

Prevalence of Musculoskeletal Pain among Dentists in Dakshina Kannada, Karnataka: A Cross-sectional Study

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ABSTRACT

Aim and objective: The study aimed to evaluate the prevalence of musculoskeletal pain among dentists in Dakshina Kannada district, Karnataka, India.

Materials and methods: A cross-sectional descriptive survey of the prevalence of musculoskeletal disorder (MSD) was conducted among dentists during the month of July to August 2019 over a span of 1 month at AB Shetty Memorial Institute of Dental Sciences, Mangaluru. This included interns, postgraduates, and private practitioners in Dakshina Kannada. An SNQ (Standard Nordic Questionnaire) about their practice pattern, their general lifestyle including exercise, fitness patterns, the prevalence of MSDs, and their general awareness regarding MSDs was recorded. The responses were recorded and analyzed using descriptive statistics, univariate analysis, and Fisher's exact test.

Results: A total of 138 dentists consented to be part of the study; among them, 68 were males and 70 females, with a response rate of 95.17% (138/145). The dentists who participated in the study reported MSDs in the areas with respect to the neck (60%), lower back (60%), upper back (57%), and the intensity of the pain progressing from mild to moderate.

Conclusion: A high prevalence of MSD exists among dental experts influencing the everyday practice of more than one-third of dentists. The present study suggests the need to identify these factors predisposing to MSD among the dental practitioners and encourage them to adopt the practices and measures to eliminate the MSD. The adoption of such practices would help the practitioners improve their quality of professional life and work.

Clinical significance: The high prevalence of MSD in this study indicates the need for dental practitioners to recognize the factors predisposing to MSD. Dental surgeons need to get more information about the effect of their seating choices in their field of work.

Keywords: Ergonomics, Magnification, Musculoskeletal disorder, Standard Nordic Questionnaire.

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INTRODUCTION

Dentistry is a challenging occupation that requires a high degree of fixation and accuracy. Dental specialists need a high degree of visual acuity, strong hearing capability, psychomotor skills, physical dexterity, and the ability to keep up with work-related roles over long periods.¹ Failure in any of these strengths will affect a dental practitioner's competence and performance. Despite various advancements in dentistry numerous medical problems related to the practice are emerging and hampering a dentist's productivity.²

The World Health Organization (WHO) has described "occupational-related" infections as a multifactorial disorder with multiple hazard factors such as physical, authoritative activity, psychosocial, individual, and socio-social backgrounds adding up to causing these diseases.³ The other components include poor position, genetic propensity, mental pressure, physical molding, and age-related degeneration.^{4,5}

Musculoskeletal disorder (MSD) is defined as the presence of discomfort, impairment, or persistent pain in joints, muscles, ligaments, and various sections, caused by constant movement and painful or restricted body postures.⁶ It is prevalent among Indian dentists and is one of the most common causes of long-standing pain and incapacity affecting a large number of individuals identified by the WHO and the United Nations with help from the 2000 to 2017 Bone and Joint Decade.⁷

India has been struggling with conventional general medical issues such as infectious diseases, lack of health support, population development, and insufficient clinical consideration, apart from the medical issues related to the work.⁸ Musculoskeletal disorder is one

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of India's major medical work-related issues and assessments have shown that MSD adds about 40% of all expenses to business-related disease treatment.⁹ However, the predominance of a musculoskeletal issue among dental specialists is a rampant problem, it is not much recorded or reported in India. This study aimed to assess the prevalence of musculoskeletal distress among dental specialists in the Karnataka district of Dakshina Kannada, India.

MATERIALS AND METHODS

A cross-sectional descriptive survey of the prevalence of MSD was conducted among dentists during the month of July to August 2019 over a span of 1 month at AB Shetty Memorial Institute of Dental Sciences, Mangaluru. This included interns, postgraduates, and

private practitioners in Dakshina Kannada Community. Centered on 90% of musculoskeletal condition prevalence in dentists, 5%, 95%; the sample size was calculated using the master's software as $n = 138$.

