

Carpal Tunnel Syndrome in the University Administrative Staff

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Abstract

Carpal Tunnel syndrome has been described as an occupational neuropathy related to work factors that involves increased use of the hands and also repetitive movements of both the hands and the wrist. This research aims to characterize the presence of Carpal Tunnel Syndrome amongst the administrative staff of Universidad Técnica Del Norte within the year 2020. It was a descriptive and cross-sectional study, with an integrated sample of administrative personnel with secretarial positions. The information was collected through a sociodemographic survey with characteristics of day to day life and work activities, taking into account the risk factors for the development of the aforementioned syndrome. In relation to sociodemographic factors among the studied population, female civil servants, older than 40, with more than 10 years institutional service, showed a presence of the Syndrome more frequently. The use of the mouse and keyboard for more than 4 hours a day was detected as among the risk factors for developing Carpal Syndrome, especially without protective elements such as support pads. Another risk factor found has to do with domestic activities such as washing dishes. The most frequent symptoms found that alert to a possible development of the Syndrome were tingling, pain and numbness of the hands in at least three out of ten secretaries.

Keywords: Carpal Tunnel Syndrome, risk factors, administrative personnel.

1. Introduction

Carpal Tunnel Syndrome (CTS) is a condition that falls within the group of Musculoskeletal Disorders (MSD). It is a peripheral neuropathy caused by compression of the median nerve in the carpal tunnel caused by an increase in pressure, associated with sensory and motor symptoms. It is the most common entrapment neuropathy of a peripheral nerve in the upper limb with a lineal increase of incidence with age and the Body Mass Index (BMI). This is apart from its occurrence being more common in women. The median nerve is made up of two types of fibers: sensory and motor, originating in the cervical plexus C5. Already in the carpal tunnel, at the the wrist, it passes below the transverse carpal ligament, together with the superficial and deep flexors tendons of the fingers and the tendon of the thumb's long flexor [1], [21].

The first discoveries and scientific contributions regarding CTS were made by Paget in 1954 on the part of clinical anatomy [15]. Subsequently, Pierre Marie and Charles Foix conducted research on

surgical treatment in 1913 [11]. In the UK, the syndrome has had an incidence of 1–3 cases per 1000 patients annually [8].

There are several reasons why the median nerve can suffer compression and affect the mobility of the hands. These are: arthritis, diabetes, fluid retention, misaligned fractures, emotional stress and hormonal changes in women [2].

CTS has been categorized as one of the most silent diseases among workers in the administrative sector due to the risk suffered by the constant use of computers during many hours of work, the lack of ergonomic sitting position, the maintenance of forced postures while carrying out an activity.

This work had been based on the prevention of risk factors that engender the occurrence of CTS as it affects UTN's administrative personnel and through the training of personnel on preventive measures, achieve the necessary knowledge that provides staff information and awareness for the prevention of the syndrome [10]. Knowledge of CTS prevention is important so that administrative staff can carry out their daily work activities without risk of being affected by CTS.

It is important to determine the presence of risk factors and symptoms of CTS as a way to prevent the occurrence of the syndrome because this type of pathology affects staff work and lifestyle. It is essential to transmit preventive measures to personnel who are at risk of contracting this disease and thus there is an interest in the application of preventive measures against CTS.

The objective of this research has been to identify the risk factors related to the occurrence of CTS in the administrative staff of The UTN within the year 2020.

2. Methodology

A descriptive and cross-sectional study was carried out on the administrative staff of the Administrative Building, and of each faculty of The UTN during the year 2020 at their duty posts. The population under study was represented by 72 members of the administrative staff (42 women and 30 men). Once the corresponding authorization was obtained, the data was collected, whereby, a survey composed of 20 closed questions was applied. For result analysis and interpretation, descriptive statistics from Microsoft Office Excel were used. The data are presented in tables.

3. Results and Discussion

The carpal tunnel is a tube made up of tendons, ligaments, and the small carpal bones of the wrist. The tunnel covering is a tough area of connective tissue or transverse carpal ligament. The median nerve passes through the tunnel and gives sensation to the thumbs, index fingers, middle fingers, and the ring side fingers. CTS generally occurs as a result of pressure from the tissues in the carpal tunnel causing sensory and motor disturbances in this area.

