

Association between Periodontal Status Sociodemographic Profile and Different Level of Oral Hygiene Status among Smokers

SYEDA GULRUKH SABA SHAH¹, HAMMAL KHAN NASEER BALOCH², SHAMS-UL-HAQ³, AFAQ FAROOQ⁴, SYEDALALARUKH SABA SHAH⁵, FARHANA JABEEN SHAH⁶

¹Assistant Professor, Department of Anatomy, Sardar Begum Dental College Gandhara University, Peshawar

²Associate Professor, Department of Community & Preventive Dentistry, Dental Section, Bolan Medical College Quetta

³Lecturer, Department of Community Medicine, Kabir Medical College Gandhara University Peshawar

⁴Assistant Professor, Department of Periodontology, Sardar Begum Dental College Gandhara University, Peshawar

⁵Assistant Professor, Department of Community Dentistry, Lahore Medical and Dental College, Lahore

⁶Associate Professor, Department of Community Medicine, Kabir Medical College Gandhara University Peshawar

Correspondence to: Dr. Syeda Gulrukh Saba Shah, Email: gulrukhsaba321@gmail.com, Cell 0336-9678030

ABSTRACT

Aim: Association between smoking and periodontal disease with sociodemographic profile and different levels of oral hygiene status.

Study Design: Case control study.

Place and Duration of Study: Khyber College of Dentistry and Sardar Begum Dental College and Hospital Peshawar KPK from 1st July 2020 to 31st December 2020.

Methodology: There were 300 patients from 20-50 years of age were enrolled in the study. The sample was stratified into two groups, cases and controls 150 patients in each group. Patients were clinically evaluated by measuring the PDI scores and oral hygiene index.

Results: There were (43.3%) smokers and (56.6%) were non-smokers. There were 57.3% smokers and 42.6% were non-smokers with periodontal disease the result was significant ($p=0.0001$), while 29.3% smokers and 70.6% were non-smokers and did not have periodontal disease. The oral hygiene status was poor among smokers it was 23.1% while 2.9% among non-smokers, with significant result p -value was $=0.0001$. There was an association between periodontal disease with different levels of smoking the result was significant ($p=0.0001$).

Conclusions: There was an association between smoking, sociodemographic profile with periodontal disease and oral hygiene status.

Keywords: Periodontal disease, Smokers, Non-smokers, Periodontal disease index, Oral hygiene index

INTRODUCTION

Periodontitis is an inflammatory disease of teeth and their supporting tissue. It is caused by a group of microorganisms. Which leads to severe gum recession with periodontal ligament destruction and alveolar bone loss which further initiated pocket formation around the teeth.¹ The factors like pathogenic bacteria, tobacco chewing, plaque formation and microbial deposits around the teeth, among them smoking is also a risk factor for many diseases and affect health of the periodontium. Many investigators has also identified the role of tobacco smoking in the development of periodontal diseases.² The world workshop in 1996, on periodontics reviewed many studies and stated that smoking is the known risk factor for periodontal disease with an odds ratio's 2.82.³

Periodontal disease among smokers showed an increased prevalence of calculus and plaque as compared to non-smokers. Smokers are associated with increase attachment loss, furcation involvement on a radiograph, increase the pocket depth and alveolar bone loss. Smoking affects host bacterial interaction and it also has an immunosuppressive effect on the host.⁴ Smoking cause a dose-dependent suppressive effect on gingival bleeding on probing. There is decrease gingival bleeding in smokers compared to non-smokers but the mechanism of gingival bleeding suppression is still not known.⁵ Smoking cigarettes have various unpleasant effects on dental and oral health. The impact of smoking is oral carcinomas, tooth loss, delayed healing of extraction sockets, bad breath, loss of taste and smell, discoloured tongue and

teeth and periodontal problems. Smokeless tobacco causes tumours of the lip tongue and mouth and pancreas with periodontitis and destruction of gums. In five years of investigation, it was concluded that 800 tobacco consumers were in danger of attachment loss. In many epidemiological studies the association between periodontal disease and smoking has been reported there is decrease gingival bleeding in smokers as compared to non-smokers. After all, in smokers vasoconstriction occurs which further reduces gingival inflammation.⁶