Ethical approval from the institutional ethical committee was received, and the purpose of the study was clarified to the participants (ABSM/EC75/2019). The participants were approached to be part of the study and the procedure for answering the questionnaire was clarified. A personal questionnaire was collected for a maximum duration of 1 week, at the convenience of the practitioners by personally or online. Informed consent was obtained from all the participants. The sole requirement for admission into the study was at least 6 months of work experience in the current position. The study excluded participants with already existing bone deformities, trauma, and dental students, dentists aged >50 years.

We used a self-administered questionnaire, based on the Standard Nordic Questionnaire (SNQ) in English and Kannada language.¹⁰ It was delivered to them personally or by email. The questionnaire was pilot tested among the ten dentists in both languages for clarity and applicability. This questionnaire documents the prevalence of MSD in the preceding 12 months in terms of musculoskeletal symptoms (ache, pain, discomfort). It consists of two parts (total of 21 questions), a general questionnaire which included their specialization (10 questions), age-group, number of patients they treated per day, duration of chairside hours, and a more specific questionnaire focusing on different areas involving pain (neck, shoulder, lower back, upper back, elbow, wrist, knee, ankle, thigh) and severity of the pain was also recorded in the personal questionnaire (11 questions). The SNQ comprises schematics of the human body viewed from behind, separated into nine anatomical areas. This helped the participants recognize the areas of the body about which they were answering the questions. These areas are shown to develop musculoskeletal symptoms, and the respondent distinguished them from each other.

Statistical analysis was performed using the statistical package for social sciences (SPSS version 21) operating on windows 10. The continuous variables are represented as mean and standard deviation, non-continuous as frequency and %. The association between the data variable were assessed using Fisher's exact test, a p value <0.05 was considered statistically significant.

RESULTS

A total of 138 dentists consented to be part of the study; among them, 68 were males and 70 females, with a response rate of

95.17% (138/145). The participants were categorized into the age group of 20–30, 30–40, and 40–50 years. According to the Nordic questionnaire, on area wise predilection women had higher % age of MSD in the lower back (60%), neck (60%) followed by shoulders (57.1%). However, men had higher % age of pain in the lower back (66.2 %) than in females (Table 1 and Fig. 1).

There was overall mild severity of pain among both male (66.2%) and female (68.2%) groups irrespective of the location (Table 2 and Fig. 2). Among the younger age group of 20–30 years the areas of pain were found most commonly in the neck (61%), followed by the shoulder (50%), lower back (63%), and upper back (54.5%) (Table 1). All three groups saw a rise in the moderate pain form, although a higher proportion was found between 20 and 30 years (70.1%). Severe pain was also reported among the groups of 40–60 years with (12.5%) (Table 2).

In our study, higher rate of MSD was seen among the group of practitioners who treated >10 patients per day and the commonly affected areas were the lower back (67.2%) and upper back (61.2%) this did not correlate with other groups because even the dentists who treated 5–10 patients per day had shown increased % age in the shoulder area (50.6%) and patients who treated 2–5 patients showed higher % age of pain in the knee region (8.6%). Practitioners who had treated 5–10 patients (67.2%) and >10 patients (77.2%) per day had reported increased % age of severe type of pain (Table 3 and Fig. 3).

The prevalence of MSD in terms of the duration of chairside hours length >3 had increased MSD rates in all areas while the highest % age was found in the upper back (63%) and lower back (51%). Practitioners who had chairside duration for 2–3 hours (68.8%) and >3 hours (66.7%) both had reported mild type of pain. A severe type of pain was observed among the practitioner who spends chairside duration >3 hours in 7.4% (Table 4 and Fig. 4).

DISCUSSION

Work-related MSD is common among the dentist and number of studies have shown a high prevalence of MSD among dental specialists.^{11–14} This was attributed to delayed static postures, tedious movements, power utilization, and vibrations, which are considered to be hazard factors for MSDs. Severe instances of MSDs lead to repeated non-appearance from work and ultimately early retirement.

