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RESEARCH ARTICLE

PREVALENCE OF CARPAL TUNNEL SYNDROME SYMPTOMS AMONG DENTISTS IN BENGHAZI CITY - LIBYA

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Abstract

Introduction: Many diseases may affect the nerves of a wrist, one of them is Carpal Tunnel Syndrome (CTS). In the general population, the frequency of CTS prevalence ranged between 3% and 6%.

Objectives: To demonstrate the prevalence of CTS symptoms among dentists working in Benghazi-Libya.

Methods: A cross-sectional study was conducted in 2019. 205 dentists working in 14 different dental clinics across the city were asked to fill in a questionnaire regarding the symptoms of CTS.

Results: Out of 205 questionnaires distributed, only 132 dentists (64.4 %) responded, 73 were male (55.3%) and 59 (44.7%) were female. Out of those participants, 81 dentists (61.3 %) had one or more symptoms of CTS. 32 dentists (24.2%) experienced hand or wrist pain at night, whereas 42 dentists (31.8%) complained of wrist pain during the daytime. In addition, 19 dentists (14.4%) felt hand numbness and 34 (25.8%) suffered from hand weakness during work. Moreover, hand-tingling problems were observed in 23 dentists (17.4%), and the difficulty with grasping and using small objects were reported in 19 dentists (14.4%). Finally, the difficulty of handling manual devices and surgical forceps was detected in 12 dentists (9.1%) and 37 dentists (28%) respectively.

Conclusion: This study shows a significant number of dentists working in Benghazi have symptoms of Carpal Tunnel Syndrome.

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Introduction:-

One of the most common peripheral neuropathy of the median nerve is carpal tunnel syndrome (CTS) (Somaiah and Roy, 2008). It is a compression to the median nerve that characterized generally by different symptoms such as pain, numbness, and paresthesia. These symptoms occur in the area supplied by the median nerve such as thumb, index, and middle fingers, in addition to the lateral half of the ring finger (Haghighat et al., 2012). The main cause of this syndrome is unknown, but it could be a consequence of median nerve vein circulatory disorder and increasing

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internal canal pressure which indeed results in ischemia to the median nerve. Moreover, it may take place due to tenosynovitis of the tendons that close to the median nerve (Bland, 2007). In addition, wrist bone fracture or dislocation, connective tissue disorder, obesity, pregnancy, infections, and metabolic disease may also lead to this syndrome (Haghighat et al., 2012).

However, among the general population, the prevalence of CTS are ranged between 3% and 6% (Alhusain, 2019), while among pregnant women it reaches 19% (Khosrawi and Maghrouri, 2012), whereas among diabetic patients it reaches up to 20% (Oktayoglu et al., 2015). The working population has showed more prevalence of this syndrome than the non-working population. Occupationally, this syndrome happens frequently with the jobs that include chronic bending movements of the wrist during forceful catching of devices (Alhusain, 2019). Practicing dentistry is one of these jobs, which include repetitive twisting of the wrist especially during manual dental root canal treatment, scaling, tooth preparation, and extraction. Among dental practitioners, the commonness of CTS symptoms in Karachi city of Pakistan, is 10.31% (Khan et al., 2014), while in Riyadh city of Saudi Arabia it almost 30.5% (Alhusain, 2019). In Libya, the prevalence of this syndrome among dental practitioners has not yet been known. Therefore, the aim of this study is to demonstrate the prevalence of CTS symptoms among dentists who work in Benghazi city of Libya.

Material And Methods:-

A cross-sectional study was conducted in Benghazi, Libya in 2019. The Libyan ministry of health revealed that, the total number of dentists who registered and working in dental health care sectors in Benghazi city in the year 2018 was 221 dentists (Seha, 2019). In reference to that, the needed sample size was calculated with 95% confidence level and 5% margin error. In order to compensate the dropouts, a total of 205 dentists from 14 different public and private dental clinics were included. All those participants were asked to answer a two parts of self-administrated questionnaire. This questionnaire was derived from Boston carpal tunnel syndrome questionnaire with some modifications to accommodate with dental functional work (Levine, 1993). The questionnaire was developed by Levine et al. (1993) and then tested for its validity by many previous studies with perfect results of t-test reliability and excellent range of correlation coefficients that lies between 0.8 and 0.9 (Park et al., 2013; Bakhsh et al., 2012; and Lue et al., 2014).

