Work related musculoskeletal disorders among dentists at the university dental clinic in Skopje

Vasilka Rendžova, Sonja Apostolska, Marina Eftimoska, Biljana Džipunova, Vesna Filipovska
Ss. Cyril and Methodius University, Faculty of Dental Medicine, Skopje, R Macedonia

SUMMARY
Introduction Musculoskeletal disorders (MSDs) are one of the most common types of work-related diseases that affect health workers, especially dentists. The aim of our study was to examine the presence of musculoskeletal disorders among dentists at the university dental clinic in correlation with risk factors.

Materials and methods A questionnaire survey was carried out among 78 dental practitioners aged between 20 to 60 years old, employed at the university dental clinic. Questions included data on physical and psychosocial workload, perceived general health and occurrence of musculoskeletal complaints in the past 12 months, chronic complaints, frequency and length of breaks, exercising habits as well as medical care seeking.

Results Pain in the back, neck and shoulders (84.6% / 85.9%) was the most common complaint among the majority of respondents, while reduced range of movement was noticed among significantly fewer subjects, mostly between 40-60 years of age. Prolonged statistic position was considered to be one of the main causes of MSDs (82.05%) while 73.08% of respondents stated at least two more reasons beside this one.

Conclusion The percentage of MSDs prevalence among dentists in public health sector is high. More extensive surveys should be undertaken to cover larger group of dentists from both private and public sector, in order to obtain complete analysis of the prevalence of occupational disorders in our country.

Keywords: dentists; ergonomics; musculoskeletal disorders

INTRODUCTION

According to the US department of Safety and Health Administration musculoskeletal disorders (MSDs) develop as a result of imbalance between the level of demand of physical effort at the workplace and physical capacity of worker [1]. Despite having physical and psychological effects, professional disorders can impact worker’s economic state and wellbeing on a larger scale, which contributes to more frequent absence from work and early retirement [2]. Some of professional hazards in dentistry are exposure to chemical substances, radiation, dangerous biological materials and inadequate body positioning during work. Based on data received from the Occupational Information Network and US Department of Labour database, dentistry was ranked as profession that has the worst impact on the health of workers [3].

Musculoskeletal disorders are one of the most common types of work-related diseases that affect health workers, especially dentists. There are multiple factors that contribute to development of musculoskeletal disorders among dentists [4]: continuous movements, insufficient lighting, improper body position during work, psychological stress, genetics, physical conditions, age and weight [5, 6].

Ergonomics is a science about design of products and regulations that assure maximal utility and safety during work. It also studies relationship between workers, equipment and work environment. The implementation of ergonomic conditions and principles in the work place is important element in the prevention of musculoskeletal disorders and improvement of productivity and effectiveness of dentist for a longer period of time [7].

The aim of our study was to examine the presence of musculoskeletal disorders among dentists at the university dental clinic in Skopje in correlation with work-related risk factors.

MATERIAL AND METHOD

This study examined 78 dental practitioners aged between 20 to 60 years old, employed at the public health institution Dental Clinic Centre. They were given a Standard Nordisk Questionnaire consisting of two parts [8]. The first part consisted of questions regarding the musculoskeletal disorders, the presence of genetic predisposition, the frequency of painkiller usage and questions regarding diagnosis and request for medical help among patients with these disorders.

In addition to the Standard Nordisk questionnaire, another questionnaire was distributed. This questionnaire...
addressed frequency and length of breaks, position of body during work, exercising habits, wearing orthopedic shoes and utilization of alternative methods for improving health. The obtained results were analyzed with descriptive statistical analysis.

RESULTS

The research was conducted on 79.59% (79/98) of the total number of dental employees at the University dental clinic, Skopje. Employees that did not participate in the research were absent due to illness, lack of time or other subjective reasons. The sample consisted of specialists 87.18% (oral surgeons, prosthodontists, orthodontists, pedodontists, periodontologists and endodontologists) and 12.82% general dentists. Most of the participants held a postgraduate degree (MSc, PhD).

Gender distribution among the participants was not equal. 73.08% of respondents were female at age 20-60, with an average working experience of 16.9 years. The average working experience of male participants was 17.24 years. Furthermore, the amount of effective working hours among 82.05% of the respondents was 30 hours per week, while 7.95%, out of which were mainly male respondents, worked effectively for 40 hours per week.

Table 1 shows work related reasons that caused musculoskeletal disorders or discomfort. 57.69% of respondents showed genetic predisposition. 82.05% of respondents spent significant amount of time in the same position while working, 52.56% respondents reported that their work required investing lot of strength, 62.82% reported their work required repetition of movements. Furthermore, 66.67% of the respondents reported exposure to constant machine vibrations as a part of their everyday work, while 73.08% described two or three work-related conditions at the same time.

