

## Work-Related Musculoskeletal Disorder Among Medical and Dental Workers

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### Abstract

Musculoskeletal (MS) pain is a recognized worldwide health issue and remains a significant public health concern. Thus, understanding the potential cause of pain and its associated risk factors play an important role in its prevention.

To determine the prevalence of work-related MS pain or discomfort among medical professionals and identify its associated risk factors.

Two hundred self-administered questionnaires were distributed to assess the study aims. Only completed questionnaires were used in the data analysis.

A majority of the participants had MS pain or discomfort due their current job (85%). The dentists and dental assistants at increased risk for the MS problems compared to the medical doctors, medical nurses and technicians. Body areas which significantly affected by the MS pain or discomfort were the neck, shoulder, and foot ( $p \leq 0.05$ ). The upper back, wrist, hand, and knee were also affected ( $p \leq 0.001$ ). Above 50% of the participants had interference with work (60%), life outside work (61%), sleep (57%) due to their pain. 59% were using analgesics to relieve the pain.

An alarming number of participants had MS pain that impaired their daily activities. Disability from MSD can not only result in absenteeism, but also lead to decrease in the quality of care provided to patients. Hence, the implementation of educational programs emphasizing the risk factors of MS pain might help prevent this in the future.

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### Introduction

Musculoskeletal disorder refers to a group of disorders that affect the muscles, bones, tendons, ligaments, and other connective tissues in the body. These disorders can cause pain, stiffness, and difficulty performing daily activities which can make it difficult for individuals to maintain employment and can lead to financial strain. Musculoskeletal (MS) pain is a recognized worldwide health issue. Around 60-80% of adults in western countries claim to experience symptoms of low back pain, which is one of the commonest MS complaints<sup>1</sup>. A study done in the

UAE found that 75% of young adults complained of work-related musculoskeletal disorders (MSDs)<sup>2</sup>. Another study demonstrated that approximately 57% of males and 64% of females in the UAE endure low back pain<sup>3</sup>.

These numbers emphasize the high prevalence of these disorders. The MSDs are especially common among populations whose nature of work predisposes to these disorders. An example of which are the people working in the medical professions. Doctors, dentists, nurses, dental assistants and technicians are all at high risk of developing musculoskeletal problems.

One article established that among the studied population of dental personnel at a dental college in Thailand, 72.2% suffered shoulder pain, 70.3% neck pain and 50.6% low back pain<sup>4</sup>. Dental workers in Iran show a comparable pattern of MS pains, according to a research study the neck (43.4%), the back (35.8%) the shoulder (25%) and wrist (25%) were the body

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parts most affected<sup>5</sup>. This indicates that the same profession predisposes to the same MSD regardless of the geographic background.

A systematic review measuring MSD among nurses revealed that MSD prevalence was between 33.0% and 88.0%. This study concluded that the most common body areas with MS complaints were lower back, neck, shoulder, wrists, and knees. Additionally, it was found that MSD were associated with the nature of the job, i.e., repetitive tasks and cumulative trauma<sup>6</sup>. Another systematic review of MSD among medical physicians revealed that the estimated MS pain prevalence ranged between 35% to 60%, which resembles the number in the previous study. The most common MSD were degenerative lumbar (19%) and cervical (17%) spine disease, rotator cuff disorders (18%) and carpal tunnel syndrome (9%)<sup>7</sup>.

In terms of MSD impact, the disease has been shown to negatively impact people's lives, with the effects extending from interference with regular day-day activities to professional work tasks to emotional and mental impacts. A meta-analysis conducted in 2014 determined that loss of function resulting from MSD negatively impacted performance of activities<sup>8</sup>.

Household chores recreational activities and rest were among those that were impacted most. People with MSD also expressed that these symptoms led them to alter work tasks and fear losing their job<sup>8</sup>. In a study that reviewed the relationship between low back pain and emotional impact among emergency medical technicians, significant associations were found between pain and depression, stress, and job satisfaction<sup>9</sup>.

While MSD among medical professionals experience a wide array of impacts on the workers' lives, perhaps the most alarming is its effect on the quality of work provided by the worker and its subsequent effect on patients. Disability from MSD can not only result in absenteeism from work, but also lead to decrease in the quality of care provided to patients. MS diseases can have a significant impact on governments as well. The treatment of MS diseases is exceedingly expensive, in addition to their impact on the body and career. Back pain's direct medical expenses were estimated by researchers in the UK to be £1632 million in 1998<sup>10</sup>.

