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ORIGINAL RESEARCH

ASSESSING CARPAL TUNNEL SYNDROME AMONG ADMINISTRATIVE STAFF OF A HIGHER LEARNING INSTITUTION: A PRELIMINARY STUDY

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Abstract

Background: Repeated hand and wrist movements increase the risk of carpal tunnel syndrome (CTS). The administrative staff is one of the high-risk classes that repeatedly involve the execution of identical tasks.

Objective: This preliminary study was conducted to determine the prevalence of CTS among administrative staff and identify the socio-demographic and occupational risk factors for this syndrome.

Methods: Descriptive cross-sectional study design was conducted amongst administrative staff at one of the higher learning institutions in Pahang, Malaysia. A total of 61 respondents were conveniently sampled according to the inclusion criteria. Respondents were required to undergo three tests (Phallen's test, Thinel's test, Durkan's test) to identify probable CTS and answer questionnaires (socio-demographic background, occupational risk factors, and Boston Carpal Tunnel Syndrome Questionnaire). Data were analyzed using SPSS, and a Chi-square test was used to identify risk factors for CTS.

Results: The average age for respondents was 31.72 (±5.38). The majority of respondents were female (70.5%), with a bachelor's degree background and below (91.2%), and never used ergonomic tools (68.9%). The prevalence of probable CTS was 16.5% (n=10). There is no statistically significant finding between socio-demographic and occupational risk factors with probable CTS (p >.05).

Conclusion: The data from this preliminary study revealed no association between the use of computers at work and probable CTS in a higher learning institution. Although the findings are not significant, this study can be used as a baseline for a future longitudinal study for nurses and other healthcare professionals to encourage good occupational and environmental health.

KEYWORDS
preliminary data; carpal tunnel syndrome; median neuropathy; neuromuscular disease entrapment neuropathy; nursing

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BACKGROUND

Carpal tunnel syndrome (CTS) is a median nerve compression at the wrist joint level and the most common peripheral nerve entrapment syndrome. CTS is widely identified as the most costly upper extremity musculoskeletal condition among working-aged patients (Dale et al., 2013). The majority of CTS cases are chronic and idiopathic, with many risk factors reported (Wright & Atkinson, 2019). These involve the female gender (peak age 45 to 54 years), increasing age, obesity, thyroid disease, diabetes, pregnancy, renal failure, primary amyloidosis, and drug toxicity (Newington et al., 2015).

Computer use is associated with pain complaints, but it is still unclear if this association is causal. There is limited knowledge of particular conditions or diseases (Andersen et al., 2011). Evidence of increased hand activity and strength is linked to the increasing prevalence of carpal tunnel syndrome (Musolin et al., 2014). Administrative staff who have worked primarily in clerical, operational, and management offices, such as keeping records or accounts and performing other routine administrative tasks, may use a computer that requires repetitive movement to the wrist. This can trigger median nerve pressure when performing their duties at work. Typing induces changes in the median nerve that are affected by the ulnar deviation level. Poorer hand sensitivity and dexterity and excessive force exerted by digits and pen tips were reported in handwriting among CTS patients (Kuo et al., 2014). Although it is not clear if these changes contribute to long-term symptoms or nerve damage, their presence adds to the evidence of a potential connection between CTS and the

use of the keyboard (Toosi et al., 2015). There is no guideline for ergonomic devices in patients with CTS, but it remains based on personal preference (Schmid et al., 2015).

In Kuwait, approximately 18.7% of office staff reported having CTS (Raman et al., 2012). Currently, there is no clear prevalence reported for CTS among office workers in Malaysia. These data are essential for nurses and other healthcare professionals to encourage good occupational and environmental health and avoid further complications. Therefore, this study aimed to determine the prevalence of CTS among administrative staff and to identify the socio-demographic and occupational risk factors of this syndrome.

METHODS

Study Design and Participants

This is a cross-sectional quantitative descriptive study design. The participants were administrative staff engaged in clerical, operational, and office management at one of the higher learning institutions in Pahang, Malaysia. They were included based on the criteria of administrative staff who worked full-time, understand the English language, and willing to take part in the study. Respondents were excluded if they had an existing hand injury. The sample size was estimated based on the previous research, which recorded that the prevalence of workers having CTS below the age of 30 is 3% and above the age of 30 is 25% (Ithnin, 2012). By using the two proportion formulas and 95% confidence interval, the required sample was 76 (derived by Epi-Info software version 7).

