

Research Article

Prevalence of Musculoskeletal Disorders in Dental Professionals in Khed - A Cross-Sectional Study

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Abstract

Introduction: Musculoskeletal Disorders (MSDs) are generally disorders of muscles, tendons, peripheral nerve or vascular system not directly resulting from an acute or instantaneous event. The aim of this study is to find out the overall prevalence of Musculoskeletal disorders in dentists in Khed.

Materials & Methods: A cross-sectional study was conducted among 101 dental professionals of Age group 23-70 years. The data was collected using self reported questionnaires comprising demographic details, work profile of dental professionals and questions regarding Musculoskeletal symptoms and awareness, prevention related to it. The questionnaire taken were further used for statistical analysis. The statistical data revealed possible prevalence of MSDs in dental professionals.

Result: The present study included 101 dental professionals comprising Bachelor of Dental Surgery (BDS) and Master of Dental Surgery (MDS) practitioners. Comparative analysis was performed between the two groups as BDS and MDS professionals.

Conclusion: The prevalence of MSDs was found to begin early in professional practice and affects both undergraduate and postgraduate clinicians in almost equal proportions.

Keywords: Musculoskeletal disorders, Prevalence, Dental Professionals, Khed.

INTRODUCTION

Dentistry is widely recognized as a physically demanding and mentally intensive profession due to the precision required in clinical procedures, prolonged concentration, and high levels of occupational stress^{1,2}. Dental professionals frequently operate within a restricted field of vision inside the oral cavity, which compels them to adopt awkward and static postures for extended durations³. These postures often include forward head tilt, trunk flexion, rotation of the spine, and elevation of the arms, resulting in muscular imbalance and excessive strain on the musculoskeletal system⁴.

Musculoskeletal disorders (MSDs) are defined by the World Health Organization (WHO) as disorders affecting muscles, tendons, ligaments, joints, nerves, and supporting blood vessels that are not caused by acute trauma but develop over time due to repetitive stress and strain⁵. Work-related musculoskeletal disorders (WMSDs) specifically arise from occupational

activities involving repetitive movements, sustained force, vibration, and insufficient recovery periods⁶.

Recent evidence suggests that MSDs are not limited to dentistry but are highly prevalent across various occupational groups, particularly among computer users and workers in low- and middle-income countries^{7, 8}. However, dental professionals remain particularly vulnerable due to the unique combination of precision work, restricted workspace, and sustained postural demands.

Dental professionals are especially at risk of developing WMSDs due to the nature of their work, which requires fine motor skills, repetitive hand and wrist movements, and prolonged static postures⁹. These disorders commonly affect the neck, shoulders, lower back, and upper limbs, often presenting as pain, stiffness, fatigue, numbness, and reduced mobility^{10,11}. Over time, such conditions can significantly impair daily functioning, reduce clinical

efficiency, and negatively impact the quality of life of dental practitioners¹².

Several epidemiological studies have demonstrated a high prevalence of MSDs among dental professionals worldwide. Studies from Yemen, Italy, Saudi Arabia, Germany, and Europe report prevalence rates exceeding 80%^{1,13,14,15,16}. Similar findings are reported among dental students in Iran and Indonesia^{17,18}.

The etiology of MSDs in dentistry is multifactorial, including improper posture, repetitive movements, prolonged static positioning, and poor ergonomic design^{19,20}. Psychosocial factors such as stress and workload further contribute to MSD development^{2,21}.

Ergonomics plays a critical role in prevention. Proper posture, ergonomic equipment, and scheduled breaks significantly reduce MSD risk^{22,23,24}. Systematic reviews confirm that ergonomic interventions are effective in reducing MSD prevalence among dental professionals²⁵. However, awareness remains inadequate²⁶. So, the aim of this study is to find out overall prevalence of Musculoskeletal Disorder in dentist in Khed, with the help of self reported questionnaires.

MATERIALS AND METHODS

Study Design

A cross-sectional questionnaire-based survey conducted among Interns, Postgraduates and Dental professionals assessing the Prevalence of Musculoskeletal Disorders among Dental professionals in Khed

Study Setting, Sample Size Determination and Sampling Technique

The study was conducted at Yogita Dental College and Hospital, Khed. A sample size of 101 dental professionals was selected based on availability during the study period. Prior to study, digital consent was obtained from all the participants ensuring ethical compliance and informed participation. Convenience sampling was utilized for selection of participants in this study.

Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee (Ref. No.: YDCH/IEC/2107/70/2025) Participation was voluntary, and informed consent was obtained from all participants. Confidentiality of data was strictly maintained.

Study Population

Study population consisted of 3 groups - Dental interns, postgraduates, and practicing

professionals in Yogita Dental College and Hospital, Khed, aged 23–70 years.

Eligibility Criteria

Inclusion Criteria:

1. Dental interns, postgraduates, and professionals
2. Participants willing to provide informed consent

Exclusion Criteria:

1. Individuals absent during data collection
2. Those unwilling to participate

Data Collection Instruments

A pre-validated structured questionnaire was used, consisting of: Section A: Demographic details, Section B: Work profile, Section C: Musculoskeletal symptoms and Section D: Awareness and preventive measures

Section A included age, gender, educational qualification, and years of practice to describe participant characteristics. Section B assessed occupational factors such as number of patients per day, working hours, posture, break practices, use of assistants, and ergonomic aids. Section C recorded the presence, frequency, and severity of pain in different body regions, along with measures taken for relief. Section D evaluated knowledge of ergonomics, training received, preventive practices, and perception of musculoskeletal disorders in dentistry. The questionnaire was distributed via Google Forms.

2.7 Statistical Analysis

All collected data were coded and entered into Microsoft Excel 2021 and subsequently analyzed using the Statistical Package for Social Sciences (SPSS) software. Data cleaning and validation were performed prior to analysis to ensure completeness and accuracy.

Descriptive statistics were used to summarize the data. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean and standard deviation (SD). The prevalence of musculoskeletal disorders among dental professionals was calculated and presented in percentage form.

Inferential statistics were applied to determine associations between variables. The Chi-square (χ^2) test was used to assess the relationship between categorical variables such as demographic factors, work profile, and the presence of musculoskeletal symptoms.

Correlation analysis was conducted to evaluate the relationship between working hours, years of practice, and severity of symptoms. Additionally, logistic regression analysis was performed to identify significant predictors and

risk factors associated with musculoskeletal disorders.

All statistical tests were two tailed. A p-value of less than 0.05 was considered statistically significant. The results were presented in the form of tables, graphs, and charts for better interpretation and clarity.

RESULTS

The present study included 101 Dental professionals comprising Bachelor of Dental Surgery (BDS) and Master of Dental Surgery (MDS) practitioners. Comparative analysis was performed between the two groups namely - BDS and MDS practitioners. MDS practitioners showed higher mean age, number of patients treated per day, working hours, and years of

practice compared to BDS practitioners. The overall prevalence of musculoskeletal disorders was 94.1%. The results showed statistically significant difference between BDS and MDS practitioners in overall MSD prevalence. Inferential Findings suggested that multivariate logistic regression analysis indicated that presence of MSD was a significant predictor of clinical exhaustion (Odds Ratio = 8.69; $p = 0.027$). These findings suggest that musculoskeletal burden begins early in professional practice and affects both undergraduate and postgraduate clinicians. A higher number of MSD cases were observed among BDS practitioners due to their larger sample size.

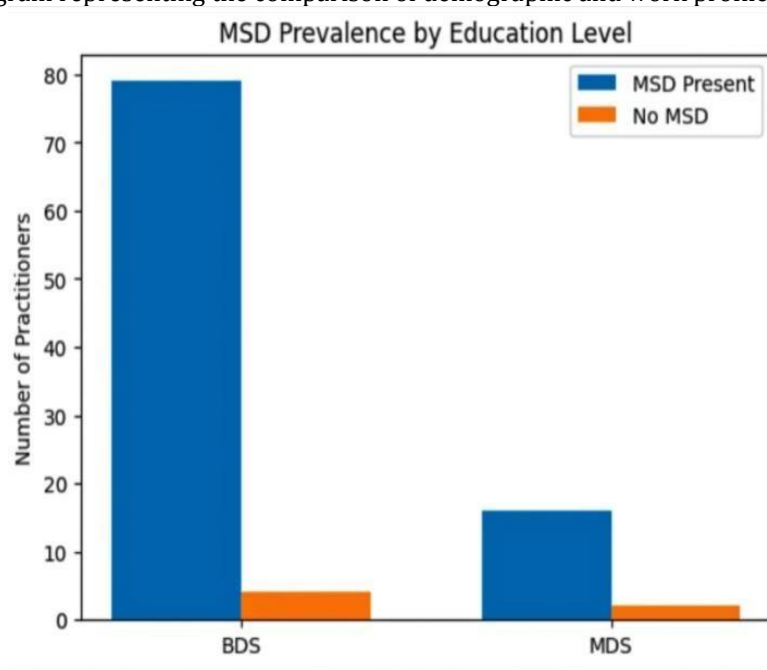
Table 1: Demographic and Work Profile Comparison (BDS vs MDS)

