

DOI: 10.4172/2472-1654.100132

## Presence and Types of Systemic Diseases among Patients with Periodontitis in Suva, Fiji

Anjali Thomas<sup>1\*</sup>,  
Leenu Raju Maimanuku<sup>2</sup>,  
Masoud Mohammadnezhad<sup>3</sup>  
and Sabiha Khan<sup>4</sup>

### Abstract

**Objectives:** Periodontitis is an infection which is caused by micro-organisms like *Porphyromonas gingivalis*. Periodontitis patients can have one or more systemic diseases such as heart diseases, diabetes, renal diseases, respiratory diseases etc. Due to lack of study in Fiji, this study is aimed to determine the presence and types of systemic diseases among patients with periodontitis in Suva, Fiji.

**Methods:** This is a descriptive study on periodontitis patients with complete self-reported systemic disease history carried out in two dental clinics operated by the Fiji National University. Periodontitis patients with or without self-reported systemic disease history were included in this study. Patients without periodontitis were excluded from this study. The patient clinical records are recorded from 1st January 2013 to 31st December 2014. SPSS was used to analysis the data and all the categorical variables were presented by numbers and percentages.

**Results:** The total number of periodontitis patients who reported having at least one type of systemic diseases was 35.5% (n=131). The most common types of diseases were heart disease 55.7% ~ 56% (n=73) and diabetes 45% (n=59). The age group 40-64-year-old periodontitis patients showed the highest number of heart diseases and diabetes, (68.1%) and (79.3%), respectively. Amongst all the ethnic groups, the Fijians of Indian Descent showed the highest number of heart diseases (49.1%), and the I-Taukei Fijians showed highest number of diabetes (42.4%). The use of tobacco was 39.7%, alcohol was 38.4% and betel-nut was 5.6% among periodontitis patients with heart diseases. And the use of tobacco was 33.9%, alcohol was 39% and betel-nut was 3.4% among periodontitis patients with diabetes mellitus. Severe periodontitis patients showed high percentages of diabetes (50.9%) among the mild periodontitis and moderate periodontitis patients. However, the occurrence of heart diseases was the same, (40.6%) among moderate and severe periodontitis patients.

**Conclusion:** The study concluded that the number of periodontitis patients with any one type of systemic disease was 35.5%. And the most common types of systemic diseases seen among the periodontitis patients were heart disease and diabetes. Further research studies in future will provide more insight to the association of periodontitis and systemic diseases.

**Keywords:** Periodontitis; Systemic diseases; Fiji

- 1 Master in Public Health, School of Public Health and Primary Care, Fiji National University, Samabula, Fiji
- 2 School of Dentistry and Oral Health, College of Medicine, Nursing and Health Sciences, Fiji National University, Samabula, Fiji
- 3 School of Public Health and Primary Care, Fiji National University, Samabula, Fiji
- 4 School of Public Health and Primary Care, Fiji National University, Samabula, Fiji

\*Corresponding author: Dr. Anjali Thomas

✉ anjalithomas23@gmail.com

Master in Public Health, School of Public Health and Primary Care, Fiji National University, Samabula, Fiji.

Tel: (+679) 3233502

**Citation:** Thomas A, Maimanuku LR, Mohammadnezhad M, Khan S (2018) Presence and Types of Systemic Diseases among Patients with Periodontitis in Suva, Fiji. J Healthc Commun Vol.3 No.2:22

**Received:** February 05, 2018; **Accepted:** February 20, 2018; **Published:** February 28, 2018

### Introduction

Periodontitis is a multifactorial chronic inflammatory oral disease. It affects 10-15% of the general population worldwide [1].

Periodontitis is an infection which is caused by micro-organisms like *Porphyromonas gingivalis* which habitats on the surface of the teeth at or below the margin of the gingiva. The infection affects the tissues of the periodontium and if left untreated can

lead to severe destruction of the connective tissues and the bone supporting the tooth. In patients suffering from periodontitis, levels of inflammatory mediators such as tumour necrosis factor: alpha (TNF- $\alpha$ ), interleukin (IL-6) (IL-1B), prostaglandin E2 (PGE2) and C-reactive protein are elevated [1,2]. The systemic effects of periodontitis arise from the combination of disseminated toxins, bacterial pathogens and the actions of both the adaptive and innate immunity [3].

Systemic diseases are a group of several diseases such as heart diseases, diabetes, renal diseases, respiratory diseases and others that affect a number of organ systems and the human body as a whole (Medical Dictionary for the Dental Professions, 2012). Periodontitis has been connected to a number of systemic diseases such as heart diseases, diabetes, renal diseases, respiratory diseases etc. Studies have shown that the periodontitis patients can have one or more systemic diseases [4-7].

