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Demographic and clinical characteristics of patients diagnosed with carpal tunnel syndrome

Ahmad F. Alelaumi[1]*, Khaled Alsalem[2], Ahmad Almutairi[2], Omar Alrumaih[2], Saif Alajmi[2], Rand Basyouni[2], Yousef Alkhalaf[2], Shaimaa Hachem[2]

[1]Department of Orthopedic Surgery, Jordan University Hospital, Amman, Jordan
[2]University of Jordan, School of Medicine, Amman, Jordan

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***Correspondence:**
Dr. Ahmad F. Alelaumi,
E-mail: ahmadfouad999@gmail.com

ABSTRACT

Background: Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy of the upper limb. It is characterized by sensory and, in advanced cases, motor symptoms due to compression of the median nerve at the wrist. Understanding the demographic and clinical profile of CTS patients in a specific setting is important for clinical practice and healthcare planning.
Methods: This descriptive cross-sectional study included 100 consecutive adult patients diagnosed with CTS at a tertiary upper limb clinic. Data were extracted from medical records. Variables included age, sex, occupation, side involvement, symptom characteristics, duration of symptoms, and associated comorbidities. Continuous variables were reported as mean±standard deviation, and categorical variables were presented as frequencies and percentages.
Results: The mean age of patients was 53.9±14.7 years. Females accounted for 81% of the sample. Most patients were non-manual workers (94%). Right-sided involvement was present in 55% of cases. Numbness or paresthesia was reported in 97% of patients, pain in 93%, and night symptoms in 88%. The mean duration of symptoms was 29.2±39.0 months. Hypertension (35%) and diabetes mellitus (28%) were the most common comorbidities.
Conclusions: CTS in this cohort was more common in middle-aged women and was characterized by a high prevalence of sensory and nocturnal symptoms. Systemic comorbidities were frequent. These findings provide local descriptive data that may support clinical awareness and future research.

Keywords: CTS, Numbness, Weakness, Comorbidities

INTRODUCTION

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy of the upper limb.[1] It results from compression of the median nerve within the carpal tunnel at the wrist.[2] This compression leads to sensory symptoms and, in advanced stages, motor impairment. CTS is a frequent cause of referral to orthopedic and upper limb clinics.[3]

Patients typically present with numbness, tingling, and pain in the thumb, index, middle, and radial half of the ring finger. Many report worsening symptoms at night.[4] Nocturnal paresthesia is often an early and characteristic complaint. As the condition progresses, symptoms may become persistent. In more severe cases, patients may develop hand weakness and thenar muscle atrophy. These changes can interfere with daily activities and fine motor tasks.[5] CTS has clear impact on quality of life. It can reduce work performance, particularly in individuals who perform repetitive hand movements.[6] Sleep disturbance is also common due to night symptoms.[7] If left untreated, condition may become chronic and lead to functional limitations.

The syndrome is more common in women and usually affects middle-aged individuals.[8] Several medical conditions have been associated with CTS, including diabetes mellitus, hypothyroidism, rheumatoid arthritis, pregnancy, and obesity.[9] Repetitive wrist motion and manual work have also been linked to an increased risk.[10] However, the distribution of these factors may vary between populations and healthcare settings.

Diagnosis is primarily clinical. A careful history and physical examination remain essential.[11] Tests such as Phalen's and Tinel's signs are commonly used in routine practice. Nerve conduction studies are often performed to confirm the diagnosis and assess severity.[12] Despite this, the clinical presentation remains central in evaluation and management.

Although CTS has been widely studied, most reports originate from Western populations. Regional and institutional variations may exist in demographic characteristics and presentation patterns. Local descriptive data are important to better understand the patient population and support clinical planning.

The aim of this study was to describe the demographic characteristics and clinical presentation patterns of patients diagnosed with CTS in a tertiary upper limb clinic. This study provides a structured overview of CTS presentation within our setting.

METHODS

Study design and setting

This was a descriptive cross-sectional study conducted at a Jordan University Hospital. The study was based on a review of patient medical records from January 2024 to December 2025.

Study population

The study included 100 consecutive adult patients who were diagnosed with CTS during the study period. Patients were identified from clinic records. Only cases with complete clinical documentation were included.

Inclusion and exclusion criteria

Patients were eligible for inclusion if they were 18 years of age or older and had a clinical diagnosis of CTS. The diagnosis was based on history and physical examination findings and confirmed with electrodiagnostic studies (nerve conduction studies) documented in medical record. Patients were excluded if they had previously undergone carpal tunnel release surgery, had incomplete or missing key clinical data, or had other peripheral neuropathies affecting the upper limb.

Data collection

Data were extracted from the medical records using a structured data collection form. The collected variables included patient age, sex, and hand dominance. Information regarding the affected side was recorded as right, left, or bilateral involvement. Symptom duration was documented when available. The presence of nocturnal symptoms was noted.

Clinical examination findings, including compression tests and Tinel sign, were recorded. The presence of thenar muscle atrophy was also documented. In addition, relevant comorbidities such as diabetes mellitus and hypothyroidism were recorded when available.

All patient data were anonymized before analysis to maintain confidentiality.

Statistical analysis

Data were analyzed using descriptive statistical methods. Continuous variables were presented as mean values with standard deviation. Categorical variables were expressed as frequencies and percentages. Since the aim of the study was descriptive, no advanced statistical modeling or inferential analysis was performed.

Ethical considerations

The study protocol was reviewed and approved by the Institutional Review Board of Jordan University Hospital. The study was conducted in accordance with institutional guidelines and the principles of the Declaration of Helsinki. Due to the retrospective nature of the study and the use of anonymized data, the requirement for informed consent was waived by the institutional review board.