Poor oral hygiene and lack of tooth brushing can encourage bacterial deposition and cause inflammation of periodontal tissue and the production of plaque on gums and teeth is also associated with periodontal disease.⁷ Axelsson et al⁸ conducted a prospective study for 15 years and found no destruction of periodontal structures in individuals who maintain and took routine professional dental care and practice proper tooth brushing.

Age is also a factor for an increase in periodontal disease, a high prevalence of periodontal disease was seen among aged individuals.⁹ Age is associated with the periodontal disease the attachment loss was obvious among individuals age 60-90 years as compared to the individual age 40-50 years.¹⁰

WHO recommends risk factors such as stress, socioeconomics and smoking are associated with periodontal disease. WHO include preventive strategies which can limit the burden of the disease at population level.¹¹

Based on the observation that with less gingival inflammation and increase attachment loss this research is conducted to evaluate the association between periodontal status sociodemographic profile and different levels of oral hygiene status among smokers and non-smokers. In Pakistan, periodontal disease with poor oral hygiene is the major public health problem. These problems can be resolved by smoking cessation and by oral hygiene practice. There is a need for preventive strategies to stop periodontal disease among individuals.

MATERIALS AND METHODS

It was a case control study and comprised 300 patients visiting to OPD of dental hospitals Peshawar. They were divided in two groups; cases & controls and each group comprised 150 patients. The standardized questionnaire consists of a periodontal index and oral hygiene index was used and an interview was taken face to face among patients visiting the dental hospitals of KPK. To collect samples verbal informed consent was used for patients. The sample was collected from the periodontology department of dental hospitals. The patient was properly examined intraorally to assess the oral health and periodontal status of the smokers and non-smokers. Periodontal examination was performed for every individual seated in a dental chair in good light conditions and properly sterilized instruments were used. Examination of teeth was done by by periodontal probe. All the teeth were examined around the whole circumference. The highest score was recorded. For intra-oral examination of smokers and non-smokers periodontal probe, twizer, mouth mirror and explorer 23 was used. The outcome variables were oral health and periodontal status while age, location, smoking and education were independent variables. To assess the periodontal status periodontal disease index was used and oral hygiene index-simplified was used to assess oral health status among smokers and non-smokers. The smokers were divided into three level based on daily consumption of cigarettes. They were divided as light smokers consuming <10 cigarettes per day, moderate smokers consuming ≥10 to <20 cigarettes per day and heavy smokers consuming ≥20 cigarettes per day. Tobacco chewers, mechanical irritant, chemical irritants, patients with immune disorders and congenital anomalies, blood disorders, patient having habits like attrition, nail biting and bruxism were excluded. The data was entered and analyzed through SPSS-20.

RESULTS

The association between age, education and periodontal disease with p-value 0.03, while location is not significant p-value was 0.43 (Table 1). There was an association between smoking and periodontal disease while smoker from 31 to 40 were 62.3% ,from 20-30 years 9.2% and from 41-50 they were 28.5% and the results was significant ,which shows association between age and smoking (Table 2). The use of cigarette was increased at the age of 31-40 years while smoking habit was very less in young adults as well as from 41 to 50 years (Table 3). There was an association between smoking and different level of oral hygiene status the result was significant p-value was 0.0001 (Table 4). Different level of smokers with

periodontal disease the result was significant p-value was 0.001 (Table 5).