The prevalence of systemic diseases among the periodontitis patients have been reported by researchers from many countries since many decades. Brasher and Rees reported 47.3% [8], Peacock and Carson reported 52.5% [9], Lagervall et al. reported 49.4% [10], Georgiou et al., stated 60% [4], Dumitrescu reported 81.96% [5] and in a recent study by Zainoddin et al. reported that 30.5% [6] periodontal disease patients had some type of systemic condition. Research studies have identified that heart diseases and diabetes are the most prevalent to be seen in patients with periodontitis. In studies by Marjanovic and Bhulin [7] and Zainoddin et al. [6] it was reported that cardiovascular diseases and diabetes was the most prevalent systemic diseases among the patients with periodontal disease.

Many hypotheses have been generated to explain this link and some have shown evidence to believe that there is a strong association between periodontitis and systemic diseases. However, the exact connection between periodontitis and systemic diseases remains complex and obscure and there is still much that remains unknown. Chronic periodontitis represents the source of chronic inflammation that may be a significant contributing factor in the pathogenesis of other inflammatory based diseases. There is strong evidence which reported that among periodontitis patients the C-reactive protein (CRP) levels are higher. The inflammation is involved in the pathogenesis of many chronic illnesses such as [10] cardiovascular disease, type 2 diabetes mellitus, and rheumatoid arthritis. Periodontitis and systemic diseases also have shared risk factors such as smoking, alcohol, obesity, heredity, age, socio-economic status, etc.

According to the 2014, international estimates the death rate due to diabetes in Fiji was the second highest at 17.96% and the death rate due to heart diseases is 24.23% and ranks 19th in the world (WHO, 2014). The incidence rate of diabetes was 618 in 2015 compared to 609 in 2014, showing an increase of 1.2% in incidence of diabetes in Fiji. The mortality rate in Fiji in 2015 was 19.7% due to diabetes and 16.6% due to ischemic heart disease, 4.1% other heart diseases. The highest mortality rate was due to diabetes in 2015 [11].

Research studies which have been published about the relationship between the occurrence of systemic diseases among

patients with periodontitis are more from developed nations, there are only few reports from under developed and developing countries and even less from Fiji and the Pacific Island region available. There has been no previous study carried out to measure the occurrence of systemic diseases among periodontitis patients in Fiji so that this study is aimed to determine the presence and types of systemic diseases among patients with periodontitis in Suva, Fiji.

## Methodology

This study is a retrospective descriptive study on periodontitis patients with complete self-reported systemic disease history from 1st January 2013 to 31st December 2014. The study was carried out in the Fiji National University Dental Clinics, Suva, Fiji using the clinical records kept for patients with periodontitis seen at the clinics from 1st January 2013 to 31st December 2014. Periodontitis patients with or without self-reported systemic disease history were included in this study. Patients without periodontitis were excluded from this study. There are two dental clinics operated by the Fiji National University, of which, one is the Pasifika Dental Clinic and the other J.B. Savou Dental Clinic. The patient clinical records are recorded by the dental academic staff and the dental students under the supervision of the clinical supervisors. The hard copies of the patient clinical records are stored in the metal cabinets in the dental clinic office; the filing is done according to patient surnames. The patient clinical records are kept in folder storage and are identified through both first names and surnames. Complete medical history including medications, blood pressure reading and blood glucose level is taken by both the dental students and the academic staff.

A total of 369 periodontitis patient records were included in this study. Patient folders were identified by names and were de-identified by serial numbers such as 1, 2, 3 and so on in a study log sheet, to ensure confidentiality is kept at all times. An excel spreadsheet was prepared to collect data which contained details on patient serial numbers, self-reported history of systemic disease, demographic variables, self-reported behavioural risk factors, Community Periodontal Index (CPI) scores and severity of periodontitis recordings.

The data was typed and stored electronically in password protected files that was only accessible to the researcher and supervisors for analysis. 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. SPSS was used to analysis the data and all the categorical variables were presented by numbers and percentages.

An ethical approval was pursued from the relevant authorities including the Departmental Research Coordinator-Fiji National University (FNU) and the College Research Ethics committee-FNU. Once the approval was granted a letter/email was sent to the Fiji National University 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.