Another part of our research focused on pain and other complaints related to the musculoskeletal system (Table 2), where 66 respondents (84.61%) reported pain in the lower back, out of which 33.33% reported back pain in the last 12 months. Upper back pain was noticed among 60.26% of respondents, of which 19.23% have been experiencing pain in the last 12 months. 14.10% of respondents had reduced movements, all of the age group of 40-60 years with an average length of working experience of 22.5 years. None of the respondents from the age group of 20-40 years reported presence of upper back pain. The majority of respondents (85.9%) of both age groups reported the presence of shoulder and neck pain. Moreover, 28 (35.9%) examinees reported pain in hand fingers, while 14% of examinees experienced reduced hand strength, while holding instruments. All subjects had multiple musculoskeletal conditions. 47.44% of respondents used painkillers often and 33.33% of respondents used painkillers on occasional basis. However, despite the high prevalence of complaints among respondents related to pain in different parts of the MS system, only 37.18% sought professional help and have been diagnosed with MSD.

The results further showed that 51.28% of respondents were familiar with ergonomic principles of work, while 43.59% were more informed. Partial application of ergonomic principles was noticed among 55.13% of respondents and only 14 respondents (17.95%) fully applied them during work. Another finding was that most of respondents (67.97%) worked in both positions, seating and standing. Employees that did not participate in the research were absent due to illness, lack of time or other subjective reasons. The sample consisted of specialists 87.18% (oral surgeons, prosthodontists, orthodontists, pedodontists, periodontologists and endodontologists) and 12.82% general dentists. Most of the participants held a postgraduate degree (MSc, PhD).

Gender distribution among the participants was not equal. 73.08% of respondents were female at age 20-60, with an average working experience of 16.9 years. The average working experience of male participants was 17.24 years. Furthermore, the amount of effective working hours among 82.05% of the respondents was 30 hours per week, while 7.95%, out of which were mainly male respondents, worked effectively for 40 hours per week.

Table 1 shows work related reasons that caused musculoskeletal disorders or discomfort.

**Table 1. Work related reasons that cause musculoskeletal disorders or discomfort**

| Variables Promenjive | Number (%) Broj (%) |
|-----------------------|---------------------|
| Total number of respondents Utukan broj ispitanika | 78 |
| Average age Prosečna starost | 41.56 ± 2.1 |
| Men Muškarci | 26.92% |
| Women Zene | 73.8% |
| Average working experience - men Prosečno radno iskustvo – muškarci | 17.24 years |
| Average working experience - women Prosečno radno iskustvo – zene | 16.9 years |
| Effective working hours ≥ 30 hours per week Efektivno radno vreme ≥ 30 sati nedeljno | 64 (82.05 %) |
| Effective working hours ≥ 40 hours per week Efektivno radno vreme ≥ 40 sati nedeljno | 14 (17.95%) |
| Genetic predisposition Genetska predispozicija | 45 (57.69%) |
| Specialists Specijalisti | 68 (87.18%) |
| Continuous body positioning Dugotrajna isti položaj tela | 64 (82.05%) |
| Repeated movements Ponovljeni pokreti | 49 (62.82%) |
| Vibrations from machines and instruments Vibration od mašina i instrumenta | 52 (66.67 %) |
| Usage of force Uzimali lekove protiv bolova | 57 (73.08 %) |

| Variables Promenjive | Number (%) Broj (%) |
|-----------------------|---------------------|
| Pain in the lower back Bol u donjem delu leđa | 66 (84.61%) |
| Experiencing pain in the last 12 months Bol u donjem delu leđa u poslednjih 12 meseci | 26 (33.33 %) |
| Pain in the upper back Bol u gornjem delu leđa | 47 (60.26%) |
| Experiencing pain in the last 12 months Bol u gornjem delu leđa u poslednjih 12 meseci | 15 (19.23%) |
| Reduced ability to move Smanjena sposobnost kretanja | 11 (14.10%) |
| Pain in the neck and shoulders Bol u vratu i ramenima | 67 (85.9%) |
| Pain in the hand and fingers Bol u ruci i prstima | 28 (35.9%) |
| Have been diagnosed with MSDs and sought medical help Djagnostikovano je MSDs i tražili medicinsku pomoć | 37 (47.44%) |
| Have been taking proper medications/ painkillers Uzimali lekove protiv bolova | 37 (47.44%) |
and standing and only 6.41% of the respondents (mostly from the group of 20–40 years) were working in seating position (Table 3).

Almost all respondents were familiar that exercise, massage, physical therapy and other alternative methods affect musculoskeletal system and reduce the occurrence of musculoskeletal disorders, but only 40 (51.28%) occasionally went to physical therapy and 41.03% occasionally got massages. Only 26 (33.33%) respondents exercised frequently while 48% exercised occasionally even though exercise (strength and muscle stretching) is one of the most important factors for the preservation of the musculoskeletal system health (Table 3).

