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Original Article

Muscular Pain Among Dentists- A Pilot Study

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Abstract

Background: Muscular pain is the most common symptom associated to muscular skeletal disorders (MSDs). Dentists were exposed to ergonomic hazards while treating the patients. Without proper dental ergonomics, they are predisposed to the MSDs. **Objective:** This present study was designed to analyse the prevalence of muscular pain among practising dentists in Universiti Teknologi MARA (UiTM) and it relatedness to ergonomic factors. **Methodology:** A total of 25 dentists were participated in this pilot study. The inclusion criteria include working experience of at least six months and those who were readily diagnosed with musculoskeletal disorders were excluded. A self-administered questionaire was employed to gather demogaphic informations and close ended (“yes” or “no”) questions were asked to assess the muscular pain experienced in the last 12 months. The collected data were then analysed statistically. **Result:** The result showed a 100% response rate. 92% of the respondents were reported to experience muscular pain, particularly on the upper body parts. Only maintenance of same postures without microbreaks and performing torsions or cervical flexions to improve vision of oral cavity correlate significantly ($P<0.05$) to the presence of muscular pain that respondent experienced. However, age, nature of work and high woking hours per weeek does not correlate to the muscular pain. **Conclusion:** The prevalence of muscular pain among dentists in UiTM is high which indirectly suggested the lack of dental ergonomic awareness and practice in their routine at work.

Keywords: *Ergonomic, muscular pain, musculoskeletal disorders*

Introduction

The MSDs is defined as musculoskeletal discomfort, symptoms or pain sensation at certain areas of body such as the neck, shoulder, limbs and lower back of body (1). It is a commonly discussed issue among dentists. Conditions such as fractures, contusions, abrasions, and lacerations resulted from physical contact of extraneous objects to body surfaces are excluded from the context of MSDs (2). MSDs most commonly reported as presence of muscular pain (OSHA 3). The pain sensation felt was resulted from injuries or disorders of muscles, nerves, tendons, joints, cartilage or structures that support the upper and lower limbs, neck and lower back (2). The severity of MSDs can be varied from mild to severe which was caused and/or exaggerated by sudden sharp turning or prolonged exposure to physical factors (3). Carpal Tunnel Syndrome is an example of MSDs associated with dental profession with the involvement of nerves, tendons and muscles (4).

The MSDs is not limited to the dentists. The same issue was also affecting the physicians and surgeons (5). However, the dentists were at higher risk for work-related MSDs (6). This

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fact has drawn serious concern to many organizations including the National Institute for Occupational Safety and Health (2). Throughout the world, MSDs has been reported to affect two out of every three dentists at various degree of severity (7), which later contributed to their early retirements from service (8). It is believed that practicing good ergonomic at work place would offer preventive measure against this occupational health, thus the MSDs (2).

Dental ergonomics is the term used to describe ergonomic practice in dental profession (9). It covers many aspects from the correctness of various postures of dentist at work, positions of daily used dental equipments including the dental chair, arrangement and selection of equipments up to the scheduling of dental procedures between the hard or long cases with the simple or short ones (7). However, workplace is only one factor whilst the risk factors of MSDs are multifactorial. Posture at work seem to play a big role as the discomfort or pain sensed was mainly attributed by prolonged non-neutral work postures and high static muscle activity besides repetitive or stressful motions of hand and wrist (Abduljabbar, 2008 (10). In reality, although dentists always strived to maintain a neutral and balanced posture, they often end-up in awkward postures. Gambhir et al., have reported that strained posture while working (both while standing and sitting close to a patient) would have put an extra burden on the spine and limbs thus resulted in negative effects on the musculoskeletal and peripheral nervous systems (11). The pain perceived was possibly due to ischemic condition resulted from activities that exerted asymmetrical forces applied on the spinal column (12).

