

## Original Research

### Prevalence of periodontal disease in adults using tobacco products and their quitting behavior- A Cross-sectional study

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#### ABSTRACT

**Background and Aim:** During this twenty-first century, tobacco could kill up to one billion people. Most tobacco users want to quit but will be unable to because of their dependence on a highly addictive substance. Present study was conducted to know the prevalence of smoking and smokeless tobacco use, its impact on periodontal disease and the quitting behavior in a population. **Material and Methods:** The present cross sectional study was conducted among 1550 participants for the period of 5 months at western part of India. A pre-structured and pre-tested schedule was used for collection of relevant data pertaining to smoking form of tobacco. The socio-demographic variables collected were age, sex, educational attainment and occupation of the participant and income of the family. Subjects were interviewed about their smoking status. Details on the different forms of smoking product used, including cigarette, bidi and tobacco were obtained from the smokers. **Results:** 190 out of 1550 were found to be exclusive tobacco users. Among 190 current smokers, 148 were males and 42 were females. More smokers were found to be males than females and the difference was found to be statistically significant Current tobacco users by their previous attempts to quit in which 61.4% current smokers and 21.3% smokeless tobacco users and 7.2% both users have attempted to quit in the past 3 months. Plaque Index is significantly higher in Yes group ( $p \leq 0.05$ ) similar result were obtained in Gingival index and Probing depth score. **Conclusion:** Tobacco usage not only contributes to periodontal disease, but spurs the development of oral cancer, smoking cessation should be considered in the treatment of periodontitis and be a part of health prevention in dentistry.

**Key words:** Plaque Index, Periodontal disease, Smoking, Tobacco

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#### INTRODUCTION

Tobacco use and its association with oral diseases is a major contributor to the global oral disease burden and responsible for up to half of all periodontitis cases among adults.<sup>1</sup> There is no universally agreed upon definition of periodontitis or of disease severity. The Armitage definition has been widely accepted for epidemiological studies, "periodontal disease defined as attachment loss of at least 4 mm at one or more sites."<sup>2</sup> Today, tobacco use causes 1 in 10 deaths among adults worldwide – more than five million people a year. By 2030, unless urgent action is taken, tobacco's annual death toll will rise to more than eight million. If current trends continue unchecked, it is estimated that around

500 million people alive today will be killed by tobacco. During this twenty-first century, tobacco could kill up to one billion people. Most tobacco users want to quit but will be unable to because of their dependence on a highly addictive substance.<sup>3</sup>

Almost 35% of men in developed countries and 50% of men in developing countries smoke; while 22% of women in developed countries and 9% of women in developing countries smoke. More than 80% of the world's smokers live in low- and middle-income countries. Every day, 80,000-100,000 young people around the world become addicted to tobacco.<sup>4</sup> 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.

Cigarette smoking and use of other tobacco products is increasing in the developing world due to rise of tobacco industry and population growth.<sup>5</sup> Cigarette smoking is a well-established risk factor for periodontal disease and it is the strongest factor among the modifiable ones.<sup>6</sup> Research evidence suggests that smokers have a higher tendency to problems such as teeth and bone loss and gingival recession compared to non-smokers, and to the formation of periodontal pockets, which increase the probability to suffer from more severe periodontal disease.<sup>7-10</sup> Tobacco can affect the function and proliferation of periodontal cells such as gingival fibroblasts, periodontal membrane cells, periodontal ligament cells and other cells, thus inducing cell apoptosis. It can also affect the invasion of periodontal disease, inhibit the autoimmune defense, and aggravate the inflammation reaction to damage and destroy the alveolar bone.

Hence the present study was conducted with the following objectives: To know the prevalence of smoking and smokeless tobacco use, its impact on periodontal disease and the quitting behavior in a population.

**MATERIALS AND METHODS**

The present cross sectional study was conducted among 1550 participants for the period of 5 months at western part of India. Written informed consent was obtained from the study subjects. A pre-structured and pre-tested schedule was used for collection of relevant data pertaining to smoking form of tobacco. The socio-demographic variables collected were age, sex, educational attainment and occupation of the participant and income of the family. Subjects were interviewed

about their smoking status. Details on the different forms of smoking product used, including cigarette, bidi and tobacco were obtained from the smokers.

**STATISTICAL ANALYSIS**

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages, means and standard deviations. For all tests, confidence level and level of significance were set at 95% and 5% respectively.

**RESULTS**

A total of 1550 subjects were studied. 190 out of 1550 were found to be exclusive tobacco users. 119 using only smoking form of tobacco while 39 subjects were using smokeless tobacco and 32 subjects using both forms of tobacco. Table 1 shows that among 190 current smokers, 148 were males and 42 were females. More smokers were found to be males than females and the difference was found to be statistically significant (p<0.05). Table 2 shows the current tobacco users by their previous attempts to quit in which 61.4% current smokers and 21.3% smokeless tobacco users and 7.2% both users have attempted to quit in the past 3 months. Prevalence of smoking, tobacco chewing and both forms observed highest in 20-29 age groups.