**DISCUSSION**

The term MSDs refers to injuries that affect soft tissues such as muscles, tendons, ligaments, joints, cartilage and nervous system. These conditions most often affect arms and back and are known as cumulative disorders caused by trauma, repetitive movements, stress, or as a syndrome of occupational overload. MSDs develop gradually within weeks, months and years and in a longer period of time may cause disabilities [9].

Several studies have examined the relationship between the occurrence of MSDs and type of profession. Dentists belong to vulnerable group constantly exposed to the threat of occupational disorders due to their static activity while working continuously for a longer period of time. Other factors that contribute to the presence of MSDs are lack of small breaks, constant repetitive movements of the arms and wrists and use of force while working [10, 11]. Another important factor that influences the occurrence of musculoskeletal disorders is working environment. According to Custodio, the positions recommended by ISO and FDI, for patient and dentist (for example, the patient is in laying position and at the “9 o’clock” orientation to the dentist) are rarely observed due to the limited workspace [12]. In their study, Burke, Main and Freeman have come to the conclusion that approximately one third of dentists are forced to retire early because of work-related difficulties [13]. A number of dental studies reported that on average, two out of three dentists experienced musculoskeletal pain [14, 15]. Most commonly reported disorders of this kind occur around spinal area, shoulders and wrist that can result in lower back pain, neck pain, brachial pain, shoulder tendonitis, carpal tunnel syndrome etc. [16, 17, 18].

Sartorio et al. indicated higher presence of MSDs (54–93%) among dental staff in Italy and significantly higher risk of exposure among senior and female dentists [19]. This study further showed that backbone, shoulder, elbow and arm were most affected.

Our research was conducted in order to investigate the prevalence of musculoskeletal disorders among dentists in the largest public health institution in our country. Seventy-eight dentists aged 20 to 60 years participated in the study. Both female and male participants were involved, specializing in different dental areas and most of them held a postgraduate degree (Master’s or Doctoral Degree).

The pain in the back, neck and shoulders was the most common complaint among the majority of respondents, while reduced range of movement was noticed among significantly fewer subjects, mostly between 40–60 years of age. An interesting finding was that all examinees experienced more than one musculoskeletal disorder. Furthermore, hand pain was present with significantly lower percentage compared to the pain in the back, neck and shoulders that was connected and dependent on the area of specialty. Our examination included respondents from different dental areas of specialty that share similar positioning of neck, shoulders and spine while working. The application of force at work and vibrations is related to only few dental areas that require use of hands and fingers and that explains low percentage of complaints related to hand and finger disorders.

The results of our research agree with the results presented by several authors. Legg and Smith surveyed 285 Australian dentists, out of which 90% practiced general dentistry, and most of complaints were related to neck, shoulder, and back. About 37.5% of dentists needed medical care, while 25% reached the point of disability and 9% required prolonged absence from their practice [20]. Alexopoulos EC et al. concluded that hand/wrist complaints (46% / 60%) were one of the most important occupation related musculoskeletal disorder and ergonomic and educational interventions could hold a prominent role in its prevention [21]. Several authors pointed out that position of dental chair needed to be adjusted according to the height of the dentist, together with the light source, in order to prevent the occurrence of MSDs [22]. Furthermore, the results show high percentage of lower back pain that can be related to working conditions as large number of respondents had long work experience or inability to apply ergonomic principles of work (defective workplace, poor lighting, inability to work in a seating position, etc.).

**Table 3. Application of ergonomic principles and exercise**

| Variables Promenjive | Number (%) | Broj (%) |
|----------------------|------------|----------|
| Familiar with the ergonomic principles of work | 40 (51.28%) | 40 (%) |
| Upoznao sa ergonomskim principima rada | 34 (43.59%) | 34 (%) |
| Partial knowledge regarding ergonomic principles of work | 43 (55.13%) | 43 (%) |
| Delimično upoznao sa ergonomskim principima rada | 53 (67.97%) | 53 (%) |
| Full application of the ergonomic principles of work | 14 (17.95%) | 14 (%) |
| Potpuna primena ergonomskih principa rada | 5 (6.41%) | 5 (%) |
| Combined work (sitting and standing) | 32 (41.03%) | 32 (%) |
| Kombinovani rad (sedenje i stajanje) | 26 (33.33%) | 26 (%) |
| Exercises (occasional) | 38 (48%) | 38 (%) |
| Vežbanje (povremeno) | 5 (6.41%) | 5 (%) |
Prolonged static position is considered to be one of the main causes of MSDs and should be addressed properly in order for dentists to practice preventive measures [23, 24]. These findings correspond with data obtained from our survey where 82.05% of respondents reported prolonged static posture as a cause for disorders and 73.08% of respondents reported at least two more reasons beside this one.

Recently, several studies have highlighted other factors such as obesity and physical inactivity in the development of chronic MSDs among dentists. Moreover, due to exhaustion and fatigue, caused by heavy workload and long working hours, dentists avoid physical exercise and activities [25, 26]. Published literature points out the important role of physical activity (pilates, aerobics) as a preventative ergonomic measure. Aerobic exercise improves the flow of oxygen in tissues, thereby increasing efficiency. Stretching exercises are effective measure for relaxing and reducing muscle tension caused by improper posture [27]. It is well known that prolonged static posture requires contraction of 50% of body’s muscles explain the need for stretching.