Table 1: Sociodemographic profile of patients with periodontal status (n=300)

Sociodemographic	PD ⁺	PD ⁻	χ ²	P value
Age (years)				
20-30	37(24.6%)	41(27.3%)	11.71	0.03
31-40	75(50%)	80(53.3%)		
41-50	38(25.3%)	29(19.3%)		
Education				
Literate	70(46.6%)	31(20.6%)	10.7	0.001
Illiterate	80(53.3%)	119(79.3%)		
Location				
Rural	60(40%)	66(44%)	1.8	0.43
Urban	90(60%)	84(56%)		

Table 2: Association between smokers with periodontal status (n=300)

Smoking status	PD ⁺	PD	χ ²	P value
Smokers	86(57.3%)	44(29.3%)	8.6	0.0001
Non-smokers	64(42.6%)	106(70.6%)		

Table 3: Association between smoking and age (n=300)

Age (years)	Smokers	Non-smokers	χ ²	P value
20-30	12(9.2%)	62(36.5%)	14.7	0.001
31-40	81(62.3%)	84(49.4%)		
41-50	37(28.5%)	24(14.1%)		

Table 4: Different levels of oral hygiene status in smokers and non-smokers (n=300)

OHI-S score	Smokers	Non-smokers	χ ²	P value
Good	31(23.8%)	148(87.1%)	75.16	0.0001
Fair	69(53.1%)	17(10%)		
Poor	30(23.1%)	5(2.9%)		

Table 5: Different level of smokers with periodontal disease (n=300)

Level of Smokers	PD ⁺	PD ⁻	Total	χ ²	P value
Non-smokers	64	106	170	42.6	0.0001
Light smokers	42	23	65		
Moderate smokers	27	16	43		
Heavy smokers	17	5	22		

DISCUSSION

The presence of periodontal disease can affect the quality of life of adult population. The present study revealed that patients from 31-40 years got 50% of periodontal disease while patient from 20 to 30 years 24.6% and 25.3% in 40-50 years, which is in accordance to the study conducted in northwest Ethiopia population there were 57.30% individuals got the periodontal disease from 20-34 years while 24.15% in elderly individuals.^{12,13} In the present study, there were 42.6% of non-smokers are affected by the periodontal disease as compared to smokers which are according to the study conducted in the Ethiopian population that there were 42.3% of participants are affected by periodontal disease agreed with the study done in Addis Ababa 53.4%¹⁴ and Arusi 52%¹⁵ there is increase in periodontal disease in other studies done in Egypt 89.8%¹⁶ and Sudan 63.9%.¹⁷

Age itself is not the factor to cause and affect the severity of the disease rather it is the combined effect of other factors and the effect of untreated diseases. There was a significant association was found between socioeconomic like educational level, location and age with the periodontal disease. Smoking is also a factor for the causation of periodontal disease, in the previous study there was an association between smoking and periodontal disease, the study conducted in Ethiopia stated that 42.2% of the study population affected with the periodontal disease the study also confirm that sociodemographic profile including education, income, age education and location showed significant association with periodontal disease. Individuals who had no formal education were 3.25 times at the risk of periodontal disease.¹³

In the present study there was association between age, smoking and periodontal disease. The individual age from 30 to 40 years were affected by periodontal disease as compared to age from 20 to 30 and 40 to 50 years. The present study also showed a statistically significant association between education and location. The participants living in rural areas are less susceptible to periodontal disease because individual living in rural area of KPK are tobacco chewers and the individual living in urban are smokers so the result is not significant which is against the agreement of other studies.^{10,11} In the present study majority of the smokers are found in urban areas of KPK. The result is not significant for rural areas that area p-value is 0.34. In the present study 46.6% of individuals got periodontal disease as compared to illiterate 53.3% got the disease as they are not practising the daily tooth brushing and because of poverty and low socioeconomic status, the periodontal disease is more pronounced in illiterate as compared to literate.^{18,19}

