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PREVALENCE OF MUSCULOSKELETAL DISORDERS AMONG DENTAL PRACTITIONERS: A CROSS SECTIONAL STUDY IN CHENNAI

Type of manuscript: Original study
Running title: Musculoskeletal disorders among dental practitioners

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ABSTRACT

Aim: To assess the prevalence of musculoskeletal disorders among dental practitioners in Chennai. **Background**: Dentists and dental students are at high risk of musculoskeletal disorder and pain due to their static and prolonged work . This disease is a complex entity involving disease. Musculoskeletal disorder is said to be an injury or damage in the musculoskeletal system consisting of joints, bones, tendons, ligaments, muscles, etc,. Musculoskeletal pain, especially neck pain, is the most prevalent among dental practitioners. The study aims to find the other body regions that are affected and more prevalent among dentists. **Methods**: The study consists of an online survey comprising self prepared questionnaires. The data collected are then tabulated and studied, with proper results the management of musculoskeletal disorder is well discussed. The study also focuses on the prevalence, comparison between genders, age, symptoms, causes and their treatment and management. **Results**: The most affected areas include the neck followed by shoulder and ankle/feet. A proper preventive measure to be taken to avoid falling into these pains. Pearson Chi Square test value shows p value is 0.002 (p value< 0.05). Hence, it is statistically significant. **Conclusion**: Thus, it is very much important to devote more attention to ergonomics at the working place of dental students as well as education in them.The physical workload that they do seem to put them into these risks of pain. During the course of investigation of musculoskeletal disorder, factors like psychosocial and other personal characteristics should be taken into account.

KEYWORDS - Dental practitioners, Ergonomics, Musculoskeletal disorder, Prevalence, Novel Questionnaire.

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INTRODUCTION:

More than 150 diseases and disorders of the musculoskeletal system affect people's locomotor systems. They range from injuries that occur unexpectedly are from temporary, such as fractures, sprains, and strains, to long-term conditions that cause functional disabilities and impairment.

Pain (often persistent) and weaknesses of mobility, dexterity, and general degree of functioning define musculoskeletal disorders, limiting people's ability to operate. Conditions that influence the musculoskeletal system include:joints - osteoarthritis, rheumatoid arthritis, psoriatic arthritis, gout, ankylosing spondylitis. Bones - osteoporosis, osteopenia and associated fragility fractures, traumatic fractures;muscles - sarcopenia ; spine - back and neck pain; multiple body areas or systems such as regional and widespread pain disorders and inflammatory diseases such as connective tissue diseases and vasculitis that have musculoskeletal manifestations, for example systemic lupus erythematosus.

Musculoskeletal disorders are also the leading cause of global recovery needs. They account for roughly two-thirds of all adults in need of recovery, and they are among the main contributors to the need for rehabilitation services among children.

There is a large requirement of physical work demand on dentists and dental students since the working area - mouth of the patient is much narrower and small. And treating patients also requires long static control , long seated posture, repetitive work of the arms.[1]

Each year, about 2 million workers suffer from musculoskeletal disorders.[2]Dentists and dental practitioners in western countries or even higher risks of musculoskeletal disorder because of their vibrating instruments, working postures with higher physical demand, a large number of patients to treat, and extensive administrative work[3]. Various questionnaire based survey studies show the balance of musculoskeletal disorder is worldwide. [4,5]

Musculoskeletal pain, especially neck and back pain or more prevalent among dental practitioners, has been found to be a major health problem in them. Several studies have reported a more or less similar prevalence of musculoskeletal disorders in dentists[5] . A few investigators have put up a statement stating that the prevalence, location of pain and other symptoms may be influenced by posture and work habits, as well as other few demographic factors. An ergonomically deficient workplace may not show immediate pain or symptoms since the human body has the capacity to adapt to various surroundings[6]. However with time, the body loses its capacity to cope up with such an environment and it leads to inevitable physical symptoms, mental stress, low productivity and poor quality of work.

Musculoskeletal disorder has become increasingly common worldwide among dental practitioners during the past few years. It has become a common cause of work related disability among workers with substantial financial consequences due to workers compensation and medical expenses[7]. Our team has extensive knowledge and research experience that has translated into high quality publications[8–16],[17],[18],[19,20],[21],[22],[23–27]. Hence the aim of the present study is to assess the prevalence of musculoskeletal disorder among dental practitioners in Chennai.

