COMPARISON OF PERIODONTAL STATUS AMONG MILD, MODERATE AND HEAVY SMOKERS IN FACULTY OF DENTISTRY, UNIVERSITAS SUMATERA UTARA

(PERBANDINGAN STATUS PERIODONTAL PADA PEROKOK RINGAN, SEDANG DAN BERAT DI FAKULTAS KEDOKTERAN GIGI UNIVERSITAS SUMATERA UTARA)

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Abstract

Smoking is associated with a wide spectrum of disease including systemic diseases such as cancer, lung,and cardiovascular disease. Smoking is one of the risk factors that cause the severity of periodontal disease which is influenced by the number of cigarettes consumed per day. This study was aimed to analyze the comparison among periodontal status in mild, moderate, and heavy smokers in the Faculty of Dentistry, Universitas Sumatera Utara. This study was an observational analytic study with the cross-sectional approach,and sampling was done by purposive sampling method. This study was held in PeriodonticsInstallation, USU Dental Hospital (RSGM USU) with a total number of 80 sampleswas selected based on inclusion and exclusion criteria. A questionnaire and informed consent form were distributed to the samples at the beginning of the study followed by oral examination such as Periodontal Index Russell. The analysis data was performed by one way ANOVA test to show the differences in periodontal status among mild, moderate, and heavy smokers. The results showed that there was a significant difference among the mean of periodontal index scores in mild, moderate, and heavy smokers ($p<0,05$). As a conclusion,the more cigarettes consumed the worse of periodontal status.

Key words:smoking habits, periodontal status, heavy smokers

Abstrak

Merokok sering dihubungkan dengan timbulnyaberbagai gangguan kesehatan, diantaranya penyakit sistemik seperti kanker, penyakit paru-paru dan kardiovaskular. Merokok merupakan salah satu faktor risiko yang memperparah penyakit periodontal, hal ini dipengaruhi oleh jumlah rokok yang dikonsumsi per hari. Penelitian ini bertujuan untuk menganalisis perbandingan status periodontal pada perokok ringan, sedang, dan berat di lingkungan Fakultas Kedokteran Gigi, Universitas Sumatera Utara.Jenis penelitian ini adalah analitik observasional dengan rancangan penelitian cross sectional dan penentuan sampel dilakukan dengan cara purposive sampling. Penelitian ini dilakukan di Instalasi Periodonsia RSGM USU dengan jumlah sampel sebanyak 80 orang yang dipilih sesuai dengan kriteria inklusi dan eksklusi. Penelitian ini diawali dengan mengisi *informed consent* dan kuisoner penelitian, lalu dilakukan pemeriksaan klinis rongga mulut menggunakan indeks periodontal Russell. Analisis data dilakukan dengan menggunakan uji *one-way ANOVA* untuk melihat perbedaan status periodontal pada perokok ringan sedang dan berat. Hasil penelitian menunjukkan bahwa terdapat perbedaan periodontal indeks yang signifikan antara perokok ringan, sedang dan berat ($p<0,05$). Sebagai kesimpulan semakin banyak rokok yang dikonsumsi maka semakin buruk status periodontalnya.

Kata kunci:kebiasaan merokok, status periodontal, perokok berat

INTRODUCTION

Smoking is one of the biggest risk factors causing death in the world.[1,2] ll World Health Organization (WHO) estimates that more than 5 million people die each year from smoking.[3] Basic Health Research results of 2013 show the prevalence of smokers in Indonesia currently reaches 36.3% with an average of

12.3 cigarettes consumed each day.[4] Based on the ability to smoke a day, smokers can be divided into three groups, namely mild smokers (<10 cigarettes per day), moderate smokers (10-20 cigarettes per day) and heavy smokers (> 20 cigarettes per day).[5]

Smoking is often associated with the emergence of various health problems, including systemic diseases such as cancer, lung and cardiovascular disease, as well as various diseases in the oral cavity, one of which is a periodontal disease.[6]

Smoking affects the increase in periodontal tissue damage. It is influenced by the number of cigarettes consumed per day.[2,7] Rajali et al. stated that smoking could increase the risk of periodontal disease, i.e. high alveolar bone resorption and pocket depth compared with people who never smoked.[6] Kolte et al. in his study showed a higher pocket depth and attachment loss in smokers than nonsmokers.[8]

Gautam et al. also mentions that smokers have a greater attachment loss and pocket depth than nonsmokers.[9] The severity of attachment loss depends on the dose or exposure to the fumes of cigarette that is accepted by smokers; where the mild smoker has a score of 2.05 mm attachment loss and a heavy smoker has 4.75 mm score.[10]

Tomar and Asma cited Neto observed that smokers had a four times higher prevalence of periodontitis than non-smokers and heavy smokers were twice as likely to have periodontitis. In Addition, the researchers also mentioned the relationship between numbers of cigarettes consumed each day with the ratio of periodontitis.[7]

Basically, the impact of smoking on the periodontal status of a population varies greatly. This depends on the frequency of exposure to cigarettes consumed.[11] Sreedevi et al. stated that smoking is considered a significant risk factor for the occurrence of periodontal disease and this depends on the number of cigarettes consumed per day and the length of time spent smoking.[12]

This study aims to analyze the comparison of periodontal status in mild, moderate and heavy smokers at the Faculty of Dentistry, Universitas Sumatera Utara. The benefits of this study are to provide information for the public about the number of cigarettes consumed every day can aggravate the condition of the oral cavity and as a means of education to the public in order to maintain oral health.