RESULTS

A total of 100 patients diagnosed with CTS were included in the analysis.

Table 1: Demographic characteristics, (n=100).

Variables	Value
Age (in years), mean±SD	53.9±14.7
Female	81 (81%)
Male	19 (19%)
Non-manual occupation	94 (94%)
Manual occupation	6 (6%)
Right-sided CTS	55 (55%)
Left-sided CTS	45 (45%)

Regarding demographic characteristics, the mean age of the study population was 53.9±14.7 years. Most patients were in middle adulthood. There was a marked female predominance. Eighty-one patients (81%) female, while nineteen (19%) were male. Most patients were non-manual

workers, accounting for 94% of sample. Only six patients (6%) were manual workers. Right-sided involvement was slightly more common than left-sided involvement. Fifty-five patients (55%) had right-sided symptoms, while 45 (45%) had left-sided symptoms (Table 1).

Regarding clinical presentation, sensory symptoms were highly prevalent. Numbness or paresthesia was reported in 97 patients (97%). Pain was present in 93 patients (93%). Night symptoms were documented in 88 patients (88%), indicating that nocturnal discomfort was common in this cohort. The mean duration of symptoms was 29.2±39.0 months, reflecting a wide range in time to presentation. The distribution of these clinical features is presented in Table 2.

Table 2: Clinical presentation.

Clinical variables	N
Numbness/paresthesia	97 (97%)
Pain	93 (93%)
Night symptoms	88 (88%)
Duration of symptoms (months), mean±SD	29.2±39.0

Regarding comorbidities, hypertension was the most common associated condition and was present in 35 patients (35%). Diabetes mellitus was identified in 28 patients (28%). Rheumatological diseases were present in 10 patients (10%). Ischemic heart disease or cerebrovascular disease was documented in 9 patients (9%). Renal disease was present in 6 patients (6%), pulmonary disease in 4 patients (4%), and central nervous system disorders in 3 patients (3%). The distribution of comorbid conditions is shown in Table 3.

Table 3: Comorbidity profile.

Comorbidity	N (%)
Hypertension	35 (35)
Diabetes mellitus	28 (28)
Rheumatological disease	10 (10)
Ischemic heart disease/CVD	9 (9)
Renal disease	6 (6)
Pulmonary disease	4 (4)
CNS disorders	3 (3)

The key demographic and clinical characteristics of the study population are summarized in Table 4.

Table 4: demographic and clinical characteristics of the study population.

Feature	Percentage
Female predominance	81
Presence of nocturnal symptoms	88
Presence of numbness	97
Presence of pain	93
Right-side involvement	55

DISCUSSION

This study described the demographic characteristics and clinical presentation patterns of 100 patients diagnosed with CTS in a Jordan University Hospital. Several important observations were identified.

First, there was a clear female predominance. Women accounted for more than four-fifths of the study population. This finding is consistent with most published literature. CTS is known to be more common in females.[13] Hormonal factors, smaller carpal tunnel dimensions, and fluid retention have been proposed as possible explanations.[13-15] The mean age in our cohort was in the mid-fifties, which also aligns with previous reports showing that CTS commonly affects middle-aged individuals.[16]

Most patients in this study were non-manual workers. Traditionally, repetitive manual work has been associated with CTS. However, recent evidence suggests that CTS also affects individuals without heavy manual labor. Sedentary occupations, prolonged computer use, and other repetitive hand activities may contribute.[13] Our findings suggest that CTS is not limited to physically demanding occupations in our setting.

Right-sided involvement was slightly more common than left-sided involvement.[17] This may reflect hand dominance, as most individuals are right-handed. Repetitive use of the dominant hand may increase mechanical stress on the median nerve. Although bilaterality was not specifically analyzed in this study, unilateral involvement was slightly more common on the right side.

Regarding clinical presentation, sensory symptoms were nearly universal. Numbness and paresthesia were present in almost all patients. Pain was also highly prevalent. Night symptoms were reported in the majority of cases. Nocturnal worsening is considered a characteristic feature of CTS and is often one of the earliest complaints.[18] These findings support the central role of history taking in diagnosis.

Comorbidities were common in this cohort. Hypertension and diabetes mellitus were the most frequently observed conditions. Diabetes is a well-known risk factor for peripheral neuropathy and may increase susceptibility to median nerve compression.[19] Rheumatological diseases were also present in a subset of patients. These conditions may contribute through synovial inflammation and increased carpal tunnel pressure.[20] Cardiovascular, renal, pulmonary, and central nervous system disorders were less frequent but still observed.[21]

This study has several strengths. It provides local data from a tertiary hospital in Jordan. It includes a defined sample size and standardized data extraction. The

descriptive design allows a clear overview of patient characteristics without complex statistical modeling.

However, certain limitations should be acknowledged. Study limited to 100 patients from single center. This may reduce generalizability. The cross-sectional design does not allow assessment of causality. In addition, reliance on medical records may introduce documentation bias.

Despite these limitations, the findings provide valuable insight into the demographic and clinical profile of CTS in our setting. The marked female predominance, high frequency of sensory symptoms, and presence of common systemic comorbidities are consistent with existing knowledge. Local descriptive data such as these can support clinical awareness and serve as a foundation for future analytical studies.

CONCLUSION

In this descriptive cross-sectional study of 100 patients with CTS, a clear female predominance and a mean age in the mid-fifties were observed. Sensory symptoms, particularly numbness and pain, were highly prevalent, and nocturnal symptoms were common. Hypertension and diabetes mellitus were the most common associated comorbidities. These findings provide a clear overview of the demographic and clinical profile of CTS patients in our setting and may support improved clinical awareness and future research planning.

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