Journal of Health and Rehabilitation Research 2791-156X JHRR

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Original Article

An Assessment of Predisposing Factors of Periodontitis in Individuals

Syed Ali Haider Kazmi[1], Mohammad Taha Qamar[1], Noor Ul Ain Khan[2], Syeda Sara Mehdi[2], Minahil Wasif[2], Rana Ahmad Mujtaba[2], Hira But[3]*

[1]General Dental Practitioner, Lahore

[2]House officer, College of Dentistry, Sharif Medical and Dental College, Lahore

[3]Demonstrator, College of Dentistry, Sharif Medical and Dental College, Lahore

Corresponding Author: Hira But; Email: hira.ah.butt@gmail.com

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ABSTRACT

Background: Periodontitis, characterized by clinical attachment loss (CAL), is a prevalent global oral health issue leading to tooth loss. Various predisposing factors such as smoking, dietary habits, stress, and oral trauma are implicated in its development. Understanding these factors is crucial for targeted interventions and improved periodontal health outcomes.

Objective: To assess the predisposing factors of periodontitis in individuals.

Methods: A descriptive cross-sectional study was conducted on 50 individuals visiting the College of Dentistry, Sharif Medical and Dental College, Lahore. Data were collected by measuring clinical attachment loss. Patients were classified based on CAL into mild, moderate, and severe periodontitis categories. The Chi-square test was used to analyze associations between periodontitis severity and factors like smoking duration, betel quid chewing, stress, oral trauma, and an unbalanced diet.

Results: A significant association was found between smoking duration and periodontitis (p=0.04). Individuals with a smoking history of over five years had higher rates of severe (51%) and moderate (18.4%) periodontitis compared to those with a history of less than five years (8.2%). Betel quid chewing (p=0.254), stress (p=0.871), oral trauma (p=0.557), and an unbalanced diet (p=0.883) were not significantly associated with periodontitis.

Conclusion: Severe periodontitis was more prevalent in individuals with a smoking history of over five years and those consuming an unhealthy diet. Moderate periodontitis was more common in individuals without a betel quid chewing habit. Mild periodontitis was observed in those reporting stress-related gum or tooth pain and those with a history of oral trauma.

Keywords: Betel quid, clinical attachment loss, periodontitis, smoking, stress

INTRODUCTION

Periodontal disease, characterized by clinical attachment loss, is a prevalent oral health issue globally (1). This condition ultimately leads to tooth loss, marking the final stage of periodontal deterioration (2). Research has indicated a notable gender predilection in the prevalence of periodontal diseases, with men more commonly affected than women (3). Men are more prone to periodontal problems due to generally poorer oral hygiene practices and a higher incidence of oral trauma (4, 5). Conversely, women tend to be more vigilant about maintaining oral hygiene and more frequently visit dentists for routine check-ups (6).

Periodontal health is influenced by a complex interplay of sociodemographic factors, dietary habits, behavioral patterns, and biological differences (7). Tobacco use is a significant predisposing factor for clinical attachment loss (8), while alcohol consumption has also been linked to oral health issues (9). Immunological differences between individuals contribute to the higher prevalence of periodontal diseases in men (8). Even when external factors such as tobacco consumption are controlled, men still exhibit more aggressive periodontal issues, suggesting that gender itself may be a predisposing factor (10). Past studies have reported that men are more likely to develop severe periodontitis, with prevalence rates ranging from 4.6% to 12.7%, compared to women (11).

Dietary and behavioral patterns further impact periodontal health. Betel quid chewing, for instance, has been reported to negatively affect periodontal health, contributing to clinical attachment loss despite its protective effect against dental caries (12). A well-balanced diet, rich in complex carbohydrates, essential fatty acids, and a variety of vitamins and minerals, is crucial for maintaining

Journal of Health and Rehabilitation Research 2791-156X JHRR

periodontal health (13). A vegetarian diet, in particular, has been associated with better periodontal outcomes (14). Smoking is another significant predisposing factor, leading to clinical attachment loss, bone loss, and eventual tooth loss (15).

The objective of this study was to assess the predisposing factors of periodontitis in individuals, aiming to elucidate the interplay of various sociodemographic, dietary, and behavioral factors in the development and progression of periodontal disease.