Variable	BDS (Mean)	MDS (Mean)	Overall Mean
Age	24.55	33.67	26.19
Patients per day	11.37	20.86	13.10
Working hours	7.06	8.36	7.30
Years of practice	1.02	1.83	1.17

Table 2: Prevalence of Musculoskeletal Disorders (MSD)

Education	No MSD	MSD Present	Total
BDS	4	79	83
MDS	2	16	18

Figure 1: Bar diagram representing the comparison of demographic and work profile variables between



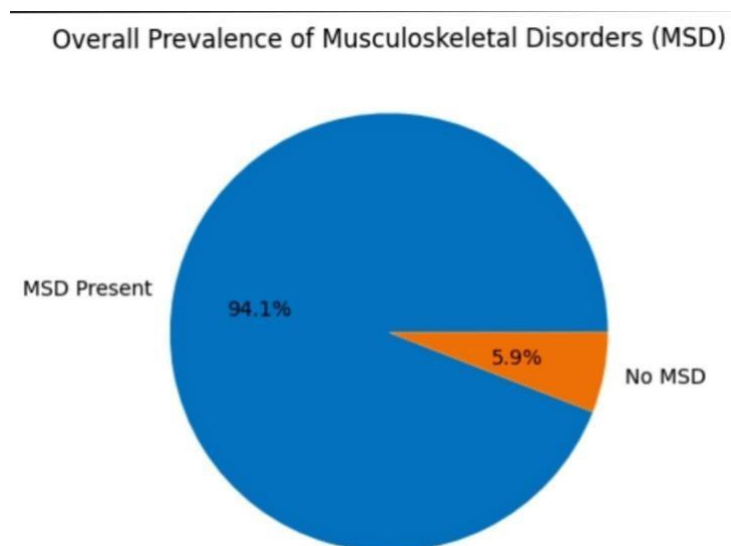


Figure 2: Bar diagram illustrating the prevalence of musculoskeletal disorders among BDS and MDS practitioners.

DISCUSSION

The present study highlights a high prevalence of musculoskeletal disorders (MSDs) among dental professionals in Khed, which is consistent with findings reported globally. Previous studies have demonstrated that MSDs are a significant occupational health concern in dentistry, with prevalence rates often exceeding 70–80% among practitioners^{1,13}. The high occurrence observed in this study reinforces the physically demanding nature of dental practice and the associated ergonomic challenges.

In the current study, the most commonly affected regions were the neck, shoulders, and lower back. These findings are in agreement with studies conducted in Yemen, Italy, and Saudi Arabia, where similar anatomical regions were reported as the most vulnerable to musculoskeletal pain^{1,13,14}. This can be attributed to prolonged static postures, forward head positioning, and repetitive upper limb movements required during dental procedures^{19,20}.

The association between prolonged working hours and increased prevalence of MSDs observed in this study aligns with previous research. Gandolfi et al. reported that working more than 5 hours per day significantly increases the risk of musculoskeletal pain¹. Similarly, Alghadir et al. found that extended clinical hours and patient load contribute to the development and severity of MSD symptoms¹⁴. These findings suggest that workload management is a critical factor in preventing occupational health issues among dental professionals.

Another important observation in this study is the role of improper posture and lack of ergonomic practices in the development of MSDs. Studies have consistently shown that poor ergonomic design and incorrect working positions are major contributors to musculoskeletal strain in dentistry^{22,23}. Valachi and Valachi described how repetitive movements and sustained awkward postures lead to cumulative trauma disorders over time¹⁹. Furthermore, inadequate use of ergonomic equipment and lack of training further exacerbate the risk^{14,26}.