In India, there is not much reporting of the prevalence of MSD among dental practitioners. As indicated by WHO, the weight of musculoskeletal issue (MSD) can be surveyed as far as issues related with them, that is the distress and weakened working (handicap)

Table 1: Area-wise predilection of musculoskeletal disorder, in terms of gender and age of the practitioner

Areas	Gender		Chi-square		Age			Chi-square	
	Male (%)	Female (%)	value	p value	20–30 years (%)	30–40 years (%)	40–50 years (%)	value	p value
Neck	52.9	60	0.70	0.40 (NS)	61	51.4	50	1.46	0.48 (NS)
Shoulder	44.1	57.1	2.34	0.13 (NS)	50.6	51.4	50	0.01	0.99 (NS)
Lower back	66.2	60	0.57	0.45 (NS)	63.6	59.5	66.7	0.35	0.84 (NS)
Wrist	23.5	24.3	0.01	0.92 (NS)	23.4	24.3	25	0.03	0.99 (NS)
Upper back	52.9	52.9	0.25	0.62 (NS)	54.5	62.2	45.8	1.59	0.45 (NS)
Elbow	14.7	7.1	2.04	0.15 (NS)	10.4	10.8	12.5	–	0.93 (NS)
Knee	2.9	2.9	–	0.28 (NS)	5.2	8.1	4.2	–	0.88 (NS)
Ankle	2.9	5.7	–	0.48 (NS)	1.3	8.1	8.3	–	0.08 (NS)
Thigh	2.9	5.7	6.71	0.04*	3.9	8.1	0.0	–	0.45 (NS)

*Significant

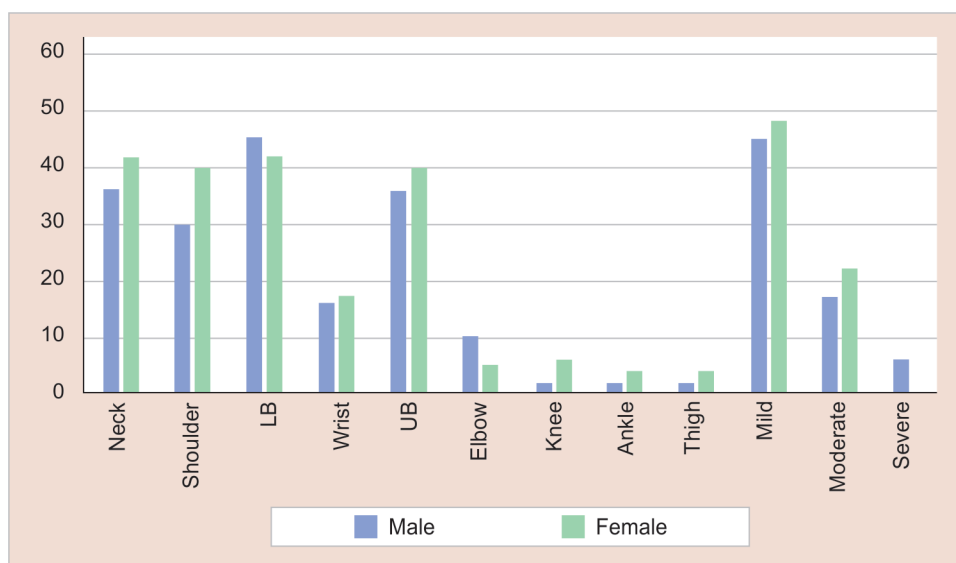


Fig. 1: Area-wise predilection of musculoskeletal disorder and severity of pain in terms of gender of the practitioner

Table 2: Severity of pain in terms of gender of the practitioner

Severity of pain	Gender		Chi-square test	p value	Age			Chi-square test	p value
	Male (%)	Female (%)			20–30 years (%)	30–40 years (%)	40–50 years (%)		
Mild	66.2	68.6	6.71	0.04*	70.1	65	62.5	–	0.21 (NS)
Moderate	25	31.4			26	35.1	25		
Severe	8.8	0.0			3.9	0	12.5		

