

Analysis of Periodontal Disease by Age, Gender, and Smoking Habit

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Abstract

The prevalence of periodontal disease increases through several factors, such as age, gender, and smoking habit. Epidemiology data of periodontal disease can be used to create a strategic plan to decrease the prevalence of the disease. Was analyzed relationship of periodontal disease with age, gender, and smoking habit in a teaching dental hospital in Jakarta, Indonesia in the period of 2010–2015. This cross-sectional study employed 538 medical records. The most common periodontal disease in each age group was chronic periodontitis, which presented in majority of the women with anon-smoking habit. Chi-square test showed $p < 0.05$, which indicates a significant difference in periodontal disease by age, gender, and smoking habit.

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Introduction

Periodontal disease is one of the highly prevalent oral health problems in the community. According to the data from the World Health Organization (WHO), 10%–15% of the world's population experiences periodontal disease and its prevalence increases with age. Periodontal disease ranks second to caries at 96.58% in terms of prevalence in Indonesia.¹ Gingivitis and periodontitis are the most common periodontal diseases. Previous study examined the different types of periodontal diseases that commonly occur in each group of age. The most common periodontal case in the juvenile group is plaque-induced chronic gingivitis accompanied by an increasing number of microbes,² that in the older age group is periodontitis with a severity level of mild to moderate, and that in the elderly is periodontitis with a high severity level accompanied by severe tooth loss.² Another study found that the increased severity of periodontal disease in the older age group occurred simultaneously with the increase in debris and calculus accumulation.³

Other studies have claimed that gender affects the prevalence of periodontal diseases, with males having worse oral hygiene than females.⁴ This trend is observed in the factor of smoking habit, which is generally seen in males. The effects of smoking habits cause males to experience physiological effects, which make them susceptible to periodontal diseases. Smoking is a habit that can greatly damage one's health. According to the WHO, tobacco smoke causes many diseases, such as lung cancer, cardiovascular disease, and risk of neoplasm of the larynx, among others. Smoking not only causes systemic effects but also affects the pathological conditions of the oral cavity. Smoking can affect the periodontal tissues through several systemic factors, for example, decreasing phagocytosis and reducing the production of antibodies. One of the ingredients of cigarettes is nicotine, which is a vasoconstrictor that may cause a lack of oxygen supply and create a good environment for the colonization of anaerobic bacteria. The decreased vascularity of the gingiva causes defects in periodontal tissue regeneration in the healing process, delaying the healing process and possibly progressing to a more severe periodontal disease.

Peeran et al. found that chronic periodontitis has the greatest prevalence in most age groups and that not only the prevalence but also the severity of periodontal disease increases with age.⁵ Cronin et al. reported that males

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smoke more than females and that smoking is closely associated with periodontal tissue damage.⁴ Moon et al. stated that alveolar bone loss, tooth mobility, and tooth loss are more severe in smokers than non-smokers.⁶ Currently, data on the distribution of periodontal disease by age group, gender, and smoking habits in Indonesia are not yet available. Some previous studies are limited in terms of the relationship of the prevalence of the disease with smoking and gender. The present study analyzed of periodontal disease in different age group, gender, and smoking habit.

Materials and methods

This work was a retrospective and analytical study of secondary data with a cross-sectional design describing periodontal disease by age, gender, and smoking habit. The study was conducted in a teaching dental hospital in Jakarta, Indonesia in 2016. The samples were dental records according to their history of periodontal disease in their visits from 2010 to 2015. The data included periodontal disease status, age, gender, and smoking habit. The data were analyzed using univariate and bivariate analyses through data processing using SPSS V.20.

Results

Variable	Frequency (%)	
Periodontal Disease		
Generalized Chronic Periodontitis	347	64.5
Localized Chronic Periodontitis	86	16.0
Generalized Aggressive Periodontitis	20	3.7
Localized Aggressive Periodontitis	4	0.7
Generalized Chronic Gingivitis	38	7.1
Localized Chronic Gingivitis	28	5.2
Others	15	2.8
Age group		
Early adolescence (12–16 yo)	6	1.1
Late adolescence (17–25 yo)	101	18.8
Early adulthood (26–35 yo)	82	15.2
Late adulthood (36–45 yo)	123	22.9
Middle age (46–55 yo)	117	21.7
Elderly (56–65 yo)	85	15.8
Old (>65 yo)	24	4.5
Gender		
Female	279	51.9
Male	259	48.1
Smoking Habit		
Yes	139	25.8
No	399	74.2

Table 1. Variable distribution of the subjects.

The data collection process yielded 538 periodontal patient's dental records at a teaching

dental hospital in Jakarta, Indonesia in the period of 2010-2015. Table 1 presents the distribution of each variable studied. Most patient had generalized chronic periodontitis. The majority of the samples were in the late adulthood group with the age between 36 to 45 years old. The proportion of male and female patients were almost equal. There were statistically significant difference between periodontal disease, as the dependent variable, compared between age groups, gender and smoking habit.