Even though all respondents from our research were aware that regular exercise is of exceptional importance to the musculoskeletal health, only one third of respondents exercised regularly, while 48% exercised only occasionally. The percentage of respondents who were utilizing alternative methods such as massage or spa centers was even lower. Besides the high percentage of musculoskeletal complaints among respondents, only 37.18% sought professional help and only 47% took medication to reduce pain, which comes as a result either from the respondent’s negligence or the frivolous approach to this issue.

This study covered only dentists employed in the public sector. Further studies are advised to examine dentists from private dental institutions, where working conditions impose more complex schedule of work, fewer breaks and free time as well as fewer absences from work.

CONCLUSION

The percentage of MSDs prevalence among dentists in public health sector is high. More extensive surveys should be undertaken to cover larger group of dentists from both private and public sector, in order to get complete analysis of the prevalence of occupational disorders in our country. Consequently, appropriate measures should be taken in order to inform and educate dentists regarding MSD. Awareness should be raised pointing out that dentistry, as a profession, is susceptible to high risk of occupational disorders and injuries. Ignorance and avoidance of the MSDs symptoms could lead to early career ending and therefore it is important to have a knowledge regarding its prevention.

REFERENCES

1. Gupta A, Ankola AV, Hebbal M. Dental Ergonomics to Combat Musculoskeletal Disorders: A Review. Int J Occup Saf Ergon. 2013; 19(4):561–71. [DOI: 10.1080/10803548.2013.11077005]

2. Fulton-Kehoe D, Franklin G, Weaver M, Cheadle A. Years of productivity lost among injured workers in Washington State: Modeling disability burden in workers’ compensation. Am J Ind Med. 2000; 37:566–62. [PMID: 10797509]

3. Natalie R. La Rochelle: Virginia Commonwealth University. Work-Related Musculoskeletal Disorders Among Dentists and Orthodontists. http://scholarcompass.vcu.edu/ed

4. Stewart WF, Ricci JA, Chee E, Morganstein D, Lipton R. Lost productive time and cost due to common pain conditions in the US workforce. JAMA. 2003; 290:2443–54. [DOI: 10.1001/jama.290.18.2443] [PMID: 14612481]

5. Smith DR, Wei N, Zhang Y, Wang RS. Musculoskeletal complaints and psychosocial risk factors among physicians in mainland China. Int J Ind Ergon. 2006; 36:599–603. [DOI: 10.1053/ooccmed/kq1117]

6. De Sio S, Traversini V, Rinaldo F, Colasanti V, Buonomprisco G, Perri R, et al. Ergonomics risk and preventive measures of musculoskeletal disorders in the dentistry environment: an umbrella review. PeerJ. 2018; 15(6):e4154. [DOI: 10.7717/peerj.4154] [PMID: 29362689]

7. Sarkar PA, Shigli AL. Ergonomics in General Dental Practice. People’s Journal of Scientific Research. 2012; 5(1):56–60.

8. Kuorinka I, Jonsson B, Kilborn A et al. Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms. Applied Ergonomics. 1987; 18(3):233–7. [PMID: 15676628]

9. Ergonomics: The Study of Work U5. Department of Labour Occupational Safety and Health Administration. 2000 Available from: https://www.osh.org/Publications/osh3125.pdf.

10. Szeto GP, Ho P, Ting AC, Poon JT, Cheng SW, Tsang RC. Work-related musculoskeletal symptoms in surgeons. J Occup Rehabil. 2009; 19:175–84. [DOI: 10.1007/s10926-009-1916-1] [PMID: 19381790]

11. Scromberg MW, Tronstad SE, Hedberg K et al. Work-related musculoskeletal disorders when performing laparoscopic surgery. Surg Laparosc Endosc Percutan Tech. 2010; 20:49–53. [DOI: 10.1097/SLE.0b013e3181cd65d4] [PMID: 20173622]

12. Custodio RA, Silva CE, Brandão JO. 2012. Ergonomics work analysis applied to dentistry. A Brazilian case study. Work 41 (Suppl 1): 699-70. [DOI: 10.3233/WOR-2012-0227-690] [PMID:22316802]

13. Burke FJ, Main JR, Freeman R. The practice of dentistry: an assessment of reasons for premature retirement. Br Dent J. 1997; 182(7):250-4. [PMID: 9134812]

14. Rucker LM. Technology meets ergonomics in the dental clinic: new toys for old games? J Am Coll Dent. 2000; 67(2):26–9. [PMID: 10941230]

