



Original Research Article

Tobacco Use and Oral Hygiene as Risk Indicators for Periodontitis- A Comparative Study

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ABSTRACT

Aim: To assess the tobacco use and oral hygiene as risk indicators for periodontitis of patients attending two Government Hospitals in Bangalore city.

Methods: A cross-sectional Hospital based study was carried out in a sample of 600 patients consisting of 376 tobacco user and 224 non tobacco users of both sex of aged 20-60 years old attending two Government Hospitals in Bangalore city. Necessary information was collected about oral hygiene practices as well as tobacco use. Clinical examination for oral hygiene and periodontal status was done using Oral Hygiene Index- Simplified and Community Periodontal Index (CPI). Statistical analysis was done by using Mann-Whitney and Kruskal-Wallis test to find the significance difference between groups and more than two groups respectively.

Results: The difference in mean OHI-S and periodontal scores (CPI) among the different groups with respect to age, frequency and duration of smoking was not statistically significant ($P>0.05$). The difference in Loss of Attachment (LOA) between the tobacco user (both Smoke and Smokeless) and non users was found to be statistically significant ($P<0.001$).

Conclusion: The findings of the present study highlighted the importance of tobacco use on Loss of Attachment, indicating an important risk factor for periodontitis.

Key Words: tobacco, oral hygiene, periodontitis risk factor

INTRODUCTION

Oral health is an important aspect in the promotion of general health and the impact of oral illness has bearing on general health and quality of life. Periodontal disease has contributed significantly to the global burden of oral disease. Though the

primary cause of periodontitis is bacterial infection of long standing, tobacco usage is one of the major environmental risk factors among others which may be associated with periodontal disease.^[1] Tobacco use, smoking in particular, has been a prominent theme

among periodontal researchers, predominantly of the industrialised countries in the recent past. The 1996 World workshop in periodontitis reviewed these studies and a meta analysis of data from a number of studies confirmed that smoking entailed an overall increased risk for severe disease; estimated overall odds ratio 2.82. [2]

One of largest epidemiological studies reporting an association between smoking and periodontitis is the National Health and Nutrition Examination Survey which included 12,329 U.S. adults 20 years and older. In this study, current smokers were four times as likely to have periodontitis compared to nonsmokers after adjusting for age, race, ethnicity, income and educational level. [3]

The use of smokeless tobacco may increase the risk for oral cancer, induce oral mucosal lesions at the site where tobacco is placed, foster nicotine addiction and dependence, and contribute to systemic vascular disease. The most consistently reported periodontal effects of smokeless tobacco are mucosal lesions that affect the gingiva, gingival recession, and various form of periodontal disease. [4]

The relationship between smokeless tobacco use and periodontitis has also been the subject of scientific inquiry, although there are few such studies in comparison with the many that have examined the association between smoking and periodontitis

The association between tobacco consumed and oral cancer in the Indian subcontinent has been widely documented over many years. However, relatively few studies have examined the relationship between this practice and periodontitis. The present study was carried out with the objective of investigating the periodontal status of smokers and betel chewers and comparing it with that of non- tobacco users.

MATERIALS AND METHODS

A cross sectional study was conducted to assess the periodontal status of tobacco users and non tobacco users of patients attending Government Hospitals of Bangalore city like Government Dental College and Research Institute, and KC General Hospital.

Inclusion criteria

- Patients of 20- 60 age groups
- Patients who are willing to participate.

Exclusion criteria

- Patients with any systemic diseases.

Before conducting the study, ethical clearance was obtained from the ethical committee of the institution. Necessary permission to carry out the study was obtained from the hospital authorities of the KCG hospital and Government Dental College and Research Institute, after explaining the procedure and purpose clearly. Informed consent was obtained from the patient.

Pilot study was conducted among 40 patients to assess the feasibility and validity of the standardized proforma and to calculate the sample size. Based on the results of the pilot study, sample size was calculated.

Total sample of 600 was decided. Patients visiting the above mentioned Hospitals with the age group of 20-60 years were selected by convenience sampling and examined clinically. The examination was done by a single examiner and recorded by the trained personnel.

The sample was stratified into two reference age groups, a younger group of 20-39 years old and an older group of 40-60 years old.

The study was carried out using a standardized proforma. The proforma consist of two parts. The first part includes interview of basic socioeconomic information, and oral health practices as

well as tobacco consumption habits, of were elicited by means of questionnaire.

Tobacco is basically consumed in two forms; smoke tobacco and smokeless tobacco. In the present study, the smoke tobacco category included cigarettes, beedi. The smokeless tobacco category included betel chewing with tobacco. The following definitions were considered appropriate in the context of the present study:

Tobacco user- an individual who was currently consuming tobacco once a day or more often in the form of smoke or smokeless tobacco and had done so at least during the past year.

Non-tobacco user- an individual who had never used tobacco even once a day, in the form of smoke or smokeless tobacco.

