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ORIGINAL ARTICLE

Prevalence of and risk factors for musculoskeletal complaints among Taiwanese dentists

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Abstract *Background/purpose:* The prevalence of musculoskeletal disorders (MSDs) was investigated among dentists in Taiwan, and risk factors for MSDs were evaluated for symptoms in different parts of the body.
Materials and methods: The Nordic musculoskeletal questionnaire modified by the Taiwan Institute of Occupational Safety and Health was completed by 197 dentists (146 males and 51 females) from the members of three groups: the Association of Oral and Maxillofacial Surgeons ($n = 33$), the Association of Family Dentistry ($n = 55$), and the Taichung County Dental Association ($n = 109$). Reported symptoms were compared by means of a Chi-square test according to various risk factors.
Results: More than half of the respondents had experienced symptoms in the shoulders (75%), neck (72%), and lower back (66%) in the year before the survey. The three parts of the body with lower prevalence (13–15%) of trouble were hips/thighs/buttocks, knees, and ankles/feet. Seven percent of respondents indicated no trouble in any part of their bodies. The prevalence of trouble in the neck increased when the number of days worked per week increased. Risk factors ($p < 0.05$) included working in a medical center for the shoulders; working with no more than one dental assistant, having a body height of >178 cm, and having a mean working time of >10 min/patient for the elbows; being <36 years old, having <11 years of experience, and having a mean time for forward bending or using a handpiece/scaler per patient for the wrists/hands; working 7 d/wk for the lower back and knees; having a patient load of >20 patients/d and being >35 years old for the hips/thighs/buttocks; and a having mean working time of >48 h/wk for the lower back.

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Conclusion: The participating Taiwanese dentists seemed to suffer a high prevalence of MSDs, especially of the shoulders, neck, and lower back. There were various associated factors and correlations with MSDs in each part of the body.

Introduction

The issue of musculoskeletal disorders (MSDs) is an important occupational health problem in all sectors, including healthcare industries and modern dentistry.[1] MSDs can affect the body's muscles, joints, tendons, ligaments, and nerves from the neck to the feet. Health problems range from discomfort, minor aches, and pains, to more serious medical conditions resulting in significant social and economic consequences, such as reduced quality of dental treatment, absence from work, and even leaving the profession.[2,3]

Several reports reviewed the prevalence of MSDs among dentists and dental hygienists.[1–3] Prevalence of MSDs among dental-care teams ranges from 46% to 93% around the world.[2] The part of the body of dental professionals affected most often might be the shoulder (21–81%), and the prevalence of neck pain was in the range of 19.8–68%. The lowest value (19.8%) had been reported among Saudi Arabian dentists in a 2003 report,[4] but that increased to 67.9% in a 2008 report.[5] However, there is still no clear information about the prevalence of MSDs among Taiwanese dentists.

In addition to studies concerned with MSDs among dental professionals, some surveys focused on problems among dental and dental-hygiene students.[6,7] Compared to professionals, students had a lower prevalence of MSDs, indicating that the prevalence of MSDs would increase when students graduated and began to develop their professional dental careers.

As dentists continue to suffer a high prevalence of MSDs and related studies are still quite limited, we need to understand fully the nature of MSDs among Taiwanese dentists, and identify the causative factors and correlations with MSDs.[1,2] In this study, the prevalence of MSDs was investigated among dentists in Taiwan, and risk factors for MSDs were evaluated for symptoms in different parts of the body.

Materials and methods

The standardized Nordic musculoskeletal questionnaire (NMQ)[8,9] was administered to dentists. The NMQ was translated into Chinese,[10] and its reliability was found to be acceptable.[11,12] An anatomical diagram with nine specifically shaded areas was included in the NMQ, including the neck, shoulders, upper back, lower back, elbows, wrists/hands, hips/thighs/buttocks, knees, and ankles/feet. A 1-year recall of MSDs was used in this study, as this was shown to be an appropriate time scale in Taiwan,[10] Japan,[13] Korea,[14] Saudi Arabia,[5] Australia,[15] and Denmark.[16] In addition, the questionnaire contained general items such as gender, age, seniority, and working conditions, including the work place, frequencies and duration of work tasks, number of dental assistants, and durations of being in a bent position and using handpieces.

The NMQ was distributed to the members of three dental professional groups, including the Association of Oral and Maxillofacial Surgeons (AOMS), the Association of Family Dentistry (AFD), and the Taichung County Dental Association (TCDA), when they attended the annual conference of the respective associations in 2009.

Data analysis

A database was designed using Microsoft Excel (Redmond, WA, USA), and data were analyzed using SPSS version 13.0 software (SPSS Inc., Chicago, IL, USA). Descriptive data were reported as frequencies and percentages. Reported symptoms were compared by means of a Chi-square test according to the various risk factors.[5] The 95% confidence interval (CI) of the prevalence rate of musculoskeletal complaints was calculated by the following equation:

$$95\%\ \mathrm{CI} = 1.96 \times \sqrt{\frac{p * q}{n}} \quad (1)$$

where p is the prevalence rate, q is $1 - p$; n is the sample size, i.e., 197; and 1.96 is the z value for a CI of 95%.

Results

Clinical practice characteristics

During the conferences, effective responses from 197 dentists were received. Tables 1–4 summarize dentists' background information and professional characteristics. Among the respondents, 146 (74.1%) were male and 51 (25.9%) were female (Table 1). Nearly half of the dentists (45.2%) were 161–170 cm tall and more than one-third (35.5%) were 171–180 cm tall. Four dentists were taller than 180 cm. Values of the body mass index (BMI) of over half (52.3%) of the dentists were in the normal range (18.5–24.0), and 11.6% were obese.

Over one-third (34.5%) were 31–40 years old, and had graduated between 2001 and 2008 (34.5%) and between 1991 and 2000 (34.0%) (Table 2). More than 50% had worked for less than 10 years, 30.5% had worked for 10–20 years, and 19.3% had worked for more than 20 years. Nearly one-fifth (17.2%) of participants had a master's or PhD degree.

Among the 197 dentists, 59 (29.9%) said that they worked in a specialty, almost all of whom were in oral surgery (Table 3). About one-half (46.2%) worked with one