Prevalence Of Carpal Tunnel Syndrome Among Computer Workers At Nalut University

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Abstract:
Aims: To study the prevalence of carpal tunnel syndrome among over use of computer in Nalut University employees.
Method : A cross sectional design study was a adopted in a purposive sample of (150) employees using computer in a daily working hour at Nalut university . The sample includes both faculty members and administrators. Certain variable's such as age, gender and the period of experience of computer work, educational level and daily work time. The controversy uses a question near, interview and Phalen test.
Results: males employees use a computer more than female (80:70). The highest prevalence of carpal tunnel syndrome was found among the age group(25-45).Post graduate represents 42% of the study sample. The study also found that diabetes (30%) and obesity (28.7%) was the most common risk factor among the participant . Pain , numbness and numbness in the thumb in index, middle participant and ring finger, increased pain during the night and unto the arm , weakness in the hand grip strength , a feeling of the pane when pressure on the nerve area are the most common symptoms among those affected by carpal tunnel syndrome.

Key : (CTS) carpal tunnel syndrome , computer , Phalen test.

Introduction:

Carpal tunnel syndrome (CTS) is a medical condition that results from the compression of the median nerve in the carpal tunnel, i.e. mononeuropathy that appears due to compression of the median nerve at the wrist. This increased pressure results in ischemia of the median nerve, which leads to a weakness in nerve conduction and the accompanying numbness and pain *(Karne & Bhalerao ,2016).*

The main symptoms appear in the form of pain, numbness, and numbness in the thumb, index, middle, and thumb side of the ring finger. In some studies, carpal tunnel syndrome has been defined as discomfort, numbness, numbness, burning and pain at the same time. These symptoms are worse at night and in severe cases, the hand muscle becomes weak. Too hard to control things *(Katz & Simmons , 2002)* .

The prevalence of carpal tunnel syndrome was found at ages ranging from (30-35), and also women were affected three times more than men, as 0.5% of the general population reported that they suffer from carpal tunnel syndrome, especially with the spread of computer and video games use, and risk factors games include obesity, repetitive wrist work, pregnancy, rheumatoid arthritis and hypothyroidism and diabetes *(Gould & Wissinge ,1978).*

Previous studies:

A study was conducted at the University of Mosul in Iraq, where a sample of 138 employees use computers in daily working hours, and the sample included faculty and administration members. The study included variables such as age, gender and working time on the daily computer. The investigators used the clinical examination (Valine test, tingling and pain test, in addition to the nerve conduction test) to diagnose the problem. Among the study participants, it was found that female employees use computers more than males by a ratio of 46:92) and the highest prevalence of carpal tunnel syndrome (CTS) was in the age group (31-35) years, and it was also found that pregnancy was the most common risk factor among the participants. In females, obesity was the most common risk factor among the male participants *(Aljuwary & Alkallak , 2019)*

A variety of conditions may be associated with carpal tunnel syndrome (CTS), which is represented in rheumatoid arthritis, hypothyroidism, and diabetes. (CTS) is also associated with repetitive activities of the hand and wrist, the incidence rate of (CTS) in patients with rheumatoid arthritis in a sample of 1070 patients with arthritis and religion who visited the rheumatology center between March 2001 and May 2013 and participated in the follow-up at least once during 5 years, it was found that the 12-year incidence of (CTS) in arthritis patients ,was 8.6%, and this study showed that the incidence of (CTS) is not associated with the duration of arthritis and has no positive relationship with Activity (CTS) *(Lee et al , 2015).*

In a study conducted in Iraq, it aimed to evaluate the association between obesity in the form of a mass index and poor nerve conduction in patients with (CTS), 28 patients with clinical and electrophysiological diagnosis and analysis of their demographic characteristics and severity (CTS) were used; Where a significant positive correlation was found between BMI and the sensory latency of the median nerve *(Shakir & Nazar ,2017).*

A cross-sectional study conducted in India over a period of one year. Adult patients with primary hypothyroidism were included in this study, patients with other causes were excluded . (CTS); A detailed medical history of the patients was obtained, and all of them underwent clinical examinations and nerve conduction by the electrical method. A total of 36 adult patients was included in the study, as CTS were found in 6 of them, at a rate of (16.7%); The study showed that no association was found between gender, patient's age, disease duration and hypothyroidism *(Palumbo et al , 2000).*

Evaluation of the relationship between clinical and neurological data and their possible influence on the course of carpal tunnel syndrome (CTS) in diabetic patients of a group of 230 patients, (CTS) was found in a third of these patients; The study variables included the duration of diabetes, type of diabetes, diabetic neuropathy, as well as the effect of carpal tunnel syndrome (CTS). The results of the study found that women are three times more affected than men, and 56% of patients have type 2 diabetes with impairment in nerves *(Zur Horst-Meyer , 2004).*

