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Original Article

Dentistry Section

Prevalence of Musculoskeletal Pain and its Correlation with Ergonomics among Dental Students and Practitioners of Karad- A Questionnaire Based Study

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ABSTRACT

Introduction: Musculoskeletal Disorder (MSD) is an ordeal for dental professionals, as they work for long hours in astatic and discomfited posture.

Aim: To assess the prevalence of musculoskeletal pain and its co-relation with ergonomics among dental students and private practitioners in Karad.

Materials and Methods: The present observational study was undertaken in the Department of Periodontology, School of Dental Sciences, Karad, Maharashtra, from January 2019 to March 2019. The study population filled a questionnaire related to socio-demographic information, musculoskeletal pain arising from professional practice and ergonomics. Group 1 consisted of 53 private practitioners and group 2 consisted of 47 postgraduate students and interns.

Results: A total of 79.25% and 59.57% of participants from group 1 and 2, respectively experienced musculoskeletal pain, with neck being commonly affected and lower extremities being least. Musculoskeletal pain was found to be significantly associated with working hours (p=0.001) and poor ergonomics.

Conclusion: MSD is prevalent among dental students and practitioners of Karad. Awareness of proper ergonomics and preventive measures and its application is required for its management.

Keywords: Awareness, Dentistry, Posture

INTRODUCTION

The World Health Organisation defines Musculoskeletal Disorder (MSD) as "a disorder of the muscle, tendons, peripheral nerves or vascular system not directly resulting from an acute or instantaneous event (e.g., slips or falls) [1]. Thus, it is of a major concern for profession requiring discomfited, repetitive or forceful motions and longworking hours insame posture. MSD are amongst the most imperative occupational health issues faced by dentist having a direct impact on the qualitative and quantitative care provided by them. The severity can be implicated by the fact that it is considered to be a leading cause of early retirement among dentists [2].

Hence, a better understanding of Ergonomics and other preventive measures to tackle MSD are must. Ergonomics is an applied science concerned with designing and arranging things, people use so that the people and things interact most efficiently and safely. Good working ergonomics increases and maintains the capability and efficiency of treatment all through the operational life of dental professionals. Many reforms are made in the field of ergonomics related to dentistry, in current years but its acceptance has to be inspected [3]. The present study was done to assess the prevalence of musculoskeletal pain and its co-relation with ergonomics among dental students (postgraduates and interns) and private practitioners in Karad. Thus, it was tried to assess the prevalence of MSD at crucial stages commencing from the fundamental stage of training till setting up a clinical practice.

MATERIALS AND METHODS

The present observational study was undertaken in the Department of Periodontology, School of Dental Sciences, Karad, Maharashtra, from January 2019 to March 2019 after the due approval of the Ethical Committee (KIMSDU/IEC/09/2018 protocol no.0352).

Hundred participants, comprising of 53 private practitioners with more than 6 years of experience (group 1) and 47 third year dental postgraduates from the clinical departments and interns who completed a minimum of six months clinical posting (group 2), from Karad who were willing for the study and without any secondary causes for MSD were included in the study.

Participants' symptoms, awareness and application of ergonomics were assessed with a close ended anonymous questionnaire. Prior validation of questionnaire was performed on ten separate participants before initiation of the study. The variables in questionnaire were divided into three groups as per the classification given by Bugarin [4]. First, was the sociodemographic information, which included questions, related to age, gender, and duration & type of professional practice. Second part included questions related to MSD resulting from professional practice that is locations of pain. It was assessed by using modified version of Standardised Nordic Questionnaire (SNQ) with focused and relevant questions about pain and discomfort in various locomotor organs which may be ongoing (in last seven days) or in stipulations of entire duration of symptoms (in preceding 12 months) [5]. Third part was the ergonomic features, with questions related to dominant limb, working hours in the static position, characteristics of the working chair and instrument holder, stretching exercises in breaks and four hand dentistry [4].

STATISTICAL ANALYSIS

Inter and intra group comparison and its association was assessed using Chi-square test and student t-test. Data analysis was carried out using Statistical Package for Social Science (SPSS) Version-20 at 95% confidence level. p-value of less than or equal to 0.05 was considered as statistically significant.

RESULTS

All the participants included in the study completed the questionnaire. The average age of group 1 was 44.5 years (35-54 years) and group 2 was 27.5 years (24-30 years). Among the responders from group 1, 33 were females while group 2 had 17 females. Among all the participants 97% were right handed and 3% were left handed. All the subjects

from group 1 worked for 10-12 hours/day, while from group 2 worked for 6-8 hours/day. Sitting dentistry was preferred by 90.56% (n=48) of respondents from group 1 and by 63.82% (n=30) from group 2.

