



# Assessment of effect of Cigarette Smoking on Periodontal Health of Patients Reporting to Dental Section of Bacha Khan Medical College Mardan

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## Abstract

**Background:** Smoking is considered a major risk factor of oral cancer. The oral health and hygiene are majorly affected by tobacco products. It is needed to provide the periodontal health status of smokers for better understanding to treat and to develop a periodontal treatment guideline for smokers. The objective of this study was to assess the effect of smoking on periodontal health of patients attending the dental section of Bacha Khan Medical College Mardan.

**Methods:** This was descriptive cross-sectional study carried out among 227 adult smokers attending dental unit of Bacha Khan Medical College for treatment from the duration of September 2018 to November 2019. After taking written consent from the head of department, an assessment questionnaire was developed, and face validated from the respective field experts. A written formal consent was taken from each patient willing to participate in the study. The predesigned validated questionnaire was filled after assessment of patients from respective experts. The collected data was about probing depth, gum recession, attachment loss, color of gingival, presence and amount of plaque, calculus deposits and mobility of teeth. Data was collected and analyzed by using SPSS version 16.

**Results:** A total 227 cigarette smokers male patients were assessed for different periodontal parameters. Study provided that 98(43%) and 68 (30%) smokers were with the age range 31-45 years and 46-60 years respectively. It was also found that 92(40.5%) smokers male patients were found with bleeding on probing and the bleeding frequency were high in elder ages and study provided a significant difference of bleeding frequency with respect to age  $p < 0.00001$ . A significant difference was found in gum recession between different age group and elder patients were with high frequency in gum recession  $p = 0.0073$ . The study also provided that majority of smokers patients were having a moderate stain 103(45.4%) in their teeth and it was found a significant difference in the severe stain level and plaque on teeth  $p < 0.0001$ . A strong association was found between plaque and stain level.

**Conclusion:** The study provided that smoking is a major factor in periodontitis. The health severity of periodontal parameters were high among smokers patients and the high age smokers were found more prone to periodontitis and associated anomalies..

**Keywords:** Periodontitis, periodontal health, assessment, gingival, recession, probing, smokers, plaque, calculus

## Introduction

**P**eriodontium comprises of four parts, gingiva, periodontal ligament, cementum and alveolar bone. Periodontitis, being periodontal disease is considered to be one of the leading causes of tooth loss throughout the world (1-7). Periodontitis is caused by bacterial aggregation in plaque accumulating on surface of teeth and in result of that hosts response. The outcome of this inflammation is loss of periodontal support to the tooth, destruction of connective tissue attachment resulting in progressive periodontal pocket formation and ultimately bone loss<sup>8</sup>. Although the main cause of periodontal diseases is dental plaque harboring bacteria, risk factors can modify the host response to these infections hence modifying the course of periodontal diseases and the rate of its progress. Tobacco smoking is one of these risk factors. Tobacco smoking has been strongly associated with periodontitis, greater attachment loss, moreover, smokers are susceptible to more advanced and aggressive forms of periodontitis as compared to non-smokers (9).

Smokers have shown to have greater pocket depth, attachment loss and bone loss. Smokers also have rapid disease progression as they develop more sites with increased probing depth and alveolar bone loss (6,9-16). attachment loss and connective tissue breakdown is more severe in smokers instead of confounding oral hygiene measures (17). As periodontal disease progression depends upon bacterial activity and host response, the type of micro flora determines the speed and course of disease progression.

Prolonged and heavy smoking often reduced gingival bleed therefore mask one of the basic clinical marker used by dentist for measuring periodontal health. This often leads to misdiagnosis and failure to detect periodontitis at its initial stages (18).

This study was conducted to be able to understand the effect of cigarette smoking on periodontal health in Pakistani population reporting to Dental Section Bacha Khan Medical College Mardan. This data can be used as reference and comparison in future in a large sample in Pakistani population and also can be useful in awareness campaigns of smoking hazards on health and to make people quit smoking in order to live a healthy life.

## Methodology

The present cross sectional descriptive study was carried out among 227 smoker's dental patients in periodontology ward Dental Section Bacha Khan Medical College, Mardan in between September 2018 and November 2019. The non-probability convenient sampling technique was used in this study. Sample size was calculated using sample size formula based on prevailing prevalence of periodontitis diseases in Pakistan. Informed written consent was taken from Head of periodontology ward Dental Section and from each participating smoker patient. A predesigned questionnaires including information regarding demography, dental history and assessment parameters were filled for each patient after complete assessment. The questionnaire was already used on 10 patients as pilot study, tested and retested for reliability.