Study in (clinical neurophysiology) to evaluate the occurrence of (CTS) during pregnancy and the Italian study focused on the occurrence of (CTS) in women during the last stages of pregnancy and registered in 7 Italian centers; After the clinical diagnosis (CTS) was found in more than half of the women (62%), and the neurophysiological diagnosis (CTS) in at least 43% was positive in one hand *(Padua et al , 2001)*

Published magazine Journal of the Neurological Sciences A study on hormonal changes associated with menopause and their relationship (CTS) after menopause; the aim of the study was to evaluate the relationship between carpal tunnel syndrome (CTS) and menopause in postmenopausal women. Menopause may be an important factor in the development of CTS, and hormonal changes associated with pregnancy also have long-term effects that increase the incidence of CTS in postmenopausal women *(Kaplan et al , 2008)*

The importance of a positive family history of carpal tunnel syndrome has determined the prevalence of the syndrome (CTS), where 75 of 253 women and 40 of 168 men with the confirmed carpal tunnel syndrome had at least one relative who had symptoms or had surgery for carpal tunnel syndrome, with a rate of 39.3% *(Radecki ,1994)*

That rate rating (CTS) in a group of computer workers, through symptoms and nerve conduction tests, shows that the position of the extended wrists while typing on the keyboard is a predisposing factor for injury (CTS). However, the relationship between the wrist extension angle and the incidence of (CTS) is not well known; A study of forty-five people

with an average age of 38.8 years who used a computer for more than 6 hours per day in a medical center in southern Taiwan, where physical examinations such as Phalen's test were performed by a physician and the maximum wrist extension angle was measured when using a keyboard. The results showed a significant correlation between (CTS) and the angle of wrist extension while using a computer keyboard *(Liu et al , 2003)*

A one-year study was conducted with the use of a questionnaire between the years 200 and 2001 in Denmark, for a sample of 3,500 participants. The aim of the study was to evaluate the contribution of the mouse and keyboard in considering them as one of the risk factors for carpal tunnel syndrome. The prevalence of numbness and tingling in the median nerve was found among the participants by 4.8%, as well as the appearance of symptoms or their intensity during the night, and it was also found that there was a relationship between the use of the mouse and keyboard device for more than 20 hours per week, which is one of the risk factors for carpal tunnel syndrome*(Andersen et al , 2003).*

The prevalence was also studied (CTS) among computer professionals and risk factors, a sample of 648 people was selected from 4276 computer professionals from 21 companies using simple random sampling method. In people who use computers and

have more than 8 years of working on the computer and more than 12 hours of work per day *(Ali & Sathiyasekaran , 2006)*.

The importance of studying:

The importance of the study stems from the fact that it highlights:

1- Knowing the prevalence of carpal tunnel syndrome among university employees.
2- Limited research in occupational health, which includes healthy sitting, hand position, and the safe distance between the worker and the computer screen.
3- Knowledge about the occupational health of university employees.
4- The need for such a study to open future prospects for related scientific studies.

Research problem:

With the institutional and service development and technology has increased the use of computers at work in the office, whether for the employee who is considered a daily work to the faculty member who considers the use of the computer in presentations , permanent in the preparation of lectures. With the frequent, daily and long-term use of the computer at work, it is noticeable that most workers do not adhere to the application of occupational health within the work offices.

Aim of study:

The main aim of the study is to estimate the prevalence of carpal tunnel syndrome among computer users in Nalut University while the specific objectives of the study were:

1- To estimate prevalence of carpal tunnel syndrome among computer users in Nalut university in regard to certain variables such as age, gender, period of work .Experience period, duration of employment and nature of the job.
2- To investigate risk factors for carpal cannel syndrome among university employees.
3- To diagnose carpal tunnel syndrome in university employees.

Methodology:

A cross section study design was adopted at Nalut university on a purposive sample of (150) participants included this study with a criteria for excessive use of computer during daily work. The employees whose jobs are not related to the computer were excluded from the sample. The sample includes both faculty members and administrators, 80 males and 70 females . Data were collected in a period of 3 months duration from January to the end of March 2021. To achieve the desired aim and the objectives of the present study a special tool was implemented, this tool was intended by the investigator's through use different literature and it consist mainly of four parts. Data were analyzed by using SPSS software version 22 .Frequency , percentage and

prevalence rate . The questionnaire consists of four parts that serve the subject of the study, which are as follows:

The part I: includes personal characteristics (gender, educational qualification, nature of work, duration of work and the number of working hours per day).
Part II: It aims to identify the causes of carpal tunnel syndrome, as it contains: 7 Axes .
Part III: aims to diagnose carpal tunnel syndrome.

Results:

Table(1): distribution of the study sample according to their socio-demographic data.