Instruments

Respondents who had already confirmed diagnosed with Carpal Tunnel Syndrome were given the questionnaire directly, while respondents who did not confirm or did not know were tested with Phalen's test, Thinel's Test, and median nerve compression (Durkan test) test before giving the questionnaire. The test session lasted about 5 minutes, and the questionnaire lasted about 20-30 minutes. Upon completion, the respondents were asked to return the questionnaire, and the questionnaire was checked before leaving the session. Socio-demographic backgrounds and occupational risk factors such as years of work experience, computer use at the workplace, hours spent on the computer, ergonomic use of computer equipment were among the requirements measured among the respondents.

Data Collection

Data were collected from January to March 2015 from six faculties at one of the higher learning institutions in Pahang, Malaysia. Respondents were identified and approached based on the list name of the staff. The purpose of the research was briefly clarified, and some questions were asked to confirm whether he/she had been diagnosed with Carpal Tunnel Syndrome and had any wrist abnormality.

Data Analysis

Data were analyzed using descriptive and inferential analysis. A Chi-square test was used to determine the association between variables and probable for CTS. P-value <0.05 was considered to be statistically significant at a 95% confidence interval.

Ethical Consideration

Ethical approvals were obtained from the Kulliyyah (Faculty) of Nursing Postgraduate and Research Committee (KNPGRC) (IIUM/313/20/4/10) and IIUM Research Ethics Committee (IREC) (IIUM/305/14/11/2/IREC3). All respondents gave their written informed consent.

RESULTS

A total of 61 respondents participated in the study, and the socio-demographic characteristics are presented in Table 1. Respondents are between 22 and 45 years of age (mean= 31.72, SD= ±5.38). The majority (70.5%) of the respondents were female than the male respondents (n = 18). The BMI is 25.09 (SD= 3.60), while the level of education ranges from high school (32.8%), diploma (39.3%), bachelor (18.0%), and others (9.8%).

Table 1 The characteristics of the respondents (n=61)

Variable	*n* (%)
Age, years (mean±SD)	31.72±5.38
Gender	
Male	18 (29.5)
Female	43 (70.5)
BMI, kg/m^2 (mean±SD)	25.09±3.60
Kulliyyah (Faculty)	
Science	10 (16.4)
Allied Health	9 (14.8)
Pharmacy	9 (14.8)
Medicine	11 (18.0)
Dentistry	12 (19.7)
Nursing	10 (16.4)
Education	
High School	20 (32.8)
Diploma	24 (39.3)
Bachelor	11 (18.0)
Master/PhD	0 (0.0)
Others	6 (9.8)

Table 2 illustrates the prevalence of probable CTS and occupational risk factors among the respondents. The majority of probable CTS was 16.5% (n =10), and the working experience was between one year and 20 years (mean = 7.26, SD = 4.764). All respondents used a computer at their working place according to scheduled office time. Hours spent on the computer is ranging from three to eight hours (mean = 6.30; SD = 1.520). However, only 31.1% (n = 19) of respondents applied ergonomic tools when using a computer, while the remaining respondents, 68.9% (n = 42), did not use any ergonomic tool.

Table 2 The prevalence of probable CTS and occupational risk factors among the respondents

Variable	*n* (%)
Probable CTS	
Yes	10 (16.4)
No	51 (83.6)
Computer usage per day, hours (mean±SD)	6.30±1.52
Applied ergonomic tool	
Yes	19 (31.1)
No	42 (68.9)
Working experience, years (mean±SD)	7.26±4.76

Table 3 shows the associations between the prevalence of probable CTS and socio-demographic and occupational risk factors. The result showed that the probable CTS was not associated with any sociodemographic and occupational risk factors. However, the prevalence rate among respondents was higher in females (20.9%) than males (5.6%). The respondents with low BMI (24.04± 5.66) more likely to have probable CTS compared to those who have higher BMI (25.29±3.08). More respondents from Kulliyyah (Faculty) of Pharmacy and completed high school were reported having probable CTS compared to respondents from other faculties. Moreover, the respondents who have long working experience and computer use were reported to have more probable CTS. Interestingly, the respondents who reported applied ergonomic tools more likely to have probable CTS.