The participants above the age of 40 years had more periodontitis that is in agreement with other regional studies. It is not according to the present study the periodontal disease is more pronounced in 30 to 40 years as compared to 40 to 50 years. In KPK it was seen that at the age of 40 to 50 years most of the individuals quit smoking because of family pressure and other hazards of smoking, so the percentage of smokers are less in Peshawar from 40 to 50 years as compared to 30-40 years. In the present study, oral hygiene is good among the non-smokers as compared to smokers while oral hygiene was fair that is 53.3% patients had fair oral hygiene and 23.1% had poor oral hygiene status. There is poor oral hygiene 2.9% among non-smokers. Smoking is the risk factor for periodontal disease because it can change the human immune response and microflora of the oral cavity which leads to the destruction of the periodontal tissue that supports the teeth. In smokers, the immune system is depressed due to the decreasing number of lymphocytes which are responsible for the production of B-cell and antibodies in the body to play important role in the defence system. The combined effect of smoking and bacterial colonization cause an increase in the destruction of periodontium according to the study conducted by Linden and Mullally²⁰, Schenkein et al²¹ and Haffajee & Socransky.²² In these studies severity of the periodontal disease is higher in young adults but the duration is not recorded but socioeconomic status and stress were

considered as a factor for the causation of the periodontal disease. The results of the present study were against the above mention studies because in Pakistan the religion, cultural values and family pressure on young adults prevent the habit of smoking in early life so there is a decrease in the severity of periodontal disease among young adults as compared to an individual from 30 to 40 years. In the present study periodontal disease is 62.3% in 30-40 years of individuals and also periodontal disease among smokers was pronounced that is 57.3% while it is less prominent among non-smokers 42.6%.²³

The mean OHI-S was higher in the smokers, which shows that smokers generally had poorer oral hygiene. Smoking causes stains and roughens the surface of the teeth which leads to plaque accumulation. This finding is similar to the present study there was poor oral hygiene in smokers as compared to non-smokers.²⁴

The fifth national health and nutrition examination survey stated that light smokers had the less periodontal disease than non-smokers. In Japanese, study conducted with sample size 1,332 from 30 to 59 years stated that increase consumption of cigarettes increases the risk of periodontal disease in smokers. While heavy smokers taking ≥ 20 cigarettes per day had 2.33 times increase periodontal disease whereas smokers of ≥ 20 cigarettes per day had 5 times higher risk of periodontitis as mention in NHANES III survey. It is according to the present study that heavy smokers had increase periodontal disease as compared to light smokers and moderate smokers.²⁵

The periodontal disease should be included in national health program. Many surveys like National oral health survey should be conducted for the understanding of the relationships between risk factors related to periodontal diseases. These risk factors can be identified and allow the individual to take oral therapy on time to get better results. It should be recommended that smokers should visit to a dentist for preventive procedures regularly and should encourage to quit smoking.

CONCLUSION

There was an association between smoking, sociodemographic profile with periodontal disease and oral hygiene status. The exception lies in urban and rural areas (location), the result is not significant.

REFERENCES

1. Novak JM. Carranza's clinical periodontology. 9th ed. Philadelphia: WB Saunders, 2003.
2. Haber J, Wattles J, Crowley M, Mandell R, Joshipura K, Kent RL. Evidence for cigarette smoking as a major risk factor for periodontitis. *J Periodontol* 1993; 64(1): 16-23.
3. Papanou PN. Periodontal diseases: epidemiology. *Ann Periodontol* 1996; 1(1): 1-36.
4. Kazor C, Taylor GW, Loesche WJ. The prevalence of BANA-hydrolyzing periodontopathic bacteria in smokers. *J Clin Periodontol* 1999; 26(12): 814-21.
5. Dietrich T, Bernimoulin JP, Glynn RJ. The effect of cigarette smoking on gingival bleeding. *J Periodontol* 2004; 75(1): 16-22.
6. Goyal J, Menon I, Singh RP, Gupta R, Sharma A, Bhagia P. Prevalence of periodontal status among nicotine-dependent individuals of 35-44 years attending community dental camps in Ghaziabad district, Uttar Pradesh. *J Fam Med Primary Care* 2019;8(7):2456.

