

Smoking as a risk factor of periodontal disease

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Abstrak

Latar Belakang: Merokok merupakan penyebab dari penyakit pada manusia dimana sesungguhnya penyakit ini dapat dicegah. Nikotin dalam rokok dapat merusak sistem respon imun dan menyebabkan penyempitan pembuluh darah, termasuk pembuluh darah di dalam jaringan sekitar gigi. Adanya penyempitan pembuluh darah, dapat membentuk suatu lingkungan yang menguntungkan bagi pertumbuhan bakteri penyebab penyakit periodontal. Tujuan dari penelitian ini untuk mengetahui apakah terdapat hubungan antara merokok dengan penyakit periodontal.

Metode: Disain penelitian adalah potong lintang (Cross Sectional), data diambil dari data sekunder Riskesdas tahun 2013. Sampel adalah anggota rumah tangga yang berusia ≥ 15 tahun dengan jumlah 722.329 orang.

Hasil: Terdapat hubungan yang bermakna antara merokok dengan penyakit pada jaringan periodontal, dengan nilai $p = 0,000$ ($p < 0,05$), ini berarti ada hubungan yang bermakna dimana $OR = 4,4343$ (95%, $CI: 4.1559-4.7312$), artinya responden yang merokok kemungkinan 4,4 kali memiliki jaringan periodontal tidak sehat dibandingkan yang tidak merokok.

Kesimpulan: Dalam studi ini dilaporkan bahwa merokok merupakan faktor risiko terjadinya penyakit periodontal, dimana dengan merokok kemungkinan empat kali lebih akan mendapatkan penyakit periodontal dibandingkan dengan tidak merokok. (*Health Science Journal of Indonesia 2016;7(2):107-12*)

Kata kunci: Merokok, penyakit periodontal, faktor risiko

Abstract

Background. Smoking is a cause of disease in humans is indeed a disease which can be prevented. Nicotine in cigarettes can damage the immune response system and causes constriction of blood vessels, including the blood vessels in the tissues surrounding the tooth. Narrowing of blood vessels, can form a favorable environment for the growth of bacteria that cause periodontal disease. The aim of research to determine whether there is a relationship between smoking and periodontal disease.

Methods: the study design is a cross sectional, data retrieved from the secondary data Riskesdas 2013. Samples are household members aged ≥ 15 years with the number of 722 329 people.

Results: There was a significant association between smoking and periodontal diseases, with a value of $p = 0.000$ ($p < 0.05$), this means that there is a significant relationship where $OR = 4.434$ (95%, $CI: 4.156-4.731$), the meaning that respondents who were 4.43 times to have periodontal diseases (unhealthy periodontal tissues) as compared to not-smoking.

Conclusion: In this studi reported the smoking is a risk factor for the periodontal diseases, where smoking were four times more likely to have periodontal diseases as compared to not-smoking. (*Health Science Journal of Indonesia 2016;7(2):107-12*)

Keywords: Smoking, periodontal disease, risk factors

Smoking increases risk of most of chronic diseases such as heart diseases, cancer, lung diseases, respiratory diseases and other smoking related diseases and can develop into a variety of pathological conditions that can cause death.¹ Nicotine in cigarettes can damage the immune response system and causes constriction of blood vessels, including the blood vessels in the tissues surrounding the tooth. A decrease of oxygen in tissues and disruption of the immune response as a result of the narrowing of blood vessels, it can form a favorable environment for the growth of disease-causing bacteria periodontal.² Tobacco in cigarettes can cause damage to periodontal tissues due to the changes caused by microbes in the mouth.³

Some studies indicate an existence of a positive relationship between smoking and the severity of periodontal disease, and the effect of potential spam factors such as: the socio-economic, educational, which also affect the oral hygiene.¹ The research in the United States it is known that in adults do not smoke, where 11% of them (passive smoking) were exposed to environmental tobacco smoke in the home or office can be affected by periodontal disease, and the risk of periodontal disease was 1.5 times higher than those not exposed to the environment, where increasing this risk smaller than in active smokers, amounting to more than 5 times, and needs to be taken into account for the development of the gum disease.¹

The effects of smoking on periodontal supporting tissue loss shown that smoking can lead to increased risk of periodontal tissue damage, with a total value of OR = 2.82 (95% CI 2, 36 to 3.39).^{1,4} The effects of tobacco on periodontal tissues seems to be more prominent in male than in female.⁵ It was also reported that smoking is a strong risk factor for the occurrence of the periodontal disease.⁶

The one goal of Oral Health in 2020 as agreed by the WHO, FDI (World Dental Federation or the Federation of Dentistry International) and the IADR (International Association for Dental Research) for periodontal disease is to reduce tooth loss due to the disease at the age of 18 years, 35 - 44 years and 65-74 years, especially for cases of poor oral hygiene, systemic diseases, smoking and stress.⁷ The appearance of periodontal disease is caused by plaque formation by bacteria and their products on the tooth surface.⁸ From the Hunter et al. study reported that smokers had a score of plaque, calculus and periodontal disease degree higher than not a

smokers.⁹ Smoking is a risk factor for the disease occurs in periodontal tissues and the tooth loss.¹⁰

In Indonesia, the proportion of people aged ≥ 15 years of smoking and chewing tobacco are likely to increase in Riskesdas 2007 (34.2%), Riskesdas 2010 (34.7%), and Riskesdas 2013 (36.3%). Compared with research Global Adult Tobacco Survey (GATS) in the age group ≥ 15 years the proportion of male smokers 67.0% and in Riskesdas 2013 were 64.9%, while female according to GATS is 2.7% and in Riskesdas 2013 is 2.1%.¹¹ The aim of research is to determine whether there is relationship between smoking and periodontal disease.