For this reason, it is essential to study

MSD in our population and address possible risk factors and measure its impact. This will provide data that will be utilized in creating plans and policies that will aid medical and dental workers with preventing and managing MSD and thereby preserving their quality of life as well as patient care quality.

Therefore, the aims of the current study were to identify the prevalence of self-reported MSD pain or discomfort in different body areas (neck, shoulder, upper and lower back, elbow, forearm, hand, knee and foot) among the medical and dental workers in the UAE and to recognize any associated risk factors.

### Materials and methods

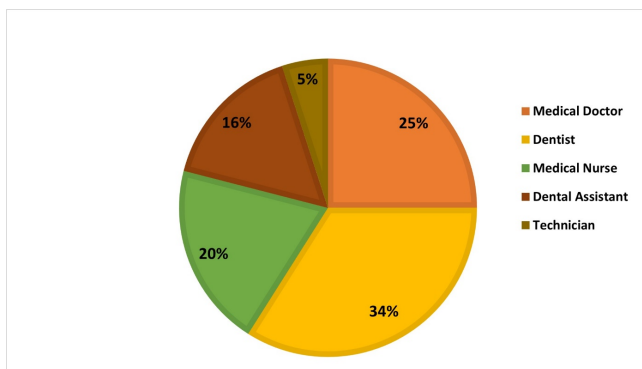
A cross-sectional study was conducted. The study included participants currently working in the medical and dental fields such as medical doctors, dentists, medical nurses, dental assistants, and technicians working in the medical and dental professions. The data was collected over the year of 2019 and was cut short in early 2020 by the COVID-19 pandemic.

Data was collected with the aid of a self-administered questionnaire. The questionnaire contained a total of 16 multiple choice questions carefully selected from the relevant articles published in international journals. The questionnaire also contained a human body diagram where participants can encircle the area(s) they have suffered pain or discomfort. The questionnaire questions were related to participants' gender, career specialty, nature of work, work hours, whether they experienced any MS problems, and the effects of these MSD had on different aspects of their life such interference with work, sleep, and daily activities. The questionnaire also included questions about the effect of rest and analgesics on MS pains. Two hundred questionnaires and consent forms were distributed among the participants to assess the aims of the current study. Participation in the study was entirely voluntary. A pilot study was carried out on some volunteers to assess the response of participants to the questionnaire questions before conducting the study. Questionnaires with uncompleted answers were excluded and a total of ninety-seven completed questionnaires were entered on an Excel spreadsheet and imported into Statistical Package for Social Sciences (SPSS) version 26

for data statistical analysis. The data statistical analysis was carried out by an expert statistician. Chi-squared tests and Fischer’s exact test were used for analysis, and the significance level is considered at ( $P \leq 0.05$ ) and highly significant at ( $P \leq 0.01$ ).

### Results

Of the health professionals who participated in this study, 33% were male and 67% were female. The participants in our study were medical doctors, dentists, medical nurses, dental assistants, and technicians (Figure 1).



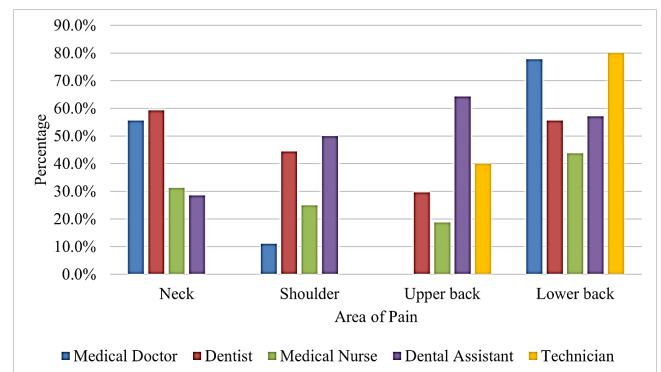
**Figure1.** Participants’ current job.

| Location     | Chi-Square<br>Fisher’s Exact Test<br>[Exact Significance (2-sided)] |
|--------------|---|
| Neck*        | 0.035   |
| Shoulder*    | 0.042   |
| Upper back** | 0.001   |
| Lower back   | 0.254   |
| Elbow        | 0.555   |
| Forearm      | 0.498   |
| Wrist**      | 0.000   |
| Hand**       | 0.001   |
| Knee**       | 0.006   |
| Foot*        | 0.037   |