## Results

The total number of periodontitis patients who reported having at least one type of systemic diseases was 35.5% (n=131). Among them, 75.5% (n=99) had presence of only one type of systemic disease, 22.1% (n=29) had presence of two types of systemic disease and 2.3% (n=3) had three types of systemic disease. The **Table 1** shows the number of systemic diseases reported among periodontitis patients.

The types of systemic diseases among patients with periodontitis with at least one type of systemic disease are given in **Table 2**. The most common types of diseases were heart disease 55.7% ~ 56% (n=73) and diabetes 45% (n=59).

## Demographic Characteristics, Use of Behavioral Risk Factors and Severity of Periodontitis among Periodontitis Patients with Heart Disease and Diabetes

The **Table 3** shows the demographic characteristics, use of behavioral risk factors which were reported and severity of periodontitis among periodontitis patients with heart disease and diabetes. In this study, the age group 40-64 year-old periodontitis patients showed the highest number of heart diseases and diabetes, (68.1%) and (79.3%), respectively. Female periodontitis patients showed higher number of heart disease (60.3%) and diabetes (55.9%) than the male periodontitis patients. Amongst all the ethnic groups, the Fijians of Indian Descent showed the highest number of heart diseases (49.1%), and the I-Taukei Fijians showed highest number of diabetes (42.4%). The use of tobacco was 39.7%, alcohol was 38.4% and betel-nut was 5.6% among periodontitis patients with heart diseases. And the use of tobacco was 33.9%, alcohol was 39% and betel-nut was 3.4% among periodontitis patients with diabetes mellitus. Severe periodontitis patients showed high percentages of diabetes (50.9%) among the mild periodontitis and moderate periodontitis patients. However, the occurrence of heart diseases was the same, (40.6%) among moderate and severe periodontitis patients.

## Discussion

The main purpose of this study was to determine the presence of systemic diseases among periodontitis patients seen at the Fiji National University Dental Clinics, in the years 2013 and 2014. A total number of 369 periodontitis patient's records were studied. The number of periodontitis patients seen in this study with any one type of systemic disease was 35.5% (n=131). This result is almost similar to the study by Zainoddin et al. [6] on 370 patient records of periodontal patients treated in School of Dental Sciences, University, Sains Malaysia (USM), Kubang Kerian, Kelantan, Malaysia, which reported that 30.5% periodontal disease patients had some type of systemic conditions. However, in the study by Georgiou et al. [4] on 1000 adult patients among Brisbane general and periodontal practice

**Table 1** The number of systemic diseases reported among the periodontitis patients (n=131).

Number of systemic diseases reported	n (%)
1	99 (75.6)
2	29 (22.1)
3	3 (2.3)

**Table 2** The types of systemic diseases among periodontitis patients with at least one type of systemic disease (n=131).

Type of systemic disease	n (%)
Heart disease	73 (55.7)
Diabetes	59 (45)
Lung disease	24 (18.3)
Kidney problems	5 (3.8)
Liver disease	2 (1.5)
HIV	2 (1.5)
Breast cancer	1 (0.8)

**Table 3** Demographic characteristics, use of behavioral risk factors and severity of periodontitis among periodontitis patients with heart disease and Diabetes mellitus.

Variable n (%)	Heart diseases n (%)	Diabetes mellitus n (%)
<b>Age</b>		
15-39	9 (12.5)	6 (10.3)
40-64	49 (68.1)	46 (79.3)
65-89	14 (19.4)	6 (10.3)
<b>Total</b>	72	58
<b>Gender</b>		
Males	29 (39.7)	26 (44.1)
Females	44 (60.3)	33 (55.9)
<b>Total</b>	73	59
<b>Ethnicity</b>		
I-Taukei	26 (35.6)	25 (42.4)
Indo-Fijian	29 (39.7)	23 (39.0)
Others	18 (24.7)	11 (18.6)
<b>Total</b>	73	59
<b>Use of tobacco</b>		
No	44 (60.3)	39 (66.1)
Yes	29 (39.7)	20 (33.9)
<b>Total</b>	73	59
<b>Use of alcohol</b>		
No	45 (61.6)	36 (61.0)
Yes	28 (38.4)	23 (39.0)
<b>Total</b>	73	59
<b>Use of betel-nut</b>		
No	67 (94.4)	56 (96.6)
Yes	4 (5.6)	2 (3.4)
<b>Total</b>	71	58
<b>Severity of periodontitis</b>		
Mild	13 (18.8)	7 (12.7)
Moderate	28 (40.6)	20 (36.4)
Severe	28 (40.6)	28 (50.9)
<b>Total</b>	69	55