The socio-demographic data was included in the first part of questionnaire, which include questions related to age, gender, years of experience, degree level, specialty, working time and medical condition. The second part of the questionnaire include nine different questions related to the symptoms of CTS and its severity as seen in Table 1. All collected data were entered by Microsoft Excel worksheet and analyzed by using IBM SPSS software version 22.

Results:-

Out of 205 questioners were distributed, only 132 dentists (64.4 %) responded, with a dropout rate of 73 dentists (35.6 %). Regarding gender, 73 dentists (55.3%) were male and 59 dentists (44.7%) were female (Figure 1). The highest number of participants 45 dentists (34.1%) was in the age group 30 – 34 years old and 44 dentists (33.3%) was in the age group less than 30 years old, whereas the lowest number of participants 3 dentists (2.3%) was in the age group 40 – 44 years old (Table 2). Out of those participants 81 dentists (61.3 %) had one or more symptoms of CTS. The majority of participants with CTS symptoms where in less than 30 years of age category and accounts for 34 dentists (25.75 %) of total number of participants. Whereas the lowest number of participants with CTS symptoms where in 40-44 and 45-49 of age category and accounts for 2 dentists (1.5 %) of total number of participants for each (Table 2).

In relation to working time and symptoms of CTS, 46 full time dentists had symptoms of CTS and 35 part time dentists had symptoms of CTS. 52 dentists (39.4%) have less than five years work experience, while 35 dentists (26.5%) have an 5-10 work experience. Moreover, 26 dentists (19.7%) and 19 dentists (14.4%) were reported to have 10 to 15 years of experience and ≥ 15 years of experience respectively.

Regarding medical condition of participants, 5 dentists (3.8%) were reported to have type II diabetes mellitus, 2 dentists (1.5%) have hypothyroidism and 2 dentists (1.5%) have hypertension. However, no one seemed to suffer from rheumatoid arthritis or other joint diseases. In relation to pregnancy, only 3 dentists (2.3%) were pregnant.

It was found that, 31 dentists (23.5%) have master degree and only 7 dentists (5.3%) have a PhD degree. The highest percentage of the participants 93 dentists (70.5%) work as a general dental practitioner (GDP) with 61 dentists (46.2%) had one or more symptoms of CTS, while the other percentages were distributed among other work specialties (Table 3).

It was also found that 32 dentists (24.2%) of the total participants experienced hand or wrist pain at night, in which the severity of the pain was distributed into 19 dentists (59.4%), 12 dentists (37.5%), and 1 dentists (3.1%) for mild, moderate and severe pain respectively. Nevertheless, the percentage of dentists' ages who complained about hand or wrist pain at daytime were more than that at night with 42 dentists (31.8%) and 32 dentists (24.2%). Some of them 27 dentists (64.3%) complained about mild pain and 15 dentists (35.7 %) had moderate pain, while there was no severe pain reported meanwhile during daytime. In addition, 19 dentists (14.4%) of the total participants showed that they suffered from numbness that were classified into 36.8% for mild, 57.9% for moderate, and 5.3% for severe form of hand numbness.

Moreover, 34 dentists (25.8%) were reported the symptom of hand weakness during work. The majority of them 24 dentists (70.6%) were reported with mild form of hand weakness. Moreover, the hand tingling was reported by 23 dentists (17.4%) (Table 4).

However, 19 dentists (14.4%) reported to have the difficulty with grasping and handling of small objects. Finally, the difficulty in handling of manual instruments and surgical forceps recorded by 12 dentists (9.1%) and 37 dentists (28%) respectively (Table 4).

Discussion:-

This cross sectional study evaluated the median nerve neuropathy among 132 dentists with different ages, years of working experience and work specialties. Occupational musculo-skeletal complains in dentistry usually occurs with upper body movements in sitting or standing positions during dental work (Chin and Jones, 2002; and Brown, 2004).

