Work-related Musculoskeletal Disorders Amongst Oral Health Workers in Cameroon

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Abstract

Musculoskeletal disorders are common among oral health workers and are a negligible work related public health problem. The aim of this study was to determine the prevalence and risk factors of musculoskeletal disorders among oral health workers in Douala and Bafoussam, Cameroon. This is a cross sectional descriptive study using the standardized self-administered Nordic questionnaire to assess musculoskeletal symptoms among oral health workers. Eighty oral health workers participated in the study and the prevalence of musculo-skeletal disorder was 78.75%. Females were more affected and the common areas affected by musculoskeletal disorders were the neck 32 (40%), shoulders 8 (10%), lower back 42 (65%), wrists 5 (6.25%), lower legs 3 (3.7%), and the feet 12 (15%). Posture 51 (64.06%) was the most common risk factor associated with these disorders. The cost of management of these disorders varied between $20 and $1000 per week. In conclusion, there is a high prevalence of Musculo-skeletal disorders among oral health workers. These Musculoskeletal disorders affect the daily practice of more than two thirds of dental practitioner.

Key Words: Cameroon, Oral health workers, Musculo-skeletal disorders, Posture

Introduction

Several specialties in the medicine profession requires precision and concentration in order to execute their activities, among these are neuro-surgeons, general surgeons, ophthalmologists and the dentists. Dentistry has been defined as the profession that necessitates a high level of concentration and precision [1]. Therefore oral health workers need to develop their senses as: visual acuity, hearing, depth perception, psychomotor skills, dexterity, and ability to maintain good working postures over long periods of time to perform their procedures [2]. The deterioration of any of these capacities affects the practitioner's performance, efficiency and productivity. Advances in dentistry in recent years had aimed at making the management of patients comfortable to the patients and the practitioners reducing occupational and iatrogenic hazards to the minimum. Despite numerous advances in dentistry, many occupational health problems still persist in modern dentistry [3] and musculoskeletal disorders (MSD) constitute one of these hazards.

MSD are defined as injuries or disorders of the joints, muscles, tendons, and other soft tissues characterized by presence of discomfort, disability or persistent pain in those areas, related to manual tasks (Ayer et al.) [4]. Epidemiological data suggest that more than 30% of all occupational injuries are associated with manual task [5].

MSD are considered as one of the common causes of long-term pain and disability and are prevalent in all regions of the world and affect hundreds of millions of people [5] especially workers whose professions requires them to maintain a static position for long periods of time. This fact has been recognized by World Health Organization (WHO) and United Nations (UN) with their endorsement of the Bone and Joint decade 2000-2010 [6].

MSD are divided into several categories such as neck and shoulders disorders, back disorders, hand and wrist disorders, amongst others. The major complaints among workers are lower back pain (LBP) and neck pain [5] and the most common areas affected by MSD in order of magnitude are: neck (43%), lower back (35.8%), shoulders (25%) and wrist (25%) reported in 2011 [7]. The disorder might have an impact on the physical, psychological and social life of the practitioners. In severe cases, work-related MSD have an impact on productivity and reduces quality of life by causing frequent absenteeism from work and subsequently leading early retirement [8].

Many activities and factors expose workers to musculoskeletal disorders including lifting or carrying loads, frequent bending and twisting, the constant use of vibration tools, static posture for a long period and lack of adequate rest. These factors, consistently associated with work-related disorders are responsible for back and neck disorders. The level of risk depends on the duration, frequency and the magnitude of exposure to these factors. For this reason, certain oral health workers who are exposed to such deleterious work-related factors maybe at a higher risk of developing low back pain and neck pain. These disorders affect the health of oral health workers and impact their efficiency. Several oral health workers are affected by these problems due to their lack of knowledge of applied ergonomics. This science could help prevent MSD among oral health workers [9].

The aim of this study was to determine the prevalence and risk factors of musculoskeletal disorders among oral health workers in 2 regions of Cameroon.

Materials and Methods

Study design

This is a cross sectional descriptive study conducted between June and August 2014 to assess the prevalence of MSD among oral health workers.

