) and confirmed

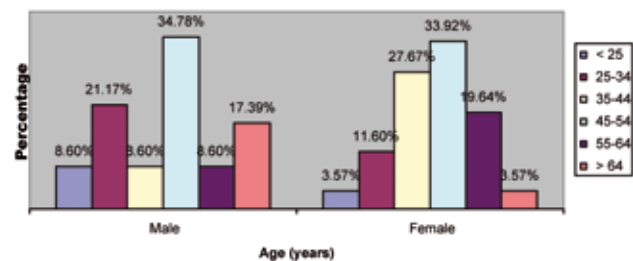
by electrophysiological studies (NCS and EMG). The demographic characteristics of patients were reviewed and analyzed concerning age, gender, and site of occurrence of CTS and included in the study. All patients with CTS that presented to our clinic from January 1999 to December 2009 were included in the study. Patients with missing files and incomplete data were excluded, along with any patient with risk factors (for example, obesity) and associated medical diseases that could predispose to CTS (for example, diabetes mellitus, rheumatoid arthritis, thyroid disease).

The data presented in this study are expressed as means  $\pm$  standard error of the mean (SEM).

**Results.** A total of 135 patients with CTS were included in the present study. There were 112 (83%) females, and 23 (17%) male patients, with a male to female ration of 1:4.9. The mean age  $\pm$  standard deviation (SD) was  $47 \pm 13.8$  years (range 17-77 years) for all patients irrespective of gender. The mean age in women  $\pm$ SD was  $45.5 \pm 11.93$  years (range 17-74 years), and  $48.5 \pm 15.25$  years in men (range 20-77 years). Out of the total 135 patients, 34.1% occurred in the 45-54 year age group, followed by 24.4% in the 35-44 year

**Table 1 -** Demographic characteristics of carpal tunnel syndrome patients from western Saudi Arabia.

Characteristics	Number	(%)
<i>Gender</i>		
Male	23	(17)
Female	112	(83)
<i>Age group</i>		
<25	6	(4.4)
25-34	18	(13.3)
35-44	33	(24.4)
45-54	46	(34.1)
55-64	24	(17.8)
>64	8	(5.9)
<i>Site of involvement</i>		
Bilateral	74	(55)
Unilateral	61	(45)
Right	41	(67)
Left	20	(33)



**Figure 1 -** Age-gender specific distribution of carpal tunnel syndrome patients from western Saudi Arabia.

age group. The CTS was involved bilaterally in 74 cases (55%), and unilaterally in 61 (45%). Out of the unilateral cases, 41 (67%) affected the right hand and 20 (33%) affected the left hand (Table 1). The age related gender distribution of our patients showed the highest percentage of CTS among the 45-54 age group in both males and females, followed by the 25-34 age group in males, and the 35-44 age group in females (Figure 1).

**Discussion.** The CTS caused by compression of the median nerve at the wrist is considered to be the most common entrapment neuropathy.<sup>6</sup> The incidence rate of CTS ranges from 0.125-1%, and the prevalence rate approximately 5-16%, depending upon the criteria used for the diagnosis. It is a condition of middle-aged individuals, and affects females more than males. Since its first description by Phalen in 1950s<sup>7</sup> several studies have reported marked female preponderance, and a peak incidence of age of 55-60 years. In the first population based study, Stevens et al<sup>8</sup> found the incidence rate of CTS to be 3 times higher among women, especially in the 50-70 year age group with a mean age of 50 years for men, and 51 years for women. In the study by Atroshi and colleagues<sup>9</sup> of CTS cases in the general population in Sweden, the prevalence rate among women was 3% versus 2.1% among men. In a recent surveillance study from UK, Bland et al<sup>10</sup> reported a female to male ratio of 2.07. Another study of 130 consecutive subjects with CTS (76.8% female, mean age of 56.5) carried out by Zambelis and colleagues in Greece<sup>11</sup> showed the right dominant hand being independently associated with a 5-fold higher chance for right hand CTS, and the left dominant hand with a 13-fold higher chance for left hand CTS. In Italy, Mondelli and colleagues<sup>12</sup> conducted a prospective study of 3142 cases of CTS, which showed a gender specific incidence of 139 for men and 506 for women. The age specific incidence for women was between 50 and 59, and in men, there was a bimodal distribution with peaks between 50 and 59 years, and between 70 and 79 years.

In a prospective study of 100 patients with CTS conducted in Riyadh, Saudi Arabia by Awada et al,<sup>13</sup> CTS was 4.5 times more common in Saudi women than men, the mean age was 44.6 years in women and 50.5 year in men, and bilateral in 73 cases, while unilateral in 23 cases. In the eastern province of Saudi Arabia, Al-Suleiman and Ismail<sup>14</sup> carried out a study including 220 CTS cases, and showed that CTS was 4.6 times higher in Saudi women than men, and with a mean age of 37 years in females and 44 years in males.

Our study in the western province of Saudi Arabia showed that CTS occurs in females 4.9 times more often than males, which is almost similar to those in other provinces of KSA, but slightly higher than in developed countries. Women have an increased risk of the

development of CTS as emphasized by most studies,<sup>14</sup> as female workers have been shown to have smaller wrists and potentially smaller carpal tunnel volume. In our population where women do a substantial amount of work at home, it is not surprising that being female is a major risk factor of CTS in KSA. The mean age of our cases was 45.5 years in women, and 48.5 years in men, with a peak age group of 45-54 years, which is almost approaching the results reported by Awada et al<sup>13</sup> from central KSA. Both results were slightly lower than those reported from western countries,<sup>5,9,10</sup> but around a decade higher than reports by Al-Suleiman and Ismail<sup>14</sup> from the eastern province of KSA. In our study, bilateral CTS occurred in 55%, and unilateral CTS in 45%. This correlates with what is already known and proven by other studies in developed countries, that CTS is a bilateral disorder, and also the right hand is affected more than the left, which is associated with the dominant hand.<sup>10,15</sup>

This study was specific to demographic characteristics (gender, age, and side) only. Other important risk factors associated with CTS that also could affect the prevalence rate of CTS in relation to gender, age, and side, mainly diabetes mellitus and obesity (high prevalence in KSA) were not included, and this is considered a limitation of our study. Future studies correlating risk factors, associated diseases, and clinical profile should be carried out.

In conclusion, the demographic pattern of CTS (age, site, and gender) in the western province of Saudi Arabia is almost similar to the pattern in other provinces of KSA, and comparative to those reported in other studies in the developed countries. However, with a slightly higher involvement of females in KSA than in the developed countries.

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#### Related topics

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