In the bigger picture, the risk factors of MSDs include the personal factors, equipment and environment at work place (13, 14). In a daily routine work of a dentist for an instance, dental procedures always involved and required repetitive motions of the fingers and wrists as well as prolonged awkward postures in a limited working area (14, 15). On top of that, routine dental procedures such as cavity preparations, restorations, scaling and extractions demanded for precise motor skills with intense hand-eye coordination (14). Any one of the said factors is a known risk factor for MSDs. Besides, working in the same posture for long hours during dental procedures is another important factor (10). Although there are reports on the prevalence of MSDs among dentists worldwide, there are limited data addressing dentists in Asia thus in Malaysia. This pilot study was undertaken to find the prevalence of muscular pain among practising dentists in Universiti Teknologi MARA (UiTM) and it relatedness to ergonomic factors.

Materials and Methods

An informed consent form and questionaire adapted from Kanteshwari et al. (2011) was distributed between January and February 2013 to practising dentists in UiTM. The data collected was based entirely on the perceptions and self-reports from the respondents. Their reports were based upon their routine practices, equipment configurations, posture and positioning profiles, medical histories, personal exercise habits, and musculoskeletal symptoms experienced if any. This questionnaire required about 5 minutes to be completed. The questionnaire consisted of self-administered section for demographic data and followed by closed-ended questions with “yes” or “no”

options for the rest of the questionaire.

At least six months of clinical work experience was required to participate in this study. Presence of muscle pain is determined with any pain percieved in the past 12 months period. On the other hand, respondents who were readily diagnosed with MSDs and those aged more than 65-year-old was excluded from this research. The data collected were then analysed through descriptive and inferential statistics by using SPSS version 21. Association between the respondents attributes were determined using Pearson chi-squared statistic. The P value was set at 0.05 with 95% confidence interval.

Results and Discussion

A total of 25 questionnaires were distributed among the dentists in UiTM Shah Alam with 100% esponse rate. The respondents were consisted of 7 male and 18 female dentists with 84% of them are specialists. Age distribution and clinical working hours per week for all the respondents were displayed in figure 1 and figure 2 respectively.

