

Determinants of Systemic Diseases amongst Periodontitis Patients in Suva, Fiji

Anjali Thomas^{1*}, Leenu Raju Maimanuku², Masoud Mohammadnezhad³ and Sabiha Khan⁴

¹Department of Public Health, School of Public Health and Primary Care, Fiji National University, Fiji

²School of Dentistry and Oral Health, College of Medicine, Nursing and Health Sciences, Fiji National University, Fiji

³Department of Public Health, School of Public Health and Primary Care, Fiji National University, Fiji

⁴Department of Statistics, School of Public Health and Primary Care, Fiji National University, Fiji

*Corresponding author: Anjali Thomas, School of Public Health and Primary Care, Fiji National University, Fiji, Tel: +6793381044; E-mail: anjalithomas23@gmail.com

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Abstract

Introduction: Periodontitis develops through opportunistic infection which usually occurs when there is an imbalance between the oral biofilm and host defense's and has been connected with various systemic diseases such as heart diseases, diabetes, renal diseases, respiratory diseases etc. Due to lack of previous study, this study is aimed to describe the determinants of systemic diseases amongst periodontitis patients in Suva, Fiji.

Methodology: This retrospective descriptive study was carried out in the FNU Dental Clinics, Suva, Fiji using the periodontitis patient clinical records from 1st January 2013 to 31st December 2014. Periodontitis patients with or without self-reported systemic disease history were included in this study. Patient demographic variables were collected and Binary logistic regression was used to calculate odds ratio with their 95% Confidence Intervals to define any association between dependent variable and independent variables. A p-value<0.05 was considered statistically significant.

Results: The results of the study showed that the odds of having systemic disease were 3.5 times higher in 40-64-year-old patients than in the 15-39-year-old periodontitis patients (OR 3.5, 95% CI 1.98-6.09, p=<0.001). Male periodontitis patients reported with 42% systemic disease and females reported with 58% systemic disease. Systemic disease was higher in females than males; however, this was not statistically significant. The odds of having systemic disease were 1.9 times higher in the Fijians of Indian Descent than among the I-Taukei Fijians (OR 1.9, 95% CI: 1.17-3.11, p=0.026).

Conclusion: The study concluded that systemic disease was the most in 40-64-year-old Fijians of Indian decent periodontitis patients, this was statistically significant. Female periodontitis patients showed higher presence of systemic diseases than the male periodontitis patients; however this was not statistically significant.

Keywords: Determinants; Periodontitis; Systemic diseases; Fiji

Introduction

Periodontitis develops through opportunistic infection which usually occurs when there is an imbalance between the oral biofilm and host defense's [1]. After dental decay, periodontal disease is considered as the second most common dental disease globally. In the United States 30–50% of the populations have periodontal disease, but only about 10% have severe forms of the disease. In 2010, it was estimated that about 750 million people or 10.8% of the population worldwide were affected by chronic periodontitis [2]. Periodontitis has been connected to a number of systemic diseases such as heart diseases, diabetes, renal diseases, respiratory diseases etc.

The prevalence of severe periodontal destruction increases with age, from 8 percent among adults 30 to 39 years of age to 35 percent among persons 60 to 69 years of age [3]. In a study by Georgiou et al. [4], the younger age groups (20-39) reported 40-50% of systemic conditions whereas among the older age groups the occurrence of systemic diseases was increased to 70-71.3%. And in a study by Agarwal et al.

[5] it was reported that 72.78% periodontitis patients above the age of 60 years reported with some type of systemic disease.

Several studies have found associations between gender and some systemic diseases in periodontitis patients. In the study by Georgiou et al. [4] it was reported that males with periodontitis had higher prevalence of heart diseases than females. Few studies have also shown that gender have no association between some systemic diseases in periodontitis patients. According to Bhateja [6] 199 male patients (53.06%) and 176 female patients (46.93%) from patient records, almost all categories, except in the Cardiovascular and Gastrointestinal diseases, evoked male predilection over female patients with systemic diseases and was statistically insignificant (P>0.05).

