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[ORIGINAL ARTICLE]

Comparison of prevalence of symptoms of carpal tunnel syndrome between dental students and dental practitioners – A cross sectional Study

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ABSTRACT :

Background: Carpal tunnel syndrome (CTS) arises from compression of the median nerve when it passes through the carpal tunnel in the wrist. Dental professionals use vibratory instruments for prolong duration with tight pinch like grip to avoid slippage of tiny instruments into oral cavity leads to symptoms of carpal tunnel syndrome. Risk factors and symptoms are based on their age, gender, no of working hours and their dental specialty. Dental students are also exposed to these risk factors hence this study aims to find out prevalence of symptoms of carpal tunnel syndrome in dental students and to compare their prevalence of symptoms with dental practitioners Risk factors and symptoms are based on their age, gender, no of working hours and their dental specialty.

Method: The cross-sectional study was conducted among total 171 dental students and dental practitioners in India. After taking demographic data Boston carpal tunnel syndrome questionnaire were used to assess severity of symptoms of carpal tunnel syndrome After taking demographic data Boston carpal tunnel syndrome questionnaire were used to assess severity of symptoms of carpal tunnel syndrome. Statistical analysis was done by using SPSS software.

Results: prevalence of symptoms of CTS was found in both dental students and dental practitioners. After comparison was done, equal prevalence was found in dental students and dental practitioners..

Conclusion: this study concludes that both dental practitioners and dental students especially, interns have prevalence of symptoms of CTS due to exposure to prolong awkward hand posture and repetitive hand motions.

Key words: Carpal Tunnel Syndrome, Prevalence, numbness

Introduction

Dentistry is a demanding profession as it requires accurate handling skills and more of concentration as practitioners have to work in a small area within patient's oral cavity which results in compromised working posture[(1)]. Injuries the to supporting system of the human body such as joints, ligaments, tendons, and blood vessels by a combination of trauma or a single event are called musculoskeletal disorder (MSD)[(2)]. MSD are mostly seen in dental practitioners as they do repeated hand and wrist movements and use static posture[(1)].

Carpal tunnel syndrome is compression of median nerve at carpal tunnel in wrist joint, which leads to functional difficulties and ischemic changes of the median nerve at the tunnel[(3,4)]. Carpal tunnel syndrome in many of the cases happens because of idiopathic causes but other reasons like disorders of connective tissues, metabolic conditions, infective condition of hand, post traumatic conditions of hand and pregnancy are also important causative factors [(5)]. Mechanical stress applied on the wrist because of direct contact stress from adjacent structures like tendons leads to compression of median nerve[(6)]. Static wrist posture, synovial fluid thickening or leaking of blood vessels within carpal tunnel are important causative factors which increases direct fluid pressure inside the area [(6)].

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Dental professionals use vibratory instruments for prolong duration with tight pinch like grip to avoid slippage of tiny instruments into oral cavity leads to symptoms of carpal tunnel syndrome[7]. Risk factors and symptoms are based on their age, gender, no of working hours and their dental specialty[3]. Dental students are also exposed to these risk factors hence this study aims to find out prevalence of symptoms of carpal tunnel syndrome in dental students and to compare their prevalence of symptoms with dental practitioners.

Materials and methods :

The cross-sectional study was conducted among dental students and dental practitioners in India. A total of 171 dental students and dental practitioners were included in the study. Among which, 88 were students from third year, final year and interns of dentistry stream and 83 were dental practitioners who had work experience of minimum 1 year.

After taking demographic data Boston carpal tunnel syndrome questionnaire were used to assess severity of symptoms of carpal tunnel syndrome. These questionnaire are divided into two parts, The Symptom Severity Scale (SSS) with 11 questions is scored on a Likert scale of 1-5 and the Functional Status Scale (FSS) with 8 questions is scored from 1-5 with 1 as no difficulty and 5 as difficult. These questionnaire were given to the patients as a Google form.

