

## Original ARTICLE

### Evaluation of correlation of smoking and periodontitis: An observational study

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#### ABSTRACT

**Background:** Periodontal disease leads to a breakdown of the connective tissue and bone that anchor the teeth and can eventually lead to the loss of teeth. The relationship between smoking and periodontal diseases has been studied extensively over the past couple of decades. Hence; the present study was conducted for assessing the correlation of smoking and periodontitis. **Materials & methods:** A total of 80 smokers and 80 non-smokers were enrolled. Clinical and periodontal examination was carried out by a mouth mirror, tweezers and William's probe. Patients who reported for routine dental check with negative history of smoking were enrolled in the non-smoker group. CPI index was used for comparing the periodontal status in between patients of the two study groups. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. **Results:** Mean age of smokers and non-smokers was found to be 52.5 and 51.8 years respectively. Majority of subjects of both smokers group and non-smokers group belonged to the age group of more than 50 years. While comparing the periodontal status among smokers and non-smokers, significant results were obtained. **Conclusion:** Smoking has substantial deleterious effect on the periodontal health and its presence significantly increases the risk of development of periodontal pathologies.

**Key words:** Periodontal, Smoking

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#### INTRODUCTION

Periodontal disease leads to a breakdown of the connective tissue and bone that anchor the teeth and can eventually lead to the loss of teeth. Tobacco use in any form has the potential to profoundly alter the systemic and oral health of the individual. The use of tobacco is associated with a wide spectrum of disease including stroke, coronary artery disease, peripheral artery disease, gastric ulcer and cancers of mouth, larynx, esophagus, pancreas, bladder and uterine cervix. It is also a major cause of chronic obstructive pulmonary disease and risk factor for low birth weight babies. It has also been recognized to be a significant risk factor for periodontitis affecting the prevalence, extent and severity of disease.<sup>1-3</sup>

The relationship between smoking and periodontal diseases has been studied extensively over the past 15 years and both cross-sectional and longitudinal studies provide strong epidemiologic evidence of a positive association between smoking and clinical and radiographic signs of periodontitis, as well as an increased risk of periodontitis in smokers.<sup>4, 5</sup> Hence; the present study was conducted for assessing the correlation of smoking and periodontitis.

#### MATERIALS & METHODS

The present study was commenced with the aim of assessing the correlation of smoking and periodontitis. A total of 80 smokers and 80 non-smokers were enrolled. Before the starting of the study, written consent was obtained from all the patients after explaining in detail the entire research protocol. Patients with having smoking habit of smoking more than 5 cigarettes for a minimum of 10 years were included in the smokers group. Complete demographic and clinical details of all the subjects were obtained. Clinical and periodontal examination was carried out by a mouth mirror, tweezers and William's probe. Patients who reported for routine dental check with negative history of smoking were enrolled in the non-smoker group. CPI index was used for comparing the periodontal status in between patients of the two study groups.<sup>7</sup>

According to this index, periodontal status was graded as follows:  
Code 0: Absence of any periodontal pathology  
Code 1: Presence of only Bleeding on probing  
Code 2: Presence of calculus or plaque during probing;  
Code 3: Presence of Pathological periodontal pocket of 4 to 5 mm

Code 4: Presence of Pathological periodontal pocket of 6 mm or more in depth

All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi- square test was used for assessment of level of significance.

**RESULTS**

In the present research, a total of 80 smokers and 80 non-smokers were enrolled. Mean age of smokers and non-smokers was found to be 52.5 and 51.8 years respectively. Majority of subjects of both smokers group and non-smokers group belonged to the age group of more than 50 years. There were 56 males and 24 females in the smokers group and 50 males and 30 females in the non-smokers group. 45 subjects of smokers group and 48 subjects of non-smokes group were of rural residence. In the present study, while comparing the periodontal status among smokers and non-smokers, significant results were obtained.

**DISCUSSION**

Smoking is a major risk factor of periodontal disease. It is now well established that tobacco use is one of the most important, preventable risk factor in the incidence and progression of periodontal diseases. In addition, tobacco use has a negative adverse effect on the full spectrum of periodontal treatment approaches such as mechanical debridement, local and systemic antimicrobial therapy, periodontal surgery, regenerative therapy, and implants.<sup>6,7</sup>

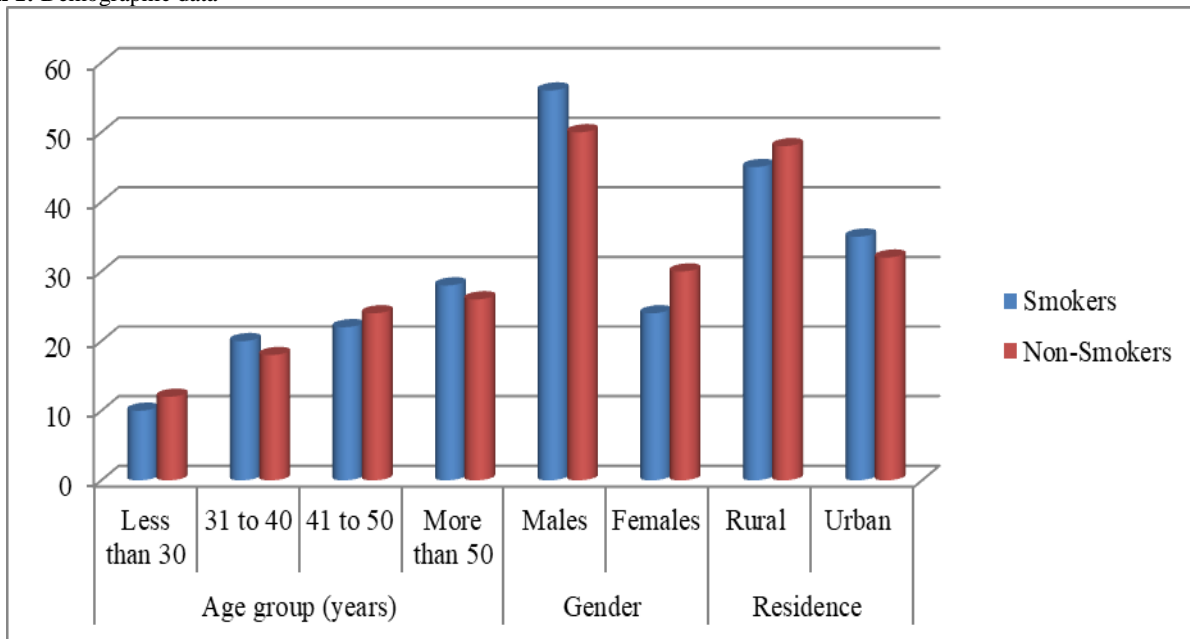
It is well known from epidemiological studies that the use of tobacco products in general, and smoking products in particular, is the major preventable risk factor in the initiation and progression of periodontal diseases. Furthermore, tobacco use has been shown to have major adverse effects on the full range of both non-invasive and surgical periodontal procedures.<sup>8, 9</sup> Hence; the present study was conducted for assessing the correlation of smoking and periodontitis.

