



A Cross-Sectional Study on the Relationship between Behavioral Variables and Economic Status in Periodontal Disease among Elderly Individuals

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ABSTRACT

Objectives: The objectives of this study were to examine the relationship between behavioral variables, such as smoking and level of income on the periodontal disease among older South Indian adults.

Materials and methods: Data pertaining to participants aged 55 years and above from the Outpatient Department of MR Ambedkar Dental College and Hospital were used. A total of 209 elderly subjects were selected by convenient sampling and a complete evaluation of their periodontal status was carried out.

Results: Our study showed that patients belonging to the lower income group and smokers had more severe disease compared to other groups. They were found to have higher plaque scores, higher calculus scores, deeper pockets and attachment loss compared to the subjects of the other groups.

Conclusion: Variables, such as smoking, gender and low income are associated with the severity of periodontal disease in older adults.

Keywords: Economic status, Education, Smoking, Periodontal diseases.

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INTRODUCTION

Periodontitis is a slowly, continually progressive condition leading into loss of alveolar bone and ultimate loss of tooth over a period of time. While acknowledging that microbial plaque is the principle etiological factor of inflammatory periodontal disease, the effect of various other factors that modify the host response to the bacterial plaque has gained importance. Social issues such as poverty, retirement and

smoking could also play role in determining the periodontal status of old people.¹⁻⁴

However, there are limited studies available regarding this in our population with wide disparity in socioeconomic status and behavioral characteristics. Most of the association studies are carried out in developed countries and or developing countries and there is paucity of data on Indian population.^{5,6} The objective of this study was to examine the relationship between the behavioral variable smoking and level of income on the periodontal status among older South Indian adults.

MATERIALS AND METHODS

The study design was cross-sectional. Three hundred subjects living in and around Bengaluru in the age group of 55 years and above were selected by convenient sampling from those attending the Oral Medicine Department of MR Ambedkar Dental College and Hospital. Subjects with at least 16 teeth on the whole and eight teeth per arch were included in the study. Subjects with history of periodontal treatment during the past 1 year were excluded from the study. The final sample size after the application of inclusion and exclusion criteria was 209.

All the patients were subjected to a detailed case history. Their medical status was carefully recorded. Patients were also requested to produce all the previous medical records, if available and relevant information obtained. Thorough periodontal examination was carried out on all patients and all the chosen parameters were carefully recorded. These recordings were made by one examiner. However, the consistency and accuracy of the measurements were regularly and randomly checked by another examiner in order to keep the intraexaminer variations to a negligible level.

Behavioral variables: These included smoking and dental visits. Smoking indicates whether the person is a current smoker, a former smoker who smoked at least 100 cigarettes or never smoked. Dental visit indicate whether the participant visited a dentist at least once within the past 2 years.

Sociodemographic variables: These included gender and income. Subjects were grouped based on income as those with an income of less than ₹5,000/- per annum, those with an income of ₹5,000 to 10,000 per annum and those with an income of ₹10,000 and above per annum.

Age, gender, income and smoking were independent variables whereas periodontal indices were the dependent variables.

Description of the dependent variables	Index used/groups
1. Plaque	Silness and Loe index ⁷
2. Gingival status	Silness and Loe index ⁸
3. Calculus	NIDR (National Institute of Dental Research) index ⁹
4. Probing pocket depth	<4 mm, 4 to 7 mm, >7 mm
5. Probing attachment level	<4 mm, 4 to 7 mm, >7 mm

Probing pocket depth: Probing pocket depth was measured from the crest of the gingival margin to the probable base of the sulcus using a William's periodontal probe. Measurements were made to the nearest millimetre at six sites (mesiobuccal, midbuccal, distobuccal, mesiolingual, mid-lingual, distolingual) of each tooth.

Probing attachment level: It was also measured at six sites of each tooth (mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual, distolingual) similar to that of probing pocket depth, as the distance between cemento enamel junction (CEJ) and probable base of the sulcus.

STATISTICAL ANALYSIS

Statistical analysis was carried out using SPSS version 10. Data are expressed as descriptive for the continuous variables. Categorical variables are expressed as percentages. Since data was nonparametric Mann-Whitney U test was used to determine the difference in the parameters between groups. Spearman's correlation was carried out to determine the correlation between cigarettes smoked and the periodontal status. A p-value of <0.05 was considered significant.

RESULTS

General information: Out of the 209 subjects 52 were aged between age 55 and 59 years, 56 were aged between age 60 and 64 years, 51 were aged between age 65 and 69 years and the remaining 50 were aged 70 years of age and above. Out of this, 110 were females and 99 were males. Smoking status: 89 patients were addicted to smoking whereas the reaming 120 patients were nonsmokers. All the patients were categorized into three groups, those with an income of less than ₹5,000 per annum, those with an income of ₹5,000 to 10,000 per annum and those with an income of ₹10,000 and above per annum. Accordingly 49, 51 and 109 subjects were included under each of the above group respectively.