Fisher’s exact test, * $p < 0.05$; Statistically significant, $p > 0.05$; NS, non-significant

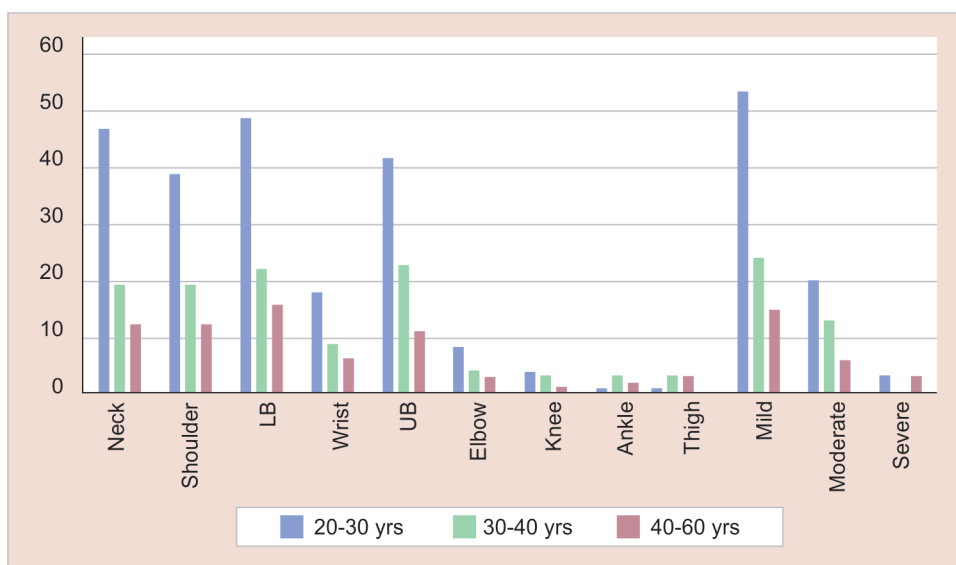


Fig. 2: Area-wise predilection of musculoskeletal disorder and severity of pain in terms of age of the practitioner

identified with the musculoskeletal framework or comparable to the reason, e.g., joint illness or injury.

The instrument used for this investigation is the SNQ, which records musculoskeletal indications and screens in an ergonomic setting¹⁰ for musculoskeletal clutters. Standard Nordic Questionnaire is shown to be meaningful in work-related settings. Administration of medicinal services looks into it as screening for side effects of

the musculoskeletal system, fills it in as a symptomatic device for dissecting the workplace, and distinguishing incongruities in work habits and ergonomics.

Dentists are predisposed to pain or injury in different regions of the body depending on the type of work and the position adopted.⁶ In the present study, females had a higher level of musculoskeletal issues in the lower back (60%), neck (60%), and upper back region

Table 3: Prevalence of musculoskeletal disorder in terms of number of patients treated and duration of chairside by the practitioner

Areas	Number of patients treated					p value	Chi-square value	Duration of chairside			p value
	2-5 Pts (%)	5-10 Pts (%)	>10 Pts (%)	>10 Pts (%)	>10 Pts (%)			1 hour (%)	2-3 hours (%)	>3 hours (%)	
Neck	47.8	57.9	58.6	0.86	0.65 (NS)	44.4	60.4	55.6	0.86	0.65 (NS)	
Shoulder	56.5	50.9	48.3	0.45	0.80 (NS)	77.8	54.2	45.7	-	0.16 (NS)	
Lower back	61.3	52.6	78.2	5.38	0.07 (NS)	65.4	58.3	66.7	0.71	0.70 (NS)	
Wrist	30.4	17.5	27.6	2.24	0.33 (NS)	55.6	27.1	18.5	6.51	0.04*	
Upper back	43.5	52.6	62.1	2.53	0.28 (NS)	51.9	58.3	66.7	-	0.60 (NS)	
Elbow	8.7	8.8	13.8	0.88	0.64 (NS)	11.1	12.5	9.9	0.22	0.90 (NS)	
Knee	4.3	3.5	8.6	-	0.64 (NS)	33.3	6.3	2.5	-	0.004*	
Ankle	13	1.8	3.4	-	0.12 (NS)	0.0	4.2	4.9	-	1.00 (NS)	
Thigh	8.7	5.3	1.7	-	0.22 (NS)	22.2	0.0	4.9	-	0.02*	