Tobacco consumption habits were recorded in terms of the number of units used per day (frequency) and the number of years of consumption (duration).

Under oral hygiene practices, information obtained from the subjects included the mode of tooth cleaning, the substance used for cleaning teeth and tooth cleaning frequency.

Second part included clinical examination, oral hygiene status were assessed by using Oral Hygiene Simplified index(OHI-S) and periodontal status by using Community Periodontal Index (CPI).

Calibration of the investigator was carried out against an experienced clinician and the calculated values of the Kappa Statistic were 0.72 and 0.73 respectively for OHI-S and CPI index. The intraexaminer consistency was also assessed and calculated

values of the Kappa statistic obtained were 0.76 and 0.72 for OHI-S and CPI index.

Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 14.0. The p value was taken significant when less than 0.05 (confidence interval of 95% was taken).

Descriptive statistics was done which provided the mean and standard deviation. The statistical test applied was Kruskal-Wallis and Mann-Whitney test to find the significance difference between groups and more than two groups respectively.

RESULTS

A total of 600 subjects aged between 20-60 years old were analysed in the study. The majority of the patients in the study 566 (94%) were males and 34(6%) were females. Among the total participants, 47% (n=280) belonged to age group of 20-29 years, 53% (n=320) belonged to the age groups of 40-60 years. 224(37%) were non tobacco users and 376(63%) were tobacco users. Majority of the participants in this study belonged to lower middle and upper middleclass.

Among 224(37%) of non tobacco users, 90(40%) belonged to 20-39 years, 132(59%) were 40-60 years, in 332(100%) of smokers group, 160(48.3%) belonged to 20-39 years, 170(51.4%) were 40-60 years of age and 1(0.3%) were more than 60 years of age. And in 17(100%) of both smokers and smokeless tobacco users, 8(47%) belonged to 20-39 years of age, and 9(53%) were 40-60 years.(Table 1)

Table 1 Distribution Of Non Tobacco Users And Tobacco Users According To Age

AGE (YEARS)	NON-TOBACCO USERS (N=224)	SMOKERS (N=332)	SMOKELESS (N=27)	BOTH SMOKERS AND SMOKELESS (N=17)	TOTAL (N=600)
20-39	90(40%)	160(48.3%)	14(51%)	8(47%)	272(45.3%)
40-60	132(59%)	170(51.4%)	13(49%)	9(53%)	325(54.2%)
>60	2(1%)	1(0.3%)	0	0	3(0.5%)
Total	224(100%)	332(100%)	27(100%)	17(100%)	600(100%)

Most of the participants in the present study smoked less than 5 times in a day, among smokers, 241(72.5%), in

smokless form, 26(96.2%) and in Both (smokers and smokeless) 9(53%) of the participants. (Table 2)

Table 2 Distribution of study participants according to frequency of tobacco use

Frequency of tobacco use	Smokers (n=332)	Smokeless (n=27)	Both (smokers and smokeless) (n=17)
< 5 times	241(72.5%)	26(96.2%)	9(53%)
6-15 times	90(27.1%)	1(3.8%)	8(47%)
>15 times	1(0.3%)	0	0
total	332(100%)	27(100%)	17(100%)

Most of the participants in both the tobacco users and non tobacco users have poor oral hygiene. The mean difference in OHI-S among non tobacco users was 3.96±0.62, in smokers 4.00±0.49, in participant

with smokeless form was 4.03±0.59, and in both (smokers and smokeless) was 4.02±0.44 which were not statistically significant (P>0.05) (Table 3).

Table 3. Distribution Of Study Participants According To Habit And Mean Ohi-S Score

Parameter	Habit	n	Mean	Std dev	Kruskal-Wallis Chi-sq	P-Value
OHI	Non-User	224	3.96	0.62	0.322	0.956
	Smoke	332	4.00	0.49		
	Smokeless	27	4.03	0.59		
	Both	17	4.02	0.44		

The Periodontal status of non tobacco users and tobacco users was similar. The mean score of CPI among non tobacco users was 2.63±0.49, in smokers 2.67±0.47, smokeless form was 2.78±0.42

and in both (smokers and smokeless) form was 2.59±0.51 which was not statistically significant with different scores (P>0.05) (Table 4).

Table 4. Distribution Of Study Participants According To Habit And Mean Cpi Score

Parameter	Habit	n	Mean	Std dev	Kruskal-Wallis Chi-sq	P-Value
CPI	Non-User	224	2.63	0.49	3.386	0.336
	Smoke	332	2.67	0.47		
	Smokeless	27	2.78	0.42		
	Both	17	2.59	0.51		

Table 5: Distribution Of Study Participants According To Habit And Mean Loa Score

Parameter	Habit	N	mean	std dev	kruskal-wallis chi-sq	p-value	sig diff between
LOA	Non-user	224	0.30	0.49	27.335	<0.001*	1vs 2
	Smoke	332	0.53	0.55			1 vs 4
	Smokeless	27	0.52	0.70			
	Both(Smoker and smokeless)	17	0.59	0.62			

Loss Of Attachment was higher in tobacco users compared to non tobacco users, the mean score of LOA in tobacco users was 0.30±0.49, in smokers it was 0.53±0.55, in smokeless tobacco 0.52±0.70, and in both (smokers and smokeless) was 0.59±0.62.

