Accredited No. 28/E/KPT/2019
p-ISSN: 1907-5987 e-ISSN: 2615-1790

RESEARCH ARTICLE

An Overview Study of Low Back Pain Event Among the Dentist in Yogyakarta

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Online submission : 11 November 2019
Accept Submission : 07 February 2020

ABSTRACT

Introduction: *Low back pain is a pain sensation in spinal and paraspinal structure of lumbosacral region. The prevalence of low back pain event in several country show the significant percentage every year. Dentist is a high-risk profession related to musculoskeletal disorders particularly low back pain. Bad posture, static sitting position and repetition movement are several risks possibility for the occurrence of low back pain.* ***Objective:*** *This research is purposed to evaluate the prevalence overview of low back pain event among the dentist in Yogyakarta city.* ***Methode:*** *This research was designed by the descriptive observational approach using cross sectional research design. The samples were 76 dentists under the "Indonesian Dentist Association of Yogyakarta" region. The research was conducted through questionnaires utilization to measure the level of low back pain from the respondents to the no disabillity, minimal disabillity, moderate disabillity dan severe disability categories.* ***Result:*** *The result showed that among dentist population in Yogyakarta there were 37 dentists (49%)* suffered *low back pain with no disabillity, 35 dentists (46%) low back pain with minimal disabillity and 4 dentists (5%) low back pain with moderate disabillitywhile there were nodentist suffered from low back pain with severe disabillity (0%).* ***Conclusion:*** *The total prevalence of low back pain event among dentist in Yogyakarya city categorized by all the severity level was 39 dentists (or 51%) suffered from a low back pain of musculoskeletal disorder.*

Keywords: *Low back pain, dentist, Yogyakarta, ergonomics.*

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Denta Jurnal Kedokteran Gigi, Februari 2020; Vol.14 No.1; Hal 1-8
Available at http://journal-denta.hangtuah.ac.id/index.php/denta/issue/view/14
DOI: 10.30649/denta.v14i1

INTRODUCTION

Musculoskeletal disorder (MSDS) is a prolonged pain coming from discomfort sensation in hands, arms, shoulders, neck and spine due to static posture while working. Such pain can vary from mild to severe when the muscles repeatedly receive the static load overa long-period of time (Andyasari and Anorital, 2012)**.** *The World Health Organization* defines MSDS as a "pain in the muscles, tendons, peripheral nerves or vascular system indirectly as a result of an acute or rapid occurrence"

Lowback pain is a pain in the spinal or paraspinal structures of the lumbo-sacred regio in the presence of a stimulus that triggers the afferent sensory nerve, causing muscle contraction and activating the nerve fibers to the inhibition of pain impulses (Ilyas and Dharmaji, 2012)**.** Low back pain will cause pain between the corners ofthe bottom ribs and fold the bottom butt and often spread wider. Some risk factors of low back pain may come from the epidemic information such as age, individual health status and conditions, psychologic and psychosocial problems, drug addiction, smoking, as well as physical factors related to active acitivities such as sitting and driving, sitting or standing in a long hours and the position of staticworking position (Mahadewa and Muliawan, 2009)**.** The symptoms of low back painmay also vary in pain including taste of baal, weakness, stiffness, tingling sensation, pain occurance, which usually occurs as a result of lifting, bending, or straining movements. A number of predisposing factors which were reported to be close related to the low back painare poor posture, standing or bending over a long-period of time, sitting on a chair with noproper back rest, lifting, the valve, pushing the burden too much and the lack of exercise(Bull and Archard, 2007)**.**The problem of musculoskeletal disorder often occurs in a working environment requiring ergonomic principle, a position or movement of the body that is less appropriate can cause fatigue and discomfort. Lower back pain, neck pain, shoulder pain, *carpal tunnel syndrome*, *tendinopathies*, *herniated disks*, *rotator cuff tendinopathies*, and *repetitive strains of injuries* are diseases that can be inflicted from the Musculoskeletal disorder (Chopra, 2014).