*Significant

Table 4: Severity of pain in terms of number of patients treated and duration of chairside by the practitioner

Severity of pain	Number of patients treated					p value	Chi-square test	Duration of chairside			p value
	2-5 Pts (%)	5-10 Pts (%)	>10 Pts (%)	>10 Pts (%)	>10 Pts (%)			1 hour (%)	2-3 hours (%)	>3 hours (%)	
Mild	43.5	77.2	67.2	-	0.008*	66.7	68.8	66.7	-	0.36 (NS)	
Moderate	31	21.1	39.1	-	-	33.3	31.3	25.9	-	-	
Severe	1.7	1.8	17.4	-	-	0.0	0.0	7.4	-	-	

Fisher's exact test, * $p < 0.05$ Statistically significant, $p > 0.05$ Non-significant, NS

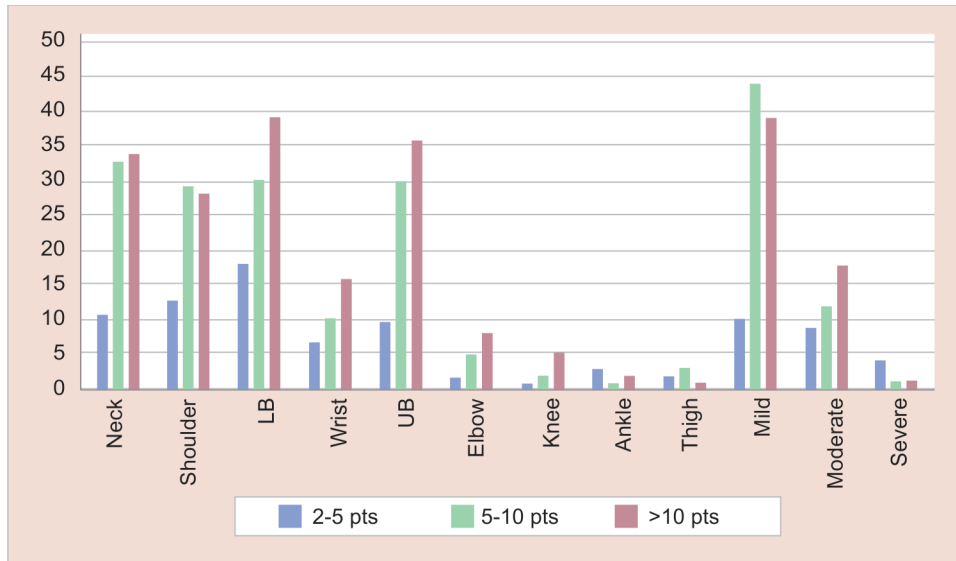


Fig. 3: Area-wise predilection of musculoskeletal disorder and severity of pain in terms of number of patients treated by the practitioner

