

Association of Systemic Diseases with Periodontitis among Patients Attending A Private Dental College in Chennai - A Record based Study

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Abstract

Oral cavity works as a continuous space of infectious agents and its condition reflects in progression of systemic diseases. Recent studies state that periodontal disease may be a potential marker to systemic diseases. Aim of the study was to determine the association of periodontitis and systemic disease among patients attending a private dental college. Russell's periodontal index was used to measure the periodontal disease. This study included all periodontal index patient records from 18- 80 years old who visited the dental college in the month of January 2020 and a total of 136 records were reviewed. Descriptive statistics and chi square tests were used for statistical analysis. In the sample population (N= 136), 64.71% males and 35.29 % females were present. Age distribution of the records showed that 16.91 % of the study population were 18-35 years old; 36.03% were 36-50 years and 47.06% were 51-80 years. It was found that 0.74% of the study population had normal gingiva; 8.09% had simple gingivitis; 23.53 % had beginning destructive periodontitis; 53.68% had established destructive periodontitis and 13.97 % had terminal periodontal disease. Results revealed that 35.56 % of the study population reported to have systemic disease. Significant association was found between age and periodontal disease; age and systemic disease ($p < 0.05$). Results of the present study showed that there was no significant association between periodontal status and systemic disease condition of the study population ($X^2 = 5.826^{ns}$; $p > 0.05$)

Keywords: *Periodontitis, systemic disease, diabetes, hypertension , Russel's periodontal index*

Introduction

Periodontitis is defined as an inflammatory disease of supporting tissues of teeth caused by specific microorganisms resulting in progressive destruction of periodontal ligament and alveolar bone with periodontal pocket formation, gingival recession or both¹. The diversity of bacterial species in the periodontal flora , the variation in composition of floras from individual

to individual and variation in host response to bacterial species are some of the major reasons that the specific etiology of periodontal diseases has not been clearly established.^{2,3}

Some of the most common organisms associated with periodontal diseases are Porphyromonas gingivalis, Prevotella intermedia, Bacteroides forsythus, Campylobacter rectus and Actinobacillus actinomycetemcomitans, as well as the treponemes⁴. Periodontitis and periodontal diseases are true infections of the oral cavity. There is an equilibrium that exists between microbial challenge and host's immune response; any alteration to that with addition of other modifying factors is responsible for clinical manifestation of periodontal disease. The oral cavity works as a continuous source of infectious agents, and its condition often reflects progression of systemic

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pathologies.⁵ Pathogens of the subgingival microbiota can interact with host tissues even without direct tissue penetration, and the subgingival microbiota accumulate on the oral cavity to form an adherent layer of plaque with the characteristics of a biofilm.¹

Many studies have proven the role of oral microflora in oral diseases.^{6,7} and their importance with aging and nutrition. It was shown to increase with the increasing age and malnutrition.^{8,9} In our country, dental caries is given much importance and people are having better knowledge about dental caries than periodontal diseases. Many studies have proved the importance of age with respect to dental caries and people's attitude and practice about dental caries.¹⁰⁻¹³ There are even ways to prevent dental caries from occurring. Studies have proven use of fluorides to prevent dental caries and use of antimicrobial agents.¹⁴⁻²⁰

Recent evidence suggests that periodontal infection may significantly enhance the risk for certain systemic diseases or alter the natural course of systemic conditions; and conditions in which influences of periodontal infection are documented include coronary heart diseases (CHD) and CHD-related events such as angina and infarction, atherosclerosis, stroke, diabetes mellitus; preterm labor, low-birth-weight delivery; and respiratory conditions such as chronic obstructive pulmonary diseases.²¹

In a study conducted by SS oberai et al in 2016, the systemic disease patients had high severity of periodontal disease²². Similarly Qi-wei Yao et al found periodontal disease has increased susceptibility to oral cancer²³. Kodovanzenti G et al has established an association between periodontitis and acute myocardial infarction in 2014²⁴. The high prevalence (42.3%) of periodontitis among adults makes it an important area of research for early diagnosis. It has been established as a potential marker for systemic disease²⁵. But these studies lacked to establish a causal relationship and use of radiographs. Since periodontal diseases are a marker of systemic disease, it is important to do further research about it and have knowledge about prevention, intervention of the periodontal disease and to identify the highly susceptible ones.

Aim of the study was to determine the association of periodontitis and systemic disease among patients

attending a private dental college

Materials and Methods

Study Setting

This was an institution based study which was conducted in Saveetha dental college.