The population under study was 72 members of the administrative staff of The UTN (Table 1)

Table 1. Administrative personnel characterized according to gender

Administrative Personnel	Quantity	%
Women	42	58
Men	30	42

Total	72	100
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The participants, the object of the study, made up of a 72 member population administrative staff, with secretarial positions at The UTN. Of those, 42 are women and 30 are men. Regarding gender, the results indicate that the female population (58%) with secretarial positions is greater than the male population (42%). Rodríguez, in 2017, in a study carried out with the staff of the Comprehensive Adult Dentistry Clinic II in Peru, reported that 22.86% of the staff under study related to CTS were women, which allows inferring that this group are more prevalent to present the syndrome [18]. Araiza and Balcázar, in a study carried out in the Dental Specialties Unit of the Ministry of National Defense in Mexico, found that 39.34% revealed they had symptoms of the syndrome belonged to the female sex [3]. The study by Balbastre et al. reports that 96.4% of women show effects of CTS and, in this case, the prevalence of CTS in women is almost eight times higher than in men [5]. It can be inferred that women are the most prone to suffer from CTS. This tendency may probably be due to the fact that in women the tunnel has an average diameter of less than 20mm, which increases the possibility of the female sex suffering more from it; to this, we can add the physiological situations generated post-menopause in which the structures that pass through the canal are increased in size, generating compression of the median nerve, this also occurs during pregnancy.

Table 2 shows the characterization of The UTN administrative staff according to age.

Table 2. UTN administrative staff according to age

Age	<29	30-39	40 or more
Quantity	10	22	40
%	14	31	55

Most of the administrative personnel with secretarial positions at The UTN are 40 years or older, (Table 2) representing 55% of the secretarial employees. Coupled with the fact that the majority are women, it can be predicted that there is a greater tendency for symptoms of the syndrome. A study, carried out by Elías Bedoya in 2011, on the STC in administrative workers at the University Of Cartagena, Colombia, where 174 workers participated, with average service of 12 years for women, while for men: 8 years [6]. Araiza and Balcázar have reported that more people between 31 and 40 years of age presented symptoms of CTS [3] and Escudero affirms in his research that people over 45 years of age suffer more frequently from the syndrome [9]. Quispe (2016) reports a greater predisposition in people over 45 years of age [17]. These results provide the basis to affirm that, as in this research, 55% of the participants are over 40 years of age; therefore, most of the personnel with secretarial positions might show symptoms of the syndrome; This result allows us to infer the need to take preventive measures applicable to administrative personnel with secretarial positions.

Table 3. Administrative staff years of service at The UTN.

Years of service	Less than 1 year	1 to 5 years	5 to 10 years	More than 10 years
Quantity	5	17	16	34

% 7 24 22 47

Years of service play an important role as a risk factor in the development of STC in administrative personnel with secretarial positions. In the population under study, 47% have more than ten years of secretarial work; There is a direct linear relationship between both variables and the appearance of the pathology may depend on the years of service in a given activity ($r = 0.1$). In the study by Bedoya & Meza (2011) on CTS in administrative workers at the University Of Cartagena, Colombia, where 174 workers participated, the participants (women) had an average seniority of 12.1 years and the men, 8.9 years. Women, as expected presented a higher incidence of CTS symptoms, especially those with more years of work in secretarial positions [6].

The excessive use of the mouse and keyboard PAD (Table 4) have been identified as risk factors for CTS.

Table 4. Use of *Mouse* or Keyboard PAD

<i>Mouse Use</i>	YES	NO
Quantity	45	27
%	63	37
Keyboard Use		
Quantity	21	29
%	51	71

Staff work in secretarial positions using a normal keyboard for more than 4 hours (92%) can become a risk factor for CTS. The statistical analysis of the relationship between the presence of CTS and the hours of mouse usage shows that there is a dependent relationship between both variables. That is, an increased use of the mouse during the day can become a causative factor for symptoms of the syndrome ($r = 0.25$).

The presence of the STC and the use of the PAD keyboard indicate that there is a direct relationship between both variables. The use of the keyboard does not pose a risk of the appearance of symptoms. ($r = -0.25$); however, its inappropriate or prolonged use can cause the appearance of symptoms of CTS.

Table 5 shows the data related to the use of the mouse. The literature reports that the use of the mouse is not a factor in the appearance of CTS symptoms; however, using it for a long time and without proper posture can be a strong risk factor in the appearance of symptoms of CTS.

