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A Study to Evaluate the Prevalence of Postural Problems among the Dentists in Chennai, Tamil Nadu, India.

Jinu Merlin Koshy^{1*}, W M S Johnson², R Archana³, and B Sathya Priya⁴.

^{1,4} Department of Anatomy, Sree Balaji Dental College and Hospital, Bharath University, Chennai. Tamil Nadu, India.

^{2,3} Department of Anatomy, Sree Balaji Medical College and Hospital, Bharath University, Chennai. Tamil Nadu, India.

ABSTRACT

The aim of the present study was to evaluate the postural problems arising due to the poor working posture among dentists in Chennai, with an objective to determine the prevalence of neck and back problems. The study was conducted on one hundred and seventy five dentists working in different clinics having an experience of 3 to 20 years with age ranging from 25 – 50 years. The randomly selected subjects were given the Standardized Nordic Questionnaire to find out the perception of musculoskeletal symptoms and if present, in which area they were localized and whether they were ongoing. The data were analyzed with Binary Logistic Regression using the Mini Tab (14) statistical software. The prevalence of postural problems in the study population was calculated and statistical significance was accepted for $p < 0.05$. There was a significant association between gender and shoulder pain ($p=0.046$). Similarly there was a significant association between patients per day ($p=0.05$) and BMI ($p=0.025$) on the hand pain. Frequency of upper back pain ($p=0.05$), lower back pain ($p=0.05$) and knee pain ($p=0.024$) of the dentists for the last 12 months was dependent on the BMI. The intensity of neck pain which caused the prevention of work was having statistically significant association with the patients treated per day ($p=0.014$) and with the working hours of the dentist ($p=0.005$). The upper back pain and the socio demographic variables like age ($p=0.018$), gender ($p=0.05$), work experience ($p=0.018$), height ($p=0.05$), and BMI ($p=0.03$) were having significant association. The study revealed that various socio demographic variables contributed to the musculoskeletal symptoms experienced by the dentists. Conversely; the number of patients attended per day and working hours per day by the dentist is statistically proportional to the pain experienced by them in their neck and hand.

Keywords: Dental professionals; musculoskeletal disorders; Standardized Nordic Questionnaire ; Posture; Fatigue; Work station.

**Corresponding author*

INTRODUCTION

The dental professionals are more prone for work related musculoskeletal disorders (MSD). Hunching over patients, reaching and stretching in awkward positions, the physical strains and repetitive movements required by the occupation can lead to muscle imbalances, postural dysfunction and compensatory movement patterns leaving the dentist with pain or chronic discomfort⁽¹⁻³⁾. The dental team is at high risk of neck and back problems due to the limited work area and impaired vision associated with the oral cavity. These working restrictions frequently cause a clinician to assume stressful body positions to achieve good access and visibility inside the oral cavity^(3, 4). Furthermore, dental procedures are usually long and require much more concentration during work. A large number of dentists suffer from musculoskeletal problems later in their professional lives. Some dentists have milder forms of musculoskeletal problems, while others have much severe forms. A proportional correlation between the number of disorders and the years of clinical experience were documented.

Back pain was the most common complaint among dentists followed by neck pain⁽⁵⁾. Dentists are subjected to a wide variety of physical and psychological ailments that aggravate disorders of musculoskeletal system and greatly affect health of dentists⁽⁶⁻⁹⁾. In order to prevent this, correct posture must be established by the dentist early in their dental career. Therefore, the correct posture must be stressed in dental institutions. Although most institutions teach the correct and ideal dentist posture and positions, it is not always applied by the dental students. The most common sites of pain among the dentists are the lumbar and the cervical vertebrae⁽⁷⁻⁹⁾.

These problems can be avoided by increasing awareness of the postures used during work, redesigning the workstation to promote neutral positions, and healthy work practices to reduce the stress of dental work on the practitioner's body⁽¹⁰⁾. Proper ergonomic design is necessary to prevent repetitive strain injuries, which can develop over time and can lead to long-term disability. Ergonomics is concerned with the efficiency of persons' movements in their working environment. It takes account of the worker's capabilities and limitations to ensure that task, equipment, information and the environment suit each worker⁽¹¹⁾.

The musculoskeletal health of dental professionals has been the subject of numerous studies worldwide, and their focus has been on the pain experienced by the practitioner. The main reason is that the fact that Dentist's work area, where dental treatment is performed, is narrow. Also another important reason is their inflexible work posture. Studies indicate that back, neck or shoulder pain is present in 81% of dental operators⁽¹²⁾. Studies highlighted that stress, postural practice (bending and twisting trying to gain better access and visibility within the oral cavity), as well as prolonged working times leads to fatigue^(4, 13).

