

Original Article

Prevalence Of Sensitivity and Bleeding Gums in Smokers versus Non-Smokers

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ABSTRACT

Background: Smoking is a significant public health issue linked to increased mortality and morbidity. Its impact on periodontal health remains unclear, whether through systemic or local effects. Tooth sensitivity and bleeding gums are common oral health issues influenced by various factors, including smoking.

Objective: To determine the prevalence of sensitivity and bleeding gums in smokers versus non-smokers.

Methods: A cross-sectional study was conducted from January 2024 to May 2024 at the College of Dentistry, Sharif Medical and Dental College, Lahore. The study involved 100 participants, 50 smokers and 50 non-smokers. Gingival health was assessed using the gingival index, which scored the marginal and interproximal tissues from 0 to 3. The participants' demographics and experiences of tooth sensitivity were recorded using a proforma. The sample size was calculated to ensure a 95% confidence level and 5% precision. Data were analyzed using SPSS version 25.0, with a significance level set at $p \leq 0.05$. Chi-square tests assessed the association between smoking status and gingival health, as well as tooth sensitivity. The mean rank scores of the gingival index were compared between smokers and non-smokers using the Mann-Whitney U test.

Results: The mean age of participants was 29.29 ± 11.946 years, with 71% males and 29% females. A significant association between smoking and gingival health was found ($p = 0.001$). Among non-smokers, 25% had good gingival health, compared to 0% of smokers. Conversely, 20% of smokers had poor gingival health, compared to 0% of non-smokers. The mean rank score for gingival index was significantly higher in smokers (75.5) than in non-smokers (25.50) ($p = 0.001$). An insignificant association between smoking and tooth sensitivity was observed ($p = 0.316$). Non-smokers reported higher tooth sensitivity (24%) compared to smokers (19%).

Conclusion: Non-smokers exhibited better gingival health compared to smokers. Bleeding gums were more prevalent among smokers, whereas tooth sensitivity was more common in non-smokers. These findings highlight the adverse effects of smoking on periodontal health and the need for targeted smoking cessation programs.

Keywords: Bleeding gums, gingival index, smoking, tooth sensitivity, periodontal health, oral health.

INTRODUCTION

Smoking has emerged as a significant public health concern due to its escalating prevalence and the associated increase in smoking-related morbidity and mortality. The deleterious effects of smoking on systemic health are well-documented; however, its specific impact on periodontal health warrants further exploration (1). It remains unclear whether the detrimental effects of smoking on periodontal health are primarily due to systemic influences or local interactions with the periodontium (2). Tooth sensitivity, characterized by sharp, transient pain in response to various stimuli, is a common dental issue that can arise from a variety of factors, including temperature changes and physical forces. Additionally, bleeding gums, indicative of gingival inflammation or gingivitis, is a prevalent oral health condition resulting from plaque accumulation along the gum line. Both conditions are influenced by a multitude of factors, including smoking (3).

The link between smoking and periodontal disease is complex. Smokers are known to exhibit more severe forms of gum disease compared to non-smokers, attributed to the propensity of smoking to foster plaque and calculus accumulation, leading to overall poor gingival health and receding gums. This recession exposes enamel and root surfaces, heightening sensitivity and susceptibility

to decay. Despite this, smokers paradoxically show less gingival bleeding on probing compared to non-smokers, suggesting that smoking affects gingival blood vessels and modifies the subgingival environment, potentially fostering a distinct microbial flora without necessarily increasing plaque levels. Recent studies have reinforced this notion, indicating that smokers may harbor more periodontal pathogens, attributed to altered immune responses induced by smoking (4, 5).

Tooth sensitivity can be attributed to several factors, such as worn enamel, exposed roots, cavities, cracked or chipped teeth, and worn fillings. Although smoking leads to conditions that could theoretically increase sensitivity, such as gingival recession and enamel wear, the relationship between smoking and tooth sensitivity remains underexplored. Conversely, bleeding gums are a direct manifestation of gingival inflammation and are commonly observed in both smokers and non-smokers, although the extent and severity may vary. The presence of bleeding gums is a sign of inflammation of gums or gingivitis, a common and mild form of disease that typically results from the buildup of plaque at the gum line (6, 7).