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Study areas and setting

The study was carried out in two different regions (Provinces) of Cameroon; the Littoral region with headquarters in Douala and the West region with headquarters in Bafoussam. Douala is the economic capital of Cameroon, it is the largest city in the Central African sub-region with a population of 2 million inhabitants. It is estimated that the oral health workforce in Cameroon is made up of 265 dentists and 120 dental auxiliaries [10]. More than 158 oral health workers constituting 47% of all oral health workforce in Cameroon practice in this city. Bafoussam is the largest city of the west region of Cameroon. It is estimated to host 15 oral health workers constituting about 4.2% of the total population of oral health workers in Cameroon.

Inclusion criteria

The inclusion criteria for the study were participants who were full-time oral health workers and have worked for at least 12 months.

Exclusion criteria

Participants who refused to participate in the study.

Data collection

To collect data from the oral health workers, appointments was fixed in their offices during a convenient time for the practitioners and a face to face interview was carried out using a questionnaire.

The questionnaire used for this study was a modified questionnaire made up of the standardized Nordic questionnaire used to establish the prevalence of musculoskeletal pain in the body. The pain disability questionnaire developed by Anagnostis was used to assess how the pain actually affected the individual and a section on dental ergonometrics.

The Questionnaire was made of 4 sections;

- A self-administrated questionnaire about the respondent's demographic information including: age, gender, job history, place and duration of employment) and the practicing posture in the dental chair. It also included questions about some work characteristics, mostly pertaining to dentistry, namely number of patients consulted per month, time and duration of work per day, design and arrangement of the patient's and dentist's chairs and the posture of body while working. Also assessed was the various types of treatments provided each day (surgery, root canal, and filling or tooth extraction), the use of direct and indirect vision with dental mirror e.t.c.
- Musculoskeletal complaints were explored through nine body areas including the neck, shoulders, upper back, lower back, elbow, wrist/hand, thighs, knees and ankles. Musculoskeletal complaints were defined as pain perceived in the last 12 months experienced as ache, discomfort, and numbness, trouble during last seven days and preventing activity during last 12 months with yes or no answers. The severity of the painful site perceived by oral health workers identified through a continuous line between two-end points from 0 to 10 using a visual analogue scale (0=none of the pain and 10=most of the pain).
- The pain disability questionnaire developed by Anagnostis was used to assess how the pain actually affected the individual and how the subject functioned in everyday activities rating from 0=no existing to 10=severe scale. The final questions rated the aggravating factors using Likert scale (1=least important aggravating factor, 4=most important aggravating factor) firstly and questions about presence of LBP and/or neck pain.
- Ergonomics in dentistry. These factors were obtained from interviewing a group of oral health workers after designing the questionnaire.

Data analysis

Data from this study was analyzed using Epi-Info 7 and results were presented in the form of graphs and tables using Microsoft excel 2010.

Ethical considerations

Ethical clearance and approval were obtained from the Ministry of Higher education and scientific research-Cameroon.

Results

Demography

Eighty oral health workers made of 54 (67.50%) females, 26 (32.5%) males participated in the study. The prevalence of musculo-skeletal disorder was found to be 78.75% and more than three quarters 66 (82.50%) of the practitioners had practiced for more than one year.

Dentists 34 (42.5%) formed a larger proportion of the respondents and 66 (82.5%) of the respondents had worked for more than 12 months (*Table 1*).

Table 1: Demographic data of the respondents

Occupations	N (%)
Dental Assistants	19 (23.8%)
Dental therapists	18 (22.5%)
Dentists	34 (42.5%)
Dental laboratory technicians	9 (11.3%)
Years of work	
12 Months	14 (17.5%)
More than 12 months	66 (82.5%)
Total	80 (100.0%)

Both sitting and standing positions 47 (58.75%) were the postures mostly used by practitioners while 18 (22.50%) of practitioners worked in standing posture, 54 (67.53%) practitioners use a dental chair with back rest, while of practitioners use adjustable dental chair with respect to height 62 (78%), forward and backward chair movement 77 (96.10%). Almost half of the practitioners (39, 48.75%) use

both the direct and indirect vision while using the dental mirror (*Table 2*).