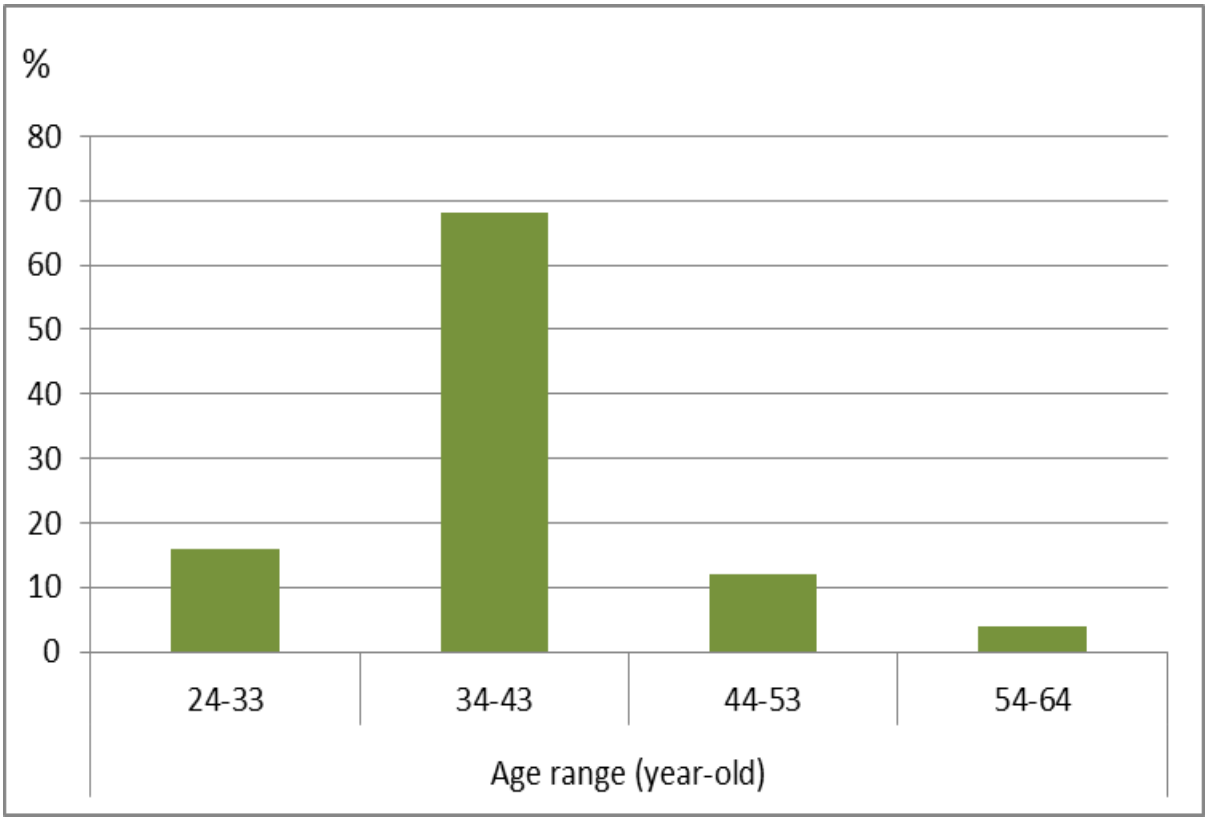

Figure 1: Distribution of age range among dentist in UiTM (n=25)

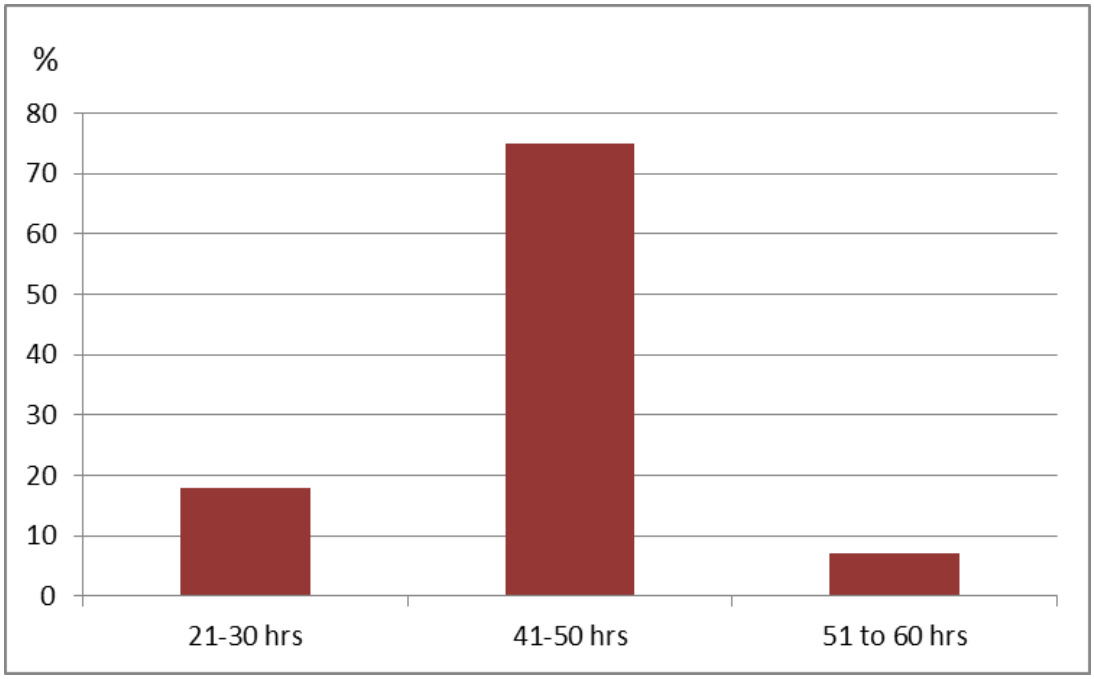

Figure 2: Working hours in clinic per week among dentist in UiTM (n=25)

Ninety two percent of the respondents were reported to experience muscular pain on various areas. Figure 3 shows the prevalence of muscular pain based on the areas of body they perceived. The remaining 8% of the respodents were muscular pain-free and claimed to practise several dental ergonomic in daily work. The dental ergonomic they practised is listed in table 1.