A dentist is a very high-level job with the highly-rateof MSDS especially on the neck and the backs. Poor working posture, repetition of work, and prolonged standing canaffect muscle disorders, joints, bones, ligaments, tendons, nerves and blood vessels come to pain, fatigue and a wide range of complaints in the musculoskeletal disturbance. Low back pain is one of the most common complaints which most dentists in the world once had that penduring work (Gaowgzeh *et al.*2015). Physical activities that do not conform to the principle of ergonomic can cause the operator to experience strain on the muscles. it is triggered by an awkward posture due to the lack of ergonomic principle, requires more repeated movements and stronger energy (OSHA, 2000). Dynamic body movements will work optimally if joints and muscles move regularly. Based on a researchin the year 2015 by Faisal rehanet al*,* which came up with 270 dentists in Karachi Pakistan, showed the results that the musculoskeletal disorder is tended to occur on the lower back area, than in other areas such as the neck, wrists, and shoulders. Almost all dentists spend most of their time for working in static positions to perform the precision and extreme procedures in the patient's oral cavity. During maintaining the hand and position of the body to reach out and properly observe working area, 50% of the body muscles contracting to resist gravity. The repetition of this movement results in a bunch of muscles for having an extension and excessive use that leads to muscle fatigue, pain in the back, neck and shoulderareas(Saleem et al*.,*2015)**.**

The results of previous studiesshowed that the prevalence of lowback pain in somecountries continue to present the significant numerical percentage from year to year. Researches which had been done in New

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DOI: 10.30649/denta.v14i1

Accredited No. 28/E/KPT/2019
p-ISSN: 1907-5987 e-ISSN: 2615-1790

South Wales 64% (Marshall et al.,1997), Saudi Arabia 52.1% (Abduljabbar, 2005), Nigeria 77.1% (Udoye and Aguwa, 2007), India 79.6% (Shetty et al., 2015) and Pakistan 64.5% (Saleem et al.,2015) of the entire population experienced in lower back pain events.

According to the above explanation, it could be interesting to study on the distribution overview of lower back pain "*Low Back pain*" at the dentist in Yogyakarta city. Low back pain has been chosen because it has the highest prevalence rate in almost every case of musculoskeletal disorder in other countries, it is also a great concern particularlyamong the dentists whose mainly work involving a static posture and position. The selection of dentists in Yogyakarta for the subject of research was based on the data obtained from the Ministry of Health in 2015 that the special region of Yogyakarta was ranked second with the most dentist in all of Indonesia (ratio of 8.86 dentists in 100,000 residents) and Yogyakarta City had been the first in the number of dentists compared to the regency of Sleman, Kulon Progo, Bantul, Gunung Kidul (ratio of 23.26 within 100,000 dentist in the population).This research is purposed to understand the ocurrance, characteristic, distribution and basic knowledge of low back pain among the dentist in Yogyakarta city.

MATERIALS AND METHODS

Type of this research was observational descriptive with *cross sectional* research design which was conducted in Yogyakarta special region for approximately 6 months for research completion. The sample population of this study was all dentists who have registered as the member of Indonesian dentist association members in the city of Yogyakarta-branch. Samples were taken by *simple random sampling* technique through specifying the minimum sample that should be included into the study with the calculation of a large sample formula as follows:

$$n = \frac{Z^2_{1-\alpha/2} P\,(1-P)}{d^2}$$

n : large of minimum sample
Z 1-α/2 : standard normal distribution value (Z table) at a certain α
P : price proportion in population
D : error (absolute) that can be tolerated
If:
α : 5% (with confidence level 95 %)
Z 1-α/2 : 1.96 (from table of Z)
P : proportion of the expected population, set by 50% (0.5)
D : degree of desired deviation, in the study was taken 6% (0,06)

The minimum sample size in this study could be determined as:

$$\mathrm{n} = \frac{1{,}96^2 0{,}5\,(1-0{,}5)}{0{,}06^2} = 266{,}7 \approx 267$$

Because the population was known then inserted into the formula as follows:

$$\text{Sample size} = \frac{\text{Minimum sample}}{1 + \frac{\text{minimum sample}-1}{\text{population}}}$$

If:
Minimum sample : 266,7
Achievable sample number : 153 dentists

Then the samples in this study:

$$\text{Sample size} = \frac{266{,}7}{1 + \frac{266{,}7-1}{153}} = 76{,}2 \approx 76$$

So, the required sample size for this study was 76 dentists. Sample for this study has to be dentist who is registered as a Indonesian dentist association of Yogyakarta-branch in active status except for those who do not want to be a subject for this study and do not fill the questionnaire completely.