15. Bedi HS, Moon NJ, Bhata V, Sidhu GK, Khan N. Evaluation of Musculoskeletal Disorders in Dentists and Application of DMAIC Technique to Improve the Ergonomics at Dental Clinics and Meta-Analysis of Literature. J Clin Diagn Res. 2015; 9(6):ZC01–3. [DOI: 10.7860/JCDR/2015/14041.6126] [PMID: 26266205]

16. Morse T, Bruneau H, Dussetschleger J. Musculoskeletal disorders of the neck and shoulder in the dental professions. Work. 2010; 35(4):419–29. [DOI: 10.3233/WOR-2010-0979] [PMID: 20448321]

17. Tirgar A, Javanshir K, Talebian A, Amiri F, Parhiz A. Musculoskeletal disorders among a group of Iranian general dental practitioners. J Back Musculoskelet Rehab 2015; 28(4):755–9. [DOI: 10.3233/BMR-140579] [PMID: 25547232]

18. Biswas R, Sachdev V, Jindal H, Ralh R. Musculoskeletal disorders and ergonomic risk factors in dental practice. Ind J Dent Sci. 2012; 4(1):70–4.

19. Sartorio F, Vercelli S, Ferriero G, D’Angelo F, Migliarini M, Franchignoni M. Work-related musculoskeletal diseases in dental professionals. Prevalence and risk factors. G Ital Med Lav Ergon. 2000; 22(7):165–9. [PMID: 16124525]

20. Leggat PA, Smith DR. Musculoskeletal disorders self reported by dentists in Queensland, Australia. Aust Dent J. 2006; 51(4):342–7. [PMID: 17256307]

21. Alexopoulos EC, Stathi IC, Charizani F. Prevalence of musculoskeletal disorders in dentists. BMC Musculoskelet Disord. 2004; 5:16. [DOI: 10.1186/1471-2474-5-16] [PMID: 15189564]

22. Gosavi SS, Gosavi SY, Jawade RS. Posturedontics. reducing the stress in dentistry. World J Dent. 2012; 3(4):335–9. [DOI: 10.5005/jp-journals-10015-1185]
23. Peros K, Vodanovic M, Mestrovic S, Rosin-Grget K, Valic M. Physical fitness course in the dental curriculum and prevention of low back pain. J Dent Educ. 2011; 75(6):761–7. [PMID: 21642521]

24. Roberts S, Gallardo F, Brown R. Cat of month. Critically appraised topics. Dentist’s awareness of posture in reducing pain in musculoskeletal disorders. Tex Dent J. 2014; 131(4):296.

25. Harutunian K, Gargallo-Albiol J, Figueiredo R, Gay-Escoda C. Ergonomics and Musculoskeletal pain among postgraduate students and faculty members of the school of dentistry of the university of Barcellona (Spain). A cross sectional study. Med Oral Patol Oral Cir Bucal. 2011; 16(3):e425–9. [PMID: 20711125]

26. Thakar S, Shivlingesh K, Jayaprakash K, Gupta B, Gupta N, Anand R, et al. High levels of physical inactivity amongst dental professionals: a questionnaire based cross sectional study. J Clin Diagn Res. 9(1):ZC43–6. [DOI: 10.7860/JCDR/2015/10459.5466] [PMID: 25738085]

27. Kumar DK, Rathan N, Mohan S, Begum M, Prasad B, Prasad ER. Exercise prescription to prevent musculoskeletal disorders in dentists. J Clin Diagn Res. 2014; 8(7): ZE13–16. [DOI: 10.7860/JCDR/2014/75494620] [PMID: 25177661]
Muskuloskeletna oboljenja kod stomatologa na stomatološkoj klinici u Skoplju

Vasilka Rendžova, Sonja Apostolska, Marina Eftimoska, Biljana Đzipunova, Vesna Filipovska
Univerzitet „Sv. Cvito i Metodije“, Stomatološki fakultet, Skoplje, Makedonija

KRATAK SADRŽAJ

Uvod
Musculoskeletne poremećaje su jedno od najčešćih oboljenja koja nastaju kao posledica rada kod većine zdravstvenih radnika, a naročito stomatologa. Cilj ovog rada je bio da se proveri prisustvo musculoskeletnih poremećaja kod stomatologa zaposlenih na Univerzitetskoj stomatološkoj klinici u Skoplju i napravi korelacija sa faktorima rizika.

Materijal i metode
Ispitivanje je sprovedeno kod 78 stomatoloških praktičara u dobi između 20 i 60 godina, koji su zaposleni na Univerzitetskoj stomatološkoj klinici. Pitanja su uključivala podatke o fizičkom i psihosocijalnom opterećenju, opštem zdravlju, radnom vremenu i radnom mestu, kao i odgovore na pitanja vezane za dijagnostikovanu MSD. Ispitanici su dobili standardni upitnik za Nordic koji se sastoji od dva dela.

