

LOW BACK PAIN IN DENTISTS OF INDONESIA

¹MUHAMMAD ILYAS

²TOMMY PAULUS DHARMAJI

ABSTRACT

Dentists often experience pain while working, especially in the lower back area. The aim of this study was to find out the factors associated with the occurrence of low back pain or complaints. The factors studied were age, number of patients, and type of cases handled by the dentist. This study was observational a cross sectional design. The data were collected by using Oswestry Low Back Pain Disability Questionnaire (ODQ). The number of samples 86 dentists (100% response) in Makassar, selected by simple random sampling method, using Chi-square Test and Cramer's V Test. The results of this study revealed a significant relationship between age of dentist and the complaints of Low Back Pain ($p < 0.05$), but did not show a significant relationship between ages of dentist, average numbers of dentist per week and types of cases handled by the dentist in last seven days.

Key Words: *Low back pain, Factors associated with*

INTRODUCTION

Dentists often have *low back pain* when working. The quality of pain varies, ranging from simply feels stiff to pain. Lower back pain is the most frequent complaint. Almost all dentists in the world have experienced this pain. Alexopoulos et al explained about 46% of dentists in Greece have had lower back pain. In Nigeria, research of Udoye et al found 77.1% dentists experienced this pain. Another study by Abduljabbar et al showed 52.1% of dentists in Saudi Arabia have experienced similar pain.^{1,2,3}

Pain *in* lower back area would be very unpleasant and disrupts activities of the dentist when working. Please note that this pain is a symptom of muscle disorders or musculoskeletal disorder. The pain that strikes at the lower back area is called the low back pain.^{4,5}

Low back pain (LBP) is the complaint of pain in area of spinal or paraspinal structures in the lumbosacral region due to the stimulus that triggers the primary sensory afferents. The stimulus may take the form of muscle fatigue ischemia, which causes contraction of muscles, and activation of C-fiber occurs. Other stimulus which makes spinal nerves wedged in, caused

by bad posture, provide mechanical load on the primary sensory afferent. If pain lasts long enough and it is ignored, physiological damage will accumulate and lead to muscle paralysis.^{6,7,8,9}

Various prevention efforts can be taken such as stretching before work, a break in the middle hours of work, perform procedures with good body posture, and reduce repetitive motion. However, there are still many other factors that may be associated with LBP. In this study, other factors associated with lower back pain are age of the dentist, number of patients, and type of cases handled by the dentist.^{4,6,10,11,12,13}

The aim of this study was to determine the factors associated with LBP. By knowing the factors associated with the onset of LBP, preventive measures can be applied. Disability and muscle paralysis can be prevented before its too late.

METHODOLOGY

This study was observational across sectional design. The study population cover all dentists in the city of Makassar, which are listed in the active dentists list of Indonesian Dental Association of Makassar City branch (totaling 258 dentists). Subsequent samples

¹ Corresponding author: Dr.drg Muhammad Ilyas, M.Kes Department of Community Dental Health Education Dentistry, Faculty of Hasanuddin University of Makassar of Indonesia, Tel (0411) 4773823, Cell: 0853 980 29 758, E-mail: ilyasmils@yahoo.com

² Dean Dentistry Faculty of Hasanuddin University of Makassar of Indonesia

were selected using simple random sampling method with the provisions of a maximum 59-year-old sample and have been active for at least one year of private practice. According to Gay and Diehl, the number of samples ideal for populations greater than 100 and less than 1000 is 30% of the total population, so the samples obtained in this study were 78 samples. To anticipate the occurrence of drop out, then the number of samples plus as much as 10% to 86 samples.^{15,16,17,18}

Research using the Oswestry Low Back Pain Disability Questionnaire (ODQ) by adding some basic information, i.e. age, gender, work experience, hours of work practices, exercise duration, average number of patients per week, dominant position, kind of case is often handled (divided in restoration, scaling, orthodontic, and extraction), and a history of low back pain during the last 12 months. ODQ is a questionnaire that has been proven for its validity and reliability. It is standard in the measurement of LBP. ODQ used in this study consisted of nine segments of the questions; the sample was instructed to choose one of the most representative states in each segment. Each segment has a score of 0-5, consecutively starting from the first condition (score of zero) until the final state (score five). Scores will be accumulated into Oswestry Disability Index (ODI) and interpreted to be “minimal disability”, “moderate disability”, “severe disability”, “crippled”, and “immobilized”. The data were tabulated by using SPSS 16.0 for windows by using the chi-square test.¹⁹

RESULTS

Table 1 shows that the number of women respondents was more than men, ie, 54 females (62.8%) and 32 males (37.2%). The average age of respondents was 39 years with an average work experience of 13 years. Table 1 also shows that of the total respondents, only 29 people (33.7%) exercised daily with an average duration of exercise only one hour / week. However, the surprising thing that turned out to respondents who had suffered and had a history of pain in their back during the last 12 months were only eight (9.3%) of 86 respondents.