7. de Oliveira C, Watt R, Hamer M. Toothbrushing, inflammation, and risk of cardiovascular disease: results from Scottish Health Survey. *BMJ* 2010;340:c2451.
8. Axelsson P, Lindhe J, Nyström B. On the prevention of caries and periodontal disease. Results of a 15-year longitudinal study in adults. *J Clin Periodontol* 1991;18:182-9.
9. Grodstein F, Colditz GA, Stampfer MJ. Post-menopausal hormone use and tooth loss: a prospective study. *J Am Dent Assoc* 1996; 127:370-7.
10. Rhee GB, Ji S, Ryu JJ, Lee JB, Shin C, Lee JY, et al. Risk assessment for clinical attachment loss of periodontal tissue in Korean adults. *J Adv Prosthodont* 2011;3:25-32.
11. Petersen PE, Ogawa H. Strengthening the prevention of periodontal disease: The WHO approach. *J Periodontol* 2005;76:2187-93.
12. Chapple IL. Time to take periodontitis seriously. *BMJ Publishing Group* 2014.
13. Pihlstrom BL, Michalowicz BS, Johnson NW. Periodontal diseases. *Lancet* 2005; 366(9499):1809-20.
14. Simon C, Tesfaye F, Berhane Y. Assessment of the oral health status of school -children in Addis Ababa. *Ethiop Med J* 2003;41(3):245-56.
15. Olsson B. Periodontal disease and oral hygiene in Arussi province, Ethiopia. *Community Dent Oral Epidemiol* 1978; 6(3):139-45.
16. Abbass MM, Rady D, Radwan IA, et al. The occurrence of periodontal diseases and its correlation with different risk factors among a convenient sample of adult Egyptian population: a cross-sectional study. *F Res* 2020;8:1740.
17. Khalifa N, Allen PF, Abu-bakr NH, Abdel-Rahman ME, Abdelghafar KO. A survey of oral health in a Sudanese population. *BMC Oral Health* 2012;12(1):5.
18. Tefera A, Bekele B. Periodontal Disease Status and Associated Risk Factors in Patients Attending a Tertiary Hospital in Northwest Ethiopia. *Clin Cosmet Investig Dent* 2020; 12:485-92.
19. Akhtar SBH, Agha SM, Farrukh MI. Periodontal disease status and associated risk factors in patients attending a Dental Teaching Hospital in Rawalpindi, Pakistan. *J Indian Soc Periodontol* 2015; 19(6): 678-82.
20. Linden GJ, Mullally BH. Cigarette smoking and periodontal destruction in young adults. *J Periodontol* 1994;65:718-23.
21. Schenkein HA, Gunsolley JC, Koertge TE, Schenkein JG, Tew JG. Smoking and its effects on earlyonset periodontitis. *J Am Dent Assoc* 1995;126:1107-13.
22. Haffajee AD, Socransky SS. Relationship of cigarette smoking to attachment level profiles. *J Clin Periodontol* 2001;28:283-95.
23. Gautam DK, Jindal V, Gupta SC, Tuli A, Kotwal B, Thakur R. Effect of cigarette smoking on the periodontal health status: a comparative, cross sectional study. *J Indian Soc Periodontol* 2011; 15(4): 383-7.
24. Arowojolu MO, Fawole OI, Dosumu EB, Opeodu OI. A comparative study of the oral hygiene status of smokers and non-smokers in Ibadan, Oyo state. *Niger Med J* 2013; 54(4): 240-43..
25. Jang AY, Lee JK, Shin JY, Lee HY. Association between smoking and periodontal disease in Korean adults: The Fifth Korea National Health and Nutrition Examination Survey (2010 and 2012). *Korean J Fam Med* 2016; 37(2): 117-22.