According to inclusion criteria, male patients with age range 20-70 years and smoked from the last three year were included in the study.

Patients who smoked at least one cigarette a day were classified current smoker and included in the study. All female Patients and patients who had previously received any kind of periodontal therapy or with some systemic problems were excluded from this study. Also patients using other tobacco products like huqqa, paan, beeri and snuff (naswar) etc were also excluded from the study.

Patients fulfilling the inclusion criteria were clinically examined and a clinical examination instrument probe called Michigan O probe with William markings was used. This is a light weight probe used to measure probing depth, recession and attachment loss in oral cavity which was divided into six sextants according to WHO guidelines (19). With help of another probe called Nabors probe furcation involvement was detected and measured. Other variables examined included bleeding on probing and presence of plaque and calculus. The data was processed and analyzed using SPSS version 16. Chi square test and frequency tabulation was used for statistical calculation.

## Results

A total 227 cigarette smokers male patients were assessed for different periodontal parameters. Study provided that 98(43%) and 68 (30%) smokers were

with the age range 31-45years and 46-60 years respectively. Majority of the smokers 118 (52) included in this study were with low level of education. Labors 67(29.5%) and skill workers 78 (34.44%) were predominant in the study (Table 1).

**Table 1. Demographic characteristics of smokers participated in the study**

Descriptions	Frequency	Percentage
<b>Age (Years)</b>	<b>N=227</b>	<b>%</b>
15-30 Years	53	23.5
31-45 Years	98	43
46-60 Years	68	30
60+ Years	8	3.5
<b>Education</b>	<b>N (%)</b>	<b>N (%)</b>
Low Level	118	52
Middle Level	69	30.4
High Level	40	17.6
<b>Occupations</b>	<b>N (%)</b>	<b>N (%)</b>
Labor Work	67	29.5
Skill worker	78	34.44
Business Man	32	14
Government Service	31	13.6
Private Service	19	8.46

It was also found that 92(40.5%) smoker male patients were found with bleeding on probing and the bleeding frequency were high in elder ages and study provided a significant difference of bleeding frequency with respect to age  $p < 0.00001$ . Plaque were observed in half population 114 (50%) of the study, the plaque frequency were in the same pattern in all age range with no significant difference  $p = 0.08$ .

There was a significant difference in the calculus formation between lower age group and elders  $p < 0.00001$  and 76.2% smokers were found with calculus in their teeth. Also 205(90.3%) smokers' patients were having pocket depth more than 4mm. A significant difference was found in Gum recession between different age group and elder patients were with high frequency in Gum recession  $p = 0.0073$  (Table 2).

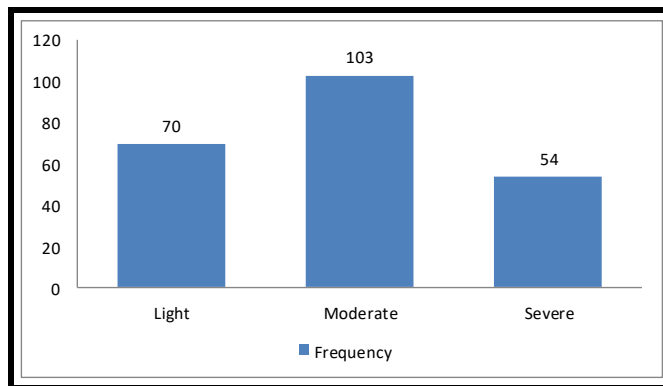
**Table 2. Frequency of different periodontal parameters of smokers in different age group**

Periodontal parameters	Frequency of patients of different age group				Total	Percent (%)	P value
	15-30 Year	31-45 Year	46-60 Year	Above 60 Year			
Bleeding on probing	16	27	43	6	92	40.5	<0.00001
Plaque	19	56	34	5	114	50	0.08
Calculus	24	90	54	5	173	76.2	<0.00001
Pocket depth more than 4mm	35	97	68	5	205	90.3	NA
Gum Recession	27	59	54	6	146	64.2	0.0073
Coral pink Color of Gingiva	18	21	18	2	59	26.0	0.42

The study also provided that majority of smokers patients were having a moderate stain 103(45.4%) in their teeth and it was found a significant difference in the severe stain level and plaque on teeth  $p < 0.0001$  (Table 3, Figure 1). A strong association was found between plaque and stain level.

