

# Prevalence of Neck and Back Musculoskeletal Disorders among Dentists in Punjab: A Questionnaire Study

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## Abstract

**Background:** The prevalence of musculoskeletal disorders (MSDs) in neck and back was investigated, along with the risk factors in association with MSDs were evaluated among dentists in Punjab.

**Methods:** This cross-sectional study was carried out among dentists using self-administered, Nordic musculoskeletal questionnaire. Descriptive statistics and Chi-square test were used for the data analysis. Statistical analysis were done using SPSS version 20.

**Results:** A total of 160 dentists were included in the study. More than half of the respondents had experienced symptoms in the neck (67.5%), upper back (56.25%), and lower back (63.75%). The prevalence of trouble in the neck increased when the number of days worked per week increased. Risk factors ( $P < 0.05$ ) included being  $>40$  years of age, body mass index  $<18.5$  as well as more than 24, no physical activity, increasing years of practice, and working with no more than one dental assistant.

**Conclusion:** There is a dire need to address and to change the way dentistry is practiced to the lower the risks to dental practitioners. Dental professionals should be cautious and well trained to stop certain behaviors that can put their health at risk as well as posture issues and ergonomics be inculcated in the educational system of dentistry.

**Key words:** Dentist, Dentistry, Ergonomics, Musculoskeletal disorder, Nordic questionnaire, Pain

## INTRODUCTION

The Center for Disease Control and Prevention in the USA defines musculoskeletal disorders (MSDs) as “injuries or disorders of the muscles, nerves, tendons, joints, cartilage, and spinal discs”.<sup>[1]</sup> They may be caused by an interplay of specific risk factors acting during work related activities, such as repetitive motions, obstinate or static positions, forceful movements, exposure to vibration (Raynaud’s disease), and mechanical stress. When these factors exist simultaneously, the risk of developing MSDs increases significantly.<sup>[2]</sup>

The prevalence of MSDs among dental-care teams ranges from 64% to 93% around the world.<sup>[3]</sup> The results of these studies also showed a high prevalence of back pain, followed by neck pain as compared to the other anatomical region (shoulders, hand, and wrists and lower extremities). The prevalence of back pain among dentist in Australia (54%), Brazil (58%), Denmark (59%), Taiwan (66%), Saudi Arabia (79%), and neck pain in Saudi Arabia (64%), Denmark (65%), and Taiwan (72%).<sup>[4]</sup> MSDs account for the most common reason (29.3%) for early retirement age in dentists worldwide.<sup>[5]</sup>

Despite the evidence of MSDs in dentistry, research conducted among the dentists in Punjab region specifically aimed at neck and back is very scanty. Hence, the present study is aimed to describe the prevalence of Neck and Back MSDs experienced by dentists during their clinical work in Punjab. The study also aimed to find the association between MSDs and selected socio-demographic, professional, and working characteristics variables.

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## METHODS

In this cross-sectional study, participants included a convenience sample of 160 dentists of Punjab Region. Written informed consent was obtained from all participants before the start of the study.

A self-administered standardized Nordic musculoskeletal questionnaire<sup>[6]</sup> was conducted on dentists in state of Punjab, over a period of 2 months. Before the study, a pilot study was undertaken to test the questionnaire for comprehensibility and relevance among ten dentists. The purpose of the questionnaire and how they should be answered was explained, and whenever necessary further information was provided. They were not included in the study.

A 1-year recall of MSDs was used in this study, as this was shown to be an appropriate time scale in Taiwan,<sup>[7]</sup> Japan,<sup>[8]</sup> Korea,<sup>[9]</sup> Saudi Arabia,<sup>[10]</sup> Australia,<sup>[11]</sup> and Denmark.<sup>[12]</sup> In addition, the questionnaire contained general items such as gender, age, body mass index (BMI), education level, seniority, and working conditions, including the work place, frequencies, and duration of work tasks, number of dental assistants, and durations of being in a bent position and using hand pieces.