Rezultati
Bol u leđima, vratu i ramena (84,6% / 85,9%) bio je najčešći problem kod većine ispitanika, dok je smanjen opseg kretanja između 40 i 60 godina. Potrebno je poduzeti obimnija istraživanja kako bi se pokrila veća grupa stomatologa iz privatnog i javnog sektora, da bi se dobila potpuna analiza prevalencije profesionalnih poremećaja.

Ključne reči: zubari; ergonomija; mišićno-skeletni poremećaji

UVOD

Prema američkom odeljenju za bezbednost i zdravstvenoj administraciji, mišićno-skeletni poremećaji nastaju kao rezultat neravnoteže između fizičkog napora na radnom mestu i fizičkog kapaciteta radnika.

Profesionalne bolesti, pored fizičkih, psiholoških i socijalnih bolesti, imaju ekonomiske i sigurnosne posledice kada počnu direktno da utiču na radne kapacitete, do sve češće odsustva sa posla i prevremenog penzionisanja. Neke profesionalne opasnosti u stomatologiji vezane su za izloženost hemijskim supstancama, zračenju, opasnim biološkim materijalima i neopasnosti u stomatologiji vezane su za izloženost hemijskim supstancama, zračenju, opasnim biološkim materijalima i neadekvatnom položaju tela tokom rada. Na osnovu podataka dobijenih iz baze podataka o profesionalnoj informativnoj mreži farmaceutičara, pitanje genetske predispozicije, učestalost upotrebe lekova protiv bolesti i pitanja vezanih za dijagnostikovanu MSD i zahteve za medicinskom pomoći.

Materijal i metode
Ispitivanje je sprovedeno kod 78 stomatoloških praktičara u dobi između 20 i 60 godina, koji su zaposleni na Univerzitetskoj stomatološkoj klinici u Skoplju. Pitanja su uključivala podatke o fizičkom i psihosocijalnom opterećenju, opštem zdravlju, radnom vremenu i radnom mestu, kao i odgovore na pitanja vezane za dijagnostikovanu MSD.

PRILAŽUĆI LIST

Odnosi se na zdravstveno-geografsku situaciju Makedonije, koja je od glavnih uzroka musculoskeletnih poremećaja (MSD) (82,05%), dok je 73,08% ispitanika navelo više od dva razloga kao uzrok.

Zaključak
Procenat prevalencije MSD kod zubara u sektoru javnog zdravstva je visok. Potrebno je poduzeti obimnija istraživanja kako bi se pokrila veća grupa stomatologa iz privatnog i javnog sektora, da bi se dobila potpuna analiza prevalencije profesionalnih poremećaja.

Ključne reči: zubari; ergonomija; mišićno-skeletni poremećaji

METODOLOGIJA

Ispitivanje je sprovedeno kod 78 stomatoloških praktičara u dobi između 20 i 60 godina, zaposlenih u javnoj zdravstvenoj ustanovi. Ispitanici su dobili standardni upitnik za Nordic koji se sastoji od dva dela. Prvi deo sadrži pitanja o izloženosti hemijskim supstancama, zračenju, opasnim biološkim materijalima i neopasnosti u stomatologiji.

Drugi deo sadržao pitanja o frekvenciji i dužini pauze, o položaju tela tokom rada i položaji tela tokom rada.

Rezultati
Istraživanje je sprovedeno na 79,59% (79/98) od ukupnog broja stomatologa praktičara na Univerzitetskoj stomatološkoj klinici u Skoplju. Razlozi zbog kojih ostali zaposleni nisu bili deo istraživanja bili su odsustvo zbog bolesti, nedostatka vremena i drugih subjektnih razloga. Istraživanje je sprovedeno na 79,59% (79/98) od ukupnog broja stomatologa praktičara na Univerzitetskoj stomatološkoj klinici u Skoplju. Razlozi zbog kojih ostali zaposleni nisu bili deo istraživanja bili su odsustvo zbog bolesti, nedostatka vremena i drugih subjektnih razloga. Zatim se sastoji od 87,18% specijalista (iz oblasti oralne hirurgije, protetike, ortodoncije, dečije stomatologije, parodontologije i endodoncije) i 12,82% opštih stomatologa. Većina učesnika je imala završenu postdiplomske studije (magистarske ili doktorske studije).
Položaj među našim učesnicima nije bio ravnomjerno. Ženskog pola je bilo 73,08% ispitanika, sa prosečnim radnim iskustvom od 16,9 godina. Prosečno radno iskustvo muških učesnika bilo je 17,24 godine. Osim toga, broj efektivnog radnog vremena kod 82,05% ispitanika je iznosio 30 sati nedeljno, dok je 17,95% (uglavnom muškarci) radilo efektivno i 40 sati nedeljno.

Tabela 1 prikazuje razloge vezane za rad koji uzrokuju poremećaje mišićno-skeletnog sistema ili neugodnost. U opisu posla, 82,05% je izjavilo da provode dugi period u istoj poziciji, 52,56% je prijavilo da je njihov rad povezan sa istezanjem, kod 62,82% ispitanika to su ponavljajući pokreti. Da su vibracije mašinskih instrumenata sastavni deo njihovog rada izjavilo je 66,67% ispitanika, dok se 73,08% ispitanika u opisu rada odlučilo za dve ili više ponuđenih karaktera.