Table 3 The associations between prevalence of probable of CTS and socio-demographic and occupation risk factors

Variable	*n* (%)		P-value
	With Probable CTS	Without Probable CTS	
Total respondents, *n*= 61	10 (16.4%)	51 (83.6%)	
Age, years (mean±SD)	31.60±5.89	31.75±5.34	0.94
Gender			0.27
Male	1 (5.6)	17 (94.4)	
Female	9 (20.9)	34 (79.1)	
BMI,kg/m^2 (mean±SD)	24.04±5.66	25.29±3.08	0.51
Kulliyah (Faculty)			0.24
Science	2 (20.0)	8 (80.0)	
Allied Health Sciences	2 (22.2)	7 (77.8)	
Pharmacy	3 (33.3)	6 (66.7)	
Medicine	1 (9.1)	10 (90.9)	
Dentistry	0 (0.0)	12 (100)	
Nursing	2 (20.0)	8 (80.0)	
Education			0.71
High School	4 (20.0)	16 (80.0)	
Diploma	4 (16.7)	20 (83.3)	
Bachelor	2 (18.2)	9 (81.8)	
Masters/PhD	0 (0.0)	0 (0.0)	
Others	0 (0.0)	6 (100)	
Computer usage per day, hours (mean±SD)	6.80±1.48	6.20±1.52	0.25
Applied ergonomic tool			0.77
Yes	4 (21.1)	15 (78.9)	
No	6 (14.3)	36 (85.7)	
Working experience, years (mean±SD)	8.30±6.96	7.06±4.27	0.60

DISCUSSION

The finding showed no significant difference in the prevalence of acquiring CTS in terms of gender. This preliminary study indicates no difference between the prevalence of developing CTS in males and females. The insignificant result could be due to the unequal distribution of gender among administrative clerical staff with fewer respondents being male staff. However, gender has been shown to have a definite effect on nerve conduction study variables, and the effects have been reported as not similar in motor and sensory nerves (Jha, 2018). It has also been reported in a study in peninsular Arab (Raman et al., 2012). One possible reason could be the difference in workload at the workplace; male workers are more likely to engage in the physically required occupation.

The result showed no association between the prevalence of acquiring probable CTS with working experience among administrative office staff. Another study on the relationship between long exposure to the frequent high movement of the wrist and the hand, extreme wrist position, availability of protection, and hand-held vibrating tools have been identified as key factors of occupational risks (Çiftdemir et al., 2013). However, only administrative staff were involved in this study, as the workplace task did not expose to the high risk of repetitive hand movement, vibrating tools, and extreme wrist position.

Computer use also shows no association with the prevalence of probable of CTS. There is no strong evidence in this study that shows the effect of long exposure to computer use that can develop CTS among respondents. This study is supported by the previous research that concludes no association between computer use and probable CTS (Mediouni et al., 2014).

Meanwhile, there is no association between the prevalence of acquiring CTS and ergonomic usage among office workers. However, another study demonstrates some personal and ergonomic factors associated with CTS among laboratory technicians (El-Helaly et al., 2017). It was recommended that proper work posture, including healthy working conditions, must be provided to make the work more comfortable and relaxed (Moom et al., 2015). Various ergonomic intervention programs may help reduce ergonomic risk factors among computer workers (Esmaeilzadeh et al., 2014; Łubkowska et al., 2016). Thus, it is crucial for nurses employed in occupational health or other healthcare professionals to develop, implement, and evaluate comprehensive occupational health and safety programs for administrative staff to prevent occupational injuries and illness.

The findings of this preliminary study were the outcome of a cross-sectional study that may not be generalized. A longitudinal study may be required to determine the causal relationship. The probable CTS in

this study sample was based on a self-reported questionnaire, which could lead to recall bias. The findings could lead to reporting bias as the administrative staff could do some other repetitive movement in daily activities such as mobile phone use. However, the authors assumed that other repetitive movements are not as thorough as their routine of work. Furthermore, clinical nerve conduction tests may be used in the future, although this approach is time-consuming and requires a great deal of cooperation from the respondents.

CONCLUSION

Data from this preliminary study showed no association between the use of computers at work and probable CTS in a higher learning institution. Although the findings are not significant, this study may be used as a baseline for future longitudinal studies. Potential large-scale research could be carried out to investigate the real prevalence of possible CTS among administrative staff in higher learning institutions.

Declaration of Conflicting Interest
The authors declare there is no conflict of interest.

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Authors Contribution

	MKCH	MSA	ZNBSA	FICJ	MKZHF
Concepts	√	√	√		
Design				√	√
Definition of intellectual content	√	√	√	√	√
Literature search	√	√	√		√
Data acquisition	√	√	√	√	√
Data analysis	√	√		√	
Statistical analysis			√	√	√
Manuscript preparation	√	√	√	√	√
Manuscript editing	√		√		√
Manuscript review		√		√	
Guarantor	√	√	√	√	√

Data Availability Statement
Research data is kept at the corresponding author's university and released upon request, if related.

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