Table 5. Period of mouse usage (Hours/ day)

Mouse Usage (h/d)	Less than 4 hours	More than 4 hours
Quantity	6	66
%	8	92

It can be observed in Table 5 of this investigation that, 92% of the personnel under study declared that they used the mouse for more than 4 hours a day; if you add the possibility that some do not have an adequate posture; excessive use of the mouse can become a causative factor of the syndrome

Quispe & Llerena (2019) in a study of the workers of the Guillermo Alemanara Irigoyen National Hospital (HNGAI), Lima, where 243 workers were surveyed, affirm that healthcare data entry operators will always be associated with CTS, since the main factor for the prevalence of the syndrome is the use of the keyboard and mouse for more than 4 hours a day without any protective element or ergonomic adaptation such as support pads; demonstrates that there is a significant relationship between both variables ($P < 0.05$) [16]. Tejedor, Cervera, Lahiguera, & Ferreres in their study on occupational and non-occupational risk factors in CTS, by means of bivariate and multivariate analysis shows that a significant positive association was found between CTS and hand strength, repetition, and the use of vibratory tools and wrist posture with approximately twice the risk of all exposures [19].

Table 6. Frequency of domestic labor

Domestic labor	Never	Some days	Near daily	Daily
Quantity	2	21	16	33
%	3	29	22	46

46% of The UTN administrative staff carry out housework on a daily basis, some housework can contribute to the appearance of Carpal Tunnel Syndrome. According to Montoro, in 2006, the development of Carpal Tunnel Syndrome has a directly proportional relationship with prolonged repetition of household activities such as washing dishes, sweeping or mopping, unscrewing objects, bearing weight, and lifting objects [13] [10]. Torres & Quevedo, 2013 [20] and Newington, et al. refer a relationship between the daily performance of activities that require vibrations, hand strength, repetition and combined exposure (force-repetition) and the appearance of CTS [14], [12]. It can therefore be inferred that household activities, almost daily or daily, have a high risk factor associated with the appearance of CTS symptoms. In this research, within the behavioral repertoire of the population, 68% of UTN's administrative personnel with secretarial positions carry out the aforementioned household activities.

Table 7. Symptomatology of CTS in UTN administrative personnel.

Symptomatology	None	Difficulty in making a fist	Inflammation	Numbness	Tingling sensation	Pain
Quantity	22	10	4	19	24	20
%	22,1	10,1	4	19,2	24,2	20,2

In Table 7, it is evident that respondents indicate, in some cases, to having more than one of the characteristic symptoms of CTS, showing the presence of tingling (24.2%), pain (20%), numbness (19.2%), difficulty in making a fist (10.1%) and inflammation (4%) as present in 69.4% of the population. Pain is a prominent feature of CTS, in addition to that is the lack of strength in the hand, loss of muscle tone, burning, numbness and tingling especially after work or at night. At these last hours of the day, the symptoms become more intense in 50 to 70% of patients. Symptoms such as a swollen hand sensation, clumsiness, falling objects and symptoms that involve all fingers, the entire hand, the forearm, the arm and the shoulder are usually also referred to. [4], Burton, 2017 [7]. It can be inferred, therefore, that most of the administrative staff of The UTN show characteristic symptoms of the syndrome; making it imperative to carry out actions framed in prevention and diagnosis; so that adequate detection and treatment can be carried out.

4. Conclusions

CTS is a common pathology in people who work. The symptoms of this disease appear very frequently when work activities are carried out without taking into account the provisions that minimize risk factors; creating a cause-effect relationship, where increases in risk factors cause the appearance of symptoms of the syndrome.

The sociodemographic factors that occurred more frequently amongst the administrative personnel with secretarial functions at The Universidad Técnica del Norte in the 2020 period were being aged over 40 years, female gender, and a period of service greater than 10 years in the institution. These are considered, according to the scientific literature, as risk factors in the development of CTS.

All the members of the population under study presented risks of developing CTS, mainly those related to the inadequate posture of the hand-wrist system, most of them due to the use of inappropriate furniture that makes a neutral posture of the upper limbs impossible. It is necessary to use the right furniture for the job in order to assume the correct posture and reduce the risk of CTS symptoms for many hours.

The administrative workers of The Universidad Técnica del Norte (UTN) have been affected by a risk factor of predisposal to the acquisition of this Syndrome. This has been due to the fact that carrying out daily activities affects the nerves due to the position of the wrists and the excessive workload of their daily activities.

The use of the mouse and keyboard for more than 4 hours, without protective elements such as support pads and domestic activities such as washing dishes were the work-related risk factors of getting CTS by The UTN secretariat staff. . The most frequent symptoms that warn about the development of CTS were tingling, pain and numbness of the hands in at least 3 out of 10 people who made up the population under study.

It is necessary to maintain preventive measures in secretarial workers to avoid the appearance of CTS symptoms; For this reason, it is recommended to maintain the proper posture while using the keyboard and mouse. The practice of circular massages along the path of the nerve in the hand, circular movements of the wrist, movements of the flexion, stretching movements of the hand and fingers and, especially, maintaining a proper position at work.

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