Periodontal Diseases	Age Groups							Total	p-value
	1	2	3	4	5	6	7		
Chronic Periodontitis	3	73	63	102	98	72	21	432	0.000
Aggressive Periodontitis	0	1	7	9	4	2	0	23	
Chronic Gingivitis	1	24	10	10	13	7	3	68	
Others	2	3	2	2	2	4	0	15	
Total	6	101	82	123	117	85	24	538	

*Chi-square test, $p < 0.05$ = significant difference.

Table 2. Comparison of periodontal disease with age group. *Chi-square test, $p < 0.05$ = significant difference

Periodontal Diseases	Gender		Smoking Habit	
	Male	Female	Yes	No
Chronic Periodontitis	216	216	126	306
Aggressive Periodontitis	12	11	6	17
Chronic Gingivitis	25	43	6	62
Others	6	9	1	14
p-value	0.015		0.001	

*Chi-square test, $p < 0.05$ = significant difference.

Table 3. Comparison of periodontal diseases with gender and smoking habit. *Chi-square test, $p < 0.05$ = significant difference

Discussion

The early adulthood, late adulthood, and middle age groups experienced the most number of periodontal diseases each year. The data were consistent with the theory that the prevalence and the severity of periodontal disease tend to increase with age.⁷ The distribution of periodontal disease each year was dominated by female patients. The female patients were dominant in almost each year. The findings were consistent with those of studies reporting that females are more prone to periodontal disease than males.⁸ The study of periodontal disease by age group showed that the late adolescence group (17-25 years old) mostly suffered from chronic gingivitis. Majority of the patients with chronic periodontitis were in the middle age group (46-55 years). These results were consistent with those of the epidemiological studies on periodontal disease

by the American Academy of Periodontology (AAP), which indicated that the incidence of gingivitis is found in the early age of children and that it increases in the adolescence group and decreases in the adulthood group. The AAP also stated that the incidence of chronic periodontitis was mostly found in the adulthood group. Grossi et al. reported that the incidence of chronic gingivitis and periodontitis showed increasing severity with age. The increased severity of periodontal disease is not caused by the increased rate of defect but by the accumulation of periodontal tissue damage that has never happened before.⁹ Aggressive periodontitis was mostly observed in patients in the late adulthood group (36-45 year old). Previous research suggested that although aggressive periodontitis is commonly found in patients less than 35 years old, it can still be found in all age groups. The incidence of aggressive periodontitis that found in patients 35 years and older is due to the patients not being aware of the disease at a young age and only realizing it and going to the hospital during adulthood. Thus, aggressive periodontitis diagnosis is usually recorded during adulthood.¹⁰

Chronic periodontitis is the periodontal disease mostly found in all age groups, and its incidence increases in the older age groups. The incidence of chronic periodontitis compared with other periodontal diseases was 15% in the adolescence group, 38% in the adulthood group, and 47% in the elderly and senior age group. These findings showed not only the increased severity but also the increased prevalence of periodontal disease with age. Aside from determining the percentage of periodontal disease in all age groups, bivariate analysis was also conducted to determine whether a significant difference could be found between periodontal disease and age group. The analysis showed a significant difference between periodontal disease and age group. These results are in line with a study by Tadjoedin et al. that showed periodontal disease tends to relate to age, even though a positive-weak-correlation was found.¹¹ The distribution of periodontal disease each year was dominated by female patients. In terms of type of illness, gingivitis mostly found in female patients and periodontitis was mostly found in male patients. The data in this study contrasted with those in the research conducted in the United States showing that male patients have more periodontal tissue

defects, which exhibit deeper periodontal pockets and more gingival bleeding, than women. National surveys showed that periodontal disease is more prevalent in males than in females because of differences in behavior, such as smoking and oral hygiene of individuals.⁸ Female patients have a higher level of susceptibility to periodontal disease than males. An association was found between pregnancy and periodontal disease.⁴ Hormonal changes during pregnancy could cause excess gingival response to plaque, thus increasing the risk of periodontal disease. Moreover, hormonal changes accompanied by vascular changes also cause the gingival to become more sensitive to bacteria and their products.

Bivariate analysis showed a significant difference between periodontal disease and gender. According to the bivariate analysis test, periodontal disease is directly linked to specific factors such as oral hygiene. Among the patients, 90% were smokers who experienced chronic periodontitis, 6% were smokers with aggressive periodontitis, and 4% were smokers with gingivitis. These results suggest that chronic periodontitis is a disease that dominates among smokers. Environmental factors, such as smoking, can increase the severity and extension of chronic periodontitis. Increased attachment loss, furcation involvement, and pocket depth were found in smokers with chronic periodontitis. Moreover, smokers experienced increased supra gingival calculus formation, decreased subgingival calculus formation, and decreased BoP scores.⁷ Bivariate analysis also showed a significant difference between periodontal disease and smoking habit.

Conclusions

Differences were found in the distribution of periodontal disease by age group, gender, and smoking habit, and an association was observed between periodontal disease and age group, gender, and smoking habit.

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