In Fiji, increase in the number of people suffering from systemic diseases and death due to systemic diseases present one of the major challenges for the countries health systems. In 2010, the main causes of morbidity in Fiji were circulatory diseases (44%), endocrine (13%), and neoplasm's (10%) [7]. According to the World Health Organization (WHO) 2014 updates the top causes of death in Fiji were coronary heart disease (24.23%) and diabetes mellitus (17.76%), respectively.

While death caused due to asthma was 2.41%, kidney disease was 2.38%, lung disease was 1.57% and liver disease was 1.15% [8].

A last published survey of oral health in Fiji showed the increase in number of patients suffering from increased periodontal diseases. According to the 2004 oral health survey report in Fiji; a widespread increase of periodontal disease was detected. Only 4.3% had healthy status, 67.1% showed presence of calculus, 19% shallow pockets, 4.1% deep pockets and about 3.3% had bleeding. Despite the increase of number of systemic diseases and periodontal diseases no study was done regarding occurrence of systemic diseases and periodontal diseases in Fiji. Therefore, the main aim of this study was to describe the determinants of systemic diseases amongst periodontitis patients in Suva, Fiji.

Methodology

This retrospective study was conducted among periodontitis patients with complete self-reported systemic disease history from 1st January 2013 to 31st December 2014 in two Dental Clinics at FNU, Suva, Fiji. Periodontitis patients with or without self-reported systemic disease history were included in this study. Patients without periodontitis were excluded from this study. The total number of periodontitis patient records studied was 369 and were identified by names. To ensure confidentiality is kept at all times the patient records were de-identified by serial numbers such as 1, 2, and 3 and so on in a study log sheet. Complete patient data such as patient serial numbers, self-reported history of systemic disease, demographic variables, self-reported behavioral risk factors, Community Periodontal Index (CPI) scores and severity of periodontitis recordings were collected in an excel spread sheet.

The data was typed and stored electronically in password protected files that was only accessible to the researcher and supervisors for analysis. Periodontitis patients with or without self-reported systemic disease history were included in this study. Patients without periodontitis were excluded from this study. Those records with no periodontal charting and non-standard gingival recession measurements and non-standard probing pocket depth measurements were categorized as not recorded in this study. All the categorical variables were presented by numbers and percentages. Chi square test was used to determine the demographic pattern among the periodontitis patients with and without systemic disease. And Binary logistic regression was used to calculate odds ratio with their 95% Confidence Intervals to define any association between dependent variable and independent variables. A p-value less than 0.05 was considered statistically significant.

An ethical approval was first sorted from the relevant college ethics board authorities such as the Departmental Research Coordinator at FNU and the College Research Ethics committee-FNU. Once the approval was granted an email was sent to FNU Dental Clinics, Deputy Head of Department of Oral Health, Clinical Director and the Clinical Coordinators to seek permission to access the records for the years 2013 and 2014.

Variable	n	With- systemic disease n (%)	Without-systemic disease n (%)	p	OR (95% CI)	Age group
15-39	108	19 (14.6)	89 (38.5)	<0.001	1	

Results

Demographic characteristics of periodontitis patients

Table 1 shows the demographic characteristics of periodontitis patients. The average age of patients was 46.8 years (SD=13.3). The periodontitis patients seen among the age group 15-39-years old was 29.9%, among the age group 40-64-years old was 61.8% and among the age group 65 years and above was 8.3%. The male periodontitis patients seen were 42.8% and 57.2% were females. I-Taukei Fijians constituted 47.4% of the study population, 32.5% were Fijians of Indian Descent and 20.1% represents individuals from other ethnic groups.