METHODS

The collection of data by perform dental and oral examinations by the National Institute of Health Research and Development (NIHRD), Ministry of Health of the Republic of Indonesia through the National Basic Health Research (Riskesdas) in 2013, is a non-intervention study with cross-sectional design. The study population was the entire population of Indonesia that covers 33 provinces, 497 district /cities (Riskesdas, 2013).¹¹ Riskesdas 2013 used a sample selection method of sampling frame the 2010 population census from the Biro Pusat Statistik (BPS-Statistic Indonesia). The process household selection determined by BPS that gives the selected building census from the selected block census. Before the data was collected the names of heads of households will be updated by the enumerators.

Criteria for samples selection are all members of the household who were aged ≥ 15 years (because since the age of 15 years permanent teeth have grown up until the second molar teeth). Total sample size was 722 329 respondents. In this study, the age was divided into two groups, ≤ 30 years of age and > 30 years of age. Furthermore the education was divided into two groups, higher ($>$ junior high school), and lower (\leq junior high school). Socio-Economic status was divided into two groups, poor and not poor. The National Basic Health Research (Riskesdas) 2013 was ethical approved by National Institute for Health Research and Development Ethics Committee, Ministry of Health, Republic of Indonesia No. 01.1206.207

The data obtained are complex and need to be weighting include strata variable age, education, and socioeconomic status and Primary Sampling Units (PSU) for variable smoking and periodontal tissues health. Data analysis using SPSS version 15 statistical tools and analyzed by using the computer program.¹² The implementation of data collection of dental and oral health through interviews and observations using the mouth mirror instruments with the help of sunlight lighting (flashlight). Data of smoking status was based on questionnaire interview, while the oral health status was determined by oral examination.

RESULTS

A total of 722 329 respondents in this study, who were having a healthy periodontal tissue as many as 34.614 respondents and 34.614 respondents showed unhealthy periodontal tissue (periodontal disease).

In the table 1, showed that most of the respondent aged ≥15 years and above had unhealthy periodontal tissue (95.2%)

Table 1. Proportion of Periodontal Disease in Respondents Aged ≥ 15 years

Periodontal Disease	n	%
Yes	687.715	95.21
No	34.614	4.79
Total	722.329	100

In table 2. showed that the number of respondents without the periodontal diseases who had aged ≥ 30 years more than <30 years, and the female respondents were more than male respondent. Furthermore analyses of the education respondents without the periodontal diseases, we found that lower education had more periodontal diseases than higher education.

In table 3, showed the relationship between smoking and periodontal diseases, at P=0,000 (p < 0.05), by Odds Ratio (OR)= 4.43; and 95% Confident Interval (CI) = 4.16-4.73. Smoking have a significant relationship with the periodontal disease, smoking were 4.43 times to have periodontal diseases as compared to not-smoking

Table 2. Proportion (%) of Periodontal Disease by Respondent Characteristics.

Characteristics of Respondents	Periodontal Disease				O R (Odds Ratio)	95% CI (Confidence Interval)
	Yes		No			
	(n=687.625)	(n=34.504)	(n=34.504)	(n=687.625)		
	n	%	n	%		
Age						
≥ 30 years (old)	445.204	96.2	17.523	3.8	1.52	1.47-1.58
< 30 years (young)	242.621	93.5	16.981	6.5		
Gender						
Male	348.917	96.9	11.128	3.1	1.05	1.01-1.09
Female	338.908	93.5	23.377	6.5		
Education						
Lower	468.621	95.7	20.914	4.3	1.24	1.20-1.29
Higher	219.204	94.2	13.590	5.8		
Occupation						
Work	415.777	96.4	15.604	3.6	0.87	0.83-0.89
Not Work	272.047	93.5	18.900	6.5		
Socioeconomic						
Poor	459.067	96.0	9.427	4.0	1.09	1.05-1.13
Not Poor	228.757	94.8	25.078	5.2		

Table 3. Relationship of Smoking and Periodontal Disease

Smoking	Periodontal Disease				OR (Odds Ratio)	p Value
	Yes		No			
	n	%	n	%		
					4.43	0,000
Smoking	449.474	98,7	3.190	1.3		
Not Smoking	238.351	93,5	31.314	6.5		
Total	687.825	95,2	34.504	4.8		

In table 4, showed the relationship between hygienic behavior and periodontal disease, at P=0,000 (p < 0.05), by Odds Ratio (OR)= 1.36; and 95% Confident Interval (CI) = 1.24-1.48. Hygienic behavior have a significant relationship with periodontal tissues health, hygienic behavior were 1.36 times to have periodontal diseases (unhealthy periodontal tissues) as compared to no- hygienic behavior.