MATERIALS AND METHODS:

A questionnaire based cross sectional study was conducted in the first week of February 2021 among Dental practitioners practicing in Chennai, Tamilnadu. The study consists of a study population of 150 dental practitioners. They were approached by different recruitment strategies. The subjects received a study invitation by email containing a link to the questionnaire.

Informed consent was collected from the practitioners who agreed to participate in the study.

Dental practitioners who agreed to participate in the study were included and dental students who are not practising were excluded from the study.

Sociodemographic details such as age, gender, Speciality , locality of practice, hours of practice per day, years of practice were also collected. Twosets of Yes/No type of questions were included. Each set has a total of 10 questions. This was a pre-validated questionnaire.

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Approval was obtained from the institutional board to conduct an online survey. The survey was carried out among dentists and dental students. The responses were collected, tabulated in the excel sheet and analysed . Data was then entered into SPSS software version 23 and the results were obtained in bar graphs and pie charts.

RESULTS:

The results were obtained using statistical analysis of SPSS software version 23. The tabulated results were then analysed carefully. The results concluded that the regions of neck, shoulder and ankle. The study also signifies that prevalence of MSD has increased among female practitioners.

TABLE 1- Sociodemographic Characteristics of the study participants

Sociodemographic profile	**Number**	**Percentage**
Age		
18-25 years	87	58%
25-30 years	27	18%
30-35 years	21	14%
Above 35 years	15	10%
Gender		
Male	63	42%
Female	87	58%
Educational Qualification		
BDS students	70	46.7%
BDS interns	41	27.3%
MDS	39	26%
Hours of Clinical practice/ day		
Less than 3 hours	62	41.3%
Between 3-6 hours	58	38.7%
More than 6 hours	30	20%
Years of practice		
Less than 3 years	77	51.3%
Between 3-5 years	53	35.3%
More than 5 years	20	13.3%

Table 1 : Above table depicts that the study had a sample size of 150 respondents who answered the self prepared questionnaire. It consisted of few demographic details followed by questions based on musculoskeletal disorder and its

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pains. The respondents were more among the age group of 18-25 years.The study responses had 87 from females and 63 from males.Majority of the study population worked for less than 3 hours per day (41.3%) and for less than 3 years (51.3%).