A considerable proportion of the participants 81 dentists (61.3 %) had one or more symptoms of CTS. This was much higher than other studies with similar aim like Karachi study (10.3%) (Khan et al., 2014), Riyadh study (30.5%) (Alhusain et al., 2019), Isfahanian study (16.7%) (Haghighat et al., 2012), Shiraz study (17.5%) (Borhan et al., 2013), Chennai study (25.7%) (Inbasekaran et al., 2018), United States army dentists study (28%) (Lalumandier and McPhee, 2001), Australian study (34%) (Leggat et al., 2007), Malaysian study (21.2%) (Munirah et al., 2014), and Lahore study (15.5%) (Ehsan et al., 2013). The explanation of this could be due to lack of knowledge about CTS and how it could be prevented as CTS was not taught during undergraduate and even in postgraduate years, also considerable proportion of the participants 60 dentists (45.5%) were working as a full time dentists which can attribute to development of CTS.

In addition, this disease is more common among middle-aged people at the age of 30 to 60 years (Blumenthal, 2006). According to Isfahanian study (Haghighat et al., 2012), the prevalence of CTS increases with age in such a way that it reaches 22.2% in ages over 55 years, as opposed to 6% among participants of ages between 25 and 34. While the Riyadh study (Alhusain et al., 2019), found no relationship between CTS symptoms and age. In our study, the prevalence of CTS was more among younger dentists and accounts for 55% of all participants less than 40 years of age and that can be explained by the largest number of participants were in younger age group, furthermore, the younger dentist tend to have more working hours than older dentists and that can increase the possibility of having CTS.

46 full time dentists and 35 part time dentists had symptoms of CTS, and this result is consistence with other studies like Karachi study (Khan et al., 2014) and Shiraz study (Borhan et al., 2013) that conclude; increasing working hours may lead to increases the possibility of having CTS.

61 dentists (46.2 %) with CTS symptoms were working as general dental practitioner (GDP) and that can explained by the large number of GDP participants in this study. In regarding to dental speciality and CTS, it was found that 4 endodontists out of 5, 3 periodontists out of 3, 3 pedodontists out of 5 and 4 restorative dentists out of 6, had CTS symptoms. The similar results were found in other studies like Karachi study (Khan et al., 2014), Riyadh study (Alhusain et al., 2019), and Chennai study (Inbasekaran et al., 2018). Gender distribution of dentists with symptoms

of CTS was 43 female dentist (53%) and 38 male dentist (47%). Female dentist was slightly found to be more prone to CTS than male dentist and this tendency could be due to smaller wrists and potentially smaller carpal tunnel volume (Ghoussoub et al., 2005).

Unlike other study (Šošić et al., 2020), the symptoms of pain related to CTS were more during daytime than that of night-time's, the explanation of that could be attributed to rest movement during dental work which increases the compression of the median nerve as it passes through the carpal tunnel.

Conclusion:-

This study shows a significant number of dentists who may have a Carpal Tunnel Syndrome in the city of Benghazi. General dental practitioners, endodontists, periodontists and pedodontist are more prone to CTS. It is, therefore, important to draw a serious attention to CTS and its risk factors. In addition, to increase the awareness and knowledge about CTS among dental students and working dentists. Further studies include larger sample size and more cities across Libya should be conducted.

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Figure 1: Gender distribution

List of abbreviations:

CTS: carpal tunnel syndrome.

GDP: General Dental Practitioners.

Tables and Figures:

Table 1:- The CTS symptoms for a typical twenty-four hour period during the past three months (mark one answer to each question).

	QUESTION	Yes	No	If yes, is it		
				mild	Mode- rate	Sever
1	Do you have hand or wrist pain at night?					
2	Do you typically have pain in your hand or wrist during the daytime?					
3	Do you have numbness (loss of sensation) in your hand?					
4	Do you have weakness in your hand or wrist?					
5	Do you have tingling sensations in your hand?					
6	Do you have difficulty with the grasping and use of small objects such as endodontic files ?					
7	Do you have difficulty with the grasping of manual instruments such as (excavator ,carver or manual scaling instrument) ?					
8	Do you have difficulty with the grasping surgical forceps during dental extraction?					
9	Do you have difficulty with grasping of dental hand piece?					