Table 4. Relationship of Higienic Behaviour with Periodontal Disease

Higienic Behaviour	Periodontal Disease				OR (Odds Ratio)	P Value
	Yes		No			
	n	%	n	%		
						0,000
Yes	14.857	92,7	1.162	7.3	1.36	
No	672.698	98,7	33.342	4.7		
Total	687.825	95,2	34.504	4.8		

In table 5, showed the relationship between age, smoking, and hygienic behavior with periodontal disease, at P=0,000 (p < 0.05).

Table 5. Relationship of Age, Smoking, and Higienic Behaviour with Periodontal Disease

Variable	Odds Ratio	p Value	95% Confidence Interval (CI)
Age	1,52	0.000	1.47 - 1.60
Smoking	4.43	0.000	4.16 - 4.73
Higienic Behaviour	1.36	0.000	1.24 - 1.48

DISCUSSION

Periodontitis is defined as an inflammatory disease of the supporting tissues of the teeth caused by specific microorganisms or groups of specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone with pocket formation, recession, or both. Periodontitis

preceded by inflammation of the tissues supporting the teeth is caused by a groups microorganisms spesifik.¹³ Periodontal disease often found is the inflammation of the gums or gingivitis and periodontitis.¹⁴ Gum disease is an infection of the gums and can affect the bone structures supporting the teeth which severe cases, can make loose the teeth. From the study of smoking in the United States it is known that smoking is a major cause of severe gum disease.¹⁵

Smoking can increase the risk for all diseases and can develop into a variety of pathological conditions that can lead to death. Several studies have shown the relationship between smoking and periodontal health. The finding of the study that smoking and periodontal destruction, the direct relationship as environmental factors and indirect relationship through genetic factors.¹⁶

In this study, it was found that the comparison to the ≥ 30 years (old) respondents, < 30 years (young) respondents were more likely to have periodontal disease (96.2%). Furthermore, compared to the female respondents, male respondent were more likely to have periodontal disease (96.9%). Compared with respondents to the higher education, lower educated respondents were more likely to have periodontal disease (95.7%). Compared with respondents to the not work, work respondents were more likely to have periodontal disease (96.4%). Furthermore, compared to the not poor socioeconomic status respondents, poor respondents were more likely to have periodontal disease (96.0%). Borrel LN et al., 2006, was reported education level was associated with prevalence of severe periodontitis among African Americans, and this association remained significant after adjustment for age, gender, odds of having severe periodontitis were 2.0 times (95% CI = 1.4, 2.9) higher among those without a high school diploma than among those with a college degree or postgraduate education. After adjustment for age, gender, low-income African Americans were 2.2 times (95% CI = 1.3, 3.7) more likely to have severe periodontitis than their high-income peers. These associations did not differ according to either gender.¹⁷

In table 3, showed the relationship between smoking and periodontal tissues health, at P=0,000 (p < 0.05), by Odds Ratio (OR)= 4.43; and 95% Confident Interval (CI) = 4.16-4.73. Smoking have a significant relationship with periodontal tissues health, smoking were four more likely to have periodontal diseases (unhealthy periodontal tissues) as compared to not-

smoking. The finding of the other study, positive association was observed between periodontal disease and cigarette smoking. It was found that cigarette smoking was associated with lesser gingival bleeding and deeper pockets as compared to non-smokers.¹⁸

Smoking is the most important environmental risk factors in causing periodontitis.¹⁸ Gerad et al, 1994 in Gautam DK, et al, 2011¹⁹, was reported that smoking in young adults can be a major factor associated with accelerating environmental destruction of periodontal tissue. In the case-control study in India by Sreedevi, et al.²⁰ is known that the respondents were smokers have more severe periodontal disease than non-smokers which has a strong effect, a chronic, dose depending on network conditions periodontal tissues. The results of the a retrospective study in Great Britain by Razali M, et al, 2005²¹ is known that smoke has evidence that more severe periodontal disease than never-smokers, in which the difference increases with age and the response of exposure. Smoking is a significant risk factor for health problems and periodontal treatment.²²

Stop smoking and keep clean their teeth a well is the most important factor for chronic periodontitis.²³ The results of the the research in Japan by Ueno M, et al., 2015, conducted in male who smoke active and former smokers showed that smoking has an adverse effect on the health of the periodontal tissues. Therefore, it is very important to inform the public about the negative effects of smoking on oral tissue health, not only for their own health but also the health of other people.²⁴ The behaviour toward the maintenance of oral hygiene contributes the most impact on periodontal tissue health status.²⁵

In conclusion, the smoking is a risk factor for the periodontal diseases, where smoking four times more likely to have periodontal diseases as compared to not-smoking.

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