In the present research, a total of 80 smokers and 80 non-smokers were enrolled. Mean age of smokers and non-smokers was found

to be 52.5 and 51.8 years respectively. Majority of subjects of both smokers group and non-smokers group belonged to the age group of more than 50 years. There were 56 males and 24 females in the smokers group and 50 males and 30 females in the non-smokers group. 45 subjects of smokers group and 48 subjects of non-smokes group were of rural residence.

Visvanathan R et al compared the effect of smoking on mRNA expression of MMP -8 and TIMP-1 in patients with untreated chronic periodontitis and in periodontally healthy subjects. Out of 60 subjects, 40 were selected subjects for the study, and were divided into Group I (periodontitis subject) and Group II (healthy subjects). Each group was further subdivided into subgroups I-A (chronic periodontitis smokers CPS), and I-B (chronic periodontitis non-smokers CPN), subgroup II-A (healthy smokers HS) and II B (healthy non-smokers HS). Both the groups underwent periodontal examination and clinical parameters were recorded. Tissue samples from both groups were subjected to the isolation of RNA which was then followed by qRT-PCR and the expression of the mRNA levels of MMP-8 and TIMP-1 were analyzed. The mRNA expression of MMP-8 and TIMP-1 was further compared with the periodontal status of all the four groups. The mRNA expression of MMP-8 was compared between the groups and showed that Group I-A (CPS) had higher expression of MMP-8 compared to group I-B (CPN). Group I-B (CPN) vs Group I-A (CPS) showed statistically significant difference in MMP-8/TIMP-1 with higher values for Group I-A (CPS) than Group I-B (CPN). A positive correlation was found between MMP-8 expression and probing depth and clinical attachment level (CAL) among Group I-B (CPN) and Group I-A (CPS) subjects. A significant correlation was also found between MMP-8 and TIMP-1 expression with probing depth and CAL among Group II B(HN) group subjects. TIMP-1 also showed a positive correlation with gingival index (GI) among group II A (HS) subjects. It is concluded that smoking has an impact on the periodontal status and mRNA expression of MMP-8 and TIMP-1 in chronic periodontitis patients.<sup>9</sup>

**Graph 1:** Demographic data



**Table 1:** Comparison of CPI scores among smokers and non-smokers group

CPI score	Smokers	Non-smokers	p- value
Code 1	4	10	0.00
Code 2	33	45	(Significant)
Code 3	29	20	
Code 4	14	5	

In the present study, while comparing the periodontal status among smokers and non-smokers, significant results were obtained. Jang AY et al evaluated an association between smoking, smoking cessation, and periodontal disease. The data were collected from 8,336 participants. Smoking status was assessed using self-administered questionnaires. Periodontal disease was defined as a community periodontal index  $\geq 3$  points. Logistic regression analysis was used to evaluate an association between smoking, smoking cessation, and periodontal disease after adjusting for age, sex, education, monthly income, diabetes, obesity, alcohol intake, and frequency of tooth brushing. The risk of periodontal disease was higher among current smokers than never smokers. Among current smokers, the risk of periodontal disease was increased in smokers of  $\geq 10$  cigarettes/d,  $\geq 20$  years duration, and  $>10$  pack-years compared with never smokers ( $P < 0.05$ ). Among former smokers, the risk of periodontal disease after 10 years since cessation declined to 0.56 (95% CI, 0.42-0.75) compared with current smokers and was indistinguishable statistically from never smokers. Periodontal disease is significantly associated with smoking status.<sup>10</sup>

A study of 540 Swedish adults 20–70 years of age has revealed that three variables – smoking, greater age and higher mean plaque levels – were potential risk factors for severe periodontitis. The risk for periodontitis is considerably greater for tobacco users, with estimated ratios in the range of 2.5–7.0 or even higher for smokers as compared with nonsmokers. Even when the levels of plaque accumulation and gingival inflammation were not significantly different between smokers and nonsmokers, smokers exhibited an increase in prevalence as well as severity of destructive disease. The relationship between smoking and periodontitis appears to be dose-dependent; the odds for more severe attachment loss range from 2.05 for light smokers to 4.75 in heavy smokers, and there is a significant correlation between probing depth and smoking pack-years.<sup>11-14</sup>

## CONCLUSION

Under the light of above results, the authors concluded that smoking has substantial deleterious effect on the periodontal health and its presence significantly increases the risk of development of periodontal pathologies. However; further studies are recommended.

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