PREVALENCE OF CAUSATIVE FACTORS FOR MUSCULOSKELETAL DISORDERS AND THEIR AWARENESS AMONGST DENTAL SURGEONS

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ABSTRACT

Musculoskeletal disorders (MSD) are a significant occupational health problem in dentists the causes of which are complex and diverse. The aim of this study was to find the level of awareness and prevalence of causative factors of MSD’s amongst Dental Surgeons.

A cross-sectional survey on 140 dentists of the University College Of Dentistry was conducted from November 2013-January 2014. A 10 item questionnaire was used. Data was analyzed using SPSS version 20, chi square test was applied with a cut-off value of 0.05.

Out of 140 subjects 67.1% were familiar with MSD. A total of 99(70.7%) reported pain, (46.4% mild pain, 48.6% moderate pain, 5.1% severe pain). Most common site of pain reported was back/waist (64.5%) followed by neck/shoulder 33.3%.

A strong correlation was found between ill-posture and pain (p-value 0.004). it is recommended that ergonomic strategies should be used for preventing MSD.

Key Words: Musculoskeletal disorders, Dental surgeons, Ergonomics.

INTRODUCTION

Musculoskeletal disorders (MSDs) are one of the most common occupational hazards for the dentists. MSDs are injuries and disorders that may affect the body movements or the musculoskeletal system. World Health Organization defines the term MSD as any health problem of the loco-motor apparatus including all forms of reversible, light, transitory disorder or irreversible, disabling injuries.

The causes of MSDs are complex and diverse and have been a subject of intense debate in recent decades the world over.1-2 The risk factors associated with dentistry include prolonged static postures of neck and shoulder flexion/abduction, lack of upper-extremity support, inadequate work breaks, coping with patient anxieties, precision required with work.3 They also include repetition, force, mechanical stress, vibration from the dental equipment, cold temperature, and extrinsic stress.4 However, the cause and effect relationship between MSD and the risk factors may be hard to determine.1-6

Dentists spend their work days in “awkward” static positions performing extremely precise procedures in approximately 2”x2½” workspace; the patient’s mouth. Since there is no room for error, a steady hand and posture needs to be maintained for a long duration. As at times awkward postures are assumed to maintain a stable hand and position for proper visualization and approach to the working field, this requires more than 50% of the body’s muscle to contract while resisting gravity. This precision comes at a physical cost and when the body is repeatedly subjected to such prolonged static postures (PSP), these repetitive movements could cause overextension and overuse of particular muscle groups, possibly causing muscle fatigue which results in pain in the back, neck and shoulder, injury, or career ending MSD. Bad or static posture is one of the most frequently cited occupational risk factors.1,3,5

Occasional pains from irregular stances or positions are to be expected, however, when the pain becomes a regular occurrence, cumulative damage could arise leading to debilitating injuries.7 An average of 2 out of 3 dental professionals has been reported to experience occupational pain.8,9

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These issues may include reduced working hours and may also lead to inefficient body movements while working resulting in an increase in the time spent per patient. Work-related MSD in severe cases results in frequent absences and finally to early retirement. Nearly one third of dentists who retire early are forced to do so because of musculoskeletal disorders (MSD). In a 2004 study conducted in US, approximately $131 million in lost income was attributed to MSDs in the dental profession. MSD is one of the major occupational health problems in India and estimates have shown that MSD contributes to about 40% of all costs towards the treatment of work related injuries.

Maintenance of dentist’s own health is essential for the health of the patients. A healthy and well-trained dentist can boost a practice’s efficiency and decrease stress for the dental team. Therefore, awareness, preventive measures, early recognition and management on MSD is extremely important. Not only will those engaged in dentistry benefit from a reduction of the chronic trauma often associated with the profession, but society as a whole will reap benefits in terms of efficiency and reliability of dentists and their practices.

The aims and objective of this study were to find the level of awareness about MSD’s and prevalence of causative factors of MSD’s amongst dental surgeons of a private University.

METHODOLOGY

A cross sectional study was done on practicing dental surgeons who had been working for more than 1 year at the University College of Dentistry, the University of Lahore. One hundred and forty dentists took part in this study from November 2013 - January 2014.

