The Effect of Cigarette Smoking on Periodontal Health Status:a Comparative Cross Sectional Study amongst Patients Visiting Government Dental College and Hospital Srinagar

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ABSTRACT

Cigarette smoking affects all tissues of the body, the periodontium being no exception. The present cross sectional study was designed to evaluate the effect of cigarrette smoking on periodontal status of patients visiting Government Dental College and Hospital, Srinagar, J&K. 100 current smokers and 100 non-smokers within the age group of 18 -65 years were subjected to a questionnaire to assess oral hygiene practices and self assessment of periodontal conditions. Clinical examination was done using CPI to correlate the smoking status with periodontal condition. It was found that young adults (<35yrs) comprised the greatest proportion of smokers. Periodontal condition as assessed by CPI score showed that there was statistically significant difference in the findings between cigarette smokers and non-smokers, with gingival bleeding more in non-smokers, whereas deep pockets were more prevalent in smokers. Non smokers were found to brush more frequently than smokers. positive association was observed between periodontal disease and cigarette smoking. In conclusion it was observed that a positive association was present between periodontal disease and cigarette smoking.

Keywords: Cigarette Smoking, Periodontal Health, Comparative Cross Sectional Study

INTRODUCTION

Chronic periodontitis is a multi-factorial disease with the dental biofilm as its initiator.[1,2] However, unlike many of the risk factors for periodontitis, including genetic predisposition, male gender, and diabetes mellitus, smoking is a controllable independent risk factor for chronic periodontitis.[3]

Studies have shown that smokers have more periodontal disease regardless of oral hygiene.[4] In fact, tobacco smoking, mostly in the form of cigarette smoking, is recognized as the most important environmental risk factor in periodontitis.[4] Smoking is thought to impair the immune response and compromises the periodontal tissues ability to heal following a period of disease activity.[5] There is substantial body of evidence to support the observation that the more a patient smokes, the greater the degree of periodontal disease and those who have never smoked have been observed to have the lowest risk.[6] Josef[7] examined periodontal needs according to the community periodontal index of treatment needs (CPITN) and smoking habits. The results showed that effect of both smoking and the number of cigarettes smoked had deleterious effect on periodontal status. Gerad et al.[8] concluded that cigarette smoking was a major environmental factor associated with accelerated periodontal destruction in young adults.

With this background, the present study aims to evaluate the periodontal health status among cigarette smokers and non cigarette smokers and to assess effect of smoking on periodontal health as related to the duration of smoking and oral hygiene habits, among patients visiting Government Dental College & Hospital, Srinagar.

MATERIAL AND METHODS

A total number of 200 male subjects (100 smokers, 100 non-smokers) of 18-74 years was be randomly chosen from among the patients visiting the OPD, Department of Periodontics, Government Dental College & Hospital, Srinagar. The study design and protocol was reviewed and approved by the institutional ethical committee. A prior informed consent of all patients was obtained for the screening. Patients were included based on the following criteria:

Inclusion criteria

- Age 18 to 74 years.
- More than 10 natural teeth present

Exclusion criteria

- Systemic conditions that might affect periodontal disease activity or requiring
- Medications such as antibiotics, steroids, or non-steroidal, anti-inflammatory drugs
- within the past 6 months.
- Past periodontal therapy

A cross sectional study design was used for the study. Subjects were divided into two
groups:

- Cigarette smokers (currently smoking)
- Non-smokers (who have never smoked)

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How to cite this article: Roobal Behal, Suhail Majid Jan, Huda Hussain. The effect of cigarette smoking on periodontal health status:a comparative cross sectional study amongst patients visiting government dental college and hospital Srinagar. International Journal of Contemporary Medical Research 2023;10(4):D1-D4.

All subjects were asked regarding their smoking and oral hygiene habits based on a prevalidated questionnaire (Fig.1)

Clinical examination

The periodontal examination was conducted using the mouth mirror and CPITN probe, and
the CPI score was recorded.
Codes and criteria of CPI index
Code-0=No periodontal disease (healthy periodontium).
Code-1=Bleeding observed during or after probing.
Code-2=Calculus or other plaque retentive factors either seen or felt during probing.
Code-3=Pathological pocket 4 to 5 mm in depth. Gingival margin situated on black band of
the probe.
Code-4=Pathological pocket 6 mm or more in depth. Black band of the probe is not visible.
At the conclusion of the study, the participants were provided with oral health instructions and enrolled for specific periodontal treatment and smoking cessation counselling (forsmokers).

STATISTICS ANALYSIS

The association of cigarette smoking and other risk factors for periodontal status was examined in this comparative, cross sectional study. The Chi-square test was used to test whether the variables had normal or non-normal distribution. The t-test was used to compare group means.

RESULTS

A total of 200 male patients, (100 current smokers and 100 non-smokers), aged 18-65 years were evaluated for the study. The mean age of smokers was 44.5 years and that of non smokers was 45.3 years, with a non-significant difference between the groups [Table 1]. Young adults under 35 years represented the majority of the study population, that is 42% of the total sample, 52.3% were current cigarette smokers. In the oldest age group (over 55 years), 13.8 % were current cigarette smokers [Table 2].

Periodontal condition as measured by maximum CPI score per person showed that there were statistically significant differences between cigarette smokers and non smokers for CPI score of 1, with non smokers more likely to have gingival bleeding. Similarly, for CPI score of 2, smokers were found to have significantly more prevalence of calculus than non smokers . For CPI score 3, more number of non smokers were found to have shallow pockets on probing. Conversely, cigarette smokers were found more likely to have deep pockets as represented by a CPI score of 4 [Table 3].