The aim of this study is to investigate the prevalence of sensitivity and bleeding gums among smokers and non-smokers. By understanding these associations, the study aims to contribute to the broader understanding of how smoking impacts oral health, potentially guiding public health interventions and clinical practices. The findings of this research are expected to highlight the need for targeted awareness programs and smoking cessation initiatives, ultimately aiding in the reduction of smoking-related periodontal diseases (8-10).

MATERIAL AND METHODS

A descriptive cross-sectional study was conducted involving 50 smokers and 50 non-smokers visiting the College of Dentistry, Sharif Medical and Dental College, Lahore. The study was carried out from January 2024 to May 2024, with ethical clearance obtained from the institution's ethical committee (No. SMDC/SMRC/176-21). Participants aged 18 years and above were included regardless of gender, while individuals with systemic illnesses, those on medications, or those with parafunctional habits such as betel nut chewing, alcohol consumption, or a history of oral trauma were excluded from the study.

Data collection involved the use of the gingival index to evaluate gingival health and assess gingival bleeding. During clinical examinations, the gingival sulcus was probed, and the marginal and interproximal tissues were scored from 0 to 3, with 0 indicating normal gingiva, 1 indicating mild inflammation without bleeding on probing (BOP), 2 indicating moderate inflammation with BOP, and 3 indicating severe inflammation with spontaneous bleeding. Based on these scores, individuals were categorized as having excellent (0), good (0.1-0.9), fair (1.0-1.9), or poor (2.0-3.0) gingival health. A proforma was also used to record demographic information and patients' experiences of tooth sensitivity.

The sample size was calculated to be 50 for each group, ensuring a 95% confidence level and 5% precision, based on a previous study that reported a 96.7% prevalence of gingivitis in smokers (12). Data were analyzed using SPSS version 25.0. The significance level was set at $p \leq 0.05$. Descriptive statistics were computed to summarize the demographic data and the prevalence of gingival health and tooth sensitivity. Chi-square tests were used to assess the association between smoking status and gingival health, as well as tooth sensitivity. The mean rank scores of the gingival index were compared between smokers and non-smokers using the Mann-Whitney U test, given the ordinal nature of the gingival health scores.

The study adhered to the principles of the Declaration of Helsinki, ensuring that all participants provided informed consent, and their confidentiality was maintained throughout the research process. The results highlighted significant associations between smoking and gingival health, with non-smokers exhibiting better gingival health compared to smokers. An insignificant association was observed between smoking and tooth sensitivity, indicating that other factors might play a more critical role in the development of tooth sensitivity. These findings contribute to a better understanding of the oral health impacts of smoking and emphasize the importance of smoking cessation programs.

RESULTS

The study included 100 participants, with a mean age of 29.29 ± 11.946 years. Among these participants, 71% were males and 29% were females. The results demonstrated significant associations between smoking status and gingival health, while the association with tooth sensitivity was insignificant.

The association of smoking with gingival health is presented in Table 1. The findings revealed that none of the smokers had good gingival health, compared to 25% of non-smokers. Conversely, 20% of smokers exhibited poor gingival health, a category in which no non-smokers were found. The difference in gingival health between smokers and non-smokers was statistically significant ($p = 0.001$).

Table 1: Smokers gingival health

Gingival Health	Smoker (%)	Non-Smoker (%)	Total (%)	p-value
Good	0 (0%)	25 (25%)	25 (25%)	0.001*
Fair	30 (30%)	25 (25%)	55 (55%)	
Poor	20 (20%)	0 (0%)	20 (20%)	

Table 2 displays the difference in gingival index scores between smokers and non-smokers. The mean rank score for smokers was significantly higher (75.5) than for non-smokers (25.50), indicating poorer overall gingival health among smokers ($p = 0.001$).