Study population

Study population included all the Russel;s periodontal index patients who have attended college in the month of January 2020. The patients from the age 18-80 years were included and they should have been interpreted by Russels periodontal index

Sampling

All the Russels periodontal index patients who have been interpreted were included in the study within the age group of 18-80 years old and their case sheets were reviewed (136). Cross verification was done by photographic verification of the patient. To avoid sampling bias, everyone who has undergone Russels periodontal index within the age group in that time period was included. Internal validity of the study was established by the use of gold standard periodontal index, Russels periodontal index (1956).

Index used

The Periodontal Index (PI) was developed by Russel A.L. in 1956. All the teeth are examined and scoring values are 0,1,2,4,6, and 8. A PI score of 0 indicates no overt inflammation in the supporting tissues or loss of function owing to destruction of supporting tissues. A PI score of 1 corresponds to mild gingivitis (overt inflammation in the free gingiva, but not circumscribing the tooth), whereas a PI score of 2 indicates gingivitis circumscribing a tooth. A PI score of 4 can be assigned only if dental radiographs are available. A PI score of 6 indicates gingivitis with a pocket formation. A PI score of 8 indicates advanced destruction of supporting tissues with loss of masticatory function, although this was not observed in any of the patients in the present study. There are no scores of 3, 5 or 7 in the Russell PI. It has a rule that "when in doubt assign the lesser score". The instruments used in this index are mouth mirror and non calibrated probe.

Data collection

The patient details were taken from the patient records and about 136 records which recorded Russels periodontal index were included in the study. The data was collected and reviewed by 2 examiners and entered in the MS excel sheet. The variables of the results were explained using tables and graphs directly from SPSS software

Statistical Analysis

Data was imported in IBM SPSS software version 20.0. The independent variables were age, sex and systemic disease condition, while the dependent variables were the interpretation of Russel's periodontal index. Descriptive statistics and chi square tests were done to identify the distribution and association between systemic disease and systemic disease.

Results and Discussion

In the present study, after excluding the incomplete data, the total sample size of the study was 136 in which 64.71% were males and 35.29% were females (figure 1). Results showed that 16.91% of the study sample were in the age group of 18-35 years old; 36.03% were present in the age group of 36-50 years and 47.06% were present in the age group of 51-80 years. (figure 2). Results of the study revealed that 0.74% of the study population had normal gingiva; 8.09% had simple gingivitis; 23.53 % had beginning destructive periodontitis; 53.68% had established destructive periodontitis and 13.97 % had terminal disease.(figure 3). Among the study population,, 35.56 % had systemic disease and 84.44% of the study population were free of systemic diseases (figure 4)

The distribution of periodontal diseases among age groups were as follows: in the age group of 18-35 years, 0% had normal gingiva, 21.73% had simple gingivitis, 26.08% had beginning destructive periodontitis, 47.82% had established destructive periodontitis and 4.34% had terminal disease. In the age group of 36-50 years, 0% had normal gingiva, 4.08% had simple gingivitis, 32.65% had beginning destructive periodontitis, 55.1% had established destructive periodontitis and 8.16% had terminal disease. In the age group of 51-80 years, 1.56% had normal gingiva, 6.25% had simple gingivitis, 15.62% had beginning destructive periodontitis, 54.68% had established destructive periodontitis and 21.87%

had terminal disease. This showed that as the age increases the severity of periodontitis increases. There was a statistically significant association found between age and periodontitis with a chi square value of 16.908^a (p=0.031)(figure 5).

Results of the distribution of systemic diseases among age groups showed that in the age group of 18-35 years, there was 0% prevalence of systemic diseases ; in the age group of 36-50 years , 18.36% had systemic diseases and 81.63 % were free of systemic diseases. In the age group of 51-80 years , 61.9% had systemic diseases while 38.09% did not have any history of systemic diseases. This clearly stated that age was directly proportional to prevalence of systemic diseases in the present study. There was a statistically significant association found between age and systemic diseases with a chi square value of 38.096^a (p=0.000)(figure 6). There was no significant association found between periodontal status and systemic disease ($X^2 = 5.826^a$; $p > 0.05$) (figure 7)