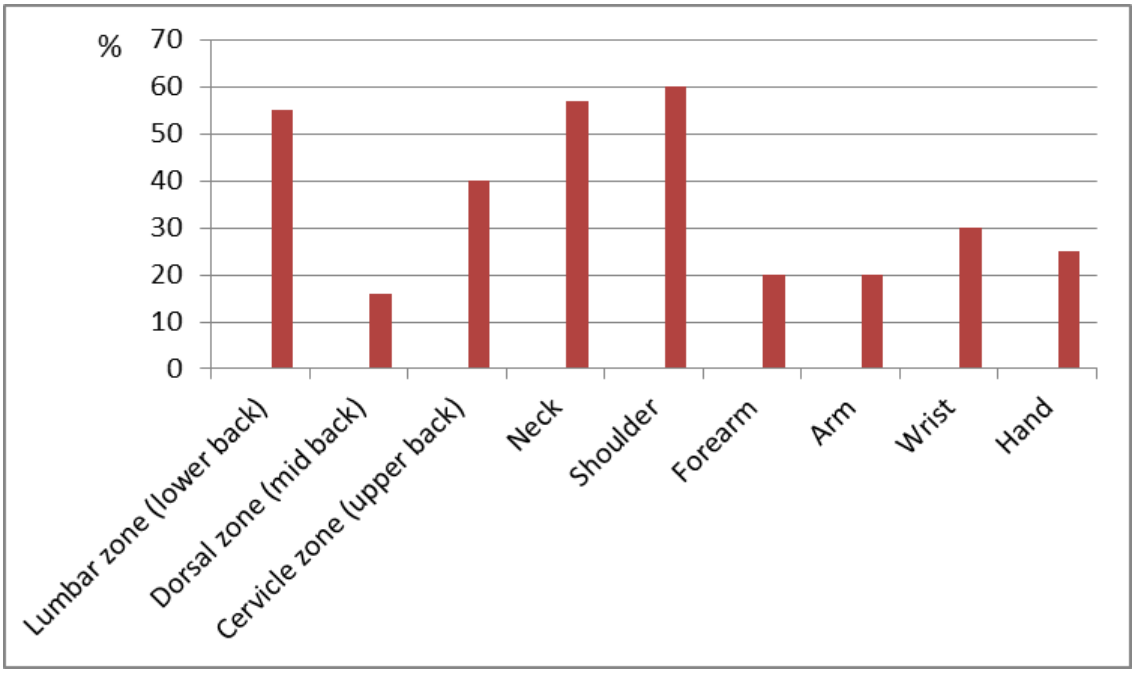

Figure 3: Musculoskeletal pain among dentists in UiTM based on its location

Dental ergonomic practices of muscular pain-free respondents
Sufficient light at workplace
Instruments are placed within easy reach
Work instruments are in optimal conditions so no need to do extra work
Position the chair to maintain an ergonomic posture
Adjust the chair so that your thighs are parallel to the floor
Adjust the patient's chair when accessing different quadrants
The instruments placed within hand reach without making strenuous movements
Aware that the dental stool used in the clinical practice can be ergonomically regulated for the individual needs
Work stool is comfortable
Use hand instruments with larger-diameter handles
Use a surgical magnification system when necessary

Table 1: List of correct ergonomic practices among muscular pain-free dentists in UiTM

Some of common doings of respondents that caused muscular pain were identified. The actions of maintenance of same postures without microbreaks and performing torsions or cervical flexions to improve vision while working in oral cavity were significantly ($P<0.05$) correlate to the muscular pain they experienced.