Još jedan deo našeg istraživanja fokusirao se na bol i druge žalbe vezane za mišićno-skeletni sistem (Tabela 2) – 66 ispitanika (84,61%) prijavilo je bol u donjem delu leđa, od čega 33,33% u zadnjih 12 meseci. Bol u donjem delu leđa je primanjan kod 60,26% ispitanika, od kojih se u 19,23% bol javio u poslednjih 12 meseci. Smanjen raspon pokreta imalo je 14,10% ispitanika (starosne grupe od 40 do 60 godina sa prosečnom dužinom radnog iskustva od 22,5 godina). Nijedan od ispitanika iz starosne grupe od 20 do 40 godina nije prijavio bolove u leđima. Većina ispitanika (85,9%) obevećena bolove u donjem delu leđa je u većem udjelu u grupi 40 do 60 godina. Većinom 84,61% ispitanika, a 60,26% u grupi 20 do 40 godina, naveću večinu bolova u leđima, vratu i ručicama.

PODGRAĐA

Rezultati su dalje pokazali da je 51,28% ispitanika uopšteno sa ergonomskim principima rada, dok je ostalih 43,59% samo delimično uopšteno. Delimična primena ergonomskih principa primećena je kod 55,13% ispitanika, a samo 14 ispitanika (17,95%) potpuno ih primenjuju tokom rada. Još jedan od značajnih faktora je da 67,97% ispitanika izjavilo je da rad njihovim rukama / zglobovima (46% / 60%) od najvećeg značaja za profesionalne mišićno-skeletne poremećaje. Brojne stomatološke studije kažu da je njihov rad povezan sa istezanjem ruku i zglobova i istezanje tokom rada 

DISKUSIJA

Termin MSD odnosi se na povrede koje utiču na mleta tkiva kao što su mišići, tetive, ligamenta, zglobovi, hrvskača i nervni sistem. To su kumulativni poremećaji uzrokovani traumom, pojavom pokretima, stresom ili kao simptom profesionalnog preopterećenja. Generalno se razvijaju postepeno tokom nekoliko nedelja, meseci i godina i obično su bolni i mogu onesposobiti pacijenta [9].

Nekoliko studija je ispitivalo odnos između pojave MSD i vrste profesije. Stomatolozi pripadaju ranjoj grupi koja je stalno isložena profesionalnim obilježjima zbog statičke pozicije, kontinuirano duži period. Drugi faktori koji doprinose prisustvu MSD su nedostatak malih pauza, stalno ponavljajući pokreti ruku i zglobova i između tog rada [10, 11].

Još jedan važan faktor koji utiče na pojavu mišićno-skeletnih poremećaja je radno okruženje. Custodio smatra da se pojavljene učestalije u poseljima zbog opterećenja u radnom vremenu kod 82,05% ispitanika je iznosio 30 sati nedeljno, dok je 17,95% (uglavnom muškarci) radilo efektivno i 40 sati nedeljno.

Tabela 1 prikazuje razloge vezane za rad koji uzrokuju poremećaje mišićno-skeletnog sistema ili neugodnost. U opisu posla, 82,05% je izjavilo da provode dugi period u istoj poziciji, 52,56% je prijavilo da je njihov rad povezan sa istezanjem, kod 62,82% ispitanika to su ponavljajući pokreti. Da su vibracije mašinskih instrumenata sastavni deo njihovog rada izjavilo je 66,67% ispitanika, dok se 73,08% ispitanika u opisu rada odlučilo za dve ili više ponuđenih karaktera.

Još jedan deo našeg istraživanja fokusirao se na bol i druge žalbe vezane za mišićno-skeletni sistem (Tabela 2) – 66 ispitanika (84,61%) prijavilo je bol u donjem delu leđa, od čega 33,33% u zadnjih 12 meseci. Bol u donjem delu leđa je primanjan kod 60,26% ispitanika, od kojih se u 19,23% bol javio u poslednjih 12 meseci. Smanjen raspon pokreta imalo je 14,10% ispitanika (starosne grupe od 40 do 60 godina sa prosečnom dužinom radnog iskustva od 22,5 godina). Nijedan od ispitanika iz starosne grupe od 20 do 40 godina nije prijavio bolove u leđima. Većina ispitanika (85,9%) obevećena bolove u donjem delu leđa je u većem udjelu u grupi 40 do 60 godina. Većinom 84,61% ispitanika, a 60,26% u grupi 20 do 40 godina, naveću večinu bolova u leđima, vratu i ručicama.

