Quetelet Index-A Threat to the Dentists

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Abstract

**Aim:** The aim of the study was to assess the presence of musculoskeletal disorders amongst dentists practicing in Jaipur city and to determine the factors contributing towards the occurrence of musculoskeletal disorders.

**Material and methods:** A close ended with few open ended, self-administered questionnaire consisting of 32 questions seeking information about the recipient’s prevalence of pain, practice of dentistry and the musculoskeletal symptoms was completed by all the practicing dentist of Jaipur City.

**Results:** Approximately 73.3% dentists reported having musculoskeletal pain during their dental careers. When pain was compared with the Body Mass ratio or the quetelet index of the individual no significant value was obtained. A higher overall percentage of women reported pain in the neck followed by mid-back than men, and a higher overall percentage of men reported pain in the mid- to lower back regions than women. Dental ergonomics and working postures of dentist were found to be the maximum contributors resulting in pain.

**Conclusion:** It can be concluded that musculoskeletal pain is prevalent among general dental practitioners in Jaipur city. Although no gender variation was observed amongst the prevalence of pain. The results revealed that musculoskeletal pain is multifactorial.

Keywords: Musculoskeletal disorders (MSDs); Dentists; Prolonged static postures (PSPs)

Introduction

The postures, in which a dentist sits, require over half of the body’s muscles to work to hold the body motionless while resisting gravity. The static forces resulting from these postures have been shown to be more taxing than dynamic forces. Therefore, when the supporting muscles begin to reflect fatigue, a process of pain and discomfort begins and could very well lead to musculoskeletal injury. An article by Valachi and Valachi [1] cited a flowchart of muscle activity and pain leading to a musculoskeletal disorder: Prolonged Static Posture→ Muscle Fatigue and Muscle Imbalance→ Muscle Ischemia/Necrosis, Trigger Points and Muscle Substitution→ Pain→ Protective Muscle Contraction→ Nerve Compression, Spinal Disk Degeneration→ Musculoskeletal Disorder. Muscle imbalances could result from an awkward posture. In a steady posture a slight forward bend with the neck and head tilted in an effort to get a better view, while the arms are elevated and unsupported. As this posture becomes the normal working position, the muscles responsible for supporting the working posture become stronger and shorter while the contrasting muscle group becomes weaker.

Musculoskeletal disorders (MSDs) are the most common occupational illness in world, countries like Great Britain, affecting 1.0 million people a year. They include problems such as low back pain, joint injuries and repetitive strain injuries of various sorts. Around 2% of the UK’s population experiences back pain [2].

Musculoskeletal symptom (MSS) may be defined as pain commonly experienced by dentists in the course of their career [3]. The musculoskeletal health of dentists has been a subject of many studies world over, with pain experience as the main focus. Westgaard [4] and Lehto et al. [5] attributed work-related musculoskeletal pain as being of multifactorial origin. Musculoskeletal symptoms of dentists are assessed by a multi disciplinary approach. It was thought that the occurrence of MSS is posture related. In a study in New South Wales, Australia shows 59% of the dentists who participated in the study reported trunk pain during the previous month. A survey of dentists in Southern Thailand by Rising et al. [6] reported that 63.3% had experienced back pain.

Dentists often cannot avoid Prolonged Static Postures, or PSPs. Even in optimal seated postures, more than one-half of the body’s muscles are contracted statically, and there is little movement of the vertebral joints. This may result in damaging physiological changes (micro changes) that can lead to back, neck or shoulder pain or Musculoskeletal Disorders, or MSD (macro changes).

The present study intended to assess presence of musculoskeletal disorders amongst dentists practicing in Jaipur city using a questionnaire, to determine the factors contributing to the occurrence of musculoskeletal disorders, to provide guidelines regarding prevention and management of musculoskeletal problems and create awareness amongst dentists in Jaipur city.

Material and Methods

All the registered practicing dentists in Jaipur city were included for the study. Two hundred and forty, practicing dentists in Jaipur City were included in the study to which the self administered questionnaire was taken by the author personally.

Prior to being finalized, the questionnaire was pilot-tested on a group of thirty, MDS staff members of authors institute to ensure clarity and validity. Certain questions which were found to be irrelevant were deleted and those questions which were incomprehensive were modified/ rephrased to suit the comprehension level of survey subjects.