Musculoskeletal pain in past one week to one year was found to be prevalent in both the study groups as shown in [Table/Fig-1]. A higher prevalence of MSD was found in group 1 (79.25%) as compared to group 2 (59.57%) and was statistically significant (p-value<0.001) in stipulations of entire duration of symptoms (in preceding 12 months). In group 1, 12 respondents and in group 2, 5 respondents had ongoing symptoms (in last 7 days). Among the subjects with MSD, 59% and 37.5% of participants from group 1 and 2, respectively, had decreased grip strength. From group 1 and 2 MSD positive subjects, 53% and 7.5% had experienced, decreased range of motion in last 12 months. The neck region was the most frequently affected area in MSD positive subjects of both the groups followed by shoulder region. Hand and wrist pain was reported more frequently by the participants who also had neck and shoulder pain (p<0.05). Pain in lower extremities (that is in the region in the region of hips and thighs, knees and ankles/feet) was found to be least as compared to other sites; but it was significantly associated with standing dentistry (p≤0.0001). It was noted that subjects with MSD from group 1 worked for an average of 9.6 hours per day, while from group 2 worked for an average of 6.9 hours per day. Significant correlations was found between working hours and MSD (p=0.001). Musculoskeletal pain was found to be significantly higher in females than male in both the groups (p-value=0.006).

Study variable	Group 1		Group 2		p-value
Prevalence of MSD	In past 12 months	In past 7 days	In past 12 months	In past 7 days	<0.001S
	79.25% (N=42)	22.64% (N=12)	59.57% (N=28)	10.6% (N=5)	
Location	In past 12 months	In past 7 days	In past 12 months	In past 7 days	<0.001S
Neck	57%	66.66%	46%	60%	
Shoulder	48%	33.33%	38%	40%	
Hand and wrist	41%	25%	34%	20%	
Upper back	36%	16.66%	28%	40%	
Lower back	30%	16.66%	20%	20%	
Lower extremities (hips and thighs knees ankles/feet)	14%	8.33%	8%	20%	
More than one location	65%		55%		<0.001S
Decreased grip strength	59%		37.5%		<0.001S
Decreased range of motion	53%		7.5%		<0.001S

[Table/Fig-1]: Data related to prevalence of MSD in both the groups.
S: Statistically Significant (p-value= 0.005) student t-test

Association of MSD with that of different study variable is depicted in [Table/Fig-2]. The awareness about ergonomics was more in group 1 (66.03%) as compared to group 2 (48.93%). The knowledge regarding correct chair, patient and operator's position was found to be more in group 1 (90.56%) than in group 2 (42.55%). On subdividing group 2 into interns and postgraduates, awareness of ergonomics was found to be least among interns (21.27%). Among the MSD positive respondents the awareness about ergonomics and chair, patient and operator's position was less as compared to the whole study population (37.14% and 66.03% in group 1 and 34.78% and 48.93% in group 2, respectively).

In the present study, it was found that though many practitioners preferred sitting dentistry, only few subjects from group 1 were using ergonomically designed saddle seats (9.4%). A single practitioner with complaint of MSD was using saddle seat. Similarly, 39.62% (n=21) from group 1 and 31.9% (n=15) from group 2 reported to use

Study variable	Category	Total samples surveyed		MSD positive		Among MSD positives		p-value
Gender	Group 1 (M/F)	20	33	13	29	13	29	0.006S
	Group 2 (M/F)	30	17	17	14	17	14	
Working hours	Group 1	53		42 (79.25%)		9.6 h/day		<0.001S
	Group 2	47		28 (59.57%)		6.9 h/day		
Awareness of ergonomics	Group 1	53		35 (66.03%)		13 (37.14%)		<0.001S
	Group 2	47		23 (48.93%)		8 (34.78%)		
Awareness of position and posture	Group 1	53		48 (90.56%)		32 (66.66%)		<0.001S
	Group 2	47		20 (42.55%)		10 (50%)		
Use saddle seats	Group 1	53		5 (9.4%)		1 (20%)		<0.001S
	Group 2	47		0		0		
Use ergonomically designed instrument	Group 1	53		21 (39.62%)		13 (61.9%)		<0.001S
	Group 2	47		15 (31.9%)		8 (53.3%)		
Awareness of stretching exercise	Group 1	53		34 (64.15%)		14 (41.17%)		<0.001S
	Group 2	47		28 (59.57%)		7 (25%)		
Practice stretching exercises	Group 1	53		19 (35.84%)		8 (42.10%)		<0.001S
	Group 2	47		10 (21.27%)		4 (40%)		
Practice four hand dentistry	Group 1	53		28 (52.83%)		10 (35.7%)		<0.001S
	Group 2	47		13 (27.65%)		4 (30.7%)		

[Table/Fig-2]: Data related to association of MSD with other study variablesin both the groups.
S: Statistically significant (p-value= 0.005) chi-square test

ergonomically designed instruments which was even lesser by MSD positive respondents (61.9% in group 1 and 53.3% in group 2). It was evident from the present study that though some of the participants from group 1 and 2 were aware of the stretching exercises (64.15% and 59.57%, respectively) not many were following it (42.10% and 40%, respectively). By the responses of the participants it was also observed that 52.83% of participants from group 1 and 27.65% of participants from group 2 were practicing four handed dentistry.