**Table 3. Relation of teeth plaque with severe deposited stain among smokers (N=227)**

Patients with severe teeth stain	Patients with Plaque			Chi Square value	P value
	Yes	No	Total		
	Yes	52	2		
No	65	108	173		
Total	117	110	227		



**Figure 1. Frequency of different level of teeth stain among smoker's patients**

## Discussion

Second to dental caries, periodontal disease is most prevalent and oral pathology which is discussed worldwide<sup>20</sup>. The present study was conducted at periodontology ward Mardan Dental College which is considered one of the prestigious hospital providing quality dental care services not only to people of Mardan but also its adjacent cities like Dir, Buner, and northern areas. This study can therefore be considered reliable covering the whole spectrum of smoking related periodontal diseases among low socioeconomic population.

In this study a fair number of participants were studied which significantly improved estimates and statistical power. One clinician carried out all examination to minimize the observing bias. All selected participants were male because in Pakistani society females do not smoke, even if they do, they hide it and do not provide correct information regarding it. Finally, the influence of oral hygiene habits was limited by selecting only those participants who brushed their teeth only once a day and used no other interdental aid.

Vered et al (20) stated that although smoking is more common in middle age to aged people, it has been increasing in teenage and young adults now. Our patients were all above 20 years, and it included participants up to age 70 years, so we had a wide range of age to study them. Our first variable was bleeding on probing and out of 227 participants 92 patients (40.5%) had bleeding on probing while rest participants had no bleeding.

Our next variable was amount of deposit of calculus. Macgregor(21) found out comparably elevated calcium level in 48 hours plaque of young adult smokers suggesting a smoking associated influence on early stages of supra gingival calculus formation. In our study calculus was present in 173 smokers while rest had no or minimal calculus deposits. The difference was of high significance.

Our final and most important of all variable was measuring probing depth. It was done with the use of Michigan O probe with William markings. We used 4mm probing depth as a criterion to distinguish oral sites with presence or absence of periodontal disease. Sites with probing depth less than 4mm were considered disease free or having normal probing depth. Bergstorm, Eliason and Dock(22) measured probing depth with a 2mm graduated probe and

expressed periodontal disease as frequency of diseased sites i-e sites with 4mm probing depth or more than it. In our study 38 number of patients had more than 4mm probing depth in various parts of mouth and only 4 participants had probing depth less than 4mm. This difference was statistically also very high. In a study of Natto et al (23) which was conducted in Saudi Arabia to study the adverse effect of tobacco on periodontal health, mean probing depth was 3mm for cigarette smokers and 2.3mm for non-smokers. The association between cigarette smoking and probing depth was statistically significant ( $p < 0.001$ ). The prevalence of periodontitis with minimum PD was 24% was in cigarette smokers and 8% in non-smokers ( $p < 0.001$ ). Linden and Mullally<sup>24</sup> reported that percentage of sites with probing depth more than 4mm were almost twice (15%) as compared to non-smokers (6%). The extent of periodontitis as evaluated by percentage of sites with attachment loss more than 2mm was 22% for young adults who smoked as compared to 9% who did not smoked.

High amount of gum recession and grade 3 or 4 involvement was seen in patients who had smoked for a greater period of their lives, those who had smoked for fewer years had minimal gum recession and attachment loss. These findings support a direct relationship of amount of smoking on severity of periodontium destruction.

These studies clearly demonstrate a strong association between smoking and greater attachment loss. Thus it can be appreciated that our study supports the finding of previous researches and reinforces that smoking cigarette had a great adverse effect on periodontal health and leads to attachment loss, and reinforce a fact that smoking is no doubt a major risk factor in the progression of periodontitis.

## Conclusion

The study provided that smoking is a major factor in periodontitis. The health severity of periodontal parameters were high in the smokers patients and the smokers with high age group were found more prone to periodontitis and associated anomalies. This study will provide a baseline information regarding awareness and intervention.

### Recommendation:

Dental health education and awareness regarding smoking as risk of periodontitis need to be spread among public.

**Conflict of interest:** Nil

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