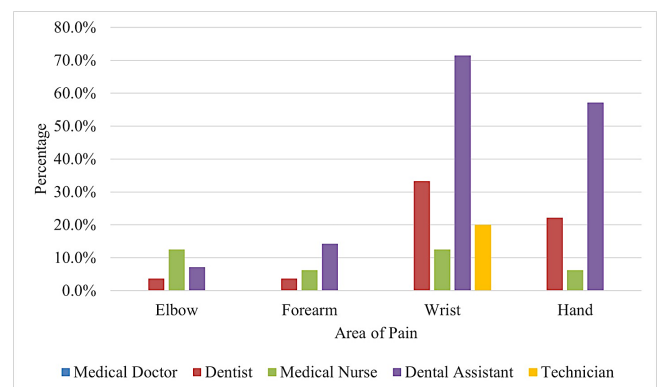
**Table 1.** Participants’ experience of MS pain or discomfort in different body areas due to current job [\* Statistically significant ( $p \leq 0.05$ ) and \*\* Highly significant ( $p \leq 0.001$ )].

The duration of participants’ current job

was mostly between 1 to 5 years (55%), followed by 5 to 10 years (20%), more than 10 years (19%), and less than 1 year (7%). Participants’ experience of pain or discomfort that lasted 2 days or more in the last year due to their current job was 84.5%. These participants experienced pain or discomfort in the neck, shoulder, upper back, or lower back, as shown in Figure (2), while the participants who experienced this kind of pain or discomfort in elbow, forearm, wrist, hand, are shown in Figure (3), and in knee, or foot are shown in Figure (4).



**Figure 2.** Participants’ experience of pain or discomfort due to their current job in neck, shoulder, upper back, or lower back.

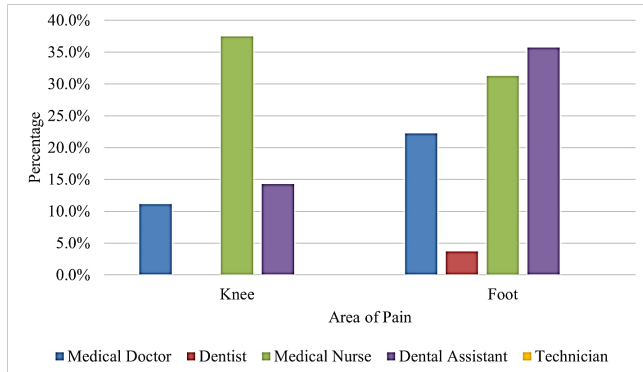


**Figure 3.** Participants’ experience of pain or discomfort due to their current job in elbow, forearm, wrist, or hand.

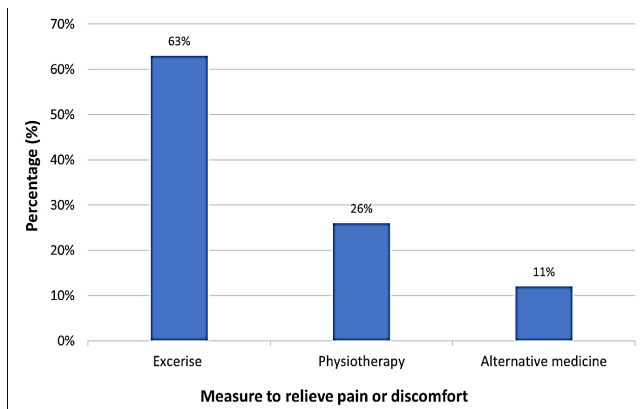
The prevalence of pain and discomfort in body areas due to the participants’ current job is shown in Table (1). As demonstrated in the table, among participants who had MS pain, a statistically significant correlation was found between most affected body parts and the participants’ MS pain due to current job ( $p \leq 0.05$ ).

The body parts which were significantly affected by the MS pain or discomfort due to the

participants' current job were the neck, shoulder, and foot ( $p \leq 0.05$ ), and highly significant in the upper back, wrist, hand, and knee ( $p \leq 0.001$ ).