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Measurement of the low back pain intensity were performed by using questionnaire containing 10 questions. The point or score of each question has a maximum value of 5. A value of 0 is given if giving an answer for the first question at each question point and a value of 5 is given if giving an answer for the last question on each question points. After completing all the 10 questions, then the result is calculated by the following formula:

50 (maximum value of the whole question) x 100 = 500%

In this study used only 9 questions then:

45 (maximum value of question) x 100 = 450%

Result from thecalculation can be categorized according to the following modified interpretation description:

0 % : No disabillity
1 - 20 % : Minimal disability
21 - 40 % : Moderate disability
41 – 60 % : Severe disability
61 – 80 % : Lame
81 – 100 % : Patient just laying down on the bed or actually just pretending

The questionnaire used in this study was modified from the *Oswestry Low Back Pain Disability Questionnaire (ODQ)*(Fairbank et al.,1980)by incorporating a form of dropper subject identity such as age, gender, practical work experience, practice work hours in a day, average number of patients in a week, dominant position during dental procedures, exercise intensity in a week, frequent action on dental procedures (restoration, scaling, orthodontic, and extraction).

RESULTS

Table.1 Characteristics of respondents

Characteristics	Number (n)	Percentage (%)
Age		
- 17 – 25 years	2	3
- 26 – 35 years	34	44
- 36-45 Years	20	27
- 46 – 55 years	8	10
- 56 – 65 years	6	8
- 65 – X Years	6	8
Gender		
- Male	24	32
- Women	52	68
Smoking		
- Yes	0	0
- No	76	100
Intensity of exercise per week	19	25
- Never	45	59
- 1x - 2x	12	16
- > 2x		
Practice experience		
- 1-10 years old	44	58
- 11-20 years old	13	17
- 21-30 years old	8	11
- 31-40 years old	7	9
- 41-50 years old	4	5
Practice hours per day		
- 1 – 5hours	35	46
- 6 – 10hours	38	50
- 11 – 15hours	3	4
Average number of patients per week		
- < 10 Persons	13	17
- 10 – 25 people	33	43
- > 25 Persons	30	40
Dominant position during dental procedures		
- Sitting	64	16
- Standing	12	84
Most common treatment during dental procedures		
- Restoration	47	62
- Orthodontic	13	17
- Extraction	9	12
- Scaling	7	9
Assistant assistance/dental nurses during dental procedures:		
- Yes/Have	66	87
- No/Do not have	10	13
Low Back Pain Degree		
- No disabillity	37	49
- Minimal disabillity	35	46
- Moderate disabillity	4	5
- Severe disabillity	0	0

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The above table shows that the number of respondents comprise of 24 males and 52 females with the range of age between 24 – 77 years with or without smoking habit. The intensity of the sport is divided into unprecedented, 1x to 2x per-week, and more than 2x per-week. The experience of dental practice can be seen from the range of 1 – 50 years, while the practice hours are calculated from 1 – 15 hours per day. The average number of respondents was divided into < 10 people, 10 – 25 people and > 25 people per week. Dental procedures performed by the dentist in a sitting or standing position, with or without assistance from the assistant/dental nurses while the most frequently performed actions include restoration, orthodontic, extraction and scaling. The degree of low back pain in the study is divided into *no disabillity, minimal disabillity, moderate disabillity and severe disabillity*.

