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PREVALENCE OF WORK-RELATED MUSCULOSKELETAL DISORDERS AMONG DENTAL STUDENTS IN SOUTHERN KARNATAKA DISTRICT

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ABSTRACT

Background: Musculoskeletal disorders are common amongst dental personnel including dental students when they are still in educational programs due to their work in a static posture. The objective of the study is to identify work-related musculoskeletal disorders in terms of perception of pain and stiffness experienced by the dental students and interns and to find the association between pain, stiffness and selected socio demographic variables.

Methods: A total of 236 subjects were selected from Yenepoya Dental College, Manipal Institute of Dental Sciences and A B Shetty Memorial Institute of Dental Sciences, Mangalore. The subjects were selected by using convenience method and were given closed-ended questionnaire to find perception of pain and stiffness experienced.

Results: The study revealed that 51.3% of dental students sometimes had pain in lower back and 44.4% in neck. 20.3% of subjects complained of having sometimes stiffness in neck and 19.9% of them had in lower back. It was observed that number of workdays per week had significant association ($p=0.01$) with increase in frequency of pain. Frequency of stiffness was significantly associated with height ($p=0.02$) and weight ($p=0.02$). There was also significant association between intensity of pain and average number of work days per week ($p=0.017$) and average number of patients treated per day ($p=0.012$).

Conclusion: The study revealed that WMSDs are prevalent in dental students and interns. A significant association was found between musculoskeletal symptoms and socio-demographic variables like gender, height, weight, number of workdays per week and number of patients treated per day.

Keywords: Musculoskeletal disorders, frequency of pain, frequency of stiffness, intensity of pain, dental students, interns.

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INTRODUCTION

National Institute for Occupational Safety and Health (NIOSH) defines Musculoskeletal disorders (MSDs) as those injuries or disorders of the muscles, nerves, tendons, joints, cartilage, and supporting structures of the upper and lower limbs, neck, and lower back that are caused, precipitated or exacerbated by sudden exertion or prolonged exposure to physical factors such as repetition, force, vibration, or awkward posture. Work-related Musculoskeletal Disorders (WMSDs) include all musculoskeletal disorders that are induced or aggravated by work and the circumstances of its performance.^{1,2}

WMSDs are common amongst dental personnel, who work in a restricted field that makes high demands on vision and requires them to sit in a static posture, use excessive force as well as undertake precise repetitive hand and wrist movements.^{3,4} The causes of WMSDs are multifactorial including not only workplace conditions and workplace exposures but also organizational, psychosocial and sociocultural variables, amongst others.^{5,6}

Clinical dental procedures involve the application of precise motor skills and involve intense hand-eye coordination and concentration. Also mental stress during the long dental procedures, increased concentration of work, the length of the consultation and possible pre-existing pain conditions may also contribute to dental practitioners musculoskeletal pain.⁷ Dentists are among those who are more often susceptible to MSDs, their work includes risk factors that may lead to many pathologies such as tendinitis, synovitis, tenosynovitis and bursitis.⁸

It has been observed that even dental students experience MSDs when they are still in the educational programs. As the body positions used during work by dental students and dentists are similar, it is possible that dental students can experience musculoskeletal problems even during their clinical training period. An average of two out of three dental professionals experience occupational pain. MSDs account for the most common reason (29.3%) for early retirement age in dentists worldwide.⁹

Despite the evidence of WMSDs in dentistry, research conducted among the students and interns in this region is very scanty. Hence the present study is aimed to describe the prevalence of WMSDs experienced by dental students and interns during their clinical work among selected dental colleges in and around Mangalore. The study also aimed to find the association between

pain and stiffness experienced by dental students and interns and selected socio-demographic variables.