PODGRAĐA

Rezultati su dalje pokazali da je 51,28% ispitanika uopšteno sa ergonomskim principima rada, dok je ostalih 43,59% samo delimično uopšteno. Delimična primena ergonomskih principa primećena je kod 55,13% ispitanika, a samo 14 ispitanika (17,95%) potpuno ih primenjuju tokom rada. Još jedan od značajnih faktora je da 67,97% ispitanika izjavilo je da rad njihovim rukama / zglobovima (46% / 60%) od najvećeg značaja za profesionalne mišićno-skeletne poremećaje. Brojne stomatološke studije kažu da je njihov rad povezan sa istezanjem ruku i zglobova i istezanje tokom rada [10, 11].

Još jedan važan faktor koji utiče na pojavu mišićno-skeletnih poremećaja je radno okruženje. Custodio smatra da se pojavljene učestalije u poseljima zbog opterećenja u radnom vremenu kod 82,05% ispitanika je iznosio 30 sati nedeljno, dok je 17,95% (uglavnom muškarci) radilo efektivno i 40 sati nedeljno.

Tabela 1 prikazuje razloge vezane za rad koji uzrokuju poremećaje mišićno-skeletnog sistema ili neugodnost. U opisu posla, 82,05% je izjavilo da provode dugi period u istoj poziciji, 52,56% je prijavilo da je njihov rad povezan sa istezanjem, kod 62,82% ispitanika to su ponavljajući pokreti. Da su vibracije mašinskih instrumenata sastavni deo njihovog rada izjavilo je 66,67% ispitanika, dok se 73,08% ispitanika u opisu rada odlučilo za dve ili više ponuđenih karaktera. 
prisustvo ispitanika sa dugogodišnjim radnim iskustvom ili ne-
možućnost primene ergonomskih principa rada (neispravno
radno mesto, loše osvetljenje, nesposobnost rada u sedištu i dr.).

Dugotrajna statička pozicija se smatra jednim od glavnih
uzroka MSD i trebalo bi da bude fokus procene rizika od stra-
ne profesionalnih doktora kako bi se olakšao razvoj efikasnih
preventivnih strategija [23, 24]. Ovi nalazi su u skladu sa poda-
cima dobijenim iz našeg istraživanja, u kojem je 82,05% navelo
produženi statički položaj kao uzrok poremećaja, a 73,08% is-
pitanika navelo je još dva razloga.

Nedavno je nekoliko istraživanja ukazalo da i drugi faktori,
kao što su gojaznost i fizička neaktivnost, utiču na razvoj
hroničnog MSD kod stomatologa. Štaviše, zbog iscrpljenosti i
zamora, uzrokovanih velikim opterećenjem i dugim radnim
vremenom, zubari izbegavaju fizičke vežbe i aktivnosti [25, 26].

Objavljena literatura ističe fizičku aktivnost (pilates, aerobik)
kao važnu preventivnu ergonomsku meru. Ove vežbe pobolj-
šavaju protok kiseonika u tkivima, čime povećavaju efikasnost.
Vežbe istezanja su efikasna mera za opuštanje i smanjenje nape-
tosti mišića uzrokovanih nepravilnim držanjem [27]. Poznato je
da produženi statički položaj zahteva kontrakciju 50% telesnih
mišića, što ukazuje na potrebu za istezanjem. Lako i konačno
ispitanici iz našeg istraživanja smatraju da je redovno
vežbanje od izuzetnog značaja za mišićno-skeletno zdravlje,
samo jedna trećina ispitanika redovno vežba, a 48% vežba samo
povremeno. Procenat koji ukazuje na korišćenje drugih alternati-
vitivih metoda kao što su masaža ili spa centri je još niži. Pored
visokog procента mišićno-skeletnih bolesti među ispitanicima,
samo 37,18% je zatražilo stručnu pomoć, a svega 47% uzimalo je
lekov za smanjivanje bolova, što može biti rezultat nehata is-
pitanika ili neodgovoran pristup po ovom pitanju.

Ova studija pokazuje stanje zdravlja doktora stomatologije u
javnom sektoru. Ostaje da se istraže položaji lekara iz privatnih
stomatoloških ustanova, gde borba za pacijente i njihovo oču-
vanje nameće složeniji raspored rada, manje pauza i slobodnog
vremena, kao i ređe odsustvo s posla.

**ZAKLJUČAK**

U zaključku se može reći da je procenat zastupljenosti MSD kod
zubara u javnom sektoru zdravstva visok. Potrebno je preduzeti
opsežnija istraživanja kako bi se pokrila veća grupa stomatologa
iz privatnog i javnog sektora i dobila potpuna slika o postojanju
profesionalnih oboljenja u našoj zemlji. Shodno tome, treba-
lo bi preduzeti odgovarajuće mere informisanja, edukovanja i
podizanja svesti kod zubara o činjenici da stomatologija nosi
visok rizik od profesionalnih oboljenja i povreda, a samim tim
potencijalno ranog završetka karijere, i načinima na koje da
se to spreči.