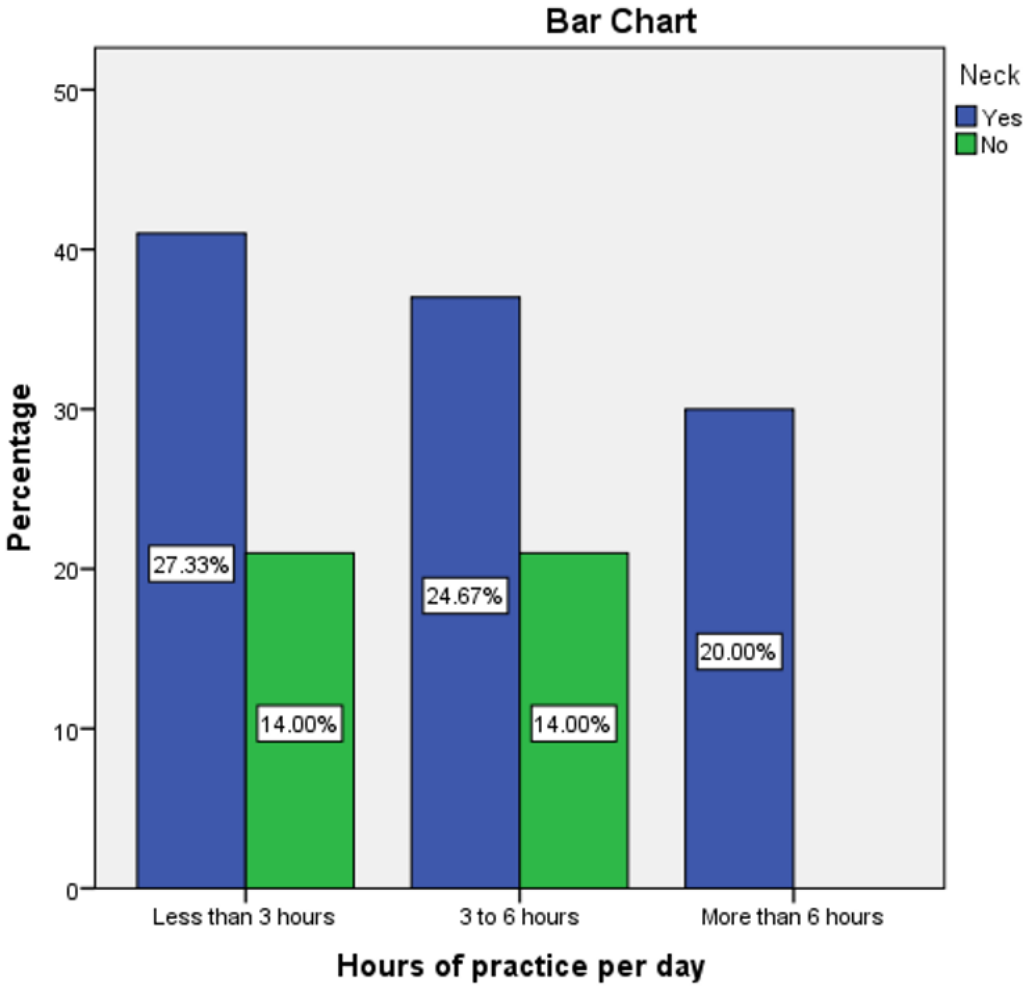

Figure 1 represents the association between hours of practice and prevalence of pain in the neck region of the practitioners. The X axis represents the hours of practice and the Y axis represents the percentage of responses. Blue represents yes and green represents no. In the present study 27.33% of the population, who practiced less than 3 hours per day, had pain in the neck region. About 24.67% , who practiced for 3 to 6 hours per day, had pain in the neck region. Dreadfully, the study has stated that all(20.00%) of the practitioners who practiced for more than 6 hours per day had pain in the neck region. Pearson Chi Square test value shows p value is 0.002 (p value< 0.05). Hence, it is statistically significant.

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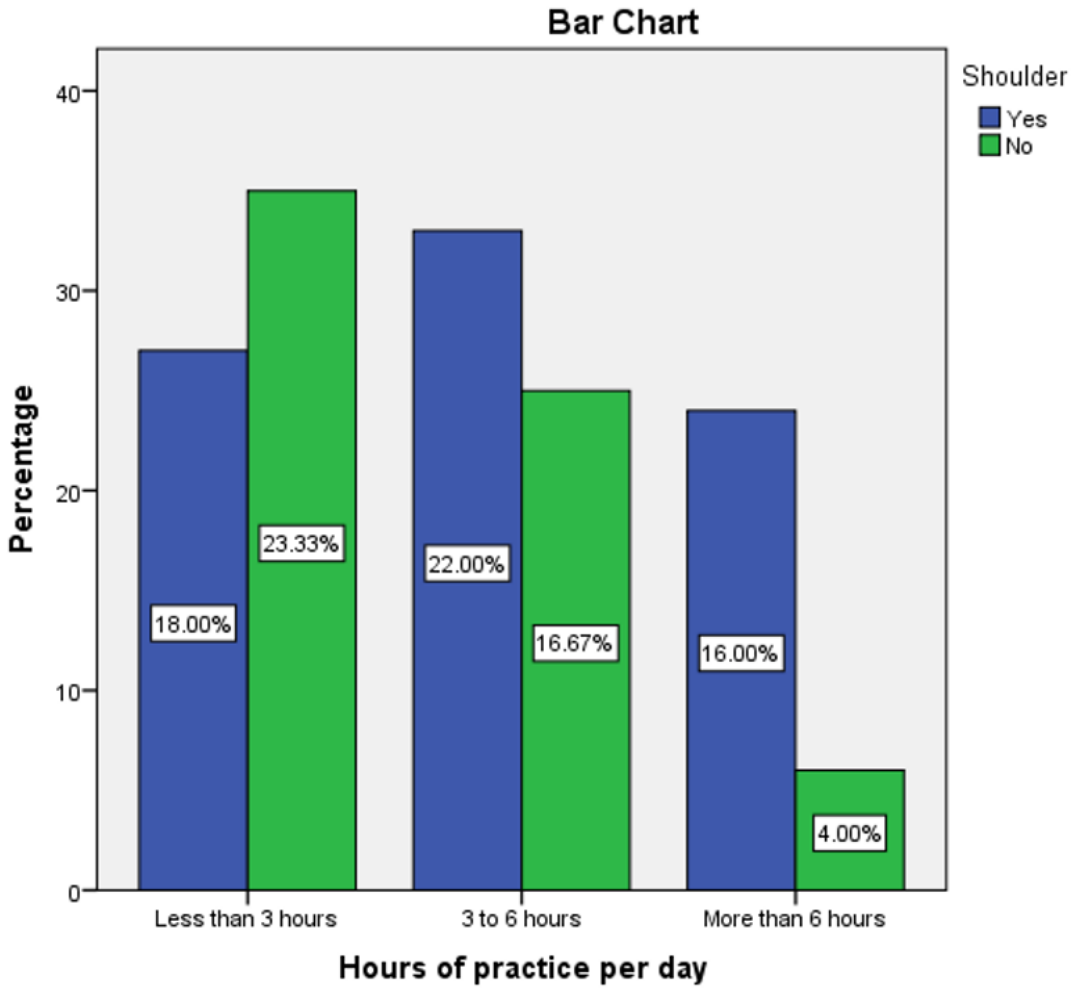