The findings also indicate that awareness regarding ergonomics among dental professionals is limited. Similar results were reported by Al-Huthaifi et al., who found low levels of ergonomic awareness despite a high prevalence of MSDs¹³. This highlights the gap between knowledge and practice, emphasizing the need for better education and training programs. Incorporating ergonomics into dental curricula and continuing education programs can play a vital role in reducing MSD prevalence^{24,26}.

Psychosocial factors such as stress, workload, and fatigue may also contribute to the development of MSDs. Studies have shown that occupational stress and burnout are associated with increased muscle tension and pain perception among dental professionals^{2,17}. Additionally, repetitive strain combined with mental fatigue can further aggravate musculoskeletal symptoms, leading to decreased productivity and job satisfaction¹².

The present study findings are also comparable with studies conducted in Iran among dental

students by Taraneh Movahhed et al., where a high prevalence of musculoskeletal pain has been reported early in their careers¹⁷. This suggests that the risk of MSDs begins during training and continues throughout professional practice. Early intervention through ergonomic training and awareness can therefore help in reducing long-term complications²⁷.

Preventive strategies play a crucial role in minimizing the burden of MSDs. Evidence suggests that maintaining proper posture, using ergonomically designed equipment, taking regular breaks, and engaging in physical exercises can significantly reduce musculoskeletal symptoms^{22,28}. Regular stretching and strengthening exercises have also been shown to improve musculoskeletal health and reduce pain intensity²⁹.

Despite these preventive measures, the persistence of high MSD prevalence indicates the need for a multifactorial approach involving ergonomic interventions, behavioral changes, and institutional support. Implementation of workplace modifications, periodic health assessments, and ergonomic audits can help in early identification and management of MSDs²³. Overall, the findings of this study are consistent with existing literature and emphasize that musculoskeletal disorders remain a major occupational hazard in dentistry. Addressing these issues through improved awareness, education, and preventive strategies is essential to enhance the health, efficiency, and longevity of dental professionals^{29,30}.

CONCLUSION

Musculoskeletal disorders are highly prevalent among dental professionals in Khed, with the neck, shoulders, and lower back being the most affected areas. Poor posture, prolonged working hours, and lack of ergonomic awareness are significant contributing factors. Implementation of ergonomic practices is essential to reduce the burden of MSDs.

Recommendations

1. Incorporation of ergonomic training in dental curriculum
2. Regular workshops and awareness programs
3. Use of ergonomic dental equipment
4. Encouraging periodic breaks during clinical work
5. Promotion of physical exercise and stretching routines

REFERENCES

1. Gandolfi MG, Zamparini F, Spinelli A, Risi A, Prati C. Musculoskeletal disorders among Italian dentists and dental hygienists. *Int J Environ Res Public Health*. 2021;18(5):2708.
2. Lee CY, Wu JH, Du JK. Work stress and occupational burnout among dental staff. *J Dent Sci*. 2019;14(3):295–303.
3. Moodley R, Naidoo S, Wyk JV. Occupational health problems in dentistry: A review. *J Occup Health*. 2018;60(2):111–125.
4. Diaz-Caballero AJ, Gómez-Palencia IP, Díaz-Cárdenas S. Ergonomic factors that cause the presence of pain muscle in students of dentistry. *Med Oral Patol Oral Cir Bucal*. 2010;15(6):e906–e911.
5. World Health Organization. Identification and control of work-related diseases. Geneva: WHO; 1985.
6. Luttmann A, Jäger M, Griefahn B, et al. Preventing musculoskeletal disorders in the workplace. Geneva: WHO; 2003.
7. Demissie B, Mekonnen GB, Aytenew TM. Musculoskeletal disorders among computer user workers in Ethiopia: A systematic review and meta-analysis. *Sci Rep*. 2025;15:26858.
8. Geto AK, Daba C, Desye B, et al. Prevalence of work-related musculoskeletal disorders among weavers in low- and middle-income countries: A systematic review and meta-analysis. *BMJ Open*. 2025;15:eXXXXX.
9. Kumar M, Pai KM, Vineetha R. Occupational musculoskeletal disorders among dental professionals: A review. *Med Pharm Rep*. 2020;93(4):405–410.
10. Jose AT, Kim CC, Ee ESY, Hui LQ, Ting MH, Leng MA. Prevalence and Distribution of Musculoskeletal Disorders among Dental Students in AIMST University: A Cross-Sectional Study. *Oral Sphere J. Dent. Health Sci*. 2026;2(2):92-103.
11. Movahhed T, Dehghani M, Arghami S. Musculoskeletal pain among dental students: A cross-sectional study. *Pak J Biol Sci*. 2013;16(24):1865–1870.
12. Hayes MJ, Cockrell D, Smith DR. A systematic review of musculoskeletal disorders among dental professionals. *Aust Dent J*. 2009;54(2):89–95.
13. Al-Huthaifi BH, Al-Shehari BA, Al-Shamiri HM, et al. Prevalence of musculoskeletal disorders among dentists in Yemen. *Med Sci Monit*. 2023;29:e939456.