patients it was reported that 60% periodontitis patients suffered from some type of systemic condition. In the retrospective study by Dumitrescu [5] among 1044 periodontitis patients visiting the Department of Periodontology, Carol Davila University of Medicine and Pharmacy, Romania, it was reported that 81.96% patients suffering from periodontitis had at least one type of systemic disease. The findings of the present study were less than the studies by Georgiou et al. [4] and Dumitrescu [5]. This could be because of the differences in patient data recording systems and also their studies reported other systemic conditions such as osteoporosis, rheumatoid arthritis, sinusitis, tumors. Also, as this study utilized self-reported history of systemic disease there could be chances that patient might not be aware about the presence of any disease and also there are chances of poor communication between patient and clinician [12].

The types of systemic diseases among the periodontitis patients with at least one type of systemic disease in this study were heart disease 55.7% (n=73), diabetes 45% (n=59), lung disease 18.3% (n=24), kidney disease 3.8% (n=5), liver disease 1.5% (n=2), HIV 1.5% (n=2), and breast cancer 0.76% (n=1).

It was found that, heart disease and diabetes was the highest among the patients with periodontitis in this study. Similarly, numerous research studies in the past have shown that heart diseases and diabetes are the most prevailing systemic diseases to be seen among patients with periodontal diseases. In the study by Zainoddin et al. [6], it was reported that hypertension and diabetes was the most prevalent systemic diseases among the patients with periodontal disease. Similarly, in a study by Marjanovic and Bhulin [7] among periodontitis patients attending the Dental School in Huddinge, Sweden, it was reported that patients with periodontitis had more percentages of systemic diseases, such as cardiovascular disease and diabetes mellitus than patients without periodontitis. Also, Bhatti et al. (2012) in their study stated that heart diseases were the most frequently seen systemic disease in patients with periodontal disease. Similarly, in a self-reported study by Dumitrescu [5] it was reported that heart diseases were the most common systemic disease in patients with periodontitis. This could be probably because heart diseases and diabetes are the most common systemic diseases globally. In the year 2014, it was estimated that 422 million people across the world had diabetes. Most non-communicable disease deaths globally are due to cardiovascular diseases, 17.7 million people annually and 1.6 million people die due to diabetes [13]. In 2015, 415 million people showed prevalence of diabetes and additionally 318 million adult populations had impaired glucose tolerance. These individuals have utmost risk of developing the disease in future. The Western Pacific had 153.2 million people with diabetes in 2015. China, the most populated country in the Western Pacific, reported about 110 million people with diabetes [14]. Fiji also reports a high prevalence of diabetic cases. In 2010, Fiji ranked 46th in the world in terms of comparative prevalence of diabetes which was 9.40%. And the national prevalence of diabetes in Fiji was 9.10%. The national prevalence specifies the proportion of each country's population that suffers from a particular disease and it is perfect for measuring the burden of the disease. The comparative

prevalence reported the world population and therefore, all the comparisons for the number of diseased populations are usually done using comparative prevalence [15]. According to the 2014, international estimates the death rate due to diabetes in Fiji was the second highest at 17.96% and the death rate due to heart diseases is 24.23% and ranks 19th in the world (WHO, 2014). The incidence rate of diabetes was 618 in 2015 compared to 609 in 2014, showing an increase of 1.2% in incidence of diabetes in Fiji. The mortality rate in Fiji in 2015 was 19.7% due to diabetes and 16.6% due to ischemic heart disease, 4.1% other heart diseases. The highest mortality rate was due to diabetes in 2015 [11]. Also, research studies suggest that periodontitis and heart diseases are frequently affected by two generally accepted risk factors i.e. diabetes and smoking. Studies also advocate that the quantity of pathogens, antigens, endotoxins, and cytokines observed in periodontitis might be important causal factors. Periodontitis has been identified as the sixth complication of diabetes. Uncontrolled diabetes mellitus elevates the risk of periodontitis and there are ever expanding evidence that periodontitis has unfavorable effect on the progression and onset of diabetes mellitus. People with diabetes have higher risk for periodontitis and the risk rises with poor glycemic control. Periodontitis can have a negative effect on glycemic control [2,16]. All these factors could be the reasons for the high presence of heart diseases and diabetes seen in the periodontitis patients in our study.