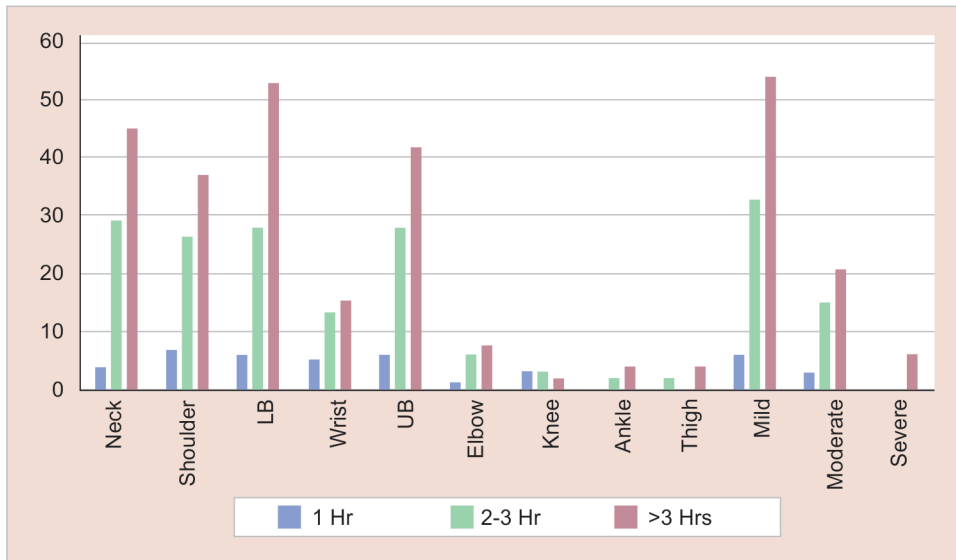


Fig. 4: Area-wise predilection of musculoskeletal disorder and severity of pain in terms of duration of chairside hours by the practitioner

(57.1%), whereas men had similar findings with the addition of the lower back (60%). Studies assessing the prevalence of MSD among dental practitioners in Lithuania¹⁵ and New Zealand¹ have similarly shown a higher prevalence of MSD among female practitioners.

However, this finding was consistent with Puriene et al., an investigation where the prevalence of MSD among dental specialists indicated a higher predominance among female dentists, which could be attributed to women being more concerned about health issues and getting them addressed at the earliest opportunity.¹⁶ The commonly affected areas in the present study were the neck (64.7%), lower back (61.5%), and shoulders (59%). This was similar to the findings of Ayers et al. and Hayes et al.^{1,13}

Among the age group of 22–30 years around the regions of the neck (61%), shoulder (50%), lower back (63%), and upper back (54.5%) and the age group of 40–60 years expressed extreme sort of agony with the MSDs. Dental experts have indicated that with increasing age the MSDs also tend to increase; similar to the

findings of Puriene et al.¹⁶ The finding in the present study justified that dentists who worked for >3 hours had pain in the upper back (66.7%) and lower back area (66.7%) and dentists who treated >10 patients in a day also had pain in the lower (78.2%) and upper back (62.1%) region.^{17,18} The results could be attributed to the more developed experts taking up fewer patients due to age or long periods of work with better adaptive measures such as changing position, better dental seats, exercise, medication, and rest.¹⁹ Thirty-one percent of the specialists observed MSD involving the above-mentioned anatomical regions and this was similar to the findings of Solidaki et al., which was directed among three Greek work-related groups (medical attendants, office laborers, and postal clerks).²⁰

The results of this study are limited by the small sample size and the recruitment of participants using one geographic area. Larger sample size will yield more comprehensive results. Dentists employed in the outskirts and peripheries may also be included

in future MSD studies. The follow-up of the interventions and the outcome can also be studied.

The high prevalence of MSD in this study indicates the need for dental practitioners to recognize the factors predisposing to MSD. Dental surgeons need to get more information about the effect of their seating choices in their field of work. The smart and modern dentist will therefore certainly opt for the better alternative of embracing ergonomics, rather than enduring its opposite.

CONCLUSION

Musculoskeletal disorders pose a significant occupational health hazard for dentists, which may have a potentially negative impact in terms of reduced work efficiency and productivity. This high prevalence of MSDs among dentists should therefore set off the alarm bells since dentists often ignore the associated long-term risks of MSDs. Appropriate seating arrangement, workplace adjustment including their chairs, patient seat, table, armrests, and support of suitable assistants including the use of correct amplifications are important.

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