Age groups	**NO**	**Percentage%**
25 - 35	58	38.7%
36 - 45	56	37.3%
45 - 55	28	19.3%
55 and more	7	4.7%
gender	**NO**	**Percentage %**
male	80	53.3%
female	70	46.7%
Education level	NO	Percentage %
institute	26	17.3%
bachelor	61	40.7%
Post graduate	63	42.0%
Type of work	NO	Percentage%
Faculty member	53	35.3%
Head of department	14	9.3%
employee	50	33.3%
Administrative employee	33	22.0%
Duration of work (year)	**NO**	**Percentage%**
<5	17	11.3%

5-10	66	44.0%
11-20	49	32.7%
>20	18	12.0%
working time	**NO**	**Percentage%**
8-5 hours	120	80%
9-12 hours	28	18.7%
<12 hours	2	103%

Table(2):prevalence of carpal tunnel syndrome among university employees in regard to their age.

Age	**affected**		**Not affected**		**Prevalence rate**
	NO	Percentage%	NO	Percentage%	
25 -35	11	7.3%	47	31.3%	0.22
36 - 45	11	7.3%	45	30.0%	0.23
46 - 55	2	1.3%	27	18.0%	0.05
< 55	0	0%	7	4.7%	0
total	24		126		

Table (3): Risk factors of carpal tunnel syndrome among university employees.

factor	**Yes (%)**	**No (%)**
diabetes	**45 (30%)**	**105 (70%)**
Obesity	**3 (28.7%)**	**07 (71.3%)**
Thyroid disorders	**24 (16%)**	**126 (84%)**
arthritis	**18 (12%)**	**132 (88%)**
cancer	**2 (1.3%)**	**48 (98.7%)**
hormonal imbalance	**13 (8.7)**	**37 (91.3%)**
family history	**0 (26.7%)**	**10 (73.3%)**

Table (4): diagnoses of carpal tunnel syndrome among university employees.

Diagnosis	Yes (%)	No(%)
Pain, numbness, and numbness in the thumb, index and middle fingers, and ring finger	57 (38%)	93 (62%)
Pain increases during the night and reaches the arm	47 (31.3%)	03 (68.7%)
weak hand grip	70 (46.7%)	80 (53.3%)
pressure in the nerve area	60 (40%)	90 (60%)
Replace the hand when severe pain	79 (52.7%)	71 (47.3%)
Valen's test	50 (33.3%)	00 (66.7%)

Discussion:

The prevalence of carpal tunnel syndrome, even if it is not diagnosed, but one of its symptoms is actually present in people who use the computer for several years and in their daily work, the prevalence of carpal tunnel syndrome symptoms was observed in this cross-sectional study, where a significant percentage was found among the participants.

Table (1) shows that most of the study sample (76%) is between the ages (25-45) years, where the number of males was 80 and the number of females was 70, and 17.3% of the sample graduated from intermediate institutes, 40.7% of the sample had a bachelor's degree and 42% They have postgraduate studies, as the table shows that the period of work for participants reaches 5 and 10 years at a rate of 44%, and the duration of daily work is from 5 to 8 hours at a rate of 80%, and this shows that the period and duration of the participants' computer use fall within the risks of carpal tunnel syndrome and this is consistent With a study conducted in Iraq (Mosul University) 2019.

Table (2) shows the prevalence of carpal tunnel syndrome among university employees in relation to their age. It was noted that ages between (25-45) years have one of the symptoms of carpal tunnel syndrome by 14.6%, and ages between (55-46) have symptoms up to (1.3 %), and this agrees with a study conducted in Davis Medical Center in California (2000) which showed that the ages of 45 years have a history compatible with carpal tunnel

syndrome. It was found that (30%) of the participants have diabetes and they complain about one of the symptoms of carpal tunnel syndrome (Gould & Wissinger ,1978) and 28.7% have obesity and symptoms of carpal tunnel syndrome (Aljuwary,& Alkallak ,2019).

16% of the participants have thyroid disorders, which is one of the causes of carpal tunnel syndrome (Palumbo *et al*.2000), and it was noted that 12% have arthritis, which is consistent with the study of (Lee *et al*.2015) . They have carpal tunnel syndrome among their families, with a rate of 26.7%.

Table (4) shows symptoms diagnosed as carpal tunnel syndrome, as in the workers who replaced the hand when severe pain, the percentage of which reached 52.7%, followed by weakness in the hand grip by 46.7%, and complaints of pain, paresthesia and numbness in the thumb, index, middle and ring fingers with a percentage of It reached 38%, and other diagnostic symptoms such as pressure in the carpal nerve area by 40%, and this shows that there are diagnostic grounds for carpal tunnel syndrome for the study participants.

Conclusion:

It was concluded from the study that working with the computer, which includes (mouse and keyboard) causes one of the symptoms of carpal tunnel syndrome, but we cannot conclude that it is the cause of carpal tunnel syndrome and that there are risk factors that would be the cause of the symptoms of carpal tunnel syndrome.

Recommendations:

1- For prevention, working hours must be determined and divided.
2- Avoid excessive use of hands while working on the computer.
3- Apply occupational safety measures when using the computer, which includes the angle of inclination of the hand and the back and the safe distance between the worker and the computer.
4- Monitoring risk factors for carpal tunnel syndrome such as body weight and treating chronic systemic diseases such as diabetes and gland disorders.

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