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MUSCULOSKELETAL PAIN AND ERGONOMIC ASPECTS OF DENTISTRY IN ROYAL MEDICAL SERVICES, JORDAN

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ABSTRACT

The past two decades have witnessed a sharp rise in the incidence of work-related musculoskeletal disorders (WMSD). In this study the aim was to determine the prevalence of professional hazards among dentists in Jordanian Royal Medical Services. This is a cross-sectional study conducted on dental healthcare professionals working in Royal Medical Services using a modified Nordic questionnaire. The number of included participants was 82 doctors who were suitable to our inclusion criteria. Most of them (n= 49; 60%) were in ages between 25 to 34 years, and more than half of the respondents were females (n= 50; 61%). Most affected sites with pain among dentists were neck (n= 76; 92%), lower back (n= 73; 89%), and shoulder (n= 68; 83%). Furthermore, doctors who were working with flexed wrist position were suffering from hand / wrist pain significantly higher than those who were working with neutral wrist position. However, there was no significant association between the position of the neck (neutral position or bent forward) during the work and the pain of the neck.

Keywords: *work-related musculoskeletal disorders, dental health professionals, risk factors*

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INTRODUCTION

Musculoskeletal disorders are defined as the presence of discomfort, disability and persistent pain in the joints, muscles, tendons and other soft tissue parts, caused or aggravated by repeated movements and prolonged forced body postures.[1]

There are different risk factors which contribute to the development of musculoskeletal disorder. and these factors may be categorized as those related to personal background factors (e.g., anthropometric characteristics, age, hereditary factors) and those related to work factors (e.g. repetitive motion, static posture, force, awkward position, vibration, temperature, biological factors, chemical irritating or toxic factors, such as radiation).[2]

The past two decades have witnessed a sharp rise in the incidence of work-related musculoskeletal disorders (WMSD). Although all occupations are involved, this problem occurs in 54-93% of dental professionals (dentists, dental hygienists, and dental assistance), with higher risk in elderly subjects and women. Spine, shoulder, elbow, and hand are mostly affected. Prevention of WMSD is becoming crucial and requires the identification and modification of risk factors. Individual characteristics of the worker - such as gender, age, stature, physical condition, strength, etc. - may contribute to the occurrence of these musculoskeletal disorders. Moreover, the specific occupation and work organization may be the source of ergonomic hazards.[3] The suitable positioning of the operators and the patient in the dental activity are factors of fundamental importance, not only to carry out the specialist treatment correctly but also to avoid unnecessary postural fatigue both to the different dental health professionals (OSD) and the patient himself.[4] OSDs are forced to assume different attitudes in relation to the various areas of the oral cavity to be treated. These positions, which have long been codified for right-handed or left-handed people, are different depending on whether therapies are carried out at the level of the upper jaw or mandibular arch, on the right or left side, on the mouth or tongue side. All these positions must be perfectly known and applied in order to avoid useless and harmful postural overloads that affect the immediate and late well-being of the operators.[5]

Ergonomics is derived from Greek words: Ergon

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meaning 'work' & Nomos meaning 'principles or laws. It is an approach to work smarter by designing tools, equipments, work stations and this can allow practitioners to work with maximum efficiency and safety. Proper ergonomic design increased productivity and worker satisfaction and decrease and maximize injuries. Therefore, it is crucial for upcoming dental practitioners to adopt proper ergonomic design during dental practice.[6]

Only a few studies have been conducted to determine the prevalence of Work-related musculoskeletal disorders among Jordanian. This study aims to assess the prevalence of occupational hazards among dental professionals practicing various specialties in Jordanian Royal Medical Services.

MATERIALS AND METHODS

This is a cross sectional study conducted on dental healthcare professionals working in Royal Medical Services between May 2020 until October 2020. The modified Nordic questionnaire was used in order to estimate the ongoing musculoskeletal work-related symptoms which dental workers suffering from, taking the room operation set up in the consideration. The number of included participants was 82 dental proessional who were suitable to our inclusion criteria, which included general practitioners and dentists with different specialties who worked at royal medical services.

After reviewing the literature, we developed a questionnaire to evaluate the ongoing musculoskeletal symptoms of dental workers along with the contribution of operating room elements causing these symptoms. The questionnaire was randomly distributed online as well as in hard copies in papers. The responses of the participants were entered into Microsoft Excel and analysed using the SPSS software. The characteristics of the respondents were descriptive using the number with percentages. Chi-square and Fisher-exact tests were conducted to examine the association between two categorical variables.

RESULTS

A Total of 82 participants answered the questions. Most of them (n= 49; 60%) were in ages between 25 to 34 years; followed by ages between 35 to 44 years (n= 29; 35%), and ages between 45 to 54 years (n= 4; 5%). More than half of the respondents were females (n= 50; 61%), and almost all of them (n= 72; 93%) were using the right hand as a dominant one. The specialities were; pedodentists (n= 20; 24%), endodontists (n= 20; 24%), periodontists (n= 13; 16%), prosthodontists (n= 1; 12%), orthodontists (n=7; 9%), maxillofacial surgeons (n=7; 9%), and general practitioners (n=5; 6%). Furthermore, they had different years of experience; 16 (20%) were working from less than five years, 66 (80%) worked from more than five years, but only 35 (43%) worked more than 10 years. Other details can be seen from table 1 & figure 1.

TABLE 1: REPRESENTS THE NUMBERS OF PARTICIPANTS SUFFERED FROM THE PAIN IN DIFFERENT SITES, AND THE NUMBER OF PROFESSIONALS WHOSE DAILY WORKS ARE AFFECTED BECAUSE OF THE PAIN.