Table 2:- Age distribution:

Age	Frequency (%)	With CTS	% With CTS from age group	% With CTS from total
less than 30	44 (33.3%)	34	77.3%	25.7%
30-34	45 (34.1%)	23	51%	17.2%
35-39	25 (18.9%)	16	64%	12%
40-44	3 (2.3%)	2	66%	1.5%
45-49	4 (3%)	2	50%	1.5%

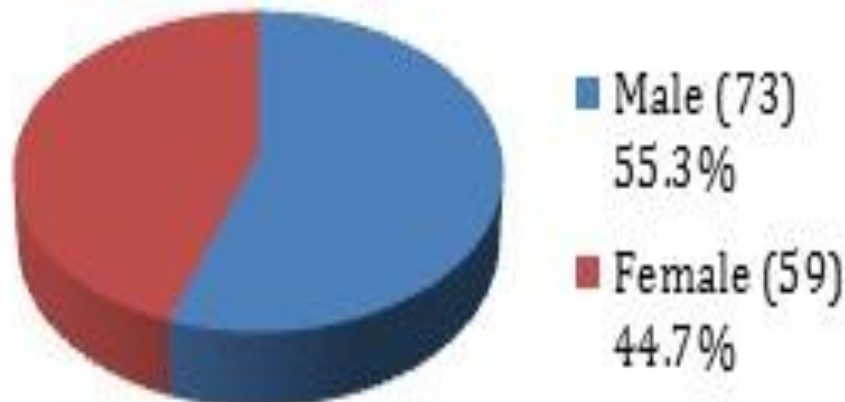
50+	11 (8.3%)	4	36.4%	3%
Total	132 (100%)	81	61.3%	61.3%

Table 3:- The distribution of work specialties:

Specialty	Frequency	Percentage	With symptoms of CTS (%)
Dental anatomy	1	0.8%	1 (0.75%)
Endodontic	5	3.8%	4 (3.03%)
Aesthetic	2	1.5%	1 (0.75%)
Fixed prosthodontic	3	2.4%	1 (0.75%)
GDP	93	70.5%	61 (46.2%)
Oral surgery & Implant	5	3.8%	1 (0.75%)
Restorative Dentistry	6	4.6%	4 (3.03%)
Oral medicine	3	2.3%	1 (0.75%)
Oral pathology	1	0.8%	0
Orthodontic	3	2.3%	1 (0.75%)
Pedodontic	5	3.8%	3 (2.27%)
Periodontic	3	2.3%	3 (2.27%)
Removable prosthodontic	2	1.6%	0 (0%)
Total	132	100.0%	81(61.3%)

Table 4:- Numbers and severity of CTS symptoms:

Symptom	Total No. (%)	Mild No. (%)	Moderate No. (%)	Sever No. (%)
Hand or wrist pain at night	32 (24.2%)	19 (59.4%)	12 (37.5%)	1 (3.1%)
Hand or wrist pain at daytime	42 (31.8%)	27 (64.3%)	15 (35.7%)	0 (0%)
Hand numbness	19 (14.4%)	7 (36.8%)	11 (57.9%)	1 (5.3%)
Hand weakness during work	34 (25.8%)	24 (70.6%)	9 (26.5%)	1 (2.9%)
Hand tingling	23 (17.4%)	13 (56.5%)	9 (39.1%)	1 (4.3%)
Difficulty in grasping and usage of small objects	19 (14.4%)	11 (57.9%)	7 (36.8%)	1 (5.3%)
Difficulty in handling of manual instrument	12 (9.1%)	7 (58.3%)	4 (33.3%)	1 (8.3%)
Difficulty in handling of surgical forceps	37 (28%)	24 (64.9%)	12 (32.4%)	1 (2.7%)

Figure 1:- Gender distribution:

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