The difference in LOA between the samples having different habits was found to be statistically significant (P<0.001). Further, it was found that statistically significant difference existed between Non-Users & Smokers (P<0.001) as well as Non-

Users and Both (Smoke+Smokeless) users (P<0.05)(Table 5).

DISCUSSION

Tobacco smoking is linked with many serious illnesses, such as cancer, cardiopulmonary diseases, low birth weight, as well as with many health problems. It is also linked to a detrimental impact on oral health, such as increasing risk of periodontal diseases. Tobacco can be consumed through the mouth in a variety of forms, varied from smoking to smokeless tobacco chewing on itself or combined with betel nut. Epidemiological studies have demonstrated that tobacco use is a significant risk factor for the development of periodontal diseases. Disease severity increases with the frequency of smoking. Smokers accumulate markedly more dental calculus than do non-smokers, and the quantity of calculus is correlated with the frequency of smoking. The adverse effects of smoking on the periodontium correlates well with both the quantity of daily consumption and the duration. [5]

Smokers were recorded to have a 2.5 to 3.5 times greater risk of severe periodontal attachment loss. Tobacco consumption may be the greatest single cause of premature death in the developed world and, increasingly, in the less developed countries. The US Surgeon General has been quoted as saying that 'smoking represents the most extensively documented cause of disease ever investigated in the history of biomedical research. [6]

One of the conclusions to emerge from a review of longitudinal studies in the 1996 World Workshop in Periodontics was that '...the interaction between environmental and subject related factors does not have to be constant in geographically or racially different populations. Virtually all the studies hitherto

that have identified tobacco as a true risk factor for periodontitis have been carried out in the western hemisphere and have focussed on the habit of tobacco smoking. [7] Accordingly, the periodontal status of mutually exclusive groups of tobacco users compared with that of non-tobacco users, who constituted the control group throughout the analysis. The stratification of the sample into two major age categories and frequency matching on this basis was necessary to overcome the confounding effects of age on periodontitis. Indeed, the wellknown association between age and periodontal status, which has previously been described by previous studies in the literature was not evident in the present analysis. The reason may be as the present study population belongs to low socioeconomic status the oral hygiene of the study population was very poor. The OHI-S of 20-39 years and of 40-60 years was not statistically significant.

The kruskal wallis analysis also showed that the periodontal status was not significantly poorer in tobacco users and than in non-tobacco users. However in a study conducted by Girish Parmer et al [8] in non tobacco chewers 31% have pockets, and in tobacco chewers 55% have pockets.

Several factors make it difficult to compare the findings of the present study regarding the quantity of tobacco used and periodontitis with other studies. Firstly, the quantity of tobacco consumed by users was lower in the present study than in other studies. For example, Martinez-Canut et al [8] observed that the average quantity of tobacco used by their subjects was 22 cigarettes per day, compared to 5 per day in the present study. Secondly, they have included only cigarette smokers, whereas the present sample included cigarette and beedi smokers as well as betel chewers. Consequently, there may be distinct differences in the quantity of tobacco used

along with the betel quid as well as the bioavailability of tobacco when consumed in this mode as against tobacco smoking.

The severity of periodontitis as estimated by LOA was significantly greater in tobacco users compared to non-tobacco users which is similar to the study done by Chlebovec, Ann Marie et al. [9]

These findings suggest that whether or not subjects are tobacco users or non tobacco users *per se* is less important as a determinant of LOA than oral hygiene, even though the tobacco used is seen to have a statistically significant impact.

In other words, the impact of the quantity of tobacco used may be limited and lacking in clinical significance compared to oral hygiene in terms of lifetime disease progression.

However, such estimations may be an over-simplification in the context of a chronic episodic multifactorial disease in which, according to the 1996 World Workshop in Periodontics, there is as yet '...considerable ambiguity in our understanding of the critical pathways or critical elements which are necessary to pathogenesis'. [11]

Limitations

This is a cross-sectional study, the attributes, which were significantly associated with LOA, can be considered risk indicators for periodontitis. Consequently, they can be confirmed as true risk factors by means of longitudinal studies.

CONCLUSION

The findings confirm the significant effect of quantified tobacco use on the severity of periodontitis as reported by several workers who have investigated the tobacco-periodontal relationship in alternative cultures. However, our study suggests that the impact of quantified tobacco use on periodontitis in population may be limited compared to the importance

of oral hygiene and age, and highlights the cardinal role of oral hygiene in the aetiology of periodontal disease. Nevertheless, both oral hygiene and the quantified tobacco use may be considered risk indicators for periodontitis.

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