Based on table 2, the average working hours per day practices of the respondents was five hours a day and the average number of patients per week was 28 patients. Table 2 also shows the dominant position of the dentist when performing maintenance procedures on the patient and the sitting position is a lot more common than a standing position, i.e. as many as 61 dentists (70.9%) chose to do the procedure in sitting, while only 25 people (29,1%) used standing position. Meanwhile, the types of cases handled by the respondents in the last seven days are also shown in Table 2.

Table 3 shows complaints of low back pain and their association with different ages. Association between numbers of patients seen and LBP is shown in Table 4, and Table 5 shows relationship between LBP and types of cases handled.

TABEL 1: DISTRIBUTION OF RESPONDENTS CHARACTERISTICS

Respondent Characteristics	Frequency (N)	Percent (%)	Mean ± SD
Sex			
Male	32,00	37,20	
Female	54,00	62,80	
Age			39,55 ± 10,69
Work experience			13,18 ± 9,63
Exercise (per week)			
Yes	29,00	33,70	
Hours / week			1,05 ± 1,91
No	57,00	66,30	
History of low back pain (for the last 12 months)			
Yes	8,00	9,30	
No	78,00	90,70	

TABEL 2: DISTRIBUTION OF WORK DATA RESPONDENT

Work Data	Frequency (N)	Percent (%)	Mean ± SD
Working hours (per day)			5,42 ± 2,27
Number of patients (per week)			28,15 ± 14,07
Dominant position when performing procedures:			
Standing	25,00	29,10	
Sitting	61,00	70,90	
Type of cases handled by respondent: (during last seven days)			
Restoration	52,00	60,50	
Extraction	12,00	14,00	
Orthodontic	10,00	11,60	
Scalling	12,00	14,00	

TABEL 3: ASSOCIATION BETWEEN AGES OF RESPONDENTS AND LOW BACK PAIN

Ages of Respondent (years)	Low Back Pain		Total	Chi-square test (P-value/2-sided)	Value Cramer's V test
	Minimal disability	Moderate disability			
20-29	19	1	20	0,013*	0,353 (sig/p=0,013)
30-39	17	3	20		
40-49	20	11	31		
50-59	8	7	15		
Total	64	22	86		

*p<0, 05: significant

TABEL 4: ASSOCIATION BETWEEN AVERAGE NUMBERS OF PATIENTS PER WEEK AND LOW BACK PAIN

Average number of patients (per week)	Low Back Pain		Total	Chi-square test (P-value/2-sided)
	Minimal disability	Moderate disability		
10-20 patients	27	5	32	0,233**
21-31 patients	20	8	28	
>31 patients	17	9	26	
Total	64	22	86	

**p>0, 05: not significant

TABEL 5: ASSOCIATION BETWEEN TYPES OF CASES HANDLED BY RESPONDENTS IN LAST SEVEN DAYS AND LOW BACK PAIN

Type of cases handled by respondent (last seven days)	Low Back Pain		Total	Chi-square test (P-value/2-sided)
	Minimal disability	Moderate disability		
Restoration	39	13	52	0,658**
Extraction	10	2	12	
Orthodontics	6	4	10	
Scalling	9	3	12	
Total	64	22	86	

**p>0, 05: not significant

DISCUSSION

The results of the present study showed an increase in complaints of pain from age 40-49 and a decline from age 50-59. This finding is in line with Andersson's study which revealed the prevalence of maximum complaints of low back pain around the age of 64 and declined at the age of more than 84 years. Meanwhile, Jackie's research showed the highest pain complaint was at age 30-39 and declined thereafter, whereas the study by Tanaka showed the highest prevalence of low back pain was at the age of 25-34 years and decreased around the age of 74 years and after both in males and females. This is not consistent with the study of Alexopoulos who showed an increase in complaints even after 50 years of age. Research by Abduljabbar also leads to the conclusion that young dentists experience more pain than older dentists.^{1,3,20,21}