32 Out of 190 tobacco users either smokeless or smoking form, desires to quit that previously have very high addiction rate thereby giving the overall prevalence of 1.04% respectively. The reason behind the desire for quitting tobacco was awareness of addiction, financial reason, responsibility, family pressure, opinion of others, oral health deterioration. Comparison of the Plaque Index between the two groups shows that Plaque Index is significantly higher in Yes group (p<0.05) similar result were obtained in Gingival index and Probing depth score. (Table 3)

**Table 1: Gender wise distribution of the study participants**

Habit	Male N (%)	Female N (%)	Total N (%)	P value
Smoking	94 (63.5)	25 (59.5)	119 (62.6)	0.04*
Chewing	32 (21.6)	7 (16.6)	39 (20.5)	
Both	22 (14.8)	10 (23.8)	32 (16.8)	
Total	148 (100)	42 (100)	190 (100)	

\* indicates statistically significance at p<0.05, test applied chi-square test

**Table 2: Distribution of subjects according to previous attempts to quit tobacco**

Habit	Previous quitting attempt (Yes) N (%)	Previous quitting attempt (no) N (%)	Total N (%)	P value
Smoking	75 (61.4)	44 (64.7)	119 (62.6)	<b>0.04*</b>
Chewing	26 (21.3)	13 (19.11)	39 (20.5)	
Both	21 (17.2)	11 (16.1)	32 (16.8)	
Total	122 (100)	68 (100)	190 (100)	

Statistically significance at  $p \leq 0.05$ , test applied chi-square test

**Table 3: comparison of the PI, GI and probing depth between the people who quit and didn't the tobacco**

Variable	Previous Quitting Attempt	Mean $\pm$ SD	P value
Plaque Index	No	1.35 $\pm$ 0.5	0.01*
	Yes	1.47 $\pm$ 0.7	
Gingival Index	No	1.54 $\pm$ 0.36	0.003*
	Yes	1.67 $\pm$ 0.67	
Probing Depth	No	3.8 $\pm$ 1.02	0.05*
	Yes	5.1 $\pm$ 1.57	

\* indicates statistically significance at  $p \leq 0.05$ , test Student t test

## DISCUSSION

Periodontal disease is a common chronic inflammatory disease that causes tooth loss in adults, and it is characterized by the destruction of the supporting structures of teeth including the gingiva, cementum, periodontal ligament, and alveolar bone.<sup>11,12</sup> It is now recognized that periodontal disease is a multifactorial disease in which plaque is the triggering factor of periodontal disease. Common risk factors for periodontal disease include gender, poor lifestyle such as smoking habit and alcohol consumption, certain systemic diseases such as diabetes, prediabetes, obesity and metabolic syndrome, and genetic factors.<sup>13</sup> The first observation on the relationship between smoking and periodontal tissues occurred in the 1940s, when Pindborg<sup>14,15</sup> demonstrated that necrotizing ulcerative gingivitis was associated with tobacco consumption. Several epidemiological studies clearly demonstrated a strong association between tobacco use/smoking habit and periodontal diseases in diverse populations.<sup>16-18</sup> In general, evidence indicates that smokers have more severe periodontal diseases, with increased bone attachment and tooth loss, gingival recession, and pocket formation compared to nonsmokers and there is a dose-response relationship between the number of cigarettes smoked per day and odds of periodontal disease.<sup>19,20</sup>

In the study 1.04% of the current tobacco users had attempted to quit in the past 3 months. According to GATS Uttarakhand (2009-10), about 30% smokers

made an attempt to quit smoking in the past 12 months. Ansari et al in their study reported that more than half (55%) of the smokers had attempted to quit smoking in the past one year.

In the present study, the percentage of current tobacco users who made an attempt to quit tobacco was 1.04 %, as compared to 35.4% and 37.8% found according to GATS India (2009-10) and GATS Uttarakhand (2009-10) respectively.<sup>21</sup> Jindal et al reported the prevalence of current smoking to be 14% and 15.6% respectively.<sup>22</sup> Narayan et al found increased smoking prevalence among those aged 35-44 years and lowest in those aged 55-64 years.<sup>23</sup> In our study, majority of current smokers initiated the habit of smoking at or before 19 years of age which is slightly higher as compared to study done by Bhimarasetty et al where 41.2% initiated it before attaining the age of 19 years. This is comparable to the findings of GATS India (2009-10), where 40.3% of the respondents initiated smoking after 19 years.<sup>21</sup>

Danish Imtiyaz et al assess the prevalence and factors influencing smoking tobacco use among rural Community of Dehradun and found that smoking was found to be more prevalent in males as compared to females and also showed a consistent rise with the increasing age group.<sup>24</sup>

Tobacco metabolism in the body will lead to dynamic changes in its concentration and it is difficult to simulate the real situation with in vitro experiments, adding difficulties to the evaluation of human applicability and

effectiveness of the conclusions. Accurate and reliable measurements of exposure to tobacco products are essential for identifying and confirming patterns of tobacco product use and for assessing their potential biological effects in both human populations and experimental systems. This is also a difficult research problem worldwide that needs further study.

### Conclusion

Tobacco usage not only contributes to periodontal disease, but spurs the development of oral cancer, smoking cessation should be considered in the treatment of periodontitis and be a part of health prevention in dentistry. The findings from this study highlighted the need to increase awareness about the health effects of smoking and smokeless tobacco use to encourage quitting, particularly in rural areas, where levels of education and knowledge about health are lower and where health care services are scarcely available.

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