Various investigators have pointed out the common postural faults among dentists and dental auxiliaries are craning and/or excessive bending and twisting of the neck, bending forward from the waist, elevation of the shoulders, and general bending or twisting of the back and neck⁽¹⁴⁻¹⁹⁾.

The present study was to present an overview of epidemiological evidence on the relationship between the working posture of dentists and problems arising among dentists in the capital city of Tamil Nadu.

Aim & Objective

- The aim of the present study was to analyze the postural problems arising due to the wrong working posture among dentists.
- To determine the prevalence of neck and back problems due to the awkward working posture among the dentists in Chennai.

MATERIALS AND METHODS

The study was to analyze the prevalence of postural problems among dentists in Chennai. One hundred & seventy five dentists working in different clinics were randomly selected and included in this study, over a period of three months. The study proposal was submitted to the Institutional Ethics Committee & due clearance was obtained from them.

Inclusion criteria

- Dentists with 3 - 20 years work experience
- Age ranging from 25 – 50 years,
- Both sexes.

Exclusion Criteria

- Individuals with any acute ailments or systemic diseases
- Pregnant women
- Those who were not willing

Informed written consent was obtained from each of the participants.

Armamentariums

- Standardized Nordic Questionnaire (SNQ)
- Computer

A standardized questionnaire were administered and data regarding the job title, previous employment, job description, the duration and frequency of work, rest periods, description of injury or illness and information on other known occupational risk factors were collected. The self-administered questionnaire was handed over to the dental practitioners at their respective clinics. The method for answering the questionnaire was explained and those questionnaires were collected back according to the convenience of those practitioners. A pilot study was performed among the dental practitioners before commencing the study. The instrument used in this study is the Standardized Nordic Questionnaire (SNQ) (Licensed author I. Kuorinka et al supplied by Elsevier to the author of the present study; License No. 3316900588799). This questionnaire records the prevalence of MSD in terms of musculoskeletal symptoms (ache, pain, discomfort) in the preceding 12 months. SNQ consists of structured, forced, binary or multiple choice variants. It consists of two parts: - a general questionnaire and a more specific questionnaire focus on the neck, shoulders and low back regions. The general questionnaire records whether musculoskeletal symptoms were present or not and if it was present, in which area were they localized and whether they were ongoing (presence of musculoskeletal symptoms during the last seven days). After completion of the questionnaire, the candidates were interviewed to clarify any confusion and to furnish any missing data. The collected data were thoroughly screened and entered into MS Excel worksheets and analysis was carried out. Descriptive statistics and proportions were reported for socio demographic variables. The prevalence of postural problems in the study population was computed as percentages. Binary logistic regression was done with pain reported at different regions as the dependent variable. The independent variables entered were age, gender, work experience, working hours per day, number of patients treated per day, height, weight and BMI. Mini Tab version14 software was used for performing all statistical analyses. A value of $P < 0.05$ was considered as statistically significant.

RESULTS

The study group consisted of 175 dentists having work experience of minimum 3 years and maximum of 20 years. The sample population included 96 females & 76 males with an average age of 33 years and average work experience of 9 years. The general characteristics of the study population like age, work experience, working hours, height, weight, body mass index (BMI) are shown in Table 1. The percentile of subjects having the persistence of the pain for the past 12 months (Graph 1), persistence of pain which prevented the subjects from work (Graph 2), and the persistence of pain for the past 7 days (Graph 3) are presented.

The association between the frequency of pain and discomfort in different regions of the body in respect to the past 12 months, trouble causing prevention of work and the trouble in the last seven days shows there was a significant association between gender and shoulder pain ($P=0.046$) for the past one year data (Table 2). Similarly there was a significant association between patients per day ($P =0.05$) and BMI (P

=0.025) on the hand pain (Table 2). Frequency of upper back and lower back pain of the dentists for the last 12 months was dependent on the BMI ($P = 0.05$) (Table 2). The knee pain for the last 12 months was having a significant association with BMI ($P = 0.024$) (Table 2).

The intensity of neck pain which caused the prevention of work was having statistically significant association with the patients treated per day ($P = 0.014$) and with the working hours of the dentist ($P = 0.005$) (Table 2). The upper back pain and the socio demographic variables like age ($P = 0.018$), gender ($P = 0.05$), work experience ($P = 0.018$), height ($P = 0.05$), and BMI ($P = 0.03$) were having significant association (Table 2). It was also found that there was statistically significant association between the neck pain for the last seven days and the patients treated per day by the dentist ($P = 0.049$) (Table 2).

