



## MUSCULOSKELETAL DISORDERS COMPLAINTS IN DENTISTS: A SYSTEMATIC LITERATURE REVIEW

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### ABSTRACT

The profession of dentistry is a job that is at risk of musculoskeletal disorders. Dentists often work in static and non-ergonomic positions for long periods of time, perform repetitive movements, and interact with patients in limited workspaces. A comprehensive understanding of the prevalence, location of complaints, and the most dominant risk factors is needed to develop effective prevention and intervention strategies to reduce musculoskeletal disorders. Objective to identify musculoskeletal disorders in dentists along with prevalence, pain areas and risk factors. The author used the PRISMA checklist to guide the selection of articles. The databases used were Science Direct and Scopus to search for academic articles published between 2020 and 2025 that met the predetermined content criteria with the keywords Musculoskeletal Disorders, Dentist, Dental, Prevalence, Work Related and Risk Factors. Initial findings based on keywords obtained 494 articles, then screening was carried out until 10 relevant articles to review. The prevalence of MSDs complaints reported in each article was between 58.3% - 93%. The highest pain areas in dentists were in the neck, lower back and shoulders. One of the most dominant risk factors is work posture. Musculoskeletal Disorders (MSDs) are occupational health problems that are often experienced by dentists. Risk factors for MSDs are divided into individual characteristics, jobs, habits, and work environments. Interventions are needed to prevent MSDs in dentists such as ergonomic interventions and education since professional education.

Keywords: dental; dentist; musculoskeletal disorders; prevalence; work related dan risk factors

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## INTRODUCTION

The dentist profession is one of the professions that demands high precision, precision, and physical endurance (Rabia Sannam Khan et al., 2017). In practice, dentists often have to maintain a static and unergonomic working position for long periods of time, perform repetitive movements, and interact with patients in a limited workspace (Jain et al., 2024). This condition causes an increased risk of musculoskeletal disorders (MSDs) (Edrees et al., 2024). This disorder includes complaints of pain, muscle tension, and functional disorders in parts of the body such as the neck, shoulders, back, wrists, and lower limbs (Pejčić et al., 2017). If left unchecked, MSDs can have an impact on a decrease in quality of life, work performance, and even cause long-term absenteeism and reduced active work involvement (presenteeism) (Johnson & Kanji, 2016). The prevalence of musculoskeletal pain in dentists ranges from 63% to 93%, which is influenced by cumulative trauma, work style, and a less ergonomic work environment (King et al., 2021). The most common complaints occur in the neck and lower back area, which are directly related to the bent working posture and

repetitive use of the tool(Jacquier-Bret & Gorce, 2023). In addition to biomechanical factors, the risk of MSDs is also influenced by individual characteristics such as age, gender, nutritional status (BMI) and previous disease history. In addition, work factors such as length of practice, daily workload, number of patients handled, and the type of actions taken also contribute to the emergence of complaints(Hosseini et al., 2019).

Daily habits such as lack of physical activity, the habit of sitting in an inappropriate position, and a lack of awareness and knowledge of ergonomic principles also aggravate this condition(Ćwirzeń & Wagner, 2022). No less important, the work environment such as the availability of ergonomic equipment and lighting also plays a role in influencing the level of comfort and work risk of dentists(Roshene & Loganathan, 2017). Although research on MSDs complaints in dentists has been widely conducted, the available data is still scattered and has not been systematically compiled. In fact, a comprehensive understanding of the prevalence, location of complaints, and the most dominant risk factors is needed to develop effective prevention and intervention strategies. This systematic review aims to identify and summarize research findings related to MSDs complaints in dentists from various parts of the world. This study not only provides an overview of the prevalence rate and areas of pain that often appear, but also groups risk factors based on individual characteristics, occupational factors, habits, and work environment. Through this literature review, it is hoped that a deeper understanding can be obtained as a basis for promotive and preventive efforts in the world of dentistry. Thus, the results of this research are expected to be the basis for policy making, ergonomics training design, and increased awareness of the importance of occupational health among medical personnel, especially dentists.