Table 2*. Distribution of the respondents according to the most likely position adopted.*

Posture	N (%)
Sitting and standing positions	47 (58.75%)
Sitting positions	15 (18.75%)
Standing	18 (22.50%)
Support	
Dental chair with a back rest	54 (67.53%)
Do not possess a dental chair with back rest	26 (32.47%)
Adjustment of Dental chair with respect to height	
Adjustable dental chair	62 (78%)
Non-adjustable dental chair	18 (22%)
Front to back adjustment of Dental chair	
Possession of forward and backward chair	77 (96.10%)
Chair cannot be adjusted forward and backward	3 (3.90%)
Vision with dental mirror	
Use both the direct and indirect visualizations	39 (48.75%)
Direct visualization	39 (48.75%)
Indirect visualization.	2 (2.50%)

More than a third 34 (34%) of the respondents had persistent pain. Females were more affected than males; 23 (23%) of females have experienced pain while 19 (19%) had experienced persistent pain (*Table 3*).

Table 3*. Musculoskeletal pain experience.*

Musculoskeletal pain distributed by gender	**Male N (%)**	**Female N (%)**	**Total**
No pain	5 (5%)	12 (12%)	17 (17%)
Had experienced occasional pain	6 (6%)	23 (23%)	29 (29%)
Had persistent pain	15 (15%)	19 (19%)	34 (34%)
Total	26 (26%)	54 (54%)	80 (80%)

The lower back 36 (44.44%) and the neck 32 (39.68%) were the areas mostly affected by pain (*Table 4*).

Table 4*. MSD according to the most affected body parts.*

Most affected body parts	N (%)
Lower back	36 (44.44%)
Neck	32 (39.68%)
Foot	6 (7.94%)
shoulder	4 (4.76%)
wrist	1 (1.59%)
lower leg	1 (1.59%)

Practitioners that have worked for more than 12 months 25 (25%) had persistent pain and 31(31%) had experienced pain (*Table 5*).

Table 5*. MSD according to the duration of practice.*

Years of work	**N (%)**
No pain	
12 months	7 (7%)
More than 12 months	10 (10%)
Persistent Pain	
12 months	4 (4%)
More than 12 months	25 (25%)
Experienced occasional Pain	
12 months	3 (3%)
More than 12 months	31 (31%)

Dentists always 11 (11%), followed by the dental therapists 10 (10%) and sometimes by 11 (11%) followed by the dental assistants 10 (10%) (*Table 6*).

Table 6*. Relationship between MSD with Profession.*

Occupation	**No pain N (%)**	**Persistent pain N (%)**	**Occasional pain experience N (%)**	**Total**
Dental laboratory technologist	0 (0%)	4 (4%)	5 (5%)	9 (9%)
Dentists	12 (12%)	11 (11%)	11 (11%)	34 (34%)
Dental therapists	4 (4%)	10 (10%)	4 (10%)	18 (18%)
Dental assistants	1 (100%)	8 (8%)	10 (10%)	19 (19%)

Half 51 (64.06%) of the practitioners presented with pain originating from bad posture, 18 (22.5%) as a result of their work load (*Table 7*).

Table 7*. According to the distribution of pain origin.*

Pain origin	**N (%)**
Posture	51 (64.06%)
Work load	18 (22.5%)
Quality of equipment	8 (11.25%)
Difficult procedures	1 (1.25%)
Physical effort	1 (1.25%)

Pain and fatigue experience

Fatigue level 4, 25 (31.25%); level 5, 23 (28.13%) and level 6, 16 (20.31%) were mostly demonstrated by the practitioners (*Table 8*).

Table 8*. MSD and the distribution of worst fatigue.*

Worst fatigue experienced at the end of the day	N (%)
Level of 8	4 (4.69%)
Level of 7	5 (6.25%)
Level of 6	16 (20.31%)
Level of 5	23 (28.13%)
Level of 4	25 (31.25%)
Level of 3	5 (6.25%)
Level of 2	1 (1.56%)
Level of 1	1 (1.56%)

During dental procedures, 10 (12.50%) of practitioners experienced pain intensity score 6, 11 (14.09%) participants scored 5, 28 (34.38%) scored 4 and 29 (35.94%) scored 3 (*Table 9*).