Although the direct cause for periodontitis is oral bacterial infection, its progression and severity depend on a number of genetic and environmental factors Several epidemiological studies in different populations demonstrate a relationship between smoking and periodontal disease.²⁶ Cigarette smoking is arguably the strongest behavioral risk factor for the incidence and progression of periodontitis. It is also important to note that although nonsmokers universally respond better to periodontal treatment than do smokers, there is nevertheless substantial evidence of clinical improvement in smokers after treatment, indicating that smoking as a risk factor will compromise rather than prevent tissue healing.²⁷As healthcare professionals, we have a role in preventing disease occurrence and progression on all the occasions. ^{28,29} So it's our duty to inform the patients about the predilection of periodontal disease, identify high risk individuals and create awareness ³⁰

In the present study, more male population (64.71%) when compared to females. In a similar study done by Balaji et al in 2018, 59.4% males participated in their study ³¹ but in a contrastive study done by TS Sekhon et al more female participants (52.14%) been reported.³²

In the present study, 16.91% belonged to 18-35 years, 36.03% were from 36-50 years and 47.06% were

from 51-80 years old. Similar findings were found in a study done by SS Oberai et al in 2016²². But in a contrastive study done by TS Sekhon et al in 2015, only 18% were above 60 years old³²

In the present study, 35.56% had prevalence of systemic diseases. In a study by Cottone HA, every 2/3rd of Indian had medical history³³. Similar findings were found (33.49%) in a study conducted in 2005;³⁴ but in a contrastive study conducted in central India, only 4.05% had systemic diseases.³⁵ In the present study, prevalence of periodontitis was 67.65% among the study population. Similar findings were found in a study by Balaji et al in 2018 in which 54.2% had periodontal diseases.³¹ But in a contrastive study conducted by Rajesh Shankaranpillai in 2010, low prevalence of periodontitis was found³⁶

In the present study, no significant association was established between periodontal status and systemic disease. Similar findings were found in a studies in which period

But the major cited articles state that Diabetes mellitus, CVD, and respiratory disease are associated with a higher severity of periodontal disease.^{22,39-41}

There were certain limitations to the study. One of the limitations was the record based study design. Lack of external validity and small sample size are other limitations. Another limitation was the individual systemic diseases were not assessed in the study

Further research should be focused on individual systemic disease association with periodontitis in a prospective design including more samples.

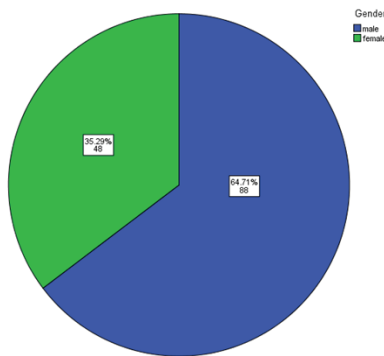


Figure 1 shows the gender distribution in the study population representing male predilection (males (64.71%) and females (35.29%))

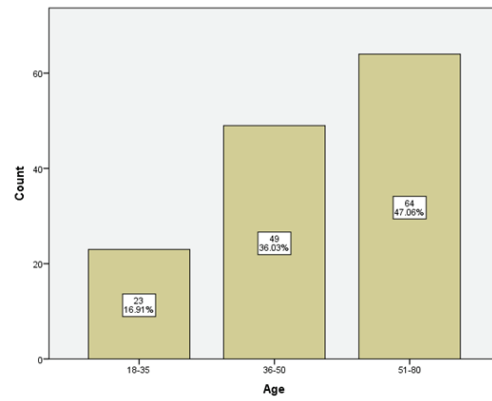


Figure 2 shows the distribution of age in the study sample. X axis represents the age group of the study participants and Y axis represents the number of people present in each group. More people were distributed in the 51-80 age group(47.06%)

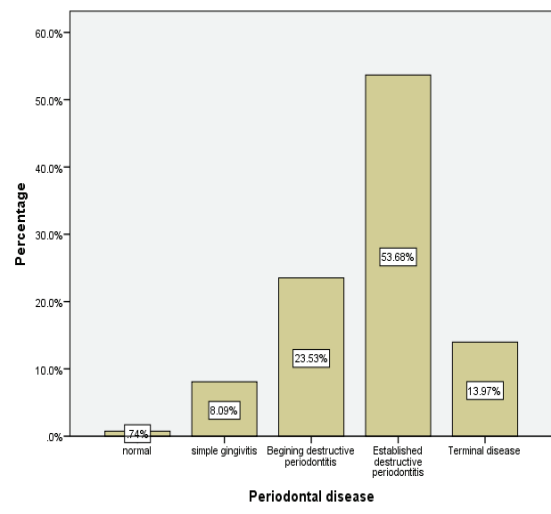


Figure 3 shows the distribution of periodontal disease in the study sample. X axis represents the periodontal disease and Y axis represents the percentage of study samples present in each score group. Established periodontal disease was the most prevalent among the study population (53.68%)