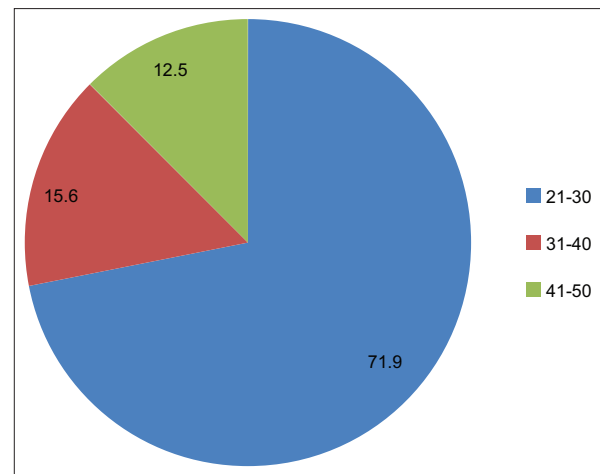
The collected data were thoroughly screened and entered into MS-Excel spread sheets and analysis was carried out using Statistical Package for the Social Sciences version 20. Descriptive statistics and Chi-square test was used to assess statistical significance of differences observed.  $P \leq 0.05$  was considered statistically significant.

## RESULTS

During the survey, effective responses from 160 dentists were received, among them, 104 (65%) were female [Figure 1]. Nearly half of the dentists (45%) were 161–170 cm tall [Figure 2]. Values of the BMI of nearly half of the respondents (43.125%) were in over weight range (43.125%), about one-third (29.375%) were within normal range, and 19.375% were obese.

Among the study sample about three-fourths (74.375%) had completed graduation in the year 2011–2020 [Figure 2]. Among the 160 dentists, 54 (33.75%) had a master's degree and the remaining 106 (66.25%) were graduates. About one-half (56.875%) worked with no dental assistant, and also nearly another one-half (41.875%) had 1 to 6 dental assistants.

Majority of them (85.625%) worked 6 days in a week. Nineteen dentists (11.875%) worked seven days per week.



**Figure 1: Distribution of study subjects according to the age groups**

Majority of dentists (85%) treated no more than 10 patients per day while about one-tenth (11.875%) treated about 11–30 patients per day. About half of dentists (53.125%) spent around half an hour per patient daily while around one-fourth (26.875%) spent more than 50 min per patient daily. During treatment, around 60% (60.625%) of dentists bent their back forward for an average time of 1–10 min/patient.

Amongst the sample, 84.375% (135 dentists) reported pain in one of the regions and 37.5% (60 dentists) had pain in all the three regions whereas 15.625% (25 dentists) reported no pain in these three regions.

Out of 160 dentists, 115 belonged to 21–30 years of age, and among them 79 dentist had trouble with neck, which was statistically insignificant. About 136 dentists said that they had 1–10 years of practice, among them 88 (55%) dentist had trouble with neck, which was statistically significant. 137 dentists worked 6 days a week and amongst them 98 had pain in neck, which was statistically significant [Table 1].

Amongst the 160 respondents, 115 dentists belonged to the age group of 21–30, among them 70 had pain in upper back, which was statistically significant. 69 dentists had BMI ranging between 24.1 and 27, among these 39 had pain in upper back, which was statistically significant. 105 had education level as BDS, amongst them 65 had pain in upper back which was statistically significant. 91 Dentists had no Dental Assistant as a result 60 had pain in upper back which was statistically significant [Table 2].

Among the 160 dentists, 115 belonged to the age group of 21–30, among them 78 had pain in lower back which was statistically significant. 69 dentists had BMI ranging between 24.1 and 27, among these 45 had pain in lower