**Figure 4.** Participants' experience of pain or discomfort due to their current job in knee or foot.



**Figure 5.** The participants' response regarding the best measure to relieve MSD pain.

|              |            | What is your current job title? |         |               |                  |            |
|--------------|------------|---------------------------------|---------|---------------|------------------|------------|
|              |            | Medical Doctor                  | Dentist | Medical Nurse | Dental Assistant | Technician |
|              |            | Row N %                         | Row N % | Row N %       | Row N %          | Row N %    |
| Area of Pain | Neck       | 28.6%                           | 45.7%   | 14.3%         | 11.4%            | 0.0%       |
|              | Shoulder   | 8.0%                            | 48.0%   | 16.0%         | 28.0%            | 0.0%       |
|              | Upper back | 0.0%                            | 36.4%   | 13.6%         | 40.9%            | 9.1%       |
|              | Elbow      | 0.0%                            | 25.0%   | 50.0%         | 25.0%            | 0.0%       |
|              | Lower back | 29.2%                           | 31.3%   | 14.6%         | 16.7%            | 8.3%       |
|              | Forearm    | 0.0%                            | 25.0%   | 25.0%         | 50.0%            | 0.0%       |
|              | Wrist      | 0.0%                            | 40.9%   | 9.1%          | 45.5%            | 4.5%       |
|              | Hand       | 0.0%                            | 40.0%   | 6.7%          | 53.3%            | 0.0%       |
|              | Knee       | 20.0%                           | 0.0%    | 60.0%         | 20.0%            | 0.0%       |
|              | Foot       | 26.7%                           | 6.7%    | 33.3%         | 33.3%            | 0.0%       |

**Table 2.** The contribution percentage of each profession to the area of pain or discomfort.

The participants' response regarding the

pain or discomfort while working, after work duty and after a week away from work is shown in Table 3, the responses regarding interference of the pain with work, life outside work or sleep is shown in Table 4. As seen in Table (3), while working the pain or discomfort experienced was "less" for 18% of the participants, "the same" for most participants (55%) and "getting worse" for 27% of the participants. The responses for pain or discomfort experienced after work duty was similar between the "less", "same" and "worse" categories. Meanwhile, most participants (85%) experienced "less" pain or discomfort after a week away from work. With regards to the interference of pain, most of the participants reported that they faced "some" interference with work (60%), life outside work (61%) or sleep (57%) due to their pain or discomfort as displayed in Table (4).

| Pain or discomfort | While working | After work duty | A week away from work |
|--------------------|---------------|-----------------|-----------------------|
| Less               | 18%           | 35%             | 85%                   |
| Same               | 55%           | 32%             | 10%                   |
| Worse              | 27%           | 33%             | 5%                    |

**Table 3.** The participants' response regarding the pain or discomfort while working, after work duty and after a week away from work.

| Pain or discomfort       | Work | Life outside work | Sleep |
|--------------------------|------|-------------------|-------|
| No interference          | 31%  | 24%               | 38%   |
| Some interference        | 60%  | 61%               | 57%   |
| Every night interference | 10%  | 15%               | 5%    |

**Table 4.** The participants' response regarding the pain or discomfort interference with work, life outside work and sleep.

During the past year, more than half of the health professionals who participated in this study used analgesics (pain killers) to relieve their pain or discomfort (59%). During work, 58% of the participants were working alone without an assistant, and the majority of participants did not have a rest in between seeing patients (62%). Daily working hours between the participants was found to be 8 hours or more per day among most of the participants (49%, 44%), a much smaller percentage worked less than 8 hours a day (9%). Regarding weekly working days, 10% of participants worked for less than five days a week, 48% of participants worked five days a



week and 42% of participants were working more than five days a week.

When asked about their opinion on which measure was best at relieving MS pain or discomfort, most of the participants (63%) answered exercise, 26% chose physiotherapy and 11% of participants answered alternative medicine (Figure 5).

## Discussion

The World Health Organization (WHO) declared that MSD is a leading cause of disability worldwide and a major contributor to lost productivity and economic burden. The global prevalence of the MSD, as stated by the WHO, is about 1.71 billion people<sup>11</sup>. Furthermore, the MS pain and discomfort can have a significant impact on a person's quality of life, as chronic pain and limited mobility can lead to depression and anxiety<sup>9</sup>; it can also make it difficult for individuals to maintain their employment and can lead to financial burdens<sup>8</sup>.

There are few research articles available in the literature that discuss specifically the prevalence of MS pain or discomfort in different body areas among different medical professionals. The previous research works concentrated on a specific profession such as dentists, nurses, office employees, or students, or focus on a specific body area such as neck, shoulder, lower back or wrist<sup>12-21</sup>.

Unlike previous studies, the current study's research work was focused on the incidence of MS pain or discomfort in several body parts (neck, shoulder, upper back, lower back, elbow, forearm, wrist, hand, knee and foot), among medical professionals who had a diversity of working procedures in medical and dental fields such as medical doctors, dentists, medical nurses, dental assistants and medical or dental technicians.

The current jobs of the medical and dental professionals who participated in this study were dentists (34%), medical doctors (25%), medical nurses (20%), dental assistants (16%) and technicians (5%), as shown in Figure (1). In the current study, most of the participants (84.5%) had pain or discomfort that lasted for 2 days or more in the last year due to their current job. The data presented in this study reveals multiple important findings important finding.