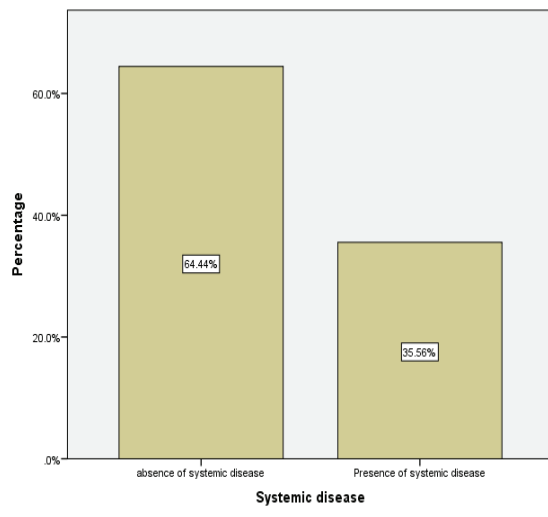


Figure 4 shows the distribution of systemic diseases in the study population. X axis represents the presence and absence of systemic disease and Y axis represents the percentage of samples present in each group. Prevalence of systemic diseases in the sample is 35.56%

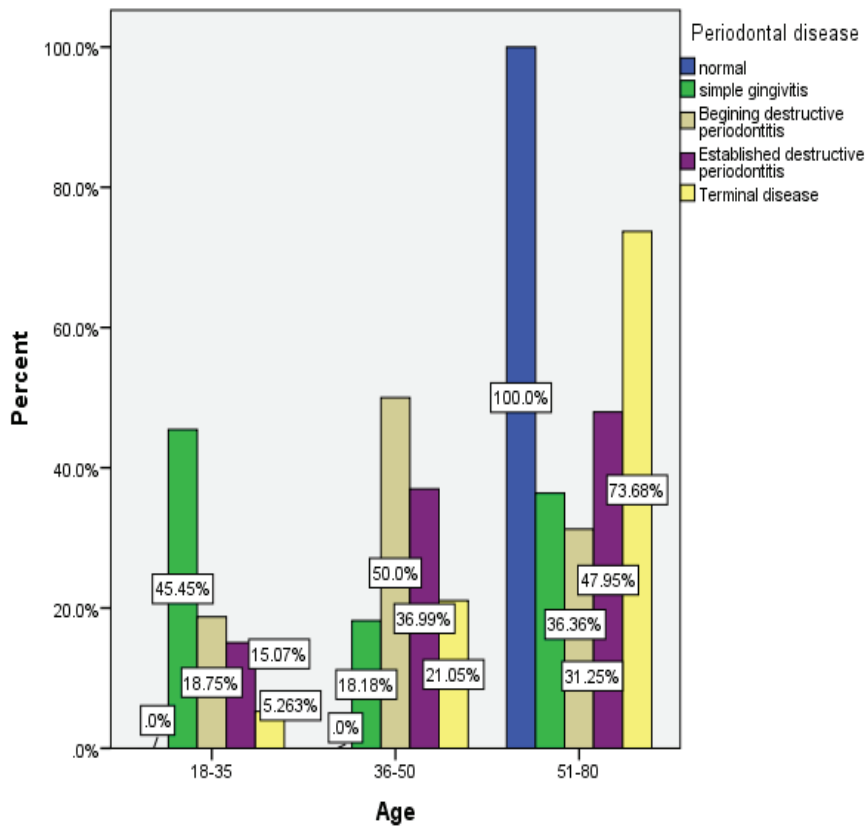


Figure 5 represents the association between age and periodontal disease. X axis represents age groups and Y axis represents periodontal disease scores. Established destructive periodontitis and terminal periodontal disease scores were more among 51-80 years old study participants than participants in 18-35 and 36-50 yrs, suggesting that advanced periodontitis was more among older people and this association was found to be statistically significant (p value = 0.031, Chi square value = 16.908^a).