All data were entered into a computer by giving coding missing, proofed for entry errors. Data obtained was compiled on a MS Office Excel Sheet (v 2019, Microsoft Redmond Campus, Redmond, Washington, United States). Data was subjected to statistical analysis using Statistical package for social sciences (SPSS v 26.0, IBM). Descriptive statistics like frequencies and percentage for categorical data, Mean & SD for numerical data has been depicted. Comparison of frequencies of categories of variables with groups was done using chi square test.

Results :

In dental practitioners, out of 83, 80.7% female and 19.3% male practitioners were approached. 44.6% of them have completed BDS and 55.4% of them have completed MDS. These practitioners worked between 4 to 14 hours a day with the mean of 7.30 hours and used dental instruments between 1 to 12 hours a day with the mean of 5.40 hours. And very less duration of rest periods was reported by these practitioners between 1 to 3 hours only.

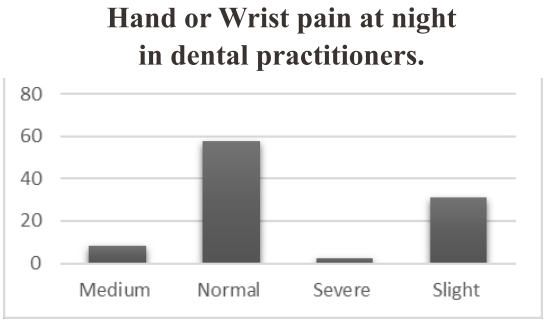

Fig 1: Distribution as per pain in hand or during hand or night in dental practitioners daytime in dental practitioners.

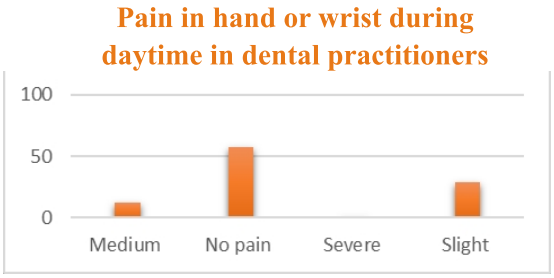

Fig. 2: Distribution as per pain in wrist during

Fig. 3: Distribution as per weakness in hand episode or wrist in dental practitioners. practitioners

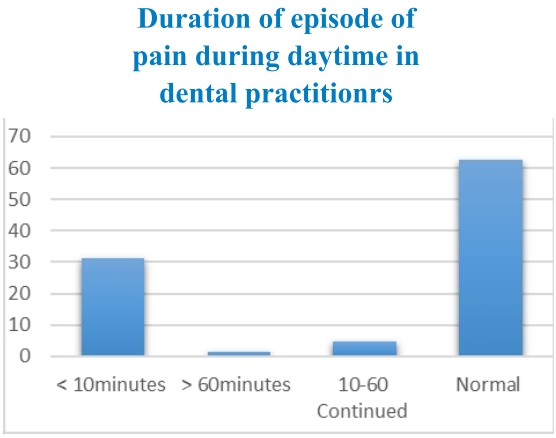

Fig. 4: Distribution as per duration of pain during day time in dental

Dental practitioners reported 28.9% slight pain during daytime and 31.3% slight pain in night, medium pain in wrist or hand was reported by 8.4% at night and 12% during night, only 2.4% reported severe pain in night and 1.2% reported during daytime. whereas maximum no. of people reported no pain (57.8%) during both day and night [figure 1&2]. 27.7% reported slight weakness and 12.0% reported medium weakness in hand or wrist [figure 3]. 4.8% have experienced pain during daytime for 10-60 min continued, 31.3% experienced for less than 10 minutes and only 1.2% have experienced for more than 1hour [figure 4].

Table 5: Distribution as per functional status scale of BCTQ in dental practitioners.