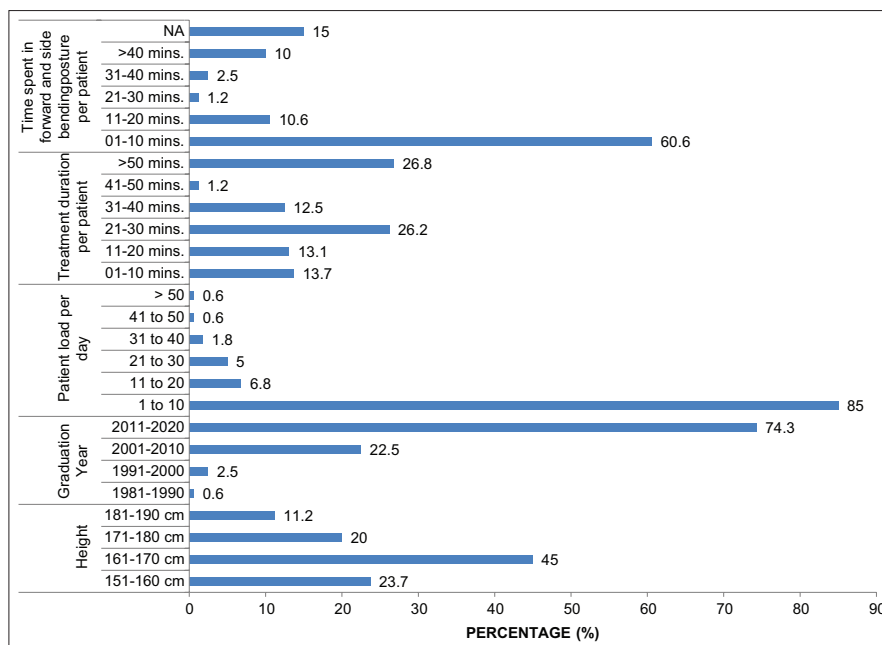


Figure 2: Distribution of study subjects according to the different variables

Table 1: Distribution and association of independent variables with neck

Factors	Trouble with locomotive organs (Neck)		Significance (P-value)
	No	Yes	
Age(years)			0.120
21-30	36	79	
31-40	12	13	
41-50	4	16	
Gender			0.524
Male	20	36	
Female	32	72	
BMI			0.080
<18.5	2	11	
18.5-24	18	29	
24.1-27	17	52	
27.1-35	12	14	
>35	3	2	
Physical activity			0.978
Yes	36	75	
No	16	33	
Years of Practice			0.006*
1-10	48	88	
11-20	2	20	
21-30	2	2	
Education level			0.580
BDS	36	70	
MDS	16	38	
Number of Dental Assistants			0.063
1	16	19	
2-6	7	25	
6-10	0	1	
>10	1	0	
NA	27	64	
Work days in a week			0.030
≤4	1	1	
5	2	0	
6	39	98	
7	10	9	

\*P<0.05 - statistically significant, BMI: Body mass index

Table 2: Distribution and association of independent variables with the upper back

Factors	Trouble with locomotive organs (Upper Back)		Significance (P-value)
	No	Yes	
Age(years)			0.000
21-30	45	70	
31-40	20	5	
41-50	5	15	
Gender			0.616
Male	26	30	
Female	44	60	
BMI			0.007
<18.5	2	11	
18.5-24	25	22	
24.1-27	30	39	
27.1-35	8	18	
>35	5	0	
Physical activity			0.125
Yes	53	58	
No	17	32	
Years of Practice			0.474
1-10	62	74	
11-20	7	15	
21-30	1	1	
Education level			0.032
BDS	40	65	
MDS	30	29	
Number of Dental Assistants			0.024
1	22	13	
2-6	16	16	
6-10	0	1	
>10	1	0	
NA	31	60	
Work days in a week			0.139
≤4	2	0	
5	2	0	
6	57	80	
7	9	10	

\*P<0.05 - statistically significant, BMI: Body mass index

back, which was statistically significant. 49 dentists had no physical activity and among them, 37 had had pain in lower back, which was statistically significant [Table 3].

Amongst the total respondents, 67.5% (108 Dentists) presented with trouble in NECK; 56.25% (90 Dentists) presented with trouble in upper back while 63.75% (102 Dentists) presented with pain in lower back.

## DISCUSSION

The Nordic standardized questionnaire has been used for analyzing musculoskeletal symptoms since 1987<sup>[5]</sup> and is an internationally respected instrument for evaluating musculoskeletal complaints.<sup>[13]</sup> It is a self-reported survey method, and disorders include aches, pains, and discomfort in the musculoskeletal system,<sup>[11]</sup> which might not be diagnosed as a disease by physicians.