MATERIALS AND METHODS

Total samples in this study amounted to 80 smokers residing in the Faculty of Dentistry USU. The sample selection was made by purposive sampling method with inclusion and exclusion criteria. Sample inclusion criteria are aged 18-65 years old, male, active smoker, good general condition, have teeth remaining at least 15 teeth, do not do tartar cleaning within the last six months, and are willing to participate in this research. Sample exclusion criteria were using orthodontic appliances, taking systemic drugs, and drinking alcohol.

The sample that meets the criteria will fill in the questionnaires that have been available and carried out a direct clinical examination. The examination was performed on all teeth using a dental mirror and periodontal prob. The assessment of Russell Periodontal Index criteria are:

0 = Negative. There is no periodontal tissue damage and no loss of function due to damage the supporting tissue.

1 = mild gingivitis. The presence of an inflammatory region in the free gingival region but not around the teeth.

2 = Gingivitis. The presence of inflammation surrounding the tooth but no damage to epithelial attachment.

6= Gingivitis accompanied by pocket formation. The epithelial attachment is discontinuous, the presence of periodontal pocket, normal mast function, the tooth remains in the socket and the absence of tilting.

8 = periodontal damage and loss of mastication function. The possibility of teeth mobility and loss of teeth, tilting, a blunt sound when percussion with metal or tooth looks unstable while in the socket.

The data obtained will be recorded on the printed sheet, and the results of the examination will then be processed using a computer program. Test data normality with Kolmogorov-Smirnov, while data analysis is done by one-way *ANOVA*testto see the comparison of periodontal status in mild, moderate, and heavy smokers at the Faculty of Dentistry USU.

RESULTS

In this study, the age group <30 years was the most subjects with 48.8% compared to subjects in other age groups. In addition, most of the subjects brushed twice a day in 68.8%. As many as 41.3% of subjects had bleeding gums at the time of brushing and 58.8% others did not. Also 43.8% of subjects never even visited a dentist before, either to do dental treatment or just to check the condition of the oral cavity (Table 1).

Table 1. Subject characteristics

No	Variable	Total	Percentage (%)

1	Ages		
	a. <30 years	39	48.8
	b. 30 - 50 years old	29	36.3
	c. > 50 years	12	15
	Total	80	100
2	Frequency of brushing		
	a. 1x a day	13	16,3
	b. 2x in a day	55	68,8
	c. More than 2x a day	11	13,8
	d. Not sure	1	1,3
	Total	80	100
3	Bleeding gums when brushing teeth		
	a. Yes	33	41,3
	b. No	47	58,8
	Total	80	100
4	Visits last to the dentist		
	a. 3 months ago	0	0
	b. 6 months ago	11	13.8
	c. 1 year ago	11	13.8
	d. Never	35	43.8
	1. e. Others	23	28.8
	Total	80	100

Table 2 showed the smoking habit data and obtained the results of smokers with consumption of 10-20 cigarettes per day is the largest group that is as much as 40% and duration of smoking most ≤ 10 years,ie 43.8%.

Table 2. Daily and duration smoking status

Variable	(n = 80)	(%)
Number of cigarettes consumed per day		
a. <10 cigarettes / day	25	31,3
b. 10 - 20 cigarettes / day	32	40
c. > 20 cigarettes / day	23	28, 7
Smoking duration		
a. ≤ 10 years	35	43.8
b. 11 - 20 years	28	35
c. > 20 years	17	21.3

Table 3 shows the percentage of Russell's periodontal index score in mild, moderate and smokers, no subjects having a Russell 0 and 1 periodontal index score in this study.

Table 3. Percentage of Russell periodontal index score on mild, moderate, and

smokers	Russell Periodontal Index										Total
	Score 0		Score 1		Score 2		Score 6		Score 8		
	N	%	n	%	N	%	n	%	n	%	
Mild	0	0	0	0	21	26,3	3	3,7	1	1,3	25
Medium	0	0	0	0	22	27,5	8	10	2	2,5	32
Weight	0	0	0	0	9	11,2	11	13,8	3	3,7	23
Total	0		0		52	65	22	27 , 5	6	7.5	80

In Table 4, *One-way*ANOVAtest of Russell's periodontal index score on mild, moderate and smokers showed significant differences with p = 0.012 (p <0.05).