Pain site	Number (%) of participants suffered from pain	Number (%) of participants who were unable to do their normal work because the pain
Neck	76 (92%)	41 (50%)
Shoulder	68 (83%)	25 (31%)
Elbow	20 (24%)	5 (6%)
Hand/Wrist	57 (70%)	23 (28%)
Upper back	50 (61%)	17 (21%)
Lower back	73 (89%)	34 (42%)
One or both knees	32 (39%)	8 (10%)
One or both legs	34 (42%)	10 (12%)

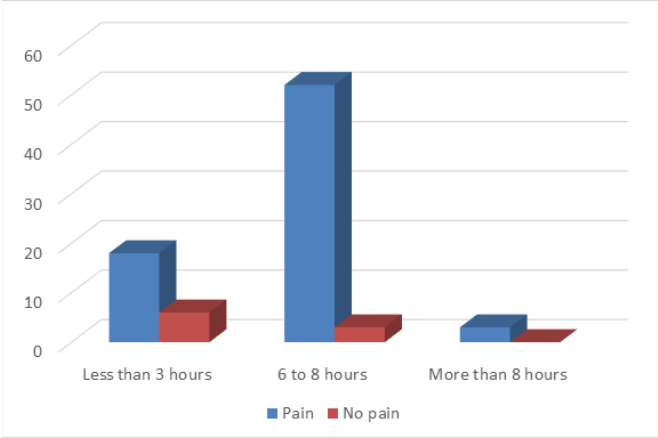

Fig 1: Represents the distribution of participants suffering from lower back pain regarding the number of working hours daily.

According to the results of Chi-square and Fisher-exact tests, there was no significant difference between the pains of neck, shoulder, and lower back with each of age, gender, and speciality, years of experience (p value≥ 0.05). Also, the pains of neck and shoulder were not significantly associated with the number of working hours daily (p value= 0.87; p value= 0.65; respectively), while the lower back pain was (p value= 0.031), Figure 2.

Additionally, there was no significant association between the position of the neck (neutral position or

bent forward) during the work and the pain of the neck (p value= 1). Further, the shape of the back (C curved or S curved) during the work was not correlated with the pain of neither upper back nor lower back (p value= 0.67, p value= 0.47; respectively). However, doctors who were working with flexed wrist position were suffering from hand/wrist pain significantly higher than those who were working with neutral wrist position (p value= 0.024).

Only a few dentists were aware or had satisfactorily knowledge about ergonomic guidelines, they represent only 15.8 % of sample size.

DISCUSSION

In this study, the most body affected region were the neck and lower back which are compatible with many other studies. Gopnadh et al reported that 73% of participants reported MSDS in neck and back.[7] Tiger et al conducted study among Iranian dentists and found that 83% of participants suffered from cervical pain.[8] Additionally, another study presented that 66% of their included dentists had neck pain[9], another study was done among dentist practicing in Jeddah city ,Saudi Arabia, they concluded that the most common location of MSDs was in low back (85%) and neck (84.6%).[10]

In the present study no significance relation was found between number of working hours daily and pain. However, another study conducted by Gopinadh et al revealed that the percentage of pain increased significantly with the increase of working time.[7] Moreover, Eyvazlon et al study noted a significant impact of working hours on total MSDS.[11] This difference in the results might be related to the period of data collection in our study which was during Corona virus lockdown that was associated with reduced working hours.

In the this study there was no significant difference between pain and participant specialty. On the other hand, in Gopinadh et al study, prosthodontists were found to have more prevalence of MSDS compared to other specialities.[7] Also, in Indian study, they found that more than half of the orthodontists and oral surgeons reported MSDS.[12] In addition, Kumar et al study found that 88% of endodontists reported wrist pain.[9] This contraindication could be attributed to the small sample size in this study, which could not prove the association.

In our study, the pain percentage reported in wrist was more than elbow, 70%, 20% and the wrist pain was the highest value of upper extremity, another study was done by Ohlendorf et al in dental profession in Germany, they reported a high percentage of pain in wrist in comparison with elbow, 30%, 10.7%; respectively.[13]

It had been proven that dental practitioners' awareness and training of ergonomic guidelines contributed significantly to reduce the prevalence of awkward posture among dentist which eventually led to WMSDs, in A Randomized Clinical Trial done by Ana Virginia et al among female dentist they concluded that e ergonomic training , as well as its adaptations to the dental practice provided by the European Society of Dental Ergonomics and other recent studies, contributed significantly to reducing the prevalence of awkward postures adopted by female dentists during the simulation of the basic periodontal procedures.[14]

In the present study Only a few dental professionals had satisfactorily knowledge of ergonomic guidelines (15.8%) ,this result was correlated with other studies, Gandolfi et al in their study among Italian dentist and dental hygienists concluded that a few percentage of dental professionals had acknowledge of ergonomic guidelines(12.7%).[15]

This was the first cross-sectional study in Royal Medical Services of Jordan that studied musculoskeletal pain and ergonomic aspects of dentistry. However, the study has some limitation including; small sample size, the study design was cross sectional study which does not present causative relation between the variables even significant results have shown.

CONCLUSION

This study concluded that the most common affected sites in the body among dentists were neck, lower back, and shoulder; respectively. Further, it was found that dentists who were working with flexed wrist position were suffering from hand/wrist pain significantly higher than those who were working with neutral wrist position.

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