MATERIALS AND METHODS

A total of 236 subjects were selected from Yenepoya Dental College, Manipal Institute of Dental Sciences and A B Shetty Memorial Institute of Dental Sciences, Mangalore. Inclusion criteria were Final year dental students, Interns, Subjects having minimum of one year of clinical exposure. Exclusion criteria were any congenital deformity, Trauma to any parts of the body, musculoskeletal symptoms related to pregnancy and menstruation. Investigator approached each subject to explain the study and gained informed consent form. The details of clinical exposure and occurrence of WMSDs were assessed by using Musculoskeletal Disorder Rating Scale after obtaining the formal administrative approval from the concerned department during working hours. Validated questionnaire was obtained with permission from Shaik AR et al: Musculoskeletal disorders among dental surgeons.^[10]

Musculoskeletal Disorder Rating Scale is divided into two parts such as, *Socio Demographic Proforma*: It consists of eight variables like Age, Gender, Field of dental practice, Working hours per day, Work days per week, Patients treated per day, Height and Weight of the subject. Subjects were asked to mark (√) in the block along the category in which they belong. *Pain and Stiffness Scale*: It consists of three variables like Frequency of pain, Frequency of stiffness and Intensity of pain. Frequency of pain and frequency of stiffness further categorized into three sub headings like Always, Sometimes, Never. Subjects were asked to mark (√) in the block along the category in which they belong. Regarding Intensity of pain, Numerical Pain Rating Scale (NPRS) was used. NPRS was rated as 0 (no pain), 1-3 (Mild pain), 4-6 (Moderate Pain) and 7-10 (Severe Pain). Subjects were asked to pick up a number according to their pain intensity. The questionnaire was filled up by subjects and was returned back to the investigator.

Ethical clearance to conduct the study was obtained from Yenepoya University Ethical Committee. After explaining the purpose of the study a written consent was obtained from the subjects on voluntary basis and the questionnaire was handed over to the dental students and interns to fill their responses.

Data were analysed using SPSS (Statistical Package for Social Sciences) version 17.0 software. The analysis was performed by using Fishers exact test

and Chi-square (χ^2) test. P value less than or equal to 0.05 was considered to be significant

RESULTS

Demographic data presented in Table 1 and 2 shows that majority (74.2%) of the dental students and interns was females and 25.8% were male. 96.6% of these were in age group of 20-25 years and 3.4% in the age group of 26-30 years. With regard to height and weight 69% of dental students were between 151-165 and 24.6% were ≥ 166 centimeters of height. 40.7 % of these were between 55-64

kilograms and 7.6 % were ≥ 75 kilograms of weight. With regard to the field of dental practice 19.4% were posted in department of oral and maxillofacial surgery department. 2.6% were posted in oral pathology department. Majority (64.0%) of these were working 4-6 hours per day and 24.6% of these were working 1-3 hours per day. 92.4% of dental students were working for more than 5 days/week. Majority (74.1%) of these was treating 1-3 patients per day and 5.6% of these were treating ≥ 11 patients.

Table 1: Frequency and percentage distribution of dental students on personal characteristics

Variables	Sample characteristics	Frequency	Percentage
Age(years)	20-25	228	96.6
	26-30	08	3.4
Gender	Male	61	25.8
	Female	175	74.2
Height (cm)	135-150	15	6.4
	151-165	163	69.0
	≥ 166	58	24.6
Weight (Kg)	45-54	69	29.2
	55-64	96	40.7
	65-74	53	22.5
	≥ 75	18	7.6

Table 2: Frequency and percentage distribution of dental students on Professional characteristics

Variables	Sample characteristics	Frequency	Percentage
Field of dental practice	Oral Medicine and Radiology	23	9.8
	Oral and Maxillo facial surgery	46	19.4
	Pedodontics	17	7.2
	Orthodontics	34	14.4
	Prosthodontics	17	7.2
	Periodontics	41	17.3
	Conservative dentistry	28	11.9
	Community dentistry	24	10.1
Average number of working hour(s) per day	Oral pathology	06	2.6
	1-3 hours	58	24.6
	4-6 hours	151	64.0
Average number of workday(s) per week	7-9 hours	27	11.4
	≤ 5	18	7.6
Average number of patient(s) treated per day	>5	218	92.4
	1-3	175	74.1
	6-10	48	20.3
	≥ 11	13	5.6

The data presented in Table 3 shows that in frequency of pain majority (51.3%) of dental students sometimes had pain in the lower back and 9.3% always had pain in lower back. 44.4% sometimes had pain in the neck and 33.1% sometimes had pain in the upper back 28% sometimes had pain in the right hand. 93.2% never

had pain their left elbow, 81.8% never had pain in left wrist.