Height and the shoulder pain were significantly associated ($P = 0.049$) (Table 2). The upper back pain for the last seven days were having a significant association with the variables like age ($P = 0.042$), work experience ($P = 0.028$), height ($P = 0.003$), and weight ($P = 0.05$) (Table 2). Similarly there was a significant association between patients BMI ($P = 0.046$) and the hand pain for the last seven days (Table 2). Hip pain was having significant association with gender ($P = 0.04$), height ($P = 0.045$) and weight ($P = 0.032$) (Table 2).

Frequency of pain in the elbow, knee, and low back in the last seven days were independent of the socio demographic variables. The shoulder pain, low back pain, and knee pain which prevented the dentist from work were also independent of age, gender, and work experience, working hours, height, weight and BMI.

Table 1: General Characteristics of the Study Subjects

n=175 M:F 79:96		
	MALE	FEMALE
Age	33 ± 5.0606	32 ± 4.23
Work experience	9 ± 5.109	8 ± 4.09
Married	57	78
Unmarried	22	18
Working hrs per day	9 ± 1.448	6 ± 1.35
Working hrs per week	54 ± 8.693	36 ± 8.08
Patients handling per day	20 ± 7.612	12 ± 4.52
Patients per week	120 ± 45.67	72 ± 27.16
Height	172 ± 7.87	158 ± 7.40
Weight	72 ± 8.48	62 ± 5.45
BMI	24.65 ± 1.72	24.80 ± 2.146

Data given above are Mean and ± SD values of the Population under study
 BMI-Body Mass Index; F- Female; M-Male

Graph 1 Persistence of pain for past 12 months

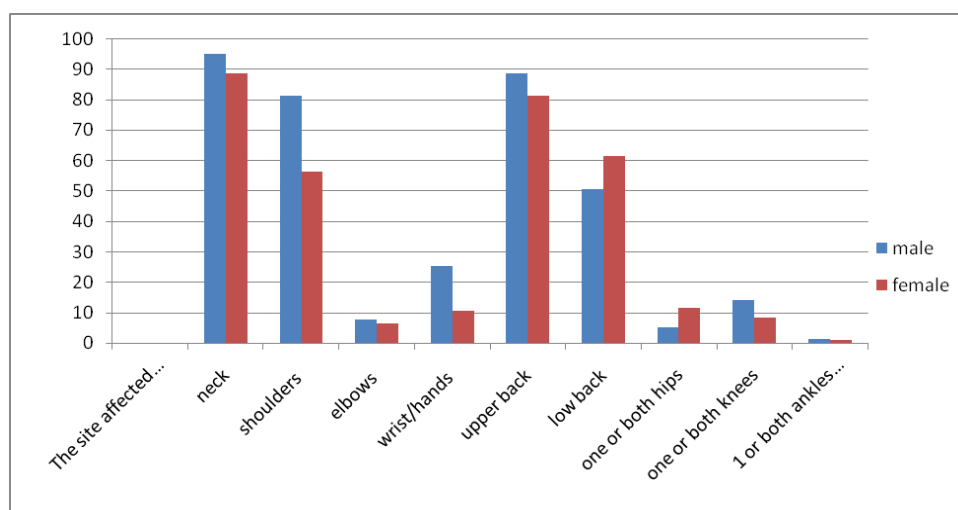
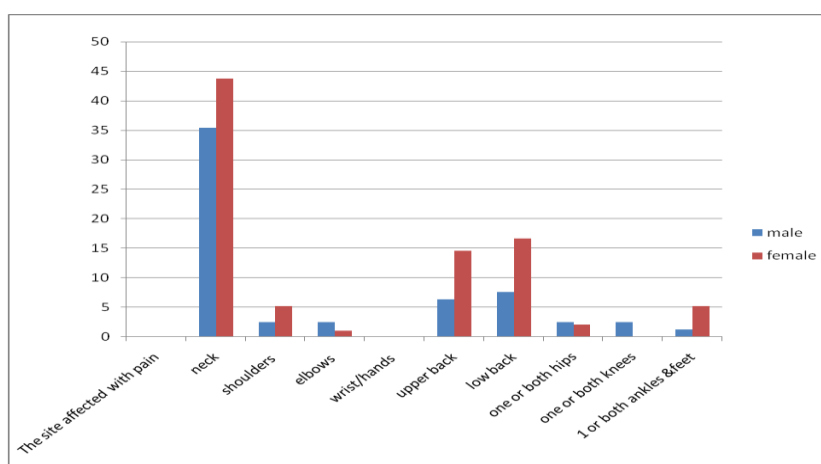