A specially designed questionnaire was distributed to the dental surgeons. It consisted of an informed consent and ten questions on factors causing musculoskeletal disorders. Participants were asked questions designed to evaluate the level of awareness and prevalence of MSD causative factors. Salient questions regarding familiarity with the term MSD and different factors contributing in the development of MSD were asked like posture, reaching distance, temperature and background noise. Most common area of discomfort while doing dental procedures were asked. Pain was reported by the participants on a three point scale as mild moderate and severe. The data was entered and results were analyzed using SPSS version 20, chi square test was applied to find the correlation and p-value of ≤0.05 was considered significant.

There were no associated risks in this project. Subjects were given the right to refuse or to withdraw from the study at any time without any drawback or loss of any benefit to which they might otherwise be entitled.

RESULTS

Most subjects out of a total of 140 were familiar with the term MSD, shown in Table 1. Out of the sample of 140 subjects, 72.5% reported that they do feel tired while doing dental procedures, whereas dental procedures didn’t concern 21% and only 6.5% never noticed any problem.

A total of 99(70.7%) out of the 140 sample reported pain. The results show that moderate to severe pain was reported by a considerably large no i.e. 53(53.5%) of those reporting pain. Table 2 reports the association between pain and ill-postures adopted during dental procedures. This value was found to be statistically significant at p<0.004.

Majority of subjects were facing problems regarding back/waist region, while others had effects on neck/shoulder region as well as finger joints. Table 3 shows the common sites of pain reported by this study sample.

### TABLE 1: AWARENESS OF MSD

<table>
<thead>
<tr>
<th>Awareness of MSD</th>
<th>Familiar with term MSD n (%)</th>
<th>Not familiar with terms MSD n (%)</th>
<th>Don't know n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>94(67.1%)</td>
<td>41(29.2%)</td>
<td>5(3.5%)</td>
</tr>
<tr>
<td>n: 140</td>
<td></td>
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</tbody>
</table>

### TABLE 2: ASSOCIATION BETWEEN ILL-POSTURE AND PAIN

<table>
<thead>
<tr>
<th>Participants reporting pain n (99)</th>
<th>Mild Pain n (%)</th>
<th>Moderate pain n (%)</th>
<th>Severe pain n (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>III Posture</td>
<td>46(46.4%)</td>
<td>48(48.5%)</td>
<td>5(3.1%)</td>
<td>0.004</td>
</tr>
</tbody>
</table>

### TABLE 3: COMMON SITES OF PAIN

<table>
<thead>
<tr>
<th>Common site of pain</th>
<th>Back/waist n (%)</th>
<th>Neck/shoulder n (%)</th>
<th>Finger joints n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>64(64.5%)</td>
<td>33(33.3%)</td>
<td>2(2.2%)</td>
</tr>
</tbody>
</table>
In this study majority of the dental personnel’s (83.3%) reported habitual bending of neck, shoulders, elbow and wrists, only 13.8 reported no bending and 2.9% did not notice the bending. Finger pinch grip was frequently used by 65.2% while doing dental procedures whereas 26.8% said no and 8% amongst them never noticed. Dental stools with non-adjusted foot rests were being used by 47.1% while 41.3% used adjusted dental stools.

Out of the total subjects 41.3% reported that their instrument reaching distance for seated procedures was either 15 inches or less than that, while 34.1% reported they had to stretch their arms to reach for the armamentarium. There was a constant noise of vibrational tools or working machines in the back ground of 71% subjects. Negative report regarding this question was given by 23.9% and 5.1% never noticed the noise. In this study 55.8% of subjects were comfortable with their working temperature while it bothered to 42.8%, only 1.4% never noticed about that.

DISCUSSION

When dentistry changed from a standing job to a sit down task, musculoskeletal pain in the neck and shoulder region became more prevalent. However, musculoskeletal pain in the lower back, regardless of occupation, remains a constant cause of loss of work for dentists and should be equally examined. Because dentists spend long hours hunched over their patients with their arms raised and their hands positioned relative to their patients’ mouths, unsupported stress is placed on the muscles of the lower back. A study by McGill explains how prolonged static contractions of the lumbar erector spine decreases oxygenation levels in the muscle, when this happens, lactic acid and metabolites accumulate and results in pain.