Table 2: Scores between smokers and non-smokers

Smoking Status	N	Mean Rank	Sum of Ranks	p-value
Smoker	50	75.50	3775.00	0.001*
Non-Smoker	50	25.50	1275.00	

Table 3 summarizes the association of tooth sensitivity with smoking. A higher percentage of non-smokers (24%) reported tooth sensitivity compared to smokers (19%). Notably, 25% of smokers reported never experiencing sensitivity, compared to 20% of non-smokers. The association between smoking and tooth sensitivity was not statistically significant ($p = 0.316$).

Table 3: Sensitivity with smoking

Tooth Sensitivity	Smoker (%)	Non-Smoker (%)	Total (%)	p-value
Yes	19 (19%)	24 (24%)	43 (43%)	0.316
No	25 (25%)	20 (20%)	45 (45%)	
Do Not Know	2 (2%)	0 (0%)	2 (2%)	
Sometimes	4 (4%)	6 (6%)	10 (10%)	

In summary, the results indicate a significant association between smoking and poor gingival health, with smokers exhibiting higher gingival index scores and a greater prevalence of poor gingival health. Conversely, the association between smoking and tooth sensitivity was found to be insignificant, with non-smokers reporting higher rates of sensitivity. These findings underscore the adverse effects of smoking on gingival health and highlight the need for targeted interventions to promote smoking cessation and improve oral health outcomes.

DISCUSSION

The present study aimed to investigate the prevalence of sensitivity and bleeding gums among smokers and non-smokers, revealing significant findings that align with and diverge from existing literature. The study found a significant association between smoking and poor gingival health, consistent with previous research indicating that smokers are more prone to periodontal disease due to plaque and calculus accumulation, leading to gingival recession and poor oral hygiene (11, 12). This study's results corroborated those of previous studies which reported that smokers exhibit significantly less gingival bleeding upon probing, potentially due to the vasoconstrictive effects of nicotine that reduce blood flow in the gingival tissues (13, 14). However, in contrast, this study observed that smokers had more bleeding on probing, suggesting that the extent of gingival inflammation and its clinical manifestation may vary depending on the population and study design (15, 16).

The finding that smokers had a higher mean rank score for gingival index, indicating poorer gingival health compared to non-smokers, supports the hypothesis that smoking exacerbates periodontal conditions. This is consistent with other studies that have documented the adverse effects of smoking on gingival health, including increased pocket depths, attachment loss, and bone loss (17, 18). These findings emphasize the importance of smoking cessation programs, as they are critical in mitigating the negative impacts of smoking on oral health. Additionally, the insignificant association between smoking and tooth sensitivity observed in this study contrasts with some previous reports that suggested smokers might experience higher sensitivity due to enamel wear and gingival recession (19). The discrepancy might be attributed to variations in study methodologies, sample sizes, and population characteristics.

This study had several strengths, including a well-defined sample size, ethical adherence to the principles of the Declaration of Helsinki, and a robust methodology for assessing gingival health using the gingival index. The cross-sectional design allowed for the collection of a substantial amount of data within a relatively short period, providing valuable insights into the oral health status of smokers and non-smokers. However, certain limitations must be acknowledged. The relatively small sample size and the single-

center design may limit the generalizability of the findings. Future research should consider larger, multi-center studies to validate these results further and explore the underlying mechanisms linking smoking to periodontal and dental health (20, 21).

The study highlighted the necessity for widespread awareness programs and smoking cessation initiatives to address the high prevalence of poor gingival health among smokers. Dental practitioners should be proactive in educating patients about the risks of smoking on oral health and encouraging them to participate in cessation programs. Regular dental check-ups and professional cleanings should be emphasized, particularly for smokers, to prevent and manage periodontal diseases effectively (22, 23).

CONCLUSION

In conclusion, the study reinforced the significant association between smoking and poor gingival health while demonstrating an insignificant link between smoking and tooth sensitivity. The findings underscore the detrimental effects of smoking on periodontal health and the importance of targeted public health interventions. Future research should aim to elucidate the precise mechanisms by which smoking influences periodontal and dental health and evaluate the long-term benefits of smoking cessation on oral health outcomes.

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