Discussion

This research examined the prevalence and distribution of muscular pain among dentist in UiTM. The result showed high prevalence (92%)of muscular pain among the respondents. The result was in agreement with Dayakar et al. (2013) who reported a slightly higher prevalence of 93.9% (16). On the other hand, unlike other researches that reported highest prevalence of neck pain (2, 17), our result showed highest prevalence of shoulder pain and followed by neck pain. For comparison, Dayakar et al. (2013) reported highest prevalence of back pain and followed by neck pain and shoulder pain. The location of pain perceived by the denstists were believed to be sourced to their practice at work. Different way of setting and posture would resulted in pain at different area. Besides that, Gupta et al. (2013) reported similar pain pattern of occurance in all dental workers, not only in dentist but also in dental hygienist and dental assistants. In our study, the highest prevalence of shoulder pain may be contributed by handling of small instruments during treating patients which required awkward arm and shoulder positions

to reach specific regions within the mouth. The action would have put inevitably increased load on the shoulder which later resulted in the pain (17). In general, the high prevalence of muscular pain was very worrying as it contributed to the development of MSDs in the future (18). For a comparison, computer workers, who have a similar sedentary working posture, have been found to have a comparable prevalence of 65.7% with highest prevalence of neck pain (19). Both professions seemed to involve sitting postures at work. Interestingly, the high prevalence of muscular pain may be due to lack of awareness on ergonomics at work (14) and therefore translated in poor ergonomic practice. In the same view, NIOSH have addressed the issue and outlined the prevention of MSDs among dentists is through dental ergonomics.

Gupta et al. (2013) highlighted that the aim of ergonomic is to find the best fit between workers and their working conditions. Since MSDs are multifactorial, association between some known factors were tested. Based on the analysis of our results, there was no association between age, nature of work and working hours to muscular pain. Feng et al. (2014) however found that age factor did contributed to muscular pain in which the older the individual, the higher the prevalence of muscularskeletal symptoms. On another note, the results of this study revealed that only maintenance of same postures without microbreaks and performing torsions or cervical flexions to improve vision of the oral cavity during dental procedures significantly ($P<0.05$) associated to muscular pain in the dentists. Prolonged posture without microbreaks with no ergonomic intervention and with times, may caused pathologies such as tendinitis, synovitis, tenosynovitis, and bursitis (14). It is well known that dental pocedures do require adequate vision exposure for a good visual of the targetted tooth strucutres which often forced the dentists to be in awkward and static postures for a period of time (NIOSH). Such occuptional hazard however caused muscular pain that may progress to MSDs, in which can lead to long-term disability (20). It was interesting that respondents who claimed were free from muscular pain, do practiced dental ergonomic. Their practices however, were limited to selection and positioning of dental instruments at workplace (table 1). Nevertheless, it seemed adequate to prevent muscular pain. Possibly, the ergonomic practiced did ease the static loading of the neck and hinders awkward positions of the hands which were some of the suggested dental ergonomic put forwarded by NIOSH as prophylaxis to muscular pain and therefore MSDs. Efforts to increase the attention and awareness of MSDs in individuals within dental profession was therefore appropriate (18).

Conclusion

Dentists are more vulnerable to occupational health hazards due to the need of the dental profession itself compared to other health care giver. Among many, MSDs represented a major occupational health issues for dentists worldwide and reports have revealed the necessary need to create awareness of ergonomics as effective measures for reducing MSDs among dentists. In conclusion, the high prevalence of muscular pain among dentist in UiTM indirectly reflected the lack of dental ergonomic awareness. The maintenance of static posture and performing torsions or

cervical flexions to improve vision seemed to be the contributing factor to the muscular pain among the respondents. Since it was well described in literatures on how poor ergonomics at work resulted in MSDs and prevention through the implementation of dental egonomic worked, awareness among dentist perhaps should be promoted.

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