Table 2. Association between frequency of pain & discomfort in different regions of body w.r.t past 12 months, trouble causing prevention of work & trouble in the last seven days

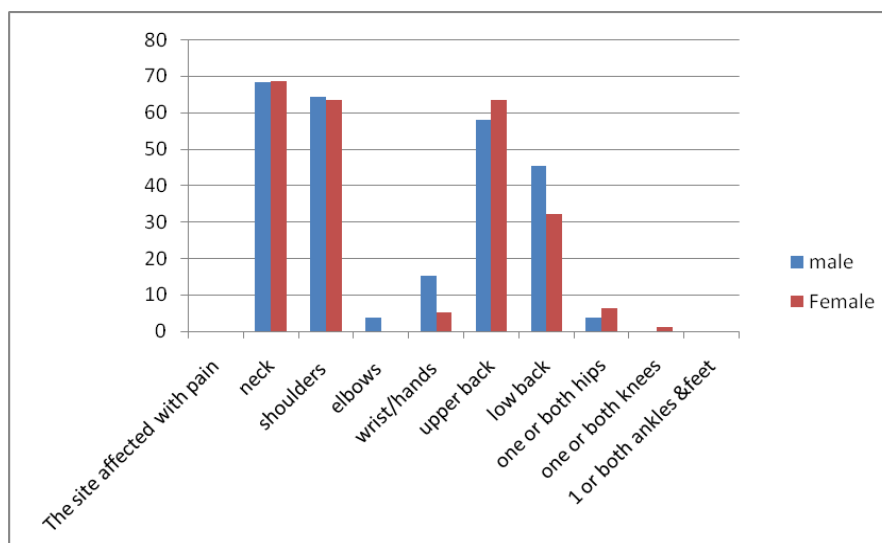
Variables	Pain and discomfort in different regions of body for the past 12 months						
	Neck	shoulders	wrist/hand	Upper back	low back	one or both hips	one or both knees
Age	0.915	0.7	0.288	0.48	0.29	0.31	0.74
Gender	0.318	0.046*	0.54	0.09*	0.82	0.88	0.66
Work experience	0.581	0.065*	0.273	0.65	0.14	0.7	0.98
Working hours/day	0.525	0.31	0.349	0.22	0.36	0.17	0.54
Patients /day	0.969	0.717	0.05*	0.2	0.52	0.24	0.3
Height	0.929	0.907	0.15	0.86	0.14	0.46	0.43
Weight	0.575	0.839	0.62	0.11	0.95	0.89	0.024*
BMI	0.421	0.89	0.025*	0.05*	0.05*	0.11	0.09*
Pain and discomfort in different regions of body which prevented the dentists from work							
	Neck	shoulders	upper back	Low back	one or both hips	one or both knees	
Age	0.13	0.45	0.018*	0.36	0.98	0.91	
Gender	0.98	0.97	0.05*	0.26	0.27	0.99	
Work experience	0.28	0.41	0.018*	0.31	0.91	0.99	
Working hours/day	0.014*	0.14	0.63	0.89	0.46	0.995	
Patients /day	0.005*	0.47	0.18	0.95	0.33	0.99	
Height	0.921	0.12	0.05*	0.14	0.67	0.99	
Weight	0.529	0.59	0.2	0.55	0.36	0.99	
BMI	0.21	0.39	0.03*	0.17	0.05*	0.995	
Pain and discomfort in different regions of body for the last 7 days							
	Neck	shoulders	wrist/hand	Upper back	low back	one or both hips	one or both knees
Age	0.94	0.37	0.26	0.042*	0.49	0.22	0.9
Gender	0.63	0.2	0.49	0.076	0.33	0.04*	1
Work experience	0.87	0.35	0.38	0.028*	0.55	0.32	0.99
Working hours/day	0.44	0.423	0.23	0.1	0.19	0.47	1
Patients/day	0.049*	0.95	0.099	0.9	0.87	0.75	1
Height	0.21	0.04*	0.78	0.003*	0.87	0.045*	1
Weight	0.58	0.12	0.125	0.05*	0.25	0.032*	0.99
BMI	0.306	0.41	0.046	0.09	0.09	0.69	0.99

Statistically significant p<0.05

Graph2. Persistence of pain which prevented subjects from work for the past 12 months



Graph3. Persistence of pain for past 7 days



DISCUSSION

Dental surgeons are normally included within the group of professionals at the risk of suffering from MSDs due to prolonged awkward or forced postures at work and failure of preventive measures ⁽²⁰⁾. The results of this study showed 94% of the males and 88% of females had neck pain some time in their lives, in the last one year, which might be due to postural practices.