	No difficulty	Little difficulty	Moderate difficulty	Intense difficulty
Writing	79.5%	16.9%	2.4%	1.2%
Buttoning of clothes	85.5%	12.0%	-	1.2%
Holding a book while reading	78.3%	19.3%	1.2%	1.2%
Gripping of a telephone handle	81.9%	15.7%	1.2%	1.2%
Opening of jars	68.7%	25.3%	4.8%	1.2%
Household chores	67.5%	27.7%	3.6%	1.2%
Carrying of grocery basket	60.2%	28.9%	8.4%	2.4%
Bathing and dressing	83.1%	14.5%	1.2%	1.2%

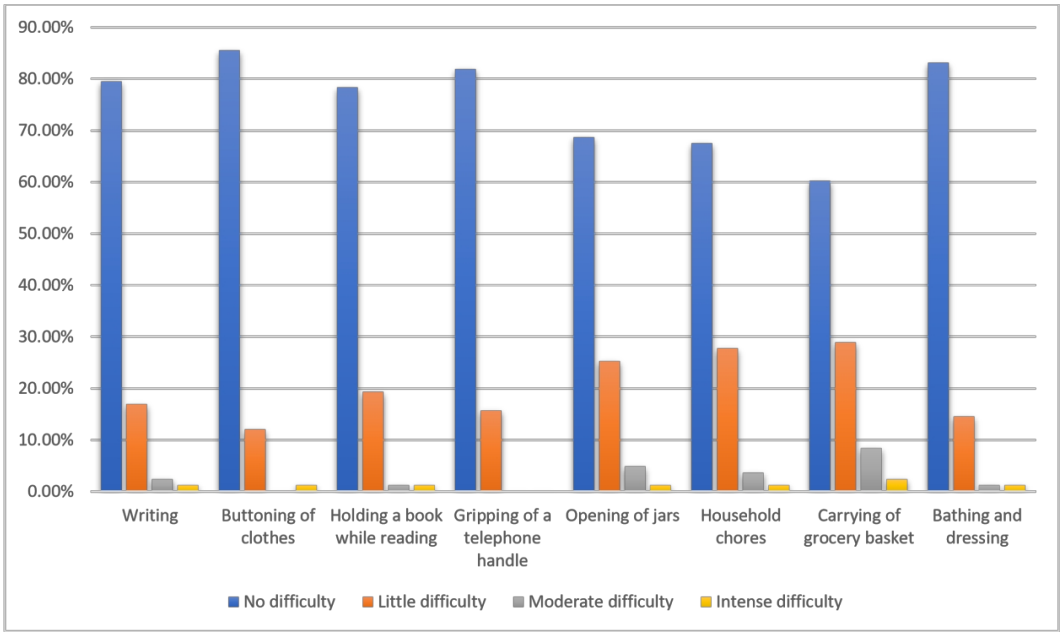

Figure 5: Distribution as per functional status scale of BCTQ in dental practitioners

Table no 5 and figure 5 shows distribution as per difficulty in performing daily activities in dental practitioners. In which it is observed that practitioners have experienced more difficulty in opening of jars, carrying of grocery basket and household chores. Whereas in activities like writing, buttoning of clothes, gripping of a telephone handle, holding a book while reading and bathing and dressing, very few people reported difficulty in performing those activities.

In dental students, out of 88 students, 81.8% were female and 18.2% male participated in this study. Among them, 19.3% were from third year, 34.1% were from fourth year and 46.6% were interns. Students have reported to spend between 3 to 6 hrs in dental practical and clinical postings with the mean of 5.08. they have reported to use dental instruments for 2 to 5 hours a day with the mean of 3.74 and with the rest period of half hour to one hour.