Frequency of stiffness shows that 20.3% of dental students sometimes had stiffness in the neck, 14.0% sometimes had stiffness in the upper back. 17.3% of them sometimes had stiffness in the lower back. 2.6% of them always had stiffness in lower back. With regard to the intensity of pain 3.0% had

severe pain in lower back followed by 0.8% in neck. 28.3% subjects had mild pain in the neck, 38.1% had mild pain in lower back and 23.3% had mild

pain in upper back. Majority (93.6%) of the dental students had no pain in left elbow.

Table 3: Description of Musculoskeletal disorders in terms of perception of pain and stiffness among dental surgeons

Location	Pain					Stiffness	
	Frequency		Intensity			Frequency	
	Always n (%)	Sometimes n (%)	Mild n (%)	Moderate n (%)	Severe n (%)	Always n (%)	Sometimes n (%)
Neck	5(2.2)	105(44.4)	67(28.3)	36(15.3)	02(0.8)	0(0)	48(20.3)
Upper back	08(3.3)	78(33.1)	55(23.3)	28(11.9)	04(1.7)	0(0)	33(14.0)
Lower back	22(9.3)	121(51.3)	90(38.1)	43(18.2)	07(3.0)	06(2.6)	41(17.3)
Right shoulder	06(2.5)	49(20.8)	34(14.4)	21(8.9)	0(0)	02(0.8)	25(10.6)
Left shoulder	07(3.0)	36(15.2)	25(10.6)	14(5.9)	0(0)	02(0.8)	15(6.4)
Right elbow	03(1.3)	25(10.6)	20(8.5)	08(3.4)	0(0)	0(0)	10(4.2)
Left elbow	02(0.9)	14(5.9)	12(5.1)	03(1.3)	0(0)	0(0)	08(3.4)
Right wrist	04(1.7)	45(19.1)	46(19.5)	07(3.0)	0(0)	0(0)	20(8.5)
Left wrist	03(1.3)	40(16.9)	34(14.4)	10(4.2)	0(0)	3(1.3)	18(7.6)
Right hand	05(2.1)	66(28)	53(22.4)	15(6.4)	0(0)	3(1.3)	16(6.8)
Left hand	04(1.7)	36(15.2)	34(14.4)	04(1.7)	0(0)	3(1.3)	10(4.2)
Right hip/thigh	02(1.7)	24(10.2)	22(9.3)	05(2.1)	0(0)	0(0)	13(5.6)
Left hip/thigh	02(0.8)	19(8.1)	19(7.6)	03(1.3)	0(0)	0(0)	14(5.9)
Right knee	03(1.3)	22(9.3)	21(8.9)	04(1.7)	0(0)	0(0)	11(4.6)
Left knee	06(2.6)	12(5.1)	16(6.8)	06(2.5)	0(0)	0(0)	8(3.4)
Right ankle	05(2.1)	26(11.0)	19(8.1)	10(4.2)	0(0)	0(0)	7(3.0)
Left ankle	04(1.7)	24(10.2)	16(6.8)	10(4.2)	0(0)	0(0)	10(4.2)

Association between socio-demographic variables and musculoskeletal symptoms are presented in Table 4 which indicate that there was significant association was found between Frequency of pain and age (0.007) and there was significant association between frequency of pain (p=0.001), stiffness (p= 0.0006) and gender. Significant association between number of work days per week and frequency of pain (p=0.01). Statistically

significant association was found between frequency of stiffness and height (p= 0.02). Weight also had significant association (p= 0.02) with frequency of stiffness. There was also significant association between intensity of pain and average number of work days per week (p= 0.017) and average number of patients treated per day (p= 0.012).

Table 4: Association between frequency of pain, frequency of stiffness, intensity of pain, and the selected socio-demographic variables.