## METHOD

Methods used in articles *Reviews* this is PRISMA-ScR.(Tricco et al., 2018) This literature is not limited to geographical regions or developing/developed countries. The time frame in this article is between 2020-2025. The language of publication used is English. The data base used in this study is *Science Direct and Scopus*.

### Search strategy

The keywords used in searching for relevant literature to meet the focus of this review article are *Musculoskeletal Disorders, Dentist, Dental, Prevalence, Work Related* and *Risk Factors*. In Table 1 below, the search strategy will be explained:

Table 1.  
Search Strategy

Database	<i>Science Direct and Scopus</i>
Search keywords	<i>[Musculoskeletal Disorders + Dentist+Dental]</i> <i>[Musculoskeletal Disorders + Dentist + Prevalence]</i> <i>[Musculoskeletal Disorders + Dentist + Risk Factors]</i> <i>[Musculoskeletal Disorders + Dentist + Work Related]</i>
Language	English
Location	Globally across countries, there are no restrictions for developed or developing countries.
Duration of the year	2020-2025
Types of publications	<i>Original article</i>
Research objectives	Identification of <i>Musculoskeletal Disorders</i> Complaints in Dentists

### Article selection

A search of the two databases yielded 449 articles published between January 2020 and April 2025 based on predetermined keywords. After filtering by the corresponding year of publication, the number of articles was reduced to 229 articles. The selection continued by

identifying articles that focused on complaints of musculoskeletal disorders (MSDs) in dentists, leaving 160 articles. After the duplicate checking process, the number of unique articles obtained was 157 articles. The next stage of exclusion was carried out for articles that were not on topic based on full text, could not be downloaded, or were not written in English, so that 22 articles that met the initial criteria were obtained. After further review, articles that were not original research and articles with irrelevant full text were removed, leaving 10 articles to be analyzed. The overall article selection process is illustrated in Figure 1.