It was found that 50.63% of males and 61.46 % of females were affected with low back problems, which is similar to the findings in other studies ^(9, 21, 22). On the other hand for the past seven days it was found that 58.23% of males and 63.54 % of females were affected with upper back problems and 88.6% of males and 68.75% of females having neck problems. The past seven day’s percentile shows that the pain is continuous and which may eventually lead to miss work in near future.

Finally of those who had neck pain and back pain only 35.44% males and 43.75% females missed work due to neck pain and only 6.33% males and 14.58% females missed due to back pain. This is very less than the 62% reported by Bassett ⁽²¹⁾. It is also very important to note that self employed dentists may suffer direct loss of their family income if they are unable to work due to their physical limitations. This low percentile might also be due to their family responsibilities, due to which they are willing to suffer pain a bit more for the sake of narrowing down their financial commitments.

Johnson et al reported overall prevalence of MSD was seen among industrial workers (32.6%) which are less than that of dentists according to the findings of the present study.

The onset of modern dentistry, as evidenced by four-handed dentistry, has made the major part of the dentist tasks purely sedentary in nature. This has resulted in dramatic rise in musculoskeletal symptoms ⁽²³⁾. Studies showed that persons with sedentary jobs and a positive family history had a probability of having diabetes ⁽²⁴⁾. Hence for dentists, along with MSDs the risk of obesity and diabetes also is alarming.

The present study found that most of the dentists had some kind of musculoskeletal pain while performing their professional work. In this study it was observed that intensity of neck pain which caused the prevention of work was having statistically significant association with the patients treated per day ($P = 0.014$) and with the working hours of the dentist ($P = 0.005$). The upper back pain and the socio demographic variables like age ($P = 0.018$), gender ($P = 0.05$), work experience ($P = 0.018$), height ($P = 0.05$), and BMI ($P = 0.03$) were also having significant association. Statistically significant association between neck pain for the last seven days and the patients treated per day ($P = 0.049$) was also identified. Height and shoulder pain were also significantly associated ($P = 0.049$). The upper back pain for the last seven days was having significant association with the

variables like age ($P = 0.042$), work experience ($P = 0.028$), height ($P = 0.003$), and weight ($P = 0.05$). Similarly there was a significant association between patients' BMI ($P = 0.046$) and the hand pain felt during last one week. Hip pain was having significant association with gender ($P = 0.04$), height ($P = 0.045$), and weight ($P = 0.032$).

Karwaski et al reported that the symptoms are a product of many risk factors including prolonged static postures, repetitive movements, and poor positioning⁽²⁵⁾.

Lalumandir et al reported that all dental specialties show a high occurrence of MSDs, but with variations in frequency and locations⁽²⁶⁾. Shaik AR et al found that frequency of pain varies with the number of patients treated per day in the area of hip and with the height of the dentists in case of hip and knee joints⁽²⁷⁾.

In the present study it was found that the frequency of pain in the upper back varies with age, gender, work experience, height and BMI where as neck pain varies with the working hours per day and the number of patients treated per day which is similar to Shaik AR et al findings.

Khalid AL et al studies showed 73.53% of the respondents had back pain some time in their lives, while neck pain was 54.41% less common. Shaik AR et al found that 73.3% had work related neck disorders, 86.6% had work related back disorders, and 20.6% had work related shoulder disorders⁽²⁶⁾. Contrary to these, this study showed 94% of the males and 88% of females had neck pain and 88.61% of the males and 81.25% of females had back disorders and 81% of the males and 56% of females had shoulder disorders some time in their lives, in the last one year. But only 35.44% males and 43.75% females missed work due to neck pain and only 6.33% males and 14.58% females missed due to back pain. This shows that the severity of the pain was only for a less percentage of people. In this study it was observed that most of the dentists were having bad posture while performing their professional work. To sum up, dentists report a high prevalence of various types of work related musculoskeletal symptoms due to prolonged awkward postures at work.

CONCLUSION

Spine and neck problems are stated to be most common health problems among dentists. The study revealed that various socio demographic variables contributed to these musculoskeletal symptoms. Conversely; the number of patients attended per day and working hours per day by the dentist is statistically proportional to the pain experienced. In order to reduce such postural problems, dentists should adopt correct postural practices, relaxation interval sessions during work, and weight monitoring.

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