**Table 3: Distribution and association of independent variables with the lower back**

Factors	Trouble with locomotive organs (Lower Back)		Significance (P-value)
	No	Yes	
Age (years)			
21–30	37	78	0.006
31–40	16	9	
41–50	5	15	
Gender			
Male	23	33	0.352
Female	35	69	
BMI			
<18.5	2	11	0.005
18.5–24	26	21	
24.1–27	24	45	
27.1–35	4	22	
>35	2	3	
Physical activity			
Yes	46	65	0.040
No	12	37	
Years of Practice			
1–10	50	86	0.833
11–20	7	15	
21–30	1	1	
Education level			
BDS	35	71	0.234
MDS	23	31	
Number of Dental Assistants			
1	15	20	0.229
2–6	13	19	
6–10	1	0	
>10	1	0	
NA	28	63	
Work days in a week			
≤4	1	1	0.874
5	1	1	
6	48	89	
7	8	11	

\*P<0.05 - statistically significant, BMI: Body mass index

This study examined the prevalence and distribution of self-reported musculoskeletal complaints in neck, upper back, and lower back among across section of Punjab dentists' population.

Age was seen as important contributory factor toward MSDs with 75% of respondents in the age group of 41–50 suffered from discomfort and pain in body. Gender difference was not of much significance with respect to problem in neck, upper back, and lower back wherein about similar prominences were discovered. Hence, it is critical for the dentists heading toward elder age to monitor their body for pain and visit physiotherapists to get relief and advise to alter the working atmosphere as well as lifestyle.

This study revealed that BMI is an important contributor towards MSDs whereby higher numbers (80) were noticed in dentists in the underweight (<18.5), overweight (24.1–27.0) and obese (>27.0) dentists. Fewer numbers in normal category suggests that maintaining ideal BMI goes a long way in keeping MSDs at bay.

Physical Activity is peculiarly helpful in combating back troubles as lesser number of dentists showed the presence of MSDs who were indulging in some kind of physical exercise; whereas not much difference was noticed with respect to neck pain as similar numbers were noticed across the group.

Higher Proportion of graduate dentists complained of MSDs as compared to post graduate dentists which explains that with age and experience, dentists are able to tackle the problem of MSDs with appropriate changes in lifestyle and ergonomics.

Additional help is always of great use in a dental setup as dentists working without any dental assistants showed far higher numbers (around 70%) as the added tasks of dental assistant makes the dentist more prone to MSDs. Having a dental assistant reduces added physical stress of certain activities such as mixing of dental materials which in turn decreases the to and fro motion of limbs and joints.

Less intermittent breaks in between patients and more number of working days has a strong correlation with early retirement among the dentists as around 100 dentists showed the presence of MSDs working for 6–7 days a week. It is highly recommended that sufficient breaks be taken in between patients by the operator so that the strained body parts attains ample rest. Similarly dental chair time per patient as well as total working hours and days be adjusted keeping in mind the status of the body.

A strong co-relation was noticed between neck and posture as dentists working in awkward postures with side bending

and forward bending for longer durations tend to observe MSDs in their Neck. It is crucial that fundamentals of ergonomics should be a vital part of dental curriculum as well as during Dental Conferences and workshops.

Similarly a strong co-relation was observed between Back and Physical Activity of the Dentists. Dentists who were physically active in some kind of exercises tend to observe MSDs in their backs in fewer numbers. Moreover, being physically indulged in exercises, sports and hobbies is helpful in keeping the BMI in check, which as discussed about earlier is an important contributor to MSDs.

### Recommendations

1. Some kind of physical activity should be a part of daily routine so that the BMI is maintained in normal range.
2. Appropriate number of dental assistants should be employed according to the number of patients
3. Keeping work days in a week no more than 5 and keeping appropriate chair time with intermittent breaks is crucial
4. Working in bent postures should be avoided as well as suitable measures such as dental loupes and dental stools with arm rest be strongly recommended so that the dentist can work without strain and sprain.
5. There is a need for revisiting the dental curricula for undergraduates with respect to ergonomics and more collaboration through dental institutions, workshops and conferences is needed.

### CONCLUSION

Dental studies and dental work often involve time spent in static, uncomfortable positions, which can lead to musculoskeletal symptom seen over the relatively short clinical training period. Dental professionals should be vigilant and try to stop certain behaviors that can put their health at risk. Continued education and tools such

as magnification loupes and coaxial illumination can dramatically help improve their ergonomic posture, reduce the number of routine movements, and make it easier for them to be more efficient when they perform their job. There is a critical need to address ergonomic issues in the educational system and to change the way dentistry is practiced to lower the risks of MSDs in dental practitioners.

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