Table 9*. Distribution of pain intensity affecting dental procedures.*

Pain intensity	N (%)
Score 6	10 (12.50%)
Score 5	11 (14.09%)
Score 4	28 (34.38%)
Score 3	29 (35.94%)
Score 2	1 (1.56%)
Score 1	1 (1.56%)

A quarter 16 (20.7%) of the practitioners spend $20 for the management of pain per month, while 11 (13.8%) spend $60 and $200 per month, and 3 (3.4%) spend $1000 per month (*Table 10*).

Table 10*. Cost of the management per month.*

The cost of the management per month	N (%)
$20 - $40	19 (24.2%)
$41 - $ 80	25 (14.8%)
$81 - $120	6 (6.8%)
$121 - $200	16 (20.7%)
$450 - $500	6 (6.8%)
$501 - $1000	5 (6.9%)
$1001 - $1200	3 (3.4%)

Almost half 39 (49.38%) of the practitioners have had knowledge of dental ergonomics and two thirds 26 (66.25%) of these practitioners apply the principles of ergonomics in their practice (*Table 11*).

Table 11*. Ergonomics knowledge and application.*

Knowledge of ergonomics	N (%)
No knowledge of dental ergonomics	41 (50.64%)
Have knowledge of dental ergonomics	39 (49.38%)
Application of dental ergonomics	
apply dental ergonomics	26 (66.25%)
Do not apply dental ergonomics	13 (33.75%)

Discussion

Demography

The current study showed a predominance of musculoskeletal disorder among female oral health practitioners in Cameroon. This can be attributed to the predominance of female practitioners in the dental workforce as noted by Agbor and Azodo [11,12] who reported that 61% of oral health workers in Cameroon were females. This is similar to a study in Sweden which reported a higher prevalence of MSD in 85% of female dentists experiencing shoulder and neck pain [13].

Prevalence of MSD

Recent studies have shown much interest on musculoskeletal disorders among oral health workers, with the prevalence of these disorders varying from one country to another. A systematic review carried out in Australia reported that the prevalence of general musculoskeletal pain among oral health workers ranges between 64% and 93% [14]. This result is similar to our study where the prevalence was found to be 78.7%, which is within their range Literature reviews across the world have shown a high prevalence of MSD among dentists [15]. This is because dentists assume static postures at work which require more than 50% of the body's muscle to contract while resisting gravity [16]. When the body is repeatedly subjected to such prolonged static postures (PSP), it results in pain, injury, or career ending MSD [16]. MSD has an impact not only on the physical but also on the psychological and social aspects of the practitioners [5,17]. Work-related MSD in severe cases results in frequent absences from work and finally to early retirement.

Posture adapted during treatment

Many risk factors for MSD have been identified, including static and awkward postures and work practices [14]. These characteristics of clinical work are the basis for static neck position, extended neck flexion and poor posture that are also associated with musculoskeletal complaints practices [14].

The current study showed that dental workers are predisposed to pain or injury in different regions of the body depending on the type of work and the posture adopted. The fact that the majority of the workers adopted the sitting position with or without back rest during procedures and also presented with back pain, means that the sitting position though very comfortable and less strenuous during treatment causes strain on the waist and therefore lower back pain. It has been reported that the most prevalent regions that dentists experienced musculoskeletal symptoms were the back, neck and shoulder regions and these are all related to their posture [14]. A Danish survey in 2008 reported a one year prevalence of low back pain and neck /shoulder pain in 50% female and 65% male dentists [18]. Szymañska et al. [19] reported MSD

of low back to be the most prevalent musculoskeletal complaint (55%). This is similar with the present study where, the highest affected site of MSD among dental practitioner was the lower back. Leggat and Smith [6] reported a high (80%) prevalence of MSD among dentists in Australia. This has been attributed in majority to prolonged static postures, which are considered to be risk factors for MSD established that among all the risk factors, working for a long time in the same position was the most aggravating risk factors for oral health workers. His results are similar to the current study and the reasons for the high level of these disorders amongst dentists and dental therapists in Cameroon is that they are the one who carry out most of the bulk of the curative oral health care clinical procedures [10] and as such, adopt different types of postures for long periods of time on obsolete, non-functional equipment [12].