Figure 2 represents the association between hours of practice and prevalence of pain in the shoulder region of the practitioners. The X axis represents the hours of practice and the Y axis represents the percentage of responses. Blue represents yes and green represents no. In the present study only 18.00% of the population, who practiced less than 3 hours per day, had pain in the shoulder region. About 22.00% , who practiced for 3 to 6 hours per day, had pain in the shoulder region and also the study has stated that the majority(16.00%) of the practitioners who practiced for more than 6 hours per day had pain in the shoulder region. Pearson Chi Square test value shows p value is 0.003 (p value< 0.05). Hence, it is statistically significant.

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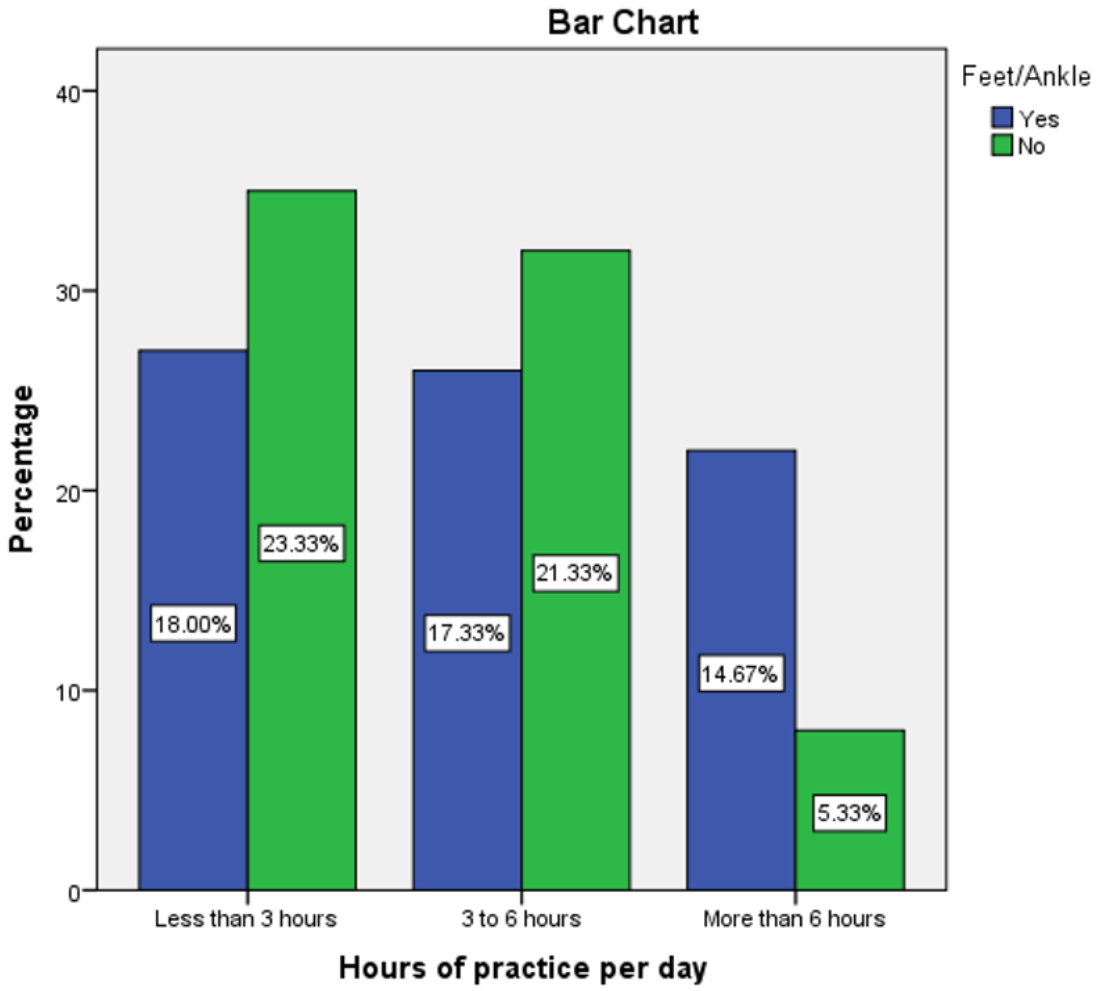