The higher a person's age, the weaker bodies' physiological ability, so the endurance limits will decrease. Increasing age also makes the muscles degenerate resulting in muscle imbalance and ischemia is more common. This will create a stimulus to the primary afferent and complaints of pain will be more often. Decrease in complaints of pain in old age in this study or by Andersson research may be due to many factors, such as reducing the intensity of work at that age, so the muscles rest more and complaints of pain are reduced.^{20,21,22,23}

Chi-square test, of this study showed $p < 0.05$ ($p = 0.013$), meaning that there was a significant relationship between age and complaints of low back pain. This is consistent with several previous studies, such as Jackie's that showed an association between age and complaints of pain ($p = 0.005$, $p < 0.05$).

Increase in the number of patients will increase the frequency and intensity of a dentist working. Increase in number of patients will result in longer working hours. Even when the posture of a dentist during work is good, pain can occur. The longer a dentist works, there will be more muscle fatigue. Muscles need energy, called ATP (Adenosine Tri Phosphate). Muscle contraction is based on two sets of contractile filaments in muscle cells, the actin and myosin filaments. Myosin filaments hydrolyse ATP to ADP and lactic acid to bind actin on contraction. Build

up of lactic acid would result in inhibition of ATP-forming enzymes. When ATP as an energy source runs out, either because of continuous use, the muscles will not be able to contract again and will experience fatigue. This cause muscle imbalance and ischemia. This will trigger the fibers of C-fiber and cause pain.^{5,8,9,29,30}

Although in theory there's a relationship between the number of patients and complaints of low back pain, but after a chi-square test it was found that $p = 0.233$ ($p > 0.05$), meaning there is no significant relationship between the number of patients and complaints of low back pain.

The results between the types of cases and complaints of low back pain showed that the highest level of complaints were recorded in restorative work, while the lowest number were seen in orthodontics (minimal disability) and scaling (moderate disability). These results are consistent with the results of Jackie, who explained that there was severe pain in root canal treatment or restorations (42%) followed by extractions (35%), and scaling patients (30%). These results influenced the answers of respondents and a random sampling procedure. Study done by Pargali N, showed that more complaints were recorded when extractions were performed followed by restorations.²⁶

Ergonomic use of equipment and intelligence functions of physicians in using his tools is imported. If the dentist can utilize properly the functioning device, then the job will be easier to complete and can be spared from the pain, because intensity of a muscle contraction will be reduced. According to the study of Kerr, there is a significant relationship between work environment and the complaints of low back pain ($p = 0.0013$, $p < 0.05$). Work environment is the vibration caused by equipment, hand power, lighting arrangement of dental units, and aid of assistants.^{4,6,30,31}

REFERENCES

- 1 Alexopoulos EC, Stathi IC, Charizani F. Prevalence of musculoskeletal disorders in dentist. *BMC Musculoskeletal Disorders* 2004; 5: 1-8.
- 2 Udoye CI, Aguwa EN. Musculoskeletal symptoms: A survey amongst a selected Nigerian Dentist. *The International Journal of Dental Science* 2007; 5(1): 1-5.
- 3 Abduljabbar T. Musculoskeletal disorders among dentists in Saudia Arabia. *Pakistan Oral & Dental Journal* 2005; 28(1): 135-44.