Variable	n	%
Age group		
15-39	108	29.90%
40-64	223	61.80%
65 above	30	8.30%
Total	361	100
Gender		
Males	158	42.80%
Females	211	57.20%
Total	369	100
Ethnicity		
I-Taukei Fijian	175	47.40%
Indo- Fijian	120	32.50%
Other	74	20.10%
Total	369	100

Table 1: Demographic characteristic of periodontitis patients.

Demographic characteristics of periodontitis patients with and without systemic disease.

The demographic characteristics of periodontitis patients with and without systemic disease are summarized as in Table 2. The odds of having systemic disease were 3.5 times higher in 40-64-year-old patients than in the 15-39-year-old periodontitis patients (OR 3.5, 95% CI 1.98-6.09, p=<0.001). Male periodontitis patients reported with 42% systemic disease and females reported with 58% systemic disease. Systemic disease was higher in females than males; however, this was not statistically significant. The odds of having systemic disease were 1.9 times higher in the Fijians of Indian Descent than among the I-Taukei Fijians (OR 1.9, 95% CI: 1.17-3.11, p=0.026).

40-64	223	95 (73.1)	128 (55.4)		3.48 (1.98, 6.09)
65 above	30	16 (12.3)	14 (6.1)		5.35 (2.24, 12.80)
Total	361	130	231		
Gender					
male	158	55 (42.0)	103 (43.3)	0.81	1
Female	211	76 (58.0)	135 (56.7)		1.05 (0.69, 1.62)
Total	369	131	238		
Ethnicity					
I-Taukei	175	50 (38.2)	125 (52.5)	0.026	1
Indo- Fijian	120	52 (39.7)	68 (28.6)		1.91(1.17, 3.11)
Others	74	29 (22.1)	45 (18.9)		1.61(0.91, 2.85)
Total	369	131	238		

Table 2: Demographic characteristics of patients with and without systemic diseases.

Discussion

The results of this study showed that systemic disease was the most in 40-64-year-old Fijians of Indian decent periodontitis patients, this was statistically significant. Female periodontitis patients showed higher presence of systemic diseases than the male periodontitis patients; however this was not statistically significant.

Age distribution

The age group in our study was divided into three groups, i.e. age group 15-39 years, 40-64 years and 65 years and above. The age group 15-39-year olds reported 29.9% (n=108) periodontitis patients with systemic diseases, the age group 40-64-year olds reported 61.8% (n=223) periodontitis patients with systemic diseases and the age group 65 years and above reported 8.3% (n=30) periodontitis patients with systemic diseases.

The odds of having systemic disease were 3.5 times higher in 40-64-year-old patients than in the 15-39-year-old periodontitis patients (OR 3.5, 95% CI 1.98-6.09, p<0.001). The younger age group 15-39 years had 14.6% systemic disease while in the older age group 40-64 years the number of systemic disease increased significantly to 73.1%. Similarly, the study by Georgiou et al. [4], reported the prevalence of systemic disease was 40-50% among the younger age group while the prevalence of systemic disease increased significantly in the old age group to 70-71.3%. In a study by Nazir [9], it was stated that periodontal disease causes increased risk of cardiovascular diseases among individuals above 65 years of age. In a study by Pattnaik et al. [10], it was reviewed that prevalence of severe periodontitis was higher among individuals aged 65 years and above than the age 20-29 years. The prevalence of risk factors increases with age along with its cumulative effects. The relationship between population ageing and growing burden is established by the association between morbidity and loss of function and biological age. However, this association is not fixed; therefore there is scope in health promotion and disease prevention among elderly individuals. Ageism, complex multi-morbidity and inadequate access to age appropriate care is aggravated

by factors like insufficient security income, social protection and user fees leading to further complications in effective intervention among the older populations [11].