The prevalence of MSD in the current study is higher than that reported by practitioners in Saudi Arabia (59.2%) was lower than reports from Iran (79, 12%) and Australia (87.2%). These variations depend on the functionality of the equipment, knowledge on ergonomics and the amount of workload.

Studies assessing the prevalence of MSD among oral health workers in Lithuania and New Zealand [13] have shown high prevalence of MSD among male practitioners with 78%. In 2009 by Adegoke et al. [20] showed that 63.5% of male and 36.5% of female suffered from musculo-skeletal disorders in Nigeria. Sex distribution of MSD can be attributed to predominance sex in the dental profession of a particular country.

In the current study, dental assistants were predisposed to foot and wrist pain and dental laboratory technicians to neck, shoulder, and wrist pain largely due to habitual their static postures combined with forceful, repetitive movements adopted when performing procedures [21]. Also the current study showed that dentists and dental therapists tend to be predisposed to neck and low back pain. This can be due to their prolonged static postures, fewer repetitive motions while working and the repeated forward positioning of head and bending of low back during clinical procedures. It appeared from the results that 21.25% oral health workers who positioned their patients in an appropriate position for a direct view had a significant lower frequency of pain. In agreement with previous studies, the results showed that dentists who use the dental mirror in direct vision had significantly less pain and discomfort [22]. The choice of the visualization and the good position during the work is important to avoid musculoskeletal symptoms. The current study showed that though most practitioners used both direct and indirect vision during treatment, they were still susceptible to high level of MSD.

Cost of management of MSD

It was noted that most of dental professionals in the current study spent a lot of money in pain management. Reejen in the USA reported that MSD it is the most costly health problem with an estimated of 4.6 billion of dollars spent on these conditions annually. Also in Australia billions are spent each year for the management of pain from dentistry (musculoskeletal conditions in Australia statistics 2004-2006). This fact has been outlined also by Bers and by Shugars who reported that dental professionals in USA loose around $41 million annually because of musculoskeletal pain [23]. The re-scheduling and/or canceling appointments of 1.3 million patients were also due to pain and discomfort suffered by their dentists. Musculoskeletal disorders are therefore related to loose of money, productivity and efficiency in the social life.

In the current study, there is an insufficient attention paid to ergonomic by dental workers that is why most of them are exposed to some occupational hazards mostly pains and fatique. Factors responsible for these included the position of chairs which are not adequate, the instruments which are not well designed, the lighting used and the position adopted during working time. Though the work load to Cameroonian oral health workers is high coupled with the use of obsolete machines that does conform to their posture during treatment, no case has been reported of a dentist leaving the profession as a result of MSD's. In order to avoid these, functional designed dental equipment and proper training in ergonomics methods should be available for all dental professionals. It was observed in the present study that only half of the oral health care workers know what ergonomics is all about, and only a third apply it when they are working. Akesson et al. [13] reported working position as a high risk factor and also identified the lack of ergonomic application as an important factor leading to the adaptation of awkward postures by dental workers.

Conclusions

This study showed that the prevalence of musculo-skeletal symptoms among oral health workers in Bafoussam and Douala is high. The most aggravating factor was the position. Pain, discomfort and fatigue were the common symptoms reported. Female dentists had a significantly high frequency of pain, discomfort and fatigue than the male. The neck, lower back and the shoulders were the areas most affected.

The majority of oral health workers have sound knowledge of Ergonomics but just minority applies it.

Recommendations

- The ministry of health should formulate and implement policies that will promote safety and prevent work related MSDs.
- The Ministry of the High Education should include Dental Ergonomics in the programs of dental schools.
- The Cameroon dental council should include ergonomics in the continuous dental education program.
- Old obsolete equipment that do not provide adequate safety to dental worker and patients should be removed from dental clinics.

Conflict of interest

The author(s) declare(s) that there is no conflict of interest regarding the publication of this article.

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