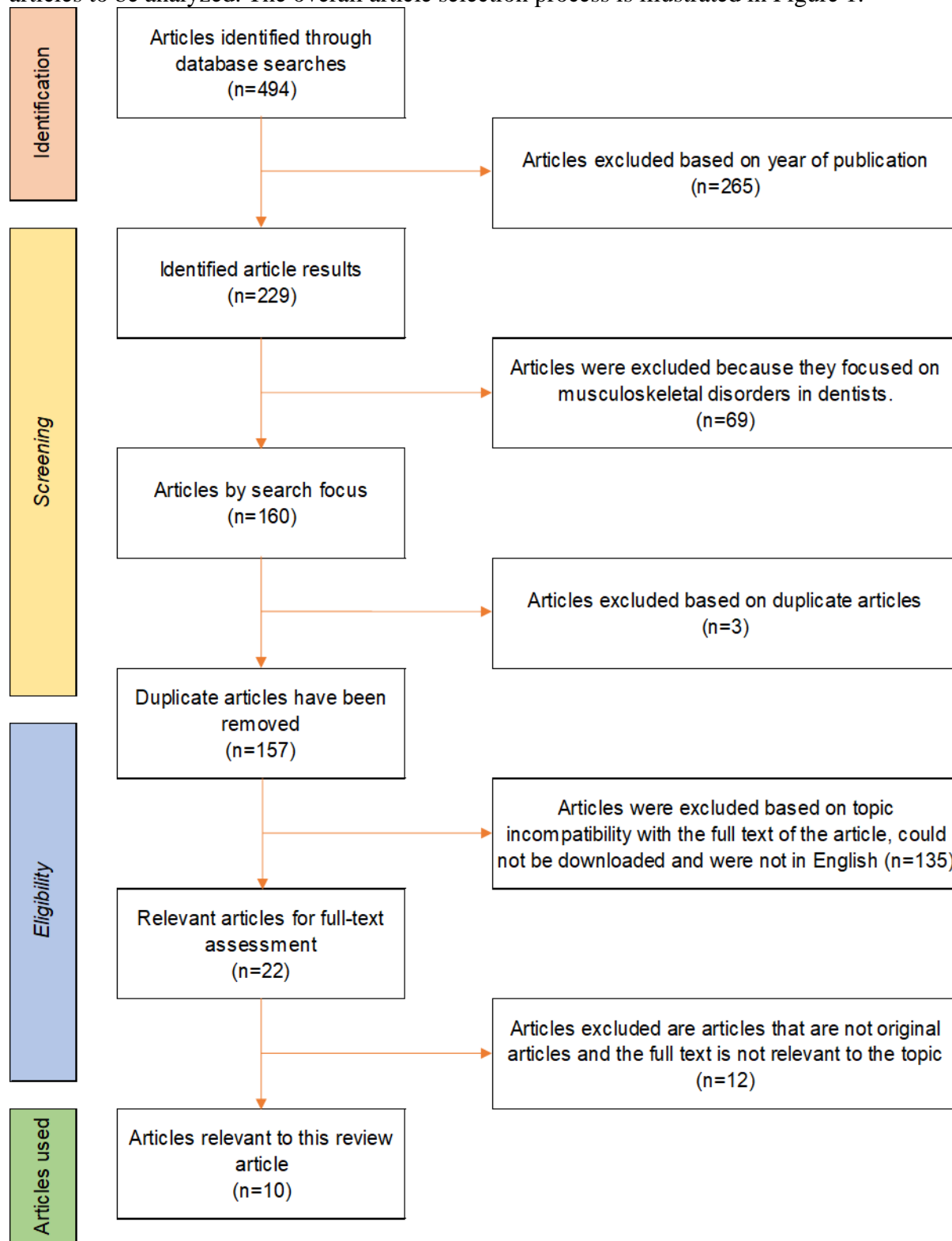


Figure 1. Flow Diagram for Selecting Articles

**Data charting and result synthesis process**

The preparation of data charts is carried out independently by each member of the research team. Articles deemed relevant were read thoroughly, and data were extracted using the PRISMA flowchart shown in Figure 1. After the extraction process, all the data in the flowchart is reviewed by all team members. Any discrepancies or discrepancies are resolved collectively. In the final stage, all team members agree on the final version before proceeding to the analysis stage. Furthermore, the results of the flowchart are poured into a charting table that includes information about the year of publication of the article, the country where the research was conducted, the design of the study, the prevalence of musculoskeletal disorders (MSDs) complaints, areas of the body that experience pain, and risk factors relevant to the study topic (Table 1).

**RESULT**

Search results from two databases in this review study identified as many as 494 articles published between January 2020 and April 2025. Based on the selection stages shown in the flowchart in accordance with the PRISMA guidelines (Figure 1), 10 articles were obtained that met the criteria for further analysis. All selected articles were observational studies with a cross-sectional design (Bakhsh et al., 2021; Bhatia et al., 2024; Edrees et al., 2024; Gandolfi et al., 2021; Gothey & Lembariti, 2022; Hussein et al., 2022; Kumar et al., 2020; Rickert et al., 2021; Shah et al., 2022; Shetty et al., 2021). The studies came from various countries, namely Germany, India, Saudi Arabia, Italy, and the East African region, especially Tanzania. The population in each study consisted of dentists who practiced in government-owned, private, and independent health care facilities. The results of the prevalence of MSDs complaints reported in the entire study were 58.3% - 93% and there was one article that did not mention the prevalence of MSDs complaints but mentioned that most of them felt pain in one and several parts of the body. The overall study observed pain complaints felt during the last twelve months since the study was conducted. The most common areas of pain reported by dentists in various studies include the neck, lower back, and shoulders. Other areas that also often experience complaints are the upper back, wrists, arms, and lower legs. The most dominant pain complaints occur in the neck, with the risk of chronic pain varying depending on the specialty and location of the work of the muscles used repeatedly.

Risk factors that contribute to complaints of musculoskeletal disorders (MSDs) in dentists can be grouped into several categories. Individual characteristic factors include gender, where women have a higher risk, age, body mass index (BMI), as well as a history of diseases related to musculoskeletal disorders. Occupational factors include unergonomic postures, especially in the neck, shoulders, back, and wrists, length of work experience, duration of daily working hours, number of patients treated daily, type of action or treatment performed, and the sector of work, both in private and government facilities. In addition, habit factors also play an important role, such as lack of physical activity, unhealthy diet, and low knowledge and awareness of ergonomic principles. Finally, work environment factors also influence, including the use of dental chairs that are not ergonomic, high pressure or work stress, and the use of computers in daily practice. The combination of these various factors significantly increases the risk of dentists experiencing complaints of MSDs during clinical practice.