MATERIAL AND METHODS

A descriptive cross-sectional study was conducted on 50 individuals visiting the College of Dentistry, Sharif Medical and Dental College, Lahore. Data collection involved measuring clinical attachment loss (CAL) in patients, who were then classified based on CAL into mild (1-2 mm), moderate (3-4 mm), and severe periodontitis (≥5 mm) categories (16). Ethical clearance was obtained from the institution's ethical committee (No. SMDC/SMRC/176-21) dated March 13, 2021. With a confidence level of 95%, a prevalence rate of periodontitis at 96.7%, and a precision of 5%, the calculated sample size was 50 (17). The study spanned six months, from June 2023 to November 2023.

Inclusion criteria encompassed individuals regardless of age and gender, while those with systemic illnesses were excluded from the study. Clinical attachment loss was measured using a Michigan probe, evaluated by probing at six sites: mesiobuccal, distobuccal, midbuccal, mesiolingual, distolingual, and midlingual. In cases of gingival recession, the probing depth was added to the gingival margin level. When the gingival margin was coronal to the cementoenamel junction (CEJ), CAL was calculated by subtracting the gingival margin level from the probing depth.

Statistical analyses were performed using SPSS version 23, with a p-value of less than or equal to 0.05 considered significant. The Chi-square test was utilized to assess the association between the severity of periodontitis (mild, moderate, and severe) and predisposing factors such as smoking duration, betel quid chewing, stress, oral trauma, and an unbalanced diet.

RESULTS

The study included a total of 50 individuals, with 29% being women and 71% men. The mean age of the participants was 29.29 ± 11.946 years. A significant association was found between the duration of smoking and the development of periodontitis (p=0.04). Individuals with a smoking history of more than five years exhibited a higher incidence of severe periodontitis (51%) and moderate periodontitis (18.4%) compared to those with a smoking history of less than five years (8.2%).

Table 1: Smoking as a predisposing factor for periodontal disease

	Periodontal health				
Duration of smoking	Mild periodontitis	Moderate periodontitis	Severe periodontitis	Total	P value
Less than 5 years	20 (40.8%)	4 (8.2%)	0 (0%)	24 (49%)	0.004*
More than 5 years	10 (20.4%)	9 (18.4%)	6 (12.2%)	25 (51%)	

The analysis of betel nut chewing habits showed no significant relation to the development of periodontal disease (p=0.254). A lower percentage of individuals with a history of betel nut chewing (4.1%) developed moderate periodontitis compared to those without this habit (22.4%).

Table 2: Betel nut chewing as predisposing factor for periodontal disease

	Periodontal health				
Betel nut chewing	Mild periodontitis	Moderate periodontitis	Severe periodontitis	Total	P Value
yes	1 (2.0%)	2 (4.1%)	0 (0.0%)	3 (6.1%)	0.254
no	29 (59.2%)	11 (22.4%)	6 (12.2%)	46 (93.9%)	

Consumption of an unbalanced diet did not show a significant association with the deterioration of periodontal health (p=0.883). However, the highest percentage of individuals consuming an unbalanced diet was observed among those with severe periodontitis (6.1%), followed by moderate periodontitis (12.2%) and mild periodontitis (36.7%).

Journal of Health and Rehabilitation Research 2791-156X JHRR

Table 3: Unbalanced diet as predisposing factor for periodontal disease

Unbalanced diet	Periodontal health			Total	P Value
	Mild periodontitis	Moderate periodontitis	Severe periodontitis		
Yes	18 (36.7%)	6 (12.2%)	3 (6.1%)	27 (55.1%)	0.883
No	8 (16.3%)	6 (12.2%)	2 (4.1%)	16 (32.7%)	
Do not know	3 (6.1%)	1 (2.0%)	1 (2.0%)	5 (10.2%)	
Based on finance	1 (2.0%)	0 (0.0%)	0 (0.0%)	1 (2.0%)	

The relationship between stress and periodontal disease was also non-significant (p=0.871). Most individuals who reported gum or tooth pain in stressful situations had mild periodontitis (14.3%), followed by moderate periodontitis (8.2%) and severe periodontitis (2%).

Table 4: Stress as a predisposing factor for periodontal disease

Pain in stressful situation	Periodontal health			Total	P Value
	Mild periodontitis	Moderate periodontitis	Severe periodontitis		
Yes	7 (14.3%)	4 (8.2%)	1 (2.0%)	12 (24.5%)	0.871
No	20 (40.8%)	9 (18.4%)	5 (10.2%)	34 (69.4%)	
Do not know	1 (2.0%)	0 (0.0%)	0 (0.0%)	1 (2.0%)	
Often	2 (4.1%)	0 (0.0%)	0 (0.0%)	2 (4.1%)	

Similarly, the history of oral trauma showed no significant association with periodontitis (p=0.557). A higher percentage of individuals with a history of oral trauma developed mild periodontitis (10.2%), followed by moderate periodontitis (8.2%) and severe periodontitis (2%).