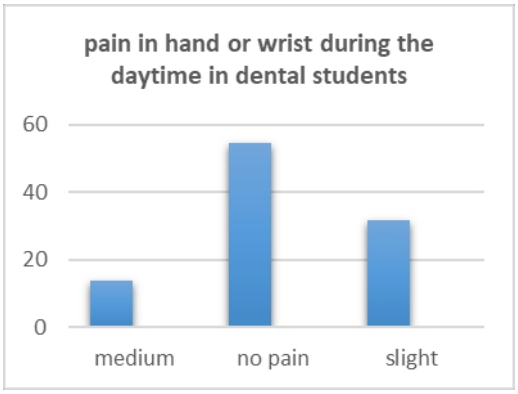

Figure 6: Distribution as per pain in hand hand or wrist during the daytime in dental student

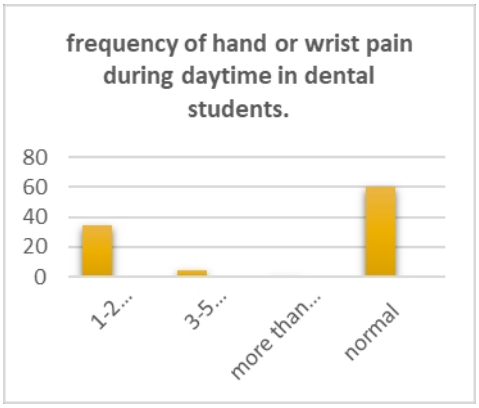

Figure 7: Distribution as per frequency of or wrist pain during daytime in dental students

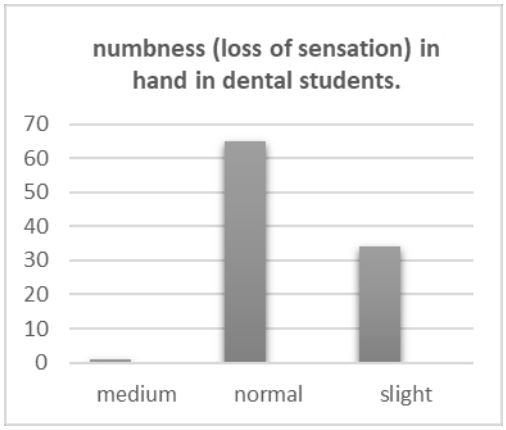

Figure 8: Distribution as per numbness tingling (loss of sensation) in hand in dental students students

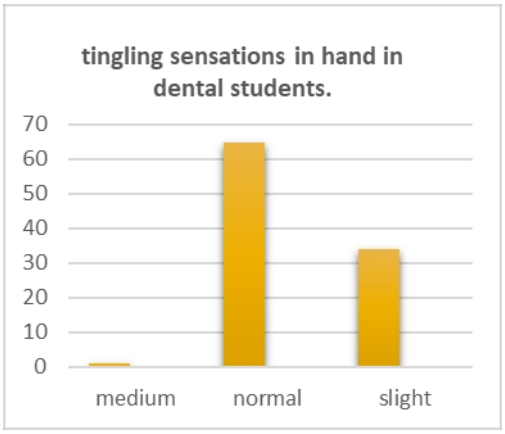

Figure 9: Distribution as per sensations in hand in dental

In dental students, 31.8% students reported slight pain and 13.6% reported medium pain during daytime [table 6, figure 6]. For frequency of pain during daytime, 34.1% complained of wrist or hand pain 1-2 times/day, 4.5% students 3-4 times/day, 1.1% students more than 5 times a day [table 7, figure 7]. Slight numbness (loss of sensations) was reported in 33% students and medium loss of sensations were noted in 2.3% students [table 8, figure 8]. slight tingling sensations were found in 34.1% and medium in 1.1% students. At night, slight numbness was present in 17% and medium in 3.4% students [table 8, figure 8].