No.	Author	Published Year	Study Country	Study Design	Prevalence MSDs	Pain Area	Influencing Factor
1.	Ala'a Edrees, et al (Edrees et al., 2024)	2024	German	Cross-sectional	59.7% have had more than one MSDs complaint in the last 12 months	The most areas of pain include the neck and lower legs, as well as a significant risk of chronic	Working hours, work pressure and health status

No.	Author	Published Year	Study Country	Study Design	Prevalence MSDs	Pain Area	Influencing Factor
						pain depending on the specialty and location of the pain.	
2.	Vibha Bhatia, et al(Edrees et al., 2024)	2024	India	Cross-sectional	A total of 120 dentists experienced 60% of MSDs complaints over the last 12 months	Complaints of the highest pain in the neck area. Other pain points in the lower back, hands and wrists, upper back and shoulders	Working posture (wrists, neck, shoulders, upper back), Repetitive movements, physical activity, gender
3.	Amal Hussein, et al(Hussein et al., 2022)	2022	United Arab Emirates	Cross-sectional	The prevalence of musculoskeletal disorders due to work is 90.4%	Neck, shoulders, upper back, lower back, wrists and wrists	Dental chairs are not ergonomic, work stress, gender, age, work experience, working hours, number of patients, income and employment sector (private and government)
4.	Hadeel R.Bakhsh, et al(Bakhsh et al., 2021)	2021	Saudi arabia	Cross-sectional	93% have experienced symptoms complaints of MSDs in at least one part of the body over the past 12 months	Neck, lower back, upper back, arms and hands	Work posture and work experience
5.	Maria Giovanna Gandolfi, et al(Gandolfi et al., 2021)	2021	Italy	Cross-sectional	84.6% had MSDs complaints	Neck, shoulders, lower back,	Working hours, work experience, gender,

No.	Author	Published Year	Study Country	Study Design	Prevalence MSDs	Pain Area	Influencing Factor
						middle back and wrists	physical activity and ergonomics knowledge
6.	Anshuman Shetty, et al(Shetty et al., 2021)	2021	Dakshina Kannada	Cross-sectional	The entire research sample of 138 dentists experienced at least one complaint of MSDs	Neck (60%), lower back (60%) and upper back (57%)	Clinical work patterns or practices, work postures, awareness and knowledge of ergonomics
7.	Carolin Rickert, et al(Rickert et al., 2021)	2021	North Rhine-Westphalia, Germany.	Cross-sectional	92.6% of subjects have MSDs in at least one part of the body	Neck and shoulders	Gender, work posture and history of diseases associated with MSDs
8.	Sagar J Shah, et al(Shah et al., 2022)	2022	India	Cross-sectional	Most of the 225 subjects reported complaints of MSDs in one or more parts of the body	Neck (48.9%), lower back (46.2%) and shoulders	Work posture, gender, diet, physical activity and hours of work
9.	Aliya I Gothey, et al(Gothey & Sheets, 2022)	2022	Tanzania	Cross-sectional	79% of dentists experience complaints of MSDs	Lower back and neck	Length of practice, Body Mass Index (BMI) and Type of Action or treatment
10.	Mathangi Kumar, et al(Kumar et al., 2020)	2020	India	Cross-sectional	58.3% have MSDs complaints	The most pain complaints are in the neck	Gender, type of Procedure or treatment, age, work experience and use of computers

## DISCUSSION

Musculoskeletal Disorders (MSDs) are one of the occupational health problems that are often experienced by medical personnel, including dentists. Based on the results of a review of ten articles analyzed, the prevalence of MSDs complaints in dentists is relatively high, ranging from 58.3% to 93%, indicating that most dentists have experienced musculoskeletal pain complaints in at least the last 12 months(Bakhsh et al., 2021; Bhatia et al., 2024; Edrees et al., 2024; Gandolfi et al., 2021; Gothey & Lembariti, 2022; Hussein et al., 2022; Kumar et al., 2020; Rickert et al., 2021; Shah et al., 2022; Shetty et al., 2021). This high prevalence rate shows that MSDs are a serious problem that impacts the comfort, productivity, and quality of dentist services.