Table 4.Comparison Russel periodontal index in mild, medium, and smokers

Smokers	**Rusell Periodontal Index**		
	n	Mean ± SD	p
Mild	25	258.78 ± 0.62	0.012 *
Medium	32	2.39 ± 1.08	
Weight	23	2.55 ± 1.02	

* significant at *p* <0.05

DISCUSSION

Generally, a comparison of Russell periodontal index score on mild, moderate, and smokers have significant differences. The results of this study indicate that the score of the periodontal index in heavy smokers is higher than mild and moderate smokers. This is in line with research conducted by Gaphor et al. that heavy smokers have a higher score of attachment loss and greater bone loss than mild smokers.[13] Singh et al. in his study showed that pocket depth in heavy smokers significantly had higher scores than mild smokers. Mild smokers had periodontal scores that tended to be lower than those of heavy smokers.[14]

Comparison of periodontal status in mild, moderate, and smokers can be seen based on clinical manifesttations of increased pocket depth, the presence of gingival attachment loss and bone loss and gingival bleeding characterized by gingival inflammation as an early sign of periodontal disease. However, gingival inflammation in heavy smokers has a lower mean score compared with mild and moderate smokers.[15] Pereira et al. explain that nicotine contained in cigarettes can cause peripheral vascular constriction and alter and worsen the gingival circulation resulting in reduced gingival inflamma-

tion.[16] Nicotine in cigarettes causes local vasoconstriction, reduces blood flow, oedema and acts as a baseline inhibitor that generally occurs in periodontal tissue through reduced gingival inflammation, redness, and bleeding.[9] Gingival inflammation is less common in heavy smokers due to large amounts of nicotine exposure resulting in keratinization of the gingiva.[17]

Nicotine is the main ingredient and the most active pharmacological agent found in tobacco. Nicotine can be found in body fluids such as urine, plasma and saliva of smokers. Smoker's mouth tissue exposed to high nicotine will have a negative effect on surrounding cells. The nicotine concentration in gingival sulcus fluid can increase to 300 times the concentration of nicotine in blood plasma.[18,19]

Measurement of nicotine levels in the blood can be done by using gas chromatography, where the time of severe nicotine in the blood is longer than the others, so this examination is preferred but the sensitivity is lower than the examination through urine.[20,21]

Nicotine absorption in the mucosa depends on pH, commercial cigarettes have an acidic pH (5.5) so that nicotine absorption is minimal, but in tobacco and cigar pipes, the pH is alkaline, so nicotine is easily absorbed through the mucosa. After the body is exposed to nicotine, there is a change in the body where the alkaloid properties of nicotine will stimulate and reduce receptor sensitivity.[18,19]

Nicotine attached to the root surface of the tooth will interfere with the attachment of fibroblasts and the expression of integrins will also reduce collagen production. Keratin gingiva smokers exposed to nicotine contain pro-inflammatory cytokines, so this interferes with the healing process, especially in periodontal therapy.[19]

Clinical signs of inflammation appear less in smokers than in non-smokers. This may be due to changes in the inflammatory response or changes in gingival vascularization response. Although there was no significant difference in healthy gingival vascular density studied in smokers and non-smokers, the microcirculation response of plaque accumulation showed a change in smokers compared to non-smokers where the development of inflammation, increased the fluid flow of the gingival sulcus and bleeding at fewer probes at smokers than non-smokers.[22]

In addition, the oxygen concentration in healthy gingival tissue appears to be lower in smokers than in non-smokers, though indirectly, this suggests moderate inflammation. Subgingival temperatures in smokers are lower than non-smokers, and recovery of vasoconstriction caused by local anaesthesia will occur longer in smokers. This suggests a change in gingival microvascularization in smokers that causes decreased blood flow and reduced signs of gingival inflammation.[22]

Meanwhile, loss of attachment and bone loss tends to increase in heavy smokers compared with mild smokers. The attachment loss in smokers can be greater than non-smokers, due to the dose exposure effects of various chemicals contained in the smoked cigarettes and the possibility of influencing periodontal disease. Possible explanations are the cumulitive effect of smoking on microorganisms on the periodontal tissues, weakening the immune system and regulating cytokines.[13] Smoking regulates the expression ofcytokines, pro-inflammatory such as in-terleukin-1 is involved in promoting tissue destruction and alveolar bone resorption.[10] Ali et al.mention that pocket depth and attachment loss were higher in heavy smokers are not only caused by poororal hygiene, but there are also direct effects of cigarettes that can damage tissue.[23]

The conclusion of this study shows a significant difference in periodontal status between mild, moderate and severe smokers and the more cigarettes consumed,the worseof the periodontal status.

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