Table 10: Distribution as per functional status scale of BCTQ in dental students

	No difficulty	Little difficulty	Moderate difficulty	Intense difficulty
Writing	69.3%	28.4%	1.1%	1.1%
Buttoning of clothes	87.5%	12.5%	-	-
Holding a book while reading	70.5%	27.3%	2.3%	-
Gripping of a telephone handle	87.5%	11.4%	1.1%	-
Opening of jars	64.8%	25%	10.2%	-
Household chores	72.7%	20.5%	6.8%	-
Carrying of grocery basket	58%	30.7%	9.1%	2.3%
Bathing and dressing	90.9%	9.1%	-	-

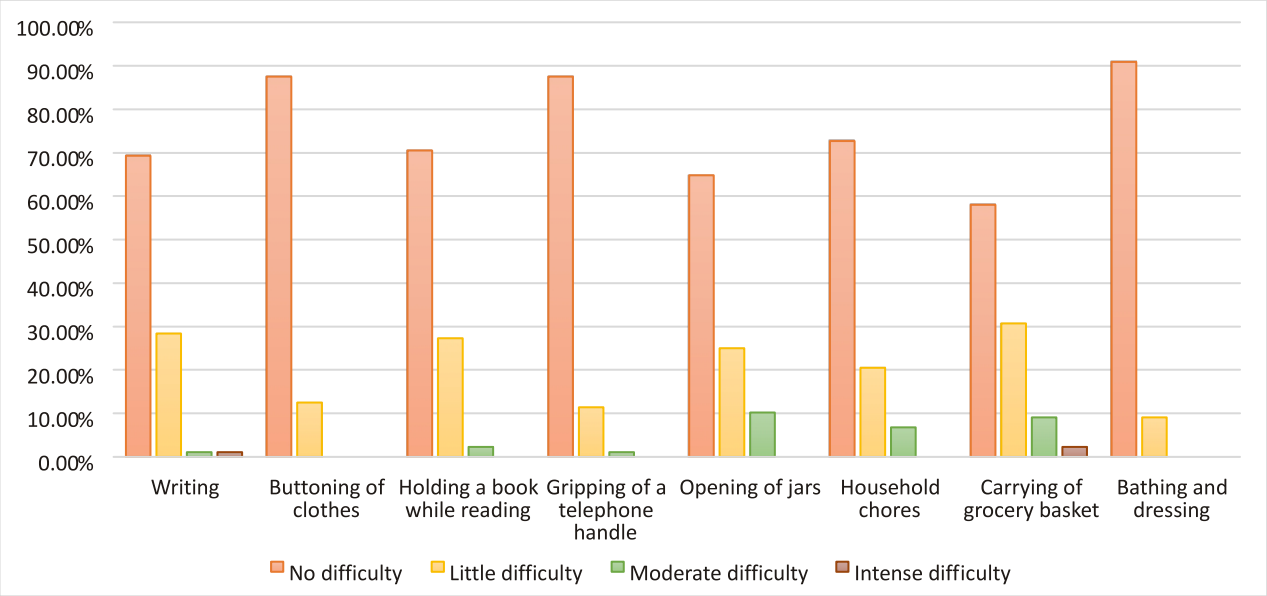

Fig. 10: Distribution as per functional status scale of BCTQ in dental students

As the collected data follows normal distribution, parametric tests were used for comparison. Inter group comparison (2 groups) was done using t test. Inter group comparison (>2 groups) was done using one way ANOVA followed by pair wise comparison using post hoc test. For all the statistical tests, $p<0.05$ was considered to be statistically significant, keeping α error at 5% and β error at 20%, thus giving a power to the study as 80%. * = statistically significant difference ($p<0.05$)

** = statistically highly significant difference ($p<0.01$), # = non-significant difference ($p>0.05$) … for all tables there was a statistically non-significant difference seen for the values between the groups($p>0.05$)

Table 11: Inter group comparison of total score of Boston carpal tunnel questionnaire (out of 95)

group	mean	Std. Deviation	Std error mean	T value	p value of T test
Dentists (83)	25.84	8.367	.918	.521	.603#
Students (88)	25.22	7.362	.785		