A large majority 94(67.1%) of the subjects in present study reported that they are familiar with the term MSD and its implications yet a large number 53(53.5%) were facing some problems while doing dental procedures. This suggests that either they were not familiar with recommended techniques or they were not following proper ergonomic requirements. While those who fell in 2nd category 41(29%); didn’t experience pain while doing dental procedures) were adopting appropriate techniques or probably were very new to the field. As more than 70% of our participants were under the age of 25 years.

There is usually frequent bending while doing dental work, this is one the factors that makes a worker tired and it could have serious implications on the back and waist regions. Habitual bending of neck, shoulders, elbow and wrists was reported by a large number of subjects (83.3%) and only 13.8% reported a straight posture without bending. The most common site of pain encountered in this study was at the back/waist region 64(64.5%), neck/shoulder 33(33.3%), and finger joints 2(2.2%). In this study 94(95%) of the subjects who had pain reported mild to moderate pain and the association between improper posture and pain was found to be statistically significant (p-value 0.004). Evaluation and reporting in this study was subjective in nature, perception of pain as mild, moderate or severe was reported by the participants. This situation however is disturbing considering that majority of the subjects were young doctors (under 25 years).

The results of this study are comparable to the results reported by another local study where 57.8% of the study sample reported backache, 37.5% reported neck ache 29.6% reported shoulder ache. A total of 46.7% of the participants reported they had MSD.

In a similar study by Muralidharan the aim was to determine the prevalence and distribution of MSD among dental practitioners. Overall 78% of the practitioners had a prevalence of at least one MSD symptom over the past twelve months. The most common areas affected with MSD in order of magnitude were the neck (52%), low back (41%), shoulders (29%), and wrists (26%) which is comparable to our study results in which 64.5% of the participants experienced back/waist problems, 33.3% with neck/shoulder complications.

These results are also comparable to some other international studies which reported MSD in dentists; a study in Sweden reported 43%, in Thailand reported 50%, in Hong Kong reported 43% and the one conducted in India reported 41% of their study population to be suffering from MSD.

It is certainly plausible that the difficult work position demand of dentists, including large cervical flexion and rotation, abducted arms, and repetitive precision-demanding handgrips, in comparison to other medical specialists, could lead to the high levels of shoulder-neck discomfort as reported by 33.3% in present study. This study found a positive correlation between improper posture and pain (p-value 0.004). This is supported through a study by Benoist and Lenoir who found that heavy physical jobs including lifting, twisting and repetitive tasks were associated with acute back pain.

More than 47% of this study participants were not using ergonomic adjustable stools while doing their dental procedures. It is to be noted that lack of availability or simply not utilizing the adjustability of chair during procedures, as well as the absence of arm and foot rests results in poor ergonomics and can be associated with back pain. This is comparable to a report on possible health hazards at workplaces in Ohio; United States that found poor dental chair ergonomics was related to back pain among dentists.

Workplace temperature is another contributing factor in developing MSD’s. However, temperature
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can be an area of debate among dental practitioners. It is stated in literature that temperature can play a pivotal role in work productivity by indirectly affecting health. In present study 55.8% of subjects reported that they were comfortable with their working temperature while it bothered 42.8%.

High prevalence of all the causative factors triggering MSD among dental professionals in this study may suggest that more attention should be paid to increase the awareness related to dental ergonomic measures and the recommended postures which should be maintained by dental doctors while doing dental procedures. This would help dentists to carry out their practice in the long run without jeopardizing their health.

The limitations of this study are the small sample size of only 140 dentists and cross-sectional study design. This may be explained on the basis that the study was confined only to one institution. Future studies with large sample size in multiple institutions are recommended to get a better representation of all dentists of Pakistan.

A future study may account for the difference in gender for those experiencing pain after four and eight hours of work as a function of height and weight (BMI) mentioning the work experience of each dentist and then noticing the level of pain while doing dental procedures. Gender based distinction and a comparison between sitting and standing dentistry in dentists reporting pain may be explored.

It is important to emphasize here that there is very little data on such an important topic and only one other local study could be identified by the authors, thus more contributions from the local researchers at large in this respect are encouraged.

CONCLUSIONS

A strong correlation was found between ill-posture and pain (p-value 0.004). There was a high prevalence of back pain among dental personnel in the study sample. Adopting and maintaining ergonomic working posture can lead to better health and productivity of the dentist. All stakeholders should take interest in ergonomic related awareness and development of Standard Operating Procedures (SOP’s) to avoid/minimize MSD’s.

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