It was found that only 35 participants from group 1 and 8 participants from group 2 took measures to reduce or manage the pain as in [Table/Fig-3].

	Participant took measures	Measures taken		
		Medication	Physio-therapy	Both
Group 1	35 (83.33%)	10 (28.57%)	8 (22.85%)	9 (25.71%)
Group 2	8 (28.57%)	3 (37.5%)	2 (25%)	2 (25%)

[Table/Fig-3]: Data related to management of MSD.

DISCUSSION

Higher chances of MSD like regional shoulder tendonitis, neuropathy, tension neck syndrome and trapezius myalgia have been documented in profession that requires repetitive and forceful motions and long working hours in static posture. According to Occupational Safety and Health Administration, MSD effects muscles, ligaments, tendons, cartilage, joints and also the nervous system [6]. It is also known as repetitive stress injuries, cumulative trauma disorders, and occupational over exertion syndrome. Dentists are one of those professional who are at high risk to suffer from MSD because of their nature of work which requires static and awkward posters and repetitive hand and wrist movements.

In the present study a high prevalence of musculoskeletal pain was recorded in group 1 (79.25%) followed by group 2 (59.57%). Result of the study are in accordance with the studies done by Muralidharan D et al., (2013), Al Ali K and Hashim R (2012), Ali Z et al., (2019), Sultana N et al., (2019) where high prevalence of MSD (78%, 68%, 88.8%, 64%, respectively) was found among dental professionals [7-10]. Such high prevalence of MSD has proven it to be an ordeal

for dentist. The neck region was found to be the most affected region followed by shoulder and hand and wrist region. The pain in the lower extremities was found to be significantly associated with the practice of standing dentistry. This is indicative that participants need to follow the basic principles of instrumentation which involves operator's, patient's as well as dental chair's position during the treatment.

The correlation of age with MSD is controversial as some state that the frequency of pain is stable with age, while others believes it to be maximum in young professionals [4,11]. No such association was established in the present study because of the homogeneity of the age in the study sample.

In the present study prevalence of MSD was found to be higher in females which is in the accordance with the study done by Harutunian K et al. and Ali Z et al., [4,9]. This might be attributed to the fact that females have a lesser muscle tone [12].

In this study, working hours was found to be statistically correlated to prevalence of MSD. It is also in accordance with the study done by Desai V et al., (2012) who stated that awkward and repeated posture for significant duration of time is an important forecaster of MSD [13]. This is also supported by the findings of other studies, where musculoskeletal pain is evident to have direct relation with the working time in uncomfortable, repeated and forced posture or motion but its relation to factors like age and gender is still inconclusive [6,7,14,15].

In this study it was noted that, though MSD is a prevalent problem, proper measures to manage or lessen it are not taken into account. Ergonomics has a huge scope in dentistry. Many reforms are made in the treatment environment to make dental unit, instrumentation and peripheral equipment flexible and more convenient for the operator.

It was observed that young dentist especially interns (group 2) were not well aware of these reforms with very few practitioners and students adapting and applying these ergonomic measures in day to day clinical practice. Apart from it, many preventive measures for MSD are suggested like proper postural techniques to avoiding long, forceful, static posture, proper operator and patient position, taking periodic breaks and stretching, four hand dentistry, indirect vision and proper illumination [16,17]. This is helpful in reducing the fatigue, increasing and prolonging the clinical efficiency and practicing duration of the dentist. Few participants from both the groups and specially interns were found to be least aware. This explains prevalence of MSD among dental students even with less working hours.

This is indicative of the surfaced need to spread awareness and knowledge of good ergonomics and preventive measures and its adaption in everyday clinical practice, not only among the dental practitioners but also in dental students, as these disturbances in studentship will lead to more severe problems during future clinical practice. It was also evident that though of some the respondents with complaint of MSD were aware of preventive and ergonomic measures, it was not mounted in practice. This shows the lack of seriousness among dental practitioners and students, even if they suffer.

Limitation(s)

This was an observational study in confined geographical area which was dependent on credibility of respondents. Despite of these limitations this questionnaire study was useful in assessment of the prevalence and symptoms of MSD, its relation to ergonomics and possible preventive measures.

CONCLUSION(S)

Within the confines of the present study, it is concluded that the MSD is prevalent among dental students and practitioners of Karad. From the present study, it can be instituted that awareness of prevention and proper ergonomic measures is yet to be incorpurated in day to day practice. These measures must be stressed upon for management of MSD from as earliest as in studentship to prevent future major disturbances.

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