The results of our study are summarized in Tables 1 to 3. Males had significantly higher plaque scores, gingival index, deeper pockets and higher attachment loss compared to females. Subjects belonging to lower income group had higher calculus scores, deeper pockets and more sites with attachment loss compared to other groups. Subjects belonging to the annual income less than ₹5,000 had attachment loss of 7 mm and above. There was no significant difference in the plaque scores and gingival status between smokers and nonsmokers. However, smokers showed higher

Table 1: Comparative evaluation of different dental parameters in the income groups

Dental parameters Index	For all patients Mean	Level of income in rupees		
		<5,000	5,000-10,000	>10,000
Plaque index	1.67	1.64	1.63	1.60
Gingival index	1.78	1.75	1.69	1.61
*Calculus index	1.81	1.90	1.68	1.68
*Probable pocket depth (mm)	3.19	3.40	3.02	2.97
Percentage of sites				
<4 mm	44	39.82	47.10	51.00
4-7 mm	35	39.20	37.00	35.00
>7 mm	21	20.98	15.90	14.00
*Attachment loss (mm)	4.99	5.20	4.62	4.05
Percentage of sites				
<4 mm	44	40.09	45.13	52.00
4-7 mm	35	39.00	36.00	34.00
>7 mm	21	20.91	18.87	14.00

*p-value less than 0.05

Table 2: Comparative evaluation of different dental parameters in males and females

Dental index	Gender	
	Males	Females
*Plaque index	1.87	1.54
*Gingival index	1.88	1.68
Calculus index	1.82	1.80
*Probable pocket depth (mm) percentage of sites	3.09	2.99
<4 mm	48.16	50.55
4-7 mm	41.16	30.01
>7 mm	10.67	9.44
*Attachment loss (mm) percentage of sites	5.19	4.86
<4 mm	41.93	51.07
4-7 mm	41.07	34.93
>7 mm	17.00	14.00

*p-value less than 0.05

Table 3: Comparative evaluation of different dental parameters in smokers

Dental parameters Mean \pm SD	Smokers	Nonsmokers Mean \pm SD
Plaque index	1.86 \pm 0.32	1.81 \pm 0.19
Gingival index	1.72 \pm 0.35	1.70 \pm 0.20
Calculus index	1.96 \pm 0.59	1.75 \pm 0.42
*Probable pocket depth (mm)	5.01 \pm 0.88	4.89 \pm 0.74
*Attachment loss (mm)	5.71 \pm 0.88	4.89 \pm 0.74

*p-value less than 0.05

calculus index, deeper pocket depth and attachment loss compared to nonsmokers. These findings correlated with the duration and number of cigarette smoking (Spearman's correlation coefficient of 5.8, p-value less than 0.05).

DISCUSSION

The relationship between ageing and periodontal status has attracted a lot of interest, with many studies have tried to investigate this problem during the last 20 years. Many of the previous studies did not take into account the other contributory factors associated with ageing, such as level of income and behavioral issues like smoking into consideration. Moreover, no uniform pattern was followed in respect of measurements of the periodontal status in many of the previous studies. Hence in this study, representative teeth were not selected for evaluation instead of which all the teeth were taken into consideration. Measurements of probing pocket depth and probing attachment level were made in six sites of all the teeth in order to obtain a true picture of the periodontal condition. Subjects included in the study were divided in two different subgroups in order to compare the effect of other variables apart from ageing on the periodontal status.

Our study showed that patients with low income and smokers had more advanced periodontitis than those without diabetes. This again compares with the earlier reports.¹⁰⁻¹³

Significant associations were found between additional attachment loss and smoking, and attachment level of 6 mm or more at baseline, with odds ratios of 3.75 and 2.29, respectively in a previous study conducted by Ogawa H et al. Smoking habit and baseline attachment level of 6 mm or more may be considered risk factors for further attachment loss among healthy elderly people.¹⁴

This study shows that with the age the presence of other factors, such as smoking and decreased income plays an additional role in the deterioration of periodontal status of such individuals. With good oral hygiene and in the absence of other risk factor such as smoking, older people can maintain a healthy and functional dentition.

CONCLUSION

Variables, such as smoking and low income, are associated with severity of periodontal disease in the elderly. Long-term prospective studies are required to further evaluate the same.

SYNOPSIS

The study on the relationship between behavioral and economic status on periodontal disease among older South Indian adults demonstrated loss of periodontal attachment in patients with low income and behavioral changes but not to the definition of moderate periodontitis.

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