Lower back was the overall most selected

area of pain followed by neck and shoulder. The most commonly selected area of pain for medical doctors, medical nurses, and technicians was lower back, the neck for dentists, and the wrist for dental assistants.

Looking at the row-wise percentages displayed in Table 2, dental assistants as a group complained of the widest variety of pain, contributing to every single area of pain asked about in this study. They were also the greatest contributors to upper back (40.9%), forearm (50%), wrist (45.5%), and hand (53.3%) pain. We attribute this to the wide variety of tasks required as part of their duty. Dentists were the greatest contributors to neck (45.7%), lower back (31.3%) and shoulder (48%) pain, and the second largest contributor to upper back (36.4%), wrist (40.9%), and hand (40%) pain. Similar to dental assistants, we also attribute this pain to the nature of work required by dentists and dental assistants alike. Finally, medical nurses were the main contributors to elbow (50%) and knee (60%) pain most likely due to the long hours of standing and note typing required. Overall, it is clear that specialties relying heavily on typing and standing for long periods of time were more likely to experience knee and foot pain while specialties requiring hand skills were more likely to complain of wrist and hand pain.

The high prevalence of MS pain among our participants may be explained by the poor posture during work which can lead to muscle and joint strain, which in turn can lead to anatomical changes in the body. This may result in MS pain and discomfort through the constriction of certain blood vessels and nerves. To prevent this, it is advised to employ good posture during work such as utilizing back support<sup>22</sup>.

The participants' response regarding MS pain while working, after work duty and after a week away from work (Table 2), as well as the interference of MS pain with work, life outside work and sleep is shown in Table (3). This current study shows that, the pain or discomfort while working was the same for more than half (55%) of participants and got worse for 27% of the participants. After work duty, the participants' response for "less", "same" and "worse" was similar regarding the pain or discomfort. However, almost all the participants (85%) experienced less MS pain after a week away from work, this indicates that MS pain can be relieved with

longer durations of rest. Most of the participants reported that the MS pain they experienced had “some” interference with work (60%), life outside work (61%) and sleep (57%), signifying the burden of MS pain on the multiple aspects of the medical professionals’ lives. A research study by the second author in this article (Alkhuboli F.) found that there was a significant association between low back pain, neck pain, job satisfaction and stress. Most workers with low back pain (37.8%) and neck pain (41.7%), stated that they were moderately satisfied with their jobs, similarly, most with low back pain (45.4%) and most with neck pain (47.0%), reported moderate perceived levels of stress (unpublished data).

Concerning the participants’ nature of work, 58% worked alone without help from an assistant, this means they were responsible for the full burden of their work. 62% of the participants did not take a break in between seeing patients. The participants’ daily working hours was found to be 8 hours a day for 49% or more than 8 hours for 44% of the participants. 10% of participants worked for less than five days a week, 48% of participants worked five days a week and 42% of participants worked more than five days a week. Between long work hours and many working days per week, medical professionals are at a higher risk of developing MS pain and problems.

The data of the present study showed that more than half (59%) of the participants used analgesics (pain killers) to relieve their pain or discomfort, which implies that the MS pain was troubling enough to seek relief. The majority of participants thought that the best measure to relieve MS pain and discomfort was exercise (63%), as opposed to physiotherapy and alternative medicine.

The data presented in this study clearly shows that a large proportion of medical workers suffer MS pain or discomfort in one body part or more. Consequently, workers of the medical and dental professions are at high risk for developing long term musculoskeletal problems due to their current job. Education and awareness programs are crucial to alert medical and dental professionals of their increased risk at developing MS problems and the impact of these problem on their general health, employment future and quality of life, programs should also be implemented to inform medical professionals of how they can prevent and manage their MS

problems. In fact, the WHO recommends a multi-disciplinary strategy for the management and prevention of MS diseases including encouraging good lifestyle practices, early diagnosis and treatment, and rehabilitation. Further studies with larger study populations can help identify precise factors in specific medical careers that predispose to MSP, this will aid in the construction of the educational programs.

## Conclusions

Within the limitations of the current study, the data presented in this study clearly demonstrates that medical and dental professionals at increased risk for MSD complications associated with their current profession. A week away from work seemed to help with MS pain and discomfort, which is an essential finding in this study as the MS discomfort experienced by the participants had considerable negative effects on the work, lives, and sleep. To promote proper general health and to reduce the risk of MSDs, health professionals in both the medical and dental fields need to take the responsibility to develop programs based on the WHO recommendation to prevent the MS diseases and its complications on the health.

## Declaration of Interest

The authors report no conflict of interest.

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