Table 5: Oral Trauma as a predisposing factor for periodontal disease

History of oral trauma	Periodontal health			Total	P value
	Mild periodontitis	Moderate periodontitis	Severe periodontitis		
Yes	5 (10.2%)	4 (8.2%)	1 (2.0%)	10 (20.4%)	0.557
no	25 (51.0%)	9 (18.4%)	5 (10.2%)	39 (79.6%)	

These findings highlight that while smoking duration significantly impacts the severity of periodontitis, other factors such as betel nut chewing, unbalanced diet, stress, and oral trauma do not show a significant association with periodontal disease development in this study population.

DISCUSSION

The study aimed to assess the predisposing factors of periodontitis and identified several key associations. A significant relationship was found between the duration of smoking and the development of periodontitis. Individuals with a smoking history exceeding five years were more likely to develop severe periodontitis (51%) and moderate periodontitis (18.4%) compared to those with a smoking history of less than five years (8.2%). These findings align with existing literature, which highlights the detrimental impact of smoking on periodontal health (21). A multivariate study demonstrated that heavy and medium smokers had significantly higher odds of developing severe clinical attachment loss (CAL) compared to non-smokers (21).

Conversely, the habit of betel nut chewing showed no significant relation to the development of periodontal disease in this study (p=0.254). This contrasts with findings from other regions, such as Southeast Asia, where betel quid consumption has been significantly correlated with clinical attachment loss (26, 27). The variation in findings could be attributed to differences in chewing habits, frequency, and the composition of betel quid in different populations (28, 29).

The study also found no significant association between the consumption of an unbalanced diet and periodontal health deterioration (p=0.883). However, individuals consuming an unbalanced diet showed higher percentages of severe periodontitis (6.1%), moderate periodontitis (12.2%), and mild periodontitis (36.7%). Although diet is an important factor in overall health, its specific impact on

periodontal disease in this study was not statistically significant, suggesting that other factors may play a more dominant role in this population (13, 14).

Stress, a known factor in many health conditions, did not show a significant association with periodontal disease in this study (p=0.871). The majority of individuals reporting stress-related gum or tooth pain had mild periodontitis (14.3%), followed by moderate (8.2%) and severe periodontitis (2%). Previous studies have indicated a potential link between psychological stress and periodontal health, with higher stress levels correlating with increased clinical attachment loss (18, 19). The lack of significant findings in this study could be due to differences in stress assessment methods or the study's limited sample size.

Oral trauma history also showed no significant association with periodontitis (p=0.557). A higher percentage of individuals with a history of oral trauma developed mild periodontitis (10.2%), followed by moderate (8.2%) and severe periodontitis (2%). This finding suggests that while oral trauma may contribute to periodontal health issues, it is not a predominant factor in this study population.

The strengths of this study include its focus on a specific population and the use of standardized clinical measures to assess periodontal health. However, limitations such as the small sample size and the cross-sectional design may affect the generalizability of the findings. Longitudinal studies with larger sample sizes are needed to further explore these associations and provide more definitive conclusions.

In conclusion, the study confirmed the significant impact of smoking on periodontal health, while other factors such as betel nut chewing, diet, stress, and oral trauma showed no significant associations. These findings underscore the importance of targeted interventions, particularly smoking cessation programs, to improve periodontal health outcomes. Further research is warranted to explore the complex interactions between various predisposing factors and periodontal disease development in different populations.

CONCLUSION

Severe periodontitis was more prevalent among individuals with a smoking history of over five years and those consuming an unhealthy diet. Moderate periodontitis was more common in those without a betel nut chewing habit, while mild periodontitis was observed in individuals reporting gum or tooth pain under stress and those with a history of oral trauma. A limitation of this study was the limited scope of predisposing factors analyzed. Including a broader range of factors and correlating them with the duration of exposure might have provided more comprehensive insights. The findings underscore the importance of targeted interventions, particularly smoking cessation and dietary modifications, to improve periodontal health outcomes. Further research with larger sample sizes and additional variables is recommended to validate and expand upon these findings.

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Journal of Health and Rehabilitation Research 2791-156X JHRR

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