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Received October 20, 2009; Published November 26, 2012

Citation: Anup (2012) Quetelet Index-A Threat to the Dentists. 1:526. doi:10.4172/ scientificreports.526

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Results

Of the 240 (125 M and 111 F) dentists surveyed 236 responded (response rate of 98.3%) in Jaipur city. The mean age amongst men was 34.3 years and amongst females was 33.7 years. Of the total 165 (69.9%) were B.D.S. while the remaining 71 were M.D.S. (30.1%).

When the body weight and mass of an individual was compared to the prevalence of pain 107 dentists out of 173 were reported to be overweight. Ninety one of these 107 (85%) reported pain. Whereas 19 (9.8%) of the dentists reported pain at night and in winters (i.e. 88 out of 173 (50.8%).)

The percentage of pain was higher amongst dentist i.e. 42.7% taking breaks after 2-3 hrs as compared to those who took breaks after every patient or procedure. When the questionnaire was subjected to univariate and multivariate analysis it revealed a risk factor of 2.59 (1.31-4.62) amongst dentist receiving no breaks during the day (Table 6).

The written permission was obtained from the principal to conduct a pilot study amongst the MDS staff of the college and for the main study amongst the practicing dentists in Jaipur city.

To determine the musculoskeletal pain, a close ended with few open ended, self-administered questionnaire was framed. The questionnaire consisted of 32 questions seeking information about the participant’s prevalence of pain, practice of dentistry and the musculoskeletal symptoms. The questionnaire also included questions assessing the knowledge and awareness of dentists about occupational hazards in dentistry. The first section was designed to collect general information regarding the presence or absence of body pain in dentists. Information regarding the dentists duration of time in practice, the dental school attended, previous posture tuition, type of chair used, if breaks were taken and methods they had taken to alleviate pain were also gathered.

The questionnaire was designed to take approximately 10 minutes to complete. Chi-square tests using an alpha level of 0.05 were used to compare frequencies of responses in a range of categories.

The data was analyzed using common database and statistical software. For each of the parameters in the questionnaire, the percentages, means and standard deviations for each dentist for both men and women were calculated. The differences among dentists based on gender using χ2 analysis for proportions and analysis of variance (ANOVA) for means was analyzed.

The table 3 and 4 shows the Prevalence of Pain and Absence from work respectively amongst dentist receiving no breaks during the day.

Table 1: Distribution and mean age of dentists (in years).

<table>
<thead>
<tr>
<th></th>
<th>Total (236)</th>
<th>Male (125)</th>
<th>Female (111)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (Years)</td>
<td>34.05</td>
<td>34.35</td>
<td>33.7</td>
</tr>
<tr>
<td>Minimum (Years)</td>
<td>22</td>
<td>22</td>
<td>23</td>
</tr>
<tr>
<td>Maximum (Years)</td>
<td>84</td>
<td>84</td>
<td>72</td>
</tr>
</tbody>
</table>

Table 2: Gender difference vs. pain.

<table>
<thead>
<tr>
<th>GENDER</th>
<th>PREVALENCE OF PAIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male (125)</td>
<td>72.8%</td>
</tr>
<tr>
<td>Female (111)</td>
<td>73.9%</td>
</tr>
</tbody>
</table>

Table 3: Prevalence of Pain vs. BMI.

<table>
<thead>
<tr>
<th>Position of knee</th>
<th>No./percentage of dentists</th>
<th>Pain(%)</th>
<th>No pain(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right position (90)</td>
<td>145(61.4%)</td>
<td>33.1%</td>
<td>66.2%</td>
</tr>
<tr>
<td>Wrong position (&gt;90&lt;90)</td>
<td>91(38.5%)</td>
<td>57.1%</td>
<td>42.2%</td>
</tr>
<tr>
<td>Position of back while standing</td>
<td>163(69.1%)</td>
<td>33.1%</td>
<td>66.2%</td>
</tr>
<tr>
<td>Right position</td>
<td>45.4%</td>
<td>52.8%</td>
<td></td>
</tr>
<tr>
<td>Wrong position</td>
<td>97(41.1%)</td>
<td>45.4%</td>
<td>52.8%</td>
</tr>
</tbody>
</table>

Table 4: Prevalence of pain in relation to different working positions.