- 4 Valachi B, Valachi K. Mechanisms leading to musculoskeletal disorders in dentistry. *J Am Dent Assoc* 2003; 134: 1344-1350.
- 5 Hutson M, Ellis R. *Textbook of Musculoskeletal Medicine* 1st ed. Oxford: Oxford University Press; 2006. p 89-95, 98-100.
- 6 Valachi B, Valachi K. Preventing musculoskeletal disorders in clinical dentistry: strategies to address the mechanism leading to musculoskeletal disorders. *J Am Dent Assoc* 2003; 134: 1604-1612.
- 7 Nutalapati R, Gaddipati R, Chitta H, Pinniti M, Boyapati R. Ergonomic in dentistry and the prevention of musculoskeletal disorders in dentist. *The International Journal of Dental Science* 2010; 1(1): 1-10.
- 8 Knight S, Biswal SV, Iqbal R. *Muscles, Bones, and Skin* 2nd ed. London: Mosby Company; 2003. p. 3-6, 11-5, 33-4, 49, 51-7, 59-64, 69-74, 91-94.
- 9 Valachi B. Postural, positioning, and stretching strategies for carrier longevity. *Dimension of Dental Hygiene* 2003; 1(3): 20, 22, 24-26.
- 10 Cooper G. *Pocket guide to musculoskeletal diagnosis*. Totowa: Humana Press; 2006. p 1-3, 19, 39, 51, 65, 91, 109, 121.
- 11 Buckup K. *Clinical Tests for the Musculoskeletal System: examination-sign-phenomena*. 2nd ed. Germany: Thieme New York; 2004. p. 61-2, 104, 116-7, 141-2, 163-4, 225-26.
- 12 Coote A, Haslam P. *Rheumatology and Orthopaedics* 1st ed. London: Mosby Company; 2004. p. 3-13, 15-16.
- 13 Warfield CA, Bajwa ZH. *Principles and Practice of Pain Medicine*. 2nd ed. United States of America: The McGraw-Hill Companies, Inc; 2004, p.13-21, 28-32, 53, 273-81.
- 14 Wallace MS, Staats PS. *Pain medicine & management*. International ed. United States of America: The McGraw-Hill Companies, Inc; 2005. p7-9, 141-46.
- 15 Waldman, SD. *Pain Management: volume 2*. 1st ed. Philadelphia: Saunders Elsevier; 2007. p749-56.
- 16 Ramamurthy S, Alanmanou E, Rogers, JN. *Decision Making in Pain Management*. 2nd ed. Philadelphia: Mosby Elsevier; 2006. p 186-9.
- 17 Kreismann J. The Struggle of Musculoskeletal Health. *Dimension of Dental Hygiene* 2007; 5(9): 24-25.
- 18 Fairbank JCT, Pynsent PB. The Oswestry Disability Index. *Spine* 2000; 25(22): 2940-2953.
- 19 Dunitz M. *Classics Paper in Rheumatology* 1st ed. United Kingdom: Taylor & Francis e-Library; 2003. p 308-13.
- 20 Lenggat PA, Kedjarune U, Smith DR. Occupational health problem in modern dentistry: a review. *Indust Health* 2007; 45: 611-21.
- 21 Kott K, McCombs G. Avoid low back pain. *Dimensions of Dental Hygiene* 2011; 9(1): 36-41.
- 22 Frymoyer JW, Pope MH, Wilder DG, MacPherson B, Ashikaga T. Risk factors in low back pain. An epidemiological survey. *J Bone Joint Surg Am* 1983; 65: 213-18.
- 23 Kerr MS, Frank JW, Shannon HS. Biomechanical and psychosocial risk factors for low back pain at work. *American Journal of Public Health* 2001; 91(7): 1069-1075.
- 24 Tanaka S, Guo HR, Halperin WE, Cameron LL. Back pain prevalence in US industry and estimates of lost workdays. *American Journal of Public Health* 1999; 89(7): 1029-1035.
- 25 Pargali N, Jowkar N. Prevalence of musculoskeletal pain among dentists in Shiraz, Southern Iran. *IJOEM* 2010; 1(2): 69-74.
- 26 Rising DW, Bennett BC, Hursh K, Plesh O. Reports of body pain in a dental student population. *JADA* 2005; 136: 81-86.
- 27 Szymanska J. Disorders of the musculoskeletal system among dentist from the aspect of ergonomics and prophylaxis. *Ann Agric Environ Med* 2002; 9: 169-73.
- 28 Harkness EF, Macfarlane GJ, Nahit ES. Risk factors for new-onset low back pain amongst cohorts of newly employed workers. *Rheumatology* 2003; 42: 959-68.
- 29 White S. Ergonomics: how does dentistry fit you? *DentistryIQ* 2003; [internet]. Available from URL, 2011.
- 30 Andersson GBJ. Epidemiological Features of Chronic Low Back Pain. *Lancet* 1999; 354: 581-85.
- 31 Wai-Ping Lau J. Occupational shoulder pain in the dental profession – orthodontist, oral and maxillofacial surgeons, and general dental practitioners. *Hong Kong Dent J* 2006; 3(1): 29-36.