Table 2. Characteristics of respondents based on degree of severity *Low Back Pain*

Characteristics	*Low Back Pain* degree			
	No disabillity	*Minimal disabillity*	*Moderate disabillity*	*Severe disabillity*
Age				
- 17 – 25 years	0	2	0	0
- 26 – 35 years	18	14	2	0
- 36-45 Years	4	15	1	0
- 46 – 55 years	6	2	0	0
- 56 – 65 years	3	2	1	0
- 65 – X years	6	0	0	0
Gender				
- Male	12	9	3	0
- Women	25	26	1	0
Smoking				
- Yes	0	0	0	0
- No	37	35	4	0
Intensity of exercise per week				
- Never	10	7	2	0
- 1x - 2x	22	22	1	0
- > 2x	5	6	1	0
Practice experience				
- 1-10 years	19	23	2	0
- 11-20 years	4	8	1	0
- 21-30 years	6	2	0	0
- 31-40 years	4	2	1	0
- 41-50 years	4	0	0	0
Practice hours per day				
- 1 – 5	18	14	3	0
- 6 – 10	18	20	0	0
- 11 - 15	1	1	1	0
Average number of patients per week				
- < 10	8	4	1	0
- 10 – 25	13	19	1	0
- > 25	16	12	2	0
Dominant position in while performing the dental procedures				
- Sitting	31	29	4	0
- Standing	6	6	0	0
Most common precautions during dental procedures				
- Restoration	22	22	3	0
- Orthodontic	5	8	0	0
- Extraction	6	3	0	0
- Scaling	4	2	1	0
Assistance/dental nurses during Dental procedures:				
- Yes/Have	31	31	4	0
- No/Do not have	6	4	0	0

The above table shows the respondents characteristic based on the severity of *low back pain*. The degree of severity of *low back pain* is measured using *oswestry low Back Pain Disability Questionnaire (ODQ)*. The degree of severity of *low back pain* is divided into *no disability, minimal disability, moderate disability,* and *severe disability.* Every aspect of the respondent's characteristics is observed based on the assessment range.

DISCUSSION

In the age-related LBP, it showed that the highest prevalence of LBP was in the age of 36-45 years old. This increasing age of a person may result in the decreasing of physical ability and capacity physiologically which may affect to muscular elasticity (Widjaya et al., 2012). From the weekly patient number-related LBP data showed that the highest LBP

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prevalence occurred in the dentist who having patient 10 to 25 persons weekly, this data was not consistent with the workload due to patient number as reported by Kalantari et al., 2016 since the increased number of patient did not increase the prevalence of LBP in our subjects. By the weekly exercise data showed slightly contradictive information towards the report by Lionel 2014, since the exercised practitioners were complaining LBP more than the unexercised practitioners, this discrepancy could be interfered by the unconditioned exercise conducted by the each respondence. From the experience duration data showed that LBP occurred almost in all categories, this data was corresponding to the previous report by Gaowgzeh et al, 2015 which states that there is no significant link between experience duration and LBP. The dominant position data also interestingly showed in which prior assumption towards sitting position should be better was not so appropriate, this condition suggested that ergonomics position is not just merely static standing or sitting position (Gupta et al., 2008). Our daily practice data showed an in-line findings with the previous research by Maria and Fernandes in 2014, which indicates that the working duration in a day can be supporting evidence for LBP. By the type of dental procedure, our data supported the previous result by Moodley and Naidoo in 2015 with slightly difference, since in our data showed not only restorative but also orthodontic procedure having a higher prevalence.Our data also showed similar condition regarding the prevalence of LBP with the other reports in which mentioned that women tends to be more experienced in LBP (Chou et al., 2013). Interestingly, by the availability of dental assistant, our data showed that almost 50% practitioners still complained about their LBP, but the similar report also have been reported by Singh et al, 2014 that in the presence of dental assistant, some dentist still complain about their LBP.

CONCLUSION

Basically, according to our overview study suggested that the prevalence of Low Back Pain event among the dental practitioner in Yogyakarta city was quite high since it affected in almost half of the population even it showed diversity among predisposing factors. Therefore, this overview study also assumed that LBP was a multifactorial related muscular disturbance.

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