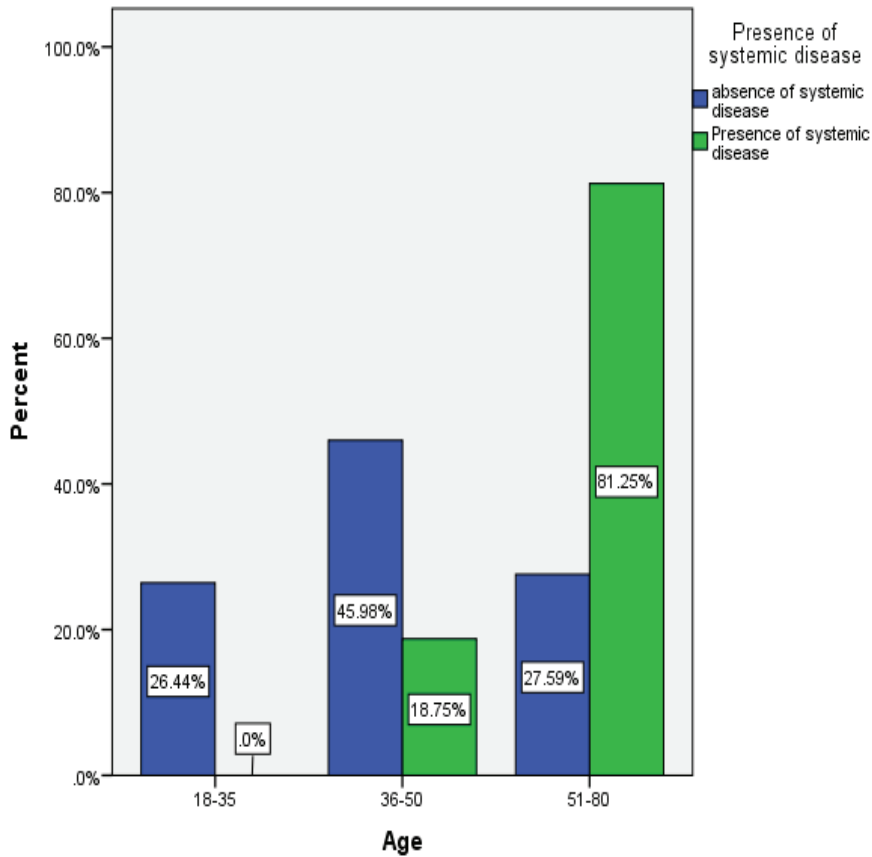


Figure 6 representing the association between age and systemic disease. X axis represents age groups and Y axis represents systemic disease. Systemic disease was more prevalent in the 51- 80 years old group than the other two age groups, suggesting that as age increases the prevalence of systemic diseases increases and this association was found to be a statistically significant association (p value = 0.000. Chi square value = 38.096^a).

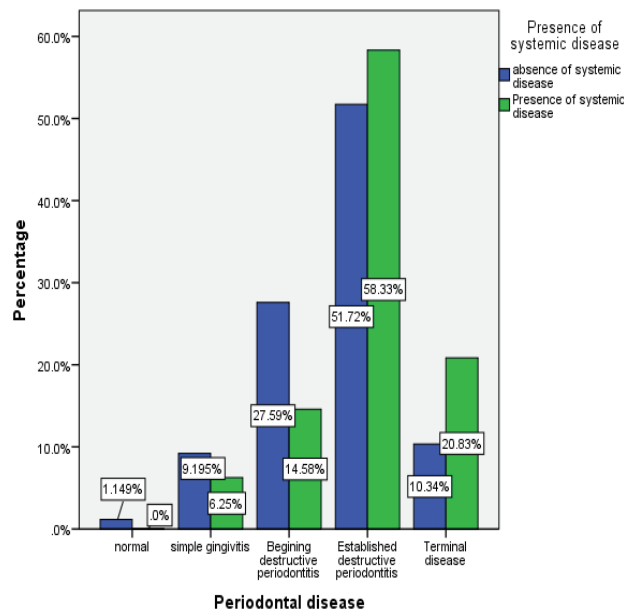


Figure 7 representing the association between periodontal disease and systemic disease. X axis represents periodontal disease and Y axis represents percentage of participants with or without systemic disease. Established destructive periodontitis and terminal disease was more prevalent in people with systemic disease but this association

was found to be not statistically significant (p value = 0.212). Chi square value = 5.826^a

Conclusion

Within the limitations of the study, the results of the current study showed that there was no statistically significant association between periodontitis and systemic diseases.

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Conflict of Interest - Nil

Ethical Clearance: It is taken from “Saveetha Institute Human Ethical Committee” (Ethical Approval Number- SDC/SIHEC/2020/DIASDATA/0619-0320)

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