14. Alghadir A, Zafar H, Iqbal ZA. Work-related musculoskeletal disorders among dental professionals in Saudi Arabia. *J Phys Ther Sci.* 2015;27(4):1107–1112.
15. Ohlendorf D, Naser A, Haas Y, et al. Prevalence of musculoskeletal disorders among dentists and dental students in Germany. *Int J Environ Res Public Health.* 2020;17(23):8740.
16. Bracciale A, Manso MC, Bracciale F, Gavinha Costa L. Prevalence of self-reported musculoskeletal disorders in dentists: A cross-sectional study in Portugal and Italy. *Healthcare.* 2025;13(9):1020.
17. Movahhed T, Dehghani M, Arghami S. Musculoskeletal pain among Iranian dental students. *Pak J Biol Sci.* 2013;16(24):1865–1870.
18. Kholinne E, Azalia X, Rahayu EP, Anestessia IJ, Agil N, Mughtar. The prevalence and risk factors of musculoskeletal disorders among Indonesian dental professionals. *Front Rehabil Sci.* 2025;6:1513442.
19. Valachi B, Valachi K. Mechanisms leading to musculoskeletal disorders in dentistry. *J Am Dent Assoc.* 2003;134(10):1344–1350.
20. Akesson I, Balogh I, Hansson GA. Physical workload in dentistry: A review. *Ergonomics.* 1999;42(7):955–965.
21. Rundcrantz BL, Johnsson B, Moritz U. Pain and discomfort in the musculoskeletal system among dentists. *Swed Dent J.* 1991;15(5):219–228.
22. Gupta A, Ankola AV, Hebbal M. Dental ergonomics to combat musculoskeletal disorders: A review. *Int J Clin Pediatr Dent.* 2014;7(2):101–108.
23. Rucker LM, Sunell S. Ergonomic risk factors associated with clinical dentistry. *J Calif Dent Assoc.* 2002;30(2):139–148.
24. Murphy DC. Ergonomics and dentistry. *N Y State Dent J.* 1997;63(7):30–34.
25. Halkai KR, Halkai R, Sulgante S, et al. Work-related musculoskeletal disorders among dentists and their prevention through ergonomic interventions: A systematic review. *Int J Occup Saf Health.* 2022;12(2):125–139.
26. Aljanakh M, Shaikh S, Siddiqui AA, et al. Awareness of ergonomics among dental professionals in Riyadh, Saudi Arabia. *J Int Soc Prev Community Dent.* 2015;5(2):S120–S125.
27. Finsen L, Christensen H, Bakke M. Musculoskeletal disorders among dentists and variation in dental work. *Int Arch Occup Environ Health.* 1998;71(2):119–123.
28. Alexopoulos EC, Stathi IC, Charizani F. Prevalence of musculoskeletal disorders in dentists. *BMC Musculoskelet Disord.* 2004;5:16.
29. Hayes MJ, Taylor JA, Smith DR. Predictors of work-related musculoskeletal disorders among dental hygienists. *Int Dent J.* 2012;62(2):87–94.
30. Leggat PA, Smith DR. Musculoskeletal disorders self-reported by dentists in Queensland, Australia. *Aust Dent J.* 2006;51(4):324–327.