In this study, the age group 40-64 years showed highest predominance among heart diseases (68.1%) and diabetes (79.3%). This could be because total number of periodontal patients seen in our study, among the age group 40-64 years was 61.8% and among the age group 65 years and above was only 8.3% and also according to the Fiji Islands Health System Review [12] it was reported that the inhabitants living beyond 50 years of age were 60% and living beyond 60 years was only 8% in Fiji. In a developing country like Fiji, the elderly is not abandoned but due to inadequate resources the healthcare is insufficient [13].

Gender distribution

In this study, the total number of male periodontitis patients were 42.8% (n=158) and the number of female periodontitis patients were 57.2% (n=211). In a study by Alam et al. [14] it was stated that males show more predilection over females in periodontal diseases. Factors such as poor oral hygiene, reduced positive attitudes toward oral health, and dental-visit behavior among males were identified as responsible for the male predilection as any genetic factor. Also, that the important factor to be considered is that women have varied periodontal problems due to hormonal changes in various decades of life. However, we cannot predict the outcome of treatment plans depending on the gender predilection for periodontal diseases because the pattern of disease progression is different in males and females [14]. In the present study, male periodontitis patients with systemic diseases was 42% (n=55) and female periodontitis patients with systemic diseases was 58% (n= 76). The study showed higher presence of systemic diseases among the female periodontitis patients than male periodontitis patients; however this was not statistically significant. Similarly, in a study by Bhateja [6] no statistical association was seen between gender and periodontitis patients with systemic disease. According to the Fiji Ministry of Health [15] reports it was reported that 61% of females had more diabetes than males 39%. And also in the

STEPS survey it was reported that the moderate to high risk of developing non-communicable diseases was 97% among men and 98% among women in Fiji and it was also identified that the risk significantly increased with age. Females can have higher probabilities of getting diabetes and heart diseases in Fiji due to overweight and obesity. Also, 85% of women consume below five helpings of fruits and vegetables per day in Fiji [16]. Nutrition is an important factor in maintaining oral and periodontal health along with general health. Vegetables and fruits are regarded as the principal dietary sources of anti-oxidants like vitamins C. Periodontitis may be prevented by the reduction of free radicals and oxidative stress in the periodontal tissues through the consumption of potassium rich vegetables and fruits [17]. All these factors could have been the reason female periodontitis patients showed a higher number of systemic diseases than males.

Ethnicity distribution

The ethnic groups in this study were I-Taukei Fijians 47.4% (n=175), Fijians of Indian Descent 32.5% (n=120) and the other group of ethnicities 20.1% (n=74) which consisted of all the ethnic groups of people excluding I-Taukei Fijians and Fijians of Indian Descent.

The odds of having systemic disease were 1.9 times higher in the Fijians of Indian Descent than among the I-Taukei Fijians (OR 1.9, 95% CI: 1.17-3.11, p=0.026). This could be due to the fact that Fijians of Indian Descent are immigrants originating from the Indian subcontinent who are at a higher risk of development of non-communicable diseases like diabetes, heart diseases due to rapid nutrition and lifestyle transitions, lower health seeking behavior, delayed diagnosis due to language barriers and religious and socio-cultural factors [18].

This study thus showed significant association between age and ethnicity among periodontitis patients with and without systemic diseases. Further prospective and interventional studies are required to determine exact cause of association as this is a retrospective descriptive study [19-21]. The study was on periodontitis patients seen at FNU Dental Clinics and hence does not represent the entire Fijian population. The study can be utilized by FNU Dental Clinics to improve oral health especially among periodontitis patients with systemic disease and also to improve their patient data recording systems and to carry on further research studies to determine the exact cause of the link between periodontitis and systemic diseases.

Conclusion

The study concluded that systemic disease was the most in 40-64-year-old patients than among all the other age groups, this was statistically significant. Female periodontitis patients showed higher presence of systemic diseases than the male periodontitis patients; however this was not statistically significant. And the Fijians of Indian Descent showed higher number of systemic diseases than the I-Taukei Fijians, this was statistically significant.

Conflict of Interest

There is no any conflict of interest.

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