Figure 3 represents the association between hours of practice and prevalence of pain in the feet/ankle region of the practitioners. The X axis represents the hours of practice and the Y axis represents the percentage of responses. Blue represents yes and green represents no. In the present study, only 18.00% of the population, who practiced less than 3 hours per day, had pain in the feet/ankle region. About 17.33% , who practiced for 3 to 6 hours per day, had pain in the neck region and also the study has stated that the majority(14.67%) of the practitioners who practiced for more than 6 hours per day had pain in the feet/ankle region. Pearson Chi Square test value shows p value is 0.015 (p value> 0.05). Hence, it is statistically non-significant.

DISCUSSION:

The purpose of this study is to identify the current prevalence of musculoskeletal disorders among dental practitioners in Chennai. The physical load among dentists seems to put them at risk for the occurrence of musculoskeletal disorders. In the present study, the dental students and dental practitioners were asked to record the occurrence of pain and discomfort over the past 12 months and impact in their daily activities[5]

The study showed the majority of the practitioners irrespective of the hours of practice and years of practice, had pain in the regions of the neck followed by shoulder and feet/ankle. This result is consistent with the previous article[28].

The study also concentrates on the MSD distribution in male and female practitioners since it is commonly known that the perception of pain differs between men and women[29].

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The questionnaire gave answers to only the regions of the body and not to the frequency and intensity of the pain. As repetitive strain injuries are at risk in dentistry, ergonomics and educational intervention plays a major role in prevention of various occupational related musculoskeletal disorders.

There are only very few studies on the terms of dental equipment and the ergonomic environment and also studies based on comparison between the dentists who suffer from MSD and those who do not[30].

The dentist's room should be a spacious area allowing free movement of the dentist to work with minimum flexion. Patient's chair position also should be at a proper place to minimise the workload[31]. The chair should be at the mid-sternal level, electronic, easy to adjust and should be comfortable for the patients. Dentists must have an erect posture by positioning the patient's chair close to him. This reduces the effort of bending,therefore reduce the pressure on neck and shoulders[31].Foot should be flat on ground to promote a neutral or anterior tilt to pelvis, which keeps back aligned and promotes the neutral curvature of back[32].There should be a 90° angle between patient's chair and dentist's knees. Position of light should be proper and easily adjustable to avoid strain on the neck and eyes[6][33].

The resting period should be suitably distributed between work and rest. Musculoskeletal disorders are controllable at late stages by medications. It cannot prevent musculoskeletal disorders at early stages, it can be taken only during severe pain and chronic stages of musculoskeletal disorders[34].

Future scope:

There is a need for future research, not only in terms of dental equipment and the ergonomic environment but also a comparison between the dentists who suffer from MSD and those who do not

CONCLUSION:

From the present study, it can be concluded that the prevalence is more in regions of neck, shoulder and lower back. In a few cases the musculoskeletal disorders are shown to interfere with daily activities, while a very few require medical attention. Musculoskeletal disorders remain a major occupational health problem. Ergonomic interventions may have a great impact in prevention. Further studies are required to carefully elucidate the impact of musculoskeletal disorders on dentists,especially with the cessation or reduction of clinical practices and also to identify specific risk factors and the frequency of pain along with the intensity of pain felt. Musculoskeletal disorders are also found to be affecting women a lot compared to men. Proper preventive measures to be taken and should be included within dental education.

AUTHORS CONTRIBUTION:

Bharath Kumar. N: Literature search, data collection, analysis, manuscript drafting.
Dr. R.Pradeep Kumar: Data verification, manuscript drafting.

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CONFLICT OF INTEREST:

All the authors declare that there was no conflict of interest in present study.

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