The areas of the body that most often experience pain complaints are the neck, lower back, and shoulders. These complaints are generally caused by static and unergonomic work postures, especially when performing clinical procedures for a long time. Dentists often maintain certain body positions, bend, or rotate the body unnaturally, which if repeated over a long period of time, can trigger musculoskeletal disorders. The neck muscles are overused, and active muscles become prone to injury, resulting in inflammation. The prevalence of pain may be high in the neck because the dentist needs to perform awkward neck movements to properly look into the patient's oral cavity while working (Bhatia et al., 2024; Lazăr et al., 2024). The lower back area is caused by a static working position and bending over a long time when performing clinical procedures, especially when handling patients in a sitting position, this position causes an overload on the muscles of the lower back as well as the lumbar spine (Ashmi et al., 2023). Shoulder disorders can be caused by repetitive movements, vibrations, long duration of work, as well as a  $>45^\circ$  shoulder abduction position with flexion and pronation elbows, which trigger fatigue of the deltoid, supraspinatus, trapezius, and serratus anterior muscles (Versloot et al., 2024).

Some studies have also noted complaints in other parts such as the upper back, wrists, hands, and lower legs, although the frequency is lower. The risk factors for MSDs identified from the literature can be grouped into four categories, namely individual characteristic factors, employment factors, individual habit factors and work environment factors. Individual characteristic factors include gender, age, work experience, and body mass index (BMI). Female dentists are more prone to MSDs than men due to gender-related biological, kinematic, and electromyography differences during weightlifting tasks (Bouffard et al., 2019). Older age and longer work experience are also correlated with an increased risk of MSDs, with dentists younger than 35 years old having more than two areas of the body affected when compared to those aged 35 or older (Hussein et al., 2022) and related to work experience can be caused by the accumulation of workload and lack of ergonomic adaptation from the beginning of the career. In addition, an imperfect BMI can also affect the pressure on the musculoskeletal system.

Employment factors include long working hours, number of patients served, type of clinical procedure or procedure, employment sector (private or government), and income level. A high workload without adequate rest can aggravate muscle and joint tension (Knowles et al., 2018). Actions or treatments that are repetitive and require high concentration can also increase pressure on certain parts of the body. Habitual factors that contribute to the risk of MSDs include low physical activity, unhealthy diet, lack of awareness of posture, and lack of knowledge of ergonomics. Dentists who do not do Stretching or regular light exercise is more at risk of muscle fatigue. Decreased physical activity as dentists work long hours, teach during the day and private practice at night (Bonu et al., 2019). Low knowledge of ergonomics also causes dentists to not realize the importance of using appropriate chairs and work tools to maintain good posture (Tysiąg-Miśta et al., 2024b), (Tysiąg-Miśta et al., 2024a), (Huppert et al., 2021).

Factors that are not ergonomic in the work environment, such as the use of dental chairs that do not support posture, narrow room arrangements, inadequate lighting, and high levels of work stress, also contribute to the emergence of MSD complaints. In addition, work pressure, both physically and psychosocially, increases the likelihood of muscle tension and worsens the pain symptoms experienced (Krishnan et al., 2021). In general, unergonomic work postures, long working hours, and lack of knowledge of ergonomics are the dominant factors that cause MSDs in dentists. Therefore, it is important to carry out comprehensive interventions, ranging from education about the correct work posture, the provision of ergonomic work facilities, to the implementation of a work system that pays attention to rest time and workload balance. Increasing awareness of ergonomics since the time of

professional education is also important so that dentists are able to maintain the health of their musculoskeletal system in the long term.

## **CONCLUSION**

Musculoskeletal Disorders (MSDs) are occupational health problems that are often experienced by dentists, with a high prevalence. The most common areas of pain are the neck, lower back, and shoulders, due to an unergonomic and static work posture. Risk factors are divided into individual characteristics, occupations, habits, and work environment, with poor work posture, long working hours, and lack of knowledge of ergonomics as the dominant causes. Ergonomic interventions and education since professional education are needed to prevent MSDs in dentists.

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