Over the years, a number of studies with different strategies such as case-control, retrospective, prospective observational, and meta-analysis have reported divergent outcomes while calculating the association between both systemic diseases and periodontitis. Retrospective and cross-sectional studies show sparse advantage in identifying an association and cannot affirm causality. Interventional and prospective longitudinal studies more likely provide a more diligent platform to equitably analyze periodontal disease and systemic disease relationships. The present study is a retrospective descriptive study among periodontitis patients seen at the Fiji National University Dental Clinics; the results do not represent the entire population of Fiji Islands or many of its subsects. Furthermore, the results of this study are likely to be biased as the data was self-reported. Further research studies in future will provide more insight to the association of periodontitis and systemic diseases.

## Societal Issues as a Barrier to Breaking Bad News

The local traditional healers are famous over the media claiming spurious skills of curing all form of diseases. As soon as the physician admits 'there is nothing more we can do', the patient runs to meet the herbalist who may be a better communicator. Religion is also not helping the issue as expected in terms of good existential support; rather some pastors may be assuring the patient that; "its well", for it is written 'you shall not die but live'.

Societal denial of death and dying is rife as some families do lack death experience or had never recorded death in the past. This phobia often predicts the prefer place of death to be in hospital rather than at home The younger generations can only imagine

death as seen on films and television and rarely or never witnessed a physical death at home. Such discourse requires counseling, an understanding, empathy and good communication skills to earn the family's confidence in order to ensure their compliance with the care plans. It is therefore the responsibility of the health care providers to communicate and establish good professional rapport with the patient and family concerning the preferred 'place of death'. Gone are the days when patients' desire and long for peaceful deaths at home with their loved ones in old age, but today we had institutionalized death to be in the hospital.

## Conclusion

The study concluded that the number of periodontitis patients with any one type of systemic disease was 35.5%. And the most common types of systemic diseases seen among the periodontitis patients were heart disease and diabetes. The study can be utilized by the Fiji National University Dental Clinics to improve oral health especially among periodontitis patients with systemic disease and to carry on further research studies to determine the exact cause of the link between periodontitis and systemic diseases.

## References

- 1 Mawardi HH, Elbadawi LS, Sonis ST (2015) Current understanding of the relationship between periodontal and systemic diseases. *Saudi Medical Journal* 36.
- 2 Claffey N, Polyzois I, Williams R (2010) History of the oral-systemic relationship. *Periodontal and overall health: Clinician's guide*. Professional audience communication, Inc. Yardley Pennsylvania, USA.
- 3 Jeffcoat MK, Jeffcoat RL, Gladowski PA, Bramson JB, Blum JJ (2014) Impact of periodontal therapy on general health. Evidence from insurance data of five different systemic diseases. *Am J Prev Med* 47: 166-174.
- 4 Georgiou TO, Bartold PM, Marshall RI (2004) Prevalence of systemic diseases in Brisbane general and periodontal practice patients. *Aust Dent J* 49: 177-184.
- 5 Dumitrescu AL (2006) Occurrence of self-reported systemic medical conditions in patients with periodontal disease. *Rom J Intern Med* 44: 35-48.
- 6 Zainoddin MMN (2013) Systemic conditions in patients with periodontal disease. *Int Med J* 20: 363-366.
- 7 Marjanovic M, Buhlin K (2013) Periodontal and systemic diseases among Swedish dental school patients: A retrospective register study. *Oral Health & Preventive Dentistry* 11: 49-55.
- 8 Brasher WJ, Rees TD (1970) Systemic conditions in the management of periodontal patients. *J Periodontol* 41: 349-352.
- 9 Peacock ME, Carson RE (1995) Frequency of self-reported medical conditions in periodontal patients. *J Periodontol* 66: 1004-1007.
- 10 Lagervall M, Jansson L, Bergstrom J (2003) Systemic disorders in patients with periodontal disease. *J Clin Periodontol* 30: 293-299.
- 11 <http://www.aidsdatahub.org/annual-report-2015-ministry-health-and-medical-services-fiji-2016>
- 12 Smith B, Chu LK, Smith TC, Amoroso PJ, Boyko EJ, et al. (2008) Challenges of self-reported medical conditions and electronic medical records among members of a large military cohort. *BMC Med Res Methodol* 8: 37.
- 13 World Health Organization (2017) *Non-Communicable Diseases Facts*. Geneva, Switzerland: World Health Organization.
- 14 World Health Organization (2016) *Rate of Diabetes in China "explosive"*. Geneva, Switzerland: World Health Organization.
- 15 Internal Diabetes Federation (2010) *Diabetes Prevalence: Country Rankings 2010*.
- 16 Bartold PM (2010) Periodontal systemic interrelationships: An overview of the evidence. *Asian Pacific Society of Periodontology*.