According to the self-reported oral hygiene practices, the mean tooth brushing frequency in cigarette smokers was slightly higher compared with the non smoker group, but was not found to be statistically significant [Table 4]. Cigarette smokers also reported that they brushed their teeth for longer than non smokers. The tooth brushing time per minute was not statistically significant in non smoker, and the cigarette smoker group at 0.05 level of significance [Table 5].

1. How often do you brush your teeth?
   a. Once
   b. Twice
   c. Sometimes
   d. After meals
2. How many minutes do you brush your teeth?
   a. 1min
   b. 2min
   c. 3min
   d. 4min
3. What type of brushing movement do you use?
   a. Vertical
   b. Horizontal
   c. Combined
4. Do you use a mouthwash?
   a. Yes
   b. No
5. Which other methods do you use to clean your teeth?
   a. Floss
   b. Interdental brush
   c. Toothpick
   d. None
6. On what is your daily diet based?
   a. Meat
   b. Vegetables
   c. Potato chips
   d. Tea
7. Do you have bleeding gums?
   a. Yes
   b. No

Figure-1: Questionnaire

DISCUSSION

The present study reports the periodontal health condition in relation to the smoking status and relevant demographic of patients visiting Department of Periodontics, Government Dental College and Hospital, Srinagar. To the best of authors' knowledge, this is the first report of its kind, and provides baseline information for the said population.

Current cigarette smokers were found to have a higher degree of periodontal deterioration as compared to non-smokers, as is an already established fact. Tobacco smoke contains many cytotoxic substances such as nicotine, which can penetrate the soft tissue of oral cavity, adhere to the tooth surface or enter to the blood stream. Potential

Group (n)	Mean age (years)	Std. dev	P value
Smokers (100)	44.5	10.41	0.65 (NS)
Non-smokers(100)	45.3	11.27	

Table-1: Mean age of study population

Age (years)		<35(n%)	35-44(n%)	45-55(n%)	>55(n%)
Sample(n%)	Smokers	44 (52.3)	19 (45.2)	16(42.1)	5(13.8)
	Non-smokers	40 (47.6)	23 (54.7)	22(57.8)	31(86.1)
	Total	84(42)	42(21)	38(19)	36(18)
Chi Square		0.08	1.32	1.12	8.7
P value		0.75	0.26	0.08	0.003

Table-2: Relative age wise distribution of smokers and non-smokers

	CPI score:	Code 1 (n%)	Code 2(n%)	Code 3 (n%)	Code 4 (n%)	Total
Group						
Smokers		12(12)	40(40)	10(10)	38(38)	100(100)
Non smokers		51(51)	10(10)	31 (41)	8(8)	100(100)
Chi Square		7.2	8.3	10.2	11.2	
P value		0.002*	0.004*	0.004*	0.0001*	

Table-3: Relative distribution of various CPI scores among smokers and non-smokers.

Brushing Frequency	Smokers	Non-Smokers
Once	62	68
Twice	17	10
Sometimes	10	10
After meals	11	12
Total	100	100
Chi square	0.82	

Table-4: Brushing frequency among smokers and non-smokers

molecular and cellular mechanisms in the pathogenesis of smoking associated periodontal diseases has been reported and these include, immuno-suppression, exaggerated inflammatory cell responses, and impaired stromal cell functions of oral tissues. The association between cigarette smoking and periodontal diseases is well established, and represent a significant oral health problem.[9] The combined effect of bacterial colonization and the local and systemic effect of smoking are responsible for the greater severity of periodontal destruction in smokers of the current study. These results of the current study are similar to those reported by Linden and Mullally,[10] Harber et al.,[11] Schenkein et al.,[12] and Haffajee.[13] All of these studies have shown that compared to non-smokers, young adult smokers have a higher prevalence and severity of periodontitis.

When evaluated in comparison to various age groups, it was found that young smokers (<35 years) comprised of a majority of the study population, and that the prevalence of smoking decreased with age. This finding is in accordance with previous studies of Guatam et al.[14] It as been estimated that about a third of the male adult global population smokes. Among the young, one in five smokes worldwide. Between 80,000 and 100,000 children worldwide, starts smoking every day.[7] In the current study, 52.3% of all smokers were young adults under 35 years of age.

In the present study, non-smokers were found to have more gingival bleeding as compared to smokers, although their degree of periodontal deterioration was lesser as compared to smokers. The findings in the present study are consistent with the study of Feldman et al.,[15] showed that non smokers with periodontal disease had less clinical inflammation and gingival bleeding when compared with smokers. This may be explained by the fact that one of numerous tobacco smoke by-products, nicotine, exerts local vasoconstriction, reducing blood flow, edema and acts to inhibit what are normally early signs of periodontal problems by decreasing gingival inflammation, redness, and bleeding, hence supressing the gingival inflammatory symptoms in smokers. These results are parallel to those reported by Schuller,[16] Bergström and Boström[17] and Chen et al.[18]

CPI was used in the present study, as recommended by the World Health Organization to obtain an appropriate estimation of disease provides an estimate of the prevalence of moderate or deep periodontal pocketing.[19]

The result of this study confirms a consistent association between smoking and periodontal status. It should be noted that given the small difference between smokers and non smokers, other factors should have been considered such as socio-economic status and stress.

In conclusion, the current study shows that smoking is a major environmental factor associated with accelerated periodontal destruction. The depleted periodontal support in later life depends to a greater extent upon excessive smoking in youth. The findings highlight the need for preventive strategies aimed at young individuals, many of whom take up smoking as a habit. Therefore, dental public health efforts, including the young adult/adolescents and emphasizing not only oral hygiene in primary preventive efforts., but also on the adverse health and periodontal effects of smoking need to be devised and undertaken.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 29-03-2022; **Accepted:** 30-04-2023; **Published:** 30-04-2023