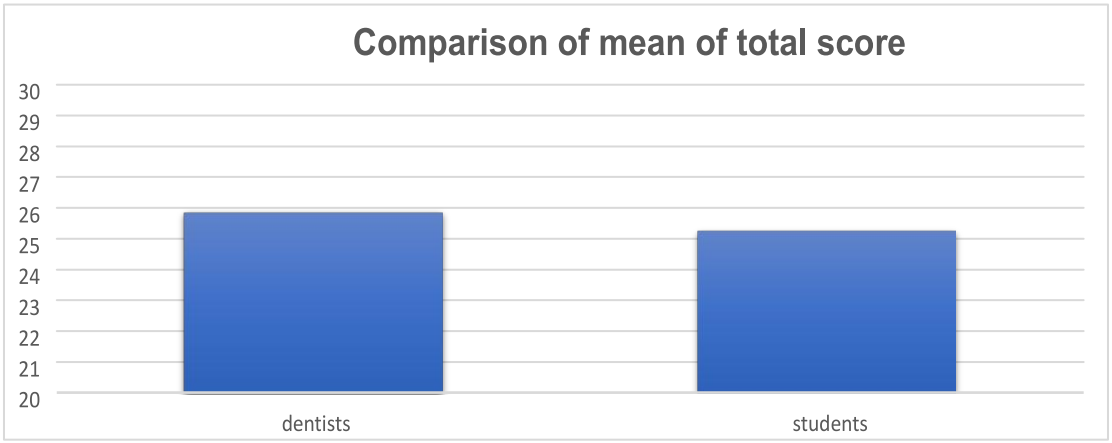

Figure 11: Inter group comparison of total score of Boston carpal tunnel questionnaire (out of 95)

Discussion :

Carpal tunnel syndrome in dental Practitioners is a well-known concern[1]. Dental students are also exposed to same risk factors during their clinical hours or practice hours. Hence this study was conducted to find out prevalence of symptoms of carpal tunnel syndrome in dental students and to compare it with dental practitioners.

Prevalence of symptoms of carpal tunnel syndrome were calculated by using validated Boston Carpal tunnel syndrome questionnaire. After doing assessment students reported to have more pain during daytime in clinical postings with frequency of hand or wrist pain from 1-2 times or 3-5 times a day. They have also experienced slight numbness and tingling sensations in hand. Students have reported to have difficulty in writing and holding a heavy book while reading as their academic schedule includes both writing for completing assignments, reading. Difficulty in doing other daily activities were also reported by students. Possible reasons for this prevalence of symptoms can be lack of training while handling instruments. Also they have rotatory clinical postings where they are supposed to use vibratory instruments with high- as well as low-speed handpieces during tooth preparation as well as they perform repeated wrist and hand movements to clean and shape root canal[3]. According previous study done to assess ergonomic risk factors associated with Carpal tunnel syndrome these are major risk factors to develop carpal tunnel syndrome [8].

Comparison of prevalence of symptoms of CTS was done among dental students and dental practitioners, almost equal prevalence was found with statically non-significant difference between both the groups. Possible reasons for the same are as both the groups are exposed to sustaining the hand position for long time without any support to maintain the work going in small work field[9]. Dental practitioners are having more clinical load compare to students with less rest time in between that could be one of the cause for having symptoms of carpal tunnel syndrome [10].

This study only concludes about the symptoms of carpal tunnel syndrome in dental student and dental practitioners and any clinical diagnostic test was not used for the confirmation of the diagnosis of carpal tunnel syndrome. Carpal tunnel syndrome is identified as a bothering disease in dentistry. Appropriate training must be included during educational periods and even after. Dentists should repeatedly be examined and suspicious cases must be followed due to treatment and prevention of further problems.

Conclusion :

This study concludes that both the dental students and dental practitioners have equal prevalence of symptoms of carpal tunnel syndrome.

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