<table>
<thead>
<tr>
<th>Absence from work</th>
<th>YES</th>
<th>NO</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>30(42.3%)</td>
<td>52(57.7%)</td>
<td>90</td>
</tr>
<tr>
<td>Female</td>
<td>21(25.4%)</td>
<td>62(74.6%)</td>
<td>83</td>
</tr>
<tr>
<td>Total</td>
<td>51(34.1%)</td>
<td>114(65.8%)</td>
<td>173</td>
</tr>
</tbody>
</table>

Table 5: Absence and duration of absence from work.
Discussion

The results show that a high percentage of dentists report some type of musculoskeletal pain. Out of the total 240 dentists 236 responded to the questionnaire. The response rate from the questionnaire was high, i.e., 98.3% being returned. The response rate according to the present study was high as the forms were personally taken to the dentist and were not mailed or posted as in the study performed by Rising et al. [6] in 2005.

An analysis of the results showed that 73.3% of dentists have experienced musculoskeletal pain. This is very high and a worry for current and future dentists. Furthermore, a review article on sex differences in chronic musculoskeletal pain showed a higher percentage of neck/shoulder pain in women than in men, and a higher prevalence of mid-lower back pain in men than in women in the general population [7]. In a study by Xu et al. [8] neck/shoulder pain was reported 49/47% for females and 29/27% for males. The present frequency of trouble in neck, shoulder and lower back were similar to frequencies reported for dentists in other countries (Lehto et al. [5]; Rundcrantz et al. [9]; Milerd and Ekenvall [10]; Shugars et al. [11]). Regarding lower back trouble, the dentists had a higher frequency of complaints than the Scandinavian working population (approx 40%).

A study, reports of pain with number of years in dental school by Rising et al. [6] showed that the persistence, duration and frequency of pain increased from the first to the third year of dental school. In addition, the perception that dental procedure aggravating the pain increased with each year in dental school.

The traditional approach for prevention and management of dental related musculoskeletal pain is provided by Valachi and Valachi [1] to adopt a proper sitting posture, reduce large scale movements and engage in periodic stretching. The recommended sitting position is one with feet flat on the floor, torso vertical and a 90° angle between the calf and the thigh. It is suggested that the patient’s mouth should be only slightly above the dentist’s elbow height. As evidenced by pain survey data, the concept of proper sitting posture (whether utilized or not) has not eliminated pain in the dental community. This is the most likely result from the preference of many dentists, for direct view during certain portions of procedures, because of increased speed and/or accuracy. The unwillingness of many dentists to tilt the patients head or adjust the patients sitting angle may contribute to stained musculoskeletal positions for the dentist. Several ergonomic investigations conclude that the least strained sitting position features an inclined backrest (130°), lumbar support and arm rests. However, others claim a detrimental effect from arm support due to stain on an inclined backrest (130°), lumbar support and arm rests. However, investigations conclude that the least strained sitting position features an inclined backrest (130°), lumbar support and arm rests. However, investigations conclude that the least strained sitting position features an inclined backrest (130°), lumbar support and arm rests. However, investigations conclude that the least strained sitting position features an inclined backrest (130°), lumbar support and arm rests. However, investigations conclude that the least strained sitting position features an inclined backrest (130°), lumbar support and arm rests. However, investigations conclude that the least strained sitting position features an inclined backrest (130°), lumbar support and arm rests. 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A two page pamphlet was formulated, inclusive of the normal anatomy and physiology of neck and back, the general cause for the pain and the recommended guidelines for working in the right position followed by the stretching exercises in order to help prevent musculoskeletal pain amongst dentists. These hand outs were then handed over to all the dentists practicing in Jaipur city personally [17,18].

Further studies also should include longitudinal reports of body pain in student’s population entering dental practice. Furthermore, the interplay between mechanical-ergonomics factors and mental stress should be investigated in both men and women, since data support sex differences. Before we can develop strategies for prevention of and intervention in musculoskeletal pain conditions related to the dental profession, we must understand the role of the various factors and their interaction in the appearance, maintenance and exacerbation of these chronic conditions of each sex.

References