Variables	Frequency of pain		Frequency of stiffness		Intensity of pain	
	Chi square	P value	Chi square	P value	Chi square	P value
Age	0.007*	0.92	2.939	0.08	0.34	0.84
Gender	0.001*	0.971	11.7	0.0006*	0.97	0.61
Field of practice	4.05	0.852	5.65	0.68	10.66	0.82
Average no. of working hrs/day	2.601	0.272	0.44	0.8	6.60	0.15
Average no. of work days/week	6.5	0.01*	0.99	0.31	8.13	0.017*
Average no. of patients treated/day	4.7	0.09	5.19	0.07	12.85	0.012*
Height	2.9	0.234	7.27	0.02*	5.50	0.23
Weight	3.01	0.389	9.17	0.02*	9.995	0.12

*significant at p<0.05

DISCUSSION

Dental students experience MSDs when they are still in the educational programs. As the body positions used during work by dental students and dentists are similar, it is possible that dental students can experience musculoskeletal problems even during their clinical training period.

The study was conducted to find the prevalence of WMSDs among dental students and interns in selected dental colleges in Mangalore. The study found that 86.4% of the students experienced WMSDs. 84.4% complained of having pain and 39% subjects reported presence of stiffness.

A study conducted in Brazil found that 58% of dentists reported complaints of musculoskeletal pain in one or more body regions.¹¹ Low Back Pain (LBP) was the most common MSDs experienced followed by neck pain and then Upper Back Pain (UBP).¹² The current study reveals that majority of subjects had complaint of low back pain and neck pain. 59.2% had lower back pain, among these 38.1% had mild pain, 18.2% moderate and 2.9% severe. 44.4% complained of having neck pain among which 28.3% had mild pain, 15.3% had moderate pain and 0.8% had severe pain. The current study also found out that 20.3% of subjects complained of having stiffness sometimes in neck and 19.9% of them had stiffness sometimes in lower back.

A similar study conducted in Australia on prevalence and correlates of MSDs among a selection of undergraduate dental hygiene students showed that MSDs were most commonly reported by students at the neck (64.29%), lower back (57.94%) and shoulder (48.41%) regions.¹² The current study revealed that pain reported by dental students and interns was 44.4% and 59.3% in neck and lower back respectively.

The findings of current study revealed that frequency of pain was significantly associated with number of working days per week ($p = 0.01$). Significant association was also found between frequency of pain (0.001), frequency of stiffness ($p = 0.0006$) and gender. Statistically highly significant association was found between frequency of stiffness and height ($p = 0.02$) and Weight ($p = 0.02$).

A study was conducted in Malaysia indicated that the number of clinical working hours per week were statistically significant risk factors and also found that students who work for longer hours in clinic were 12 times more likely to report discomfort in one or more body region. Students with increased number of working hours per week

were much more likely to report discomfort.¹³ Contrary to this the current study found that there was no significant association between average number of working hours per day and MSDs experienced by students and interns.

A similar study reported that age, gender and perceived general health status are strongly associated with chronic complaints and seeking medical care.¹⁴ A study conducted in India showed that the gender, height and weight of the dentists had no significant association with the frequency and intensity of pain and frequency of stiffness. The study also showed that there was no significant association between musculoskeletal symptoms experienced by dental surgeons and average number of working days per week. Contrary to this the current study revealed that there was significant association between musculoskeletal symptoms experienced by dental students, interns and average number of working days per week.

A study was conducted in Turkey to find prevalence of MSDs among Turkish dental students, which revealed that 86.0% of the students reported one or more musculoskeletal symptoms (ache, discomfort) in the neck, back, head and shoulder region.¹⁵ Another study conducted in Pakistan indicated that complaints of back pain were strongly related to the number of patients treated daily.¹⁶ The current study found that there was no significant association between pain and number of patients treated daily.

CONCLUSION

The study revealed that WMSDs are prevalent in dental students and in interns and various socio-demographic variables contributed to the musculoskeletal disorders experienced by the dental students. The association between the number of workdays per week by the dental students and pain experienced by them was statistically significant. A statistically significant association was also found between gender, height, weight and frequency of stiffness. Number of work days per week and number of patients treated per day was also significantly associated with intensity of pain.

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