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Original Article

Ill Effects of Tobacco Use on the Periodontal Status of Teeth- An Epidemiological Survey at a Tertiary Care Centre in Northern Madhya Pradesh

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ABSTRACT:

Background: The concept of improved lifestyle is gaining tremendous importance with reference to maintenance of periodontal health. Presently very few studies exist showing the effect of tobacco (smoking and smokeless), general education, lifestyle & socioeconomic position on the prevalence of periodontal diseases. Tobacco is one of the major toxic agents in our civilization. Since 1970, prevalence of chewing and smoking has decreased in men but drastically increased among women, teenagers and children. **Objective:** The present study is conducted to correlate the periodontal health of people with reference to tobacco (chewing and smoking), demographic factors, educational level and socioeconomic status. **Material and Method:** A prospective cross-sectional study was planned in the department of dental surgery at Gajra Raja Medical College, Gwalior. A total of 4000 subjects were examined and randomly selected from our outpatient department (OPD). The pretested interviewer administered questionnaire was used to assess the correlation of smoking and smokeless tobacco, socioeconomic status, general education and demographic factors over periodontal health. The periodontal status and treatment were evaluated by the help of CPITN Index (Community Periodontal Index of Treatment Needs) as CPI (graded as 0, 1, 2, 3, 4) and TN (graded as 0, I, II, III). **Results:** Out of 4000 subjects, males (3576= 89.4%) outnumbered females (424=10.6%) throughout the survey period with a male: female ratio of 8.4:1. Among the study group chewers (2256 patients=56.4%) were strikingly more than the smokers (888 patients). Most of the patients (2112=52.8%) belonged to the lower socio-economic group educated up till the primary education in 1832 cases (45.8%). The periodontal health status graded by CPITN index revealed higher values for CPI 2 in 1280 (32%) patients having positive history of tobacco and presence of local factors. Thus, our study confirmed positive correlation between the deleterious effects of tobacco over periodontal health. **Conclusion:** There is a strong association of smoking and smokeless tobacco, socioeconomic status, demographic factors and education on periodontal health.

Keywords: Tobacco, Chewing, Smoking, Periodontal health, CPITN.

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INTRODUCTION:

Numerous epidemiological studies have shown that the diseases of periodontium are among the most common human afflictions. It is well known that plaque microorganisms, immunological and genetic factors play a major role in the etiology of periodontal diseases. More emphasis is now directed towards combined influence of lifestyle and psychosocial factors along with standard risk factors. [1] Tobacco, both in smoked and smokeless form is considered as a global epidemic.[2] Smoked forms include cigarette or bidi (rolled tendu leaves), cigar, chillum, hookah while smokeless forms are khaini, gutka, zarda, gul, gudaku, tuibur. [3-6]

The oral and dental problems include staining or discoloration of teeth, oral mucosal lesions such as leukoplakia, oral submucous fibrosis (OSMF) and smoker's palate, acute necrotizing ulcerative gingivitis (ANUG), delayed and impaired wound healing, periodontal diseases, bone loss, mobility of teeth, and failure of dental implants to life threatening diseases such as oral cancer.[7-10, 11-14]

Presently very few studies exist showing the effect of both smoked and smokeless forms of tobacco, general education,

demographic factors and socioeconomic position on the prevalence of periodontal diseases.[2] Hence, the present study is an attempt to investigate the correlation of tobacco, demographic factors, age, educational and socioeconomic status on the periodontal health among 4000 tobacco consuming patients aged between 10-70 years attending the dental O.P.D at Gajra Raja Medical College, Gwalior from 1st February 2015 till 31st January 2017.

MATERIAL AND METHOD:

Study participants:

A total of 10487 patients were screened in the department of dental surgery, Gajra Raja Medical College, Gwalior, Madhya Pradesh during a span of 24 months from 1st February 2015 to 31st January 2017. Out of them, 4000 subjects were enrolled in the study after informed consent.

The Community Periodontal Index of Treatment Needs (CPITN) developed by J. Ainamo et al in 1982 recommended for epidemiological surveys of periodontal health was used in our study. It uses clinical parameters and criteria relevant to planning and prevention of periodontal diseases and it records the common treatable condition namely periodontal pockets, gingival inflammation and dental calculus.[14] The CPI 0 means a healthy periodontium; CPI 1 indicates the gingival bleeding on gentle probing. The CPI 2 code is characterized by the presence of retention factors for plaque on the given tooth surface most often by supragingival and or subgingival calculus. Furthermore, CPI 3 coding indicated the presence of shallow pockets upto 4-5mm, while CPI 4 indicated deep pockets 6mm or more. [14] The value TN 0 (no treatment needed) corresponds with the CPI 0. Classification CPI 1 conforms with TN I (oral hygiene necessary), whereas CPI 2 & 3 corresponds with TN II (oral hygiene needed, clearing up the calculus and other retention factors for plaque). CPI 4 is equal to TN III, which indicates the need for surgery. Treatment of periodontal pockets, fixation of rather unstable teeth and other therapeutic modalities.[14]

DATA COLLECTION:

The study consisted of 2 parts:

1) **Self Reported Questionnaire Enquiry**:
   Those subjects with the habit were questioned for the frequency of the habit in number/ day and duration of the habit in years. Personal habits such as tobacco chewing/ smoking, pan masala/ bidi (tobacco wrapped in the leaf of Diospyros melanoxylon)/ cigarette were recorded. The questionnaire also included socio-demographic variables (lower, middle and high), which included gender (male/ female), age (between 10-70 years), and education level (illiterate, primary, secondary and graduation).

2) **Clinical Examination**:
   Examination of oral health status included clinical presentation of periodontium (using CPITN). Thus, all the participants of this planned hospital based study were requested to answer the questionnaire which included questions concerning their personal history, socioeconomic status, educational qualification, profession and other important aetiological factors of oral health.

REASONS for initiating the habit (both smoked and smokeless) were also recorded. It was observed that most of the people started smoking mainly due to peer pressure or because of friends, followed by stress. Few gave other reasons such as status symbol, pain in teeth and liking.

RESULTS:

Table 1: Age & sex wise distribution of study subjects

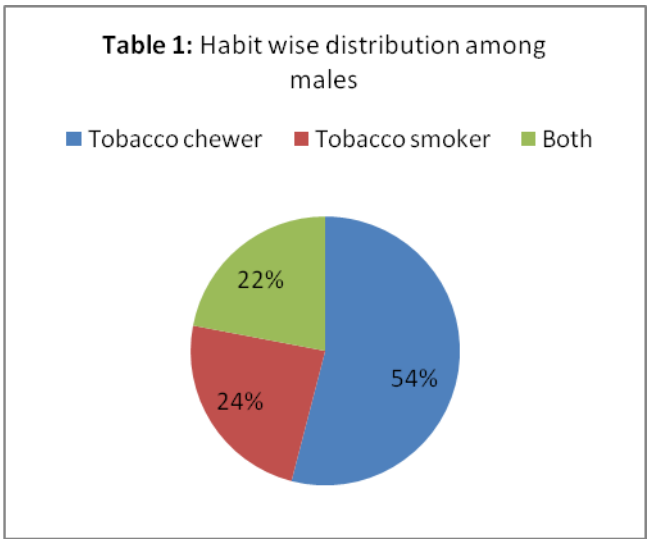
Age Group (Years)	Male	Female	Total
10-19	72	24	96
20-29	632	40	672
30-39	776	120	896
40-49	776	128	904
50-59	584	40	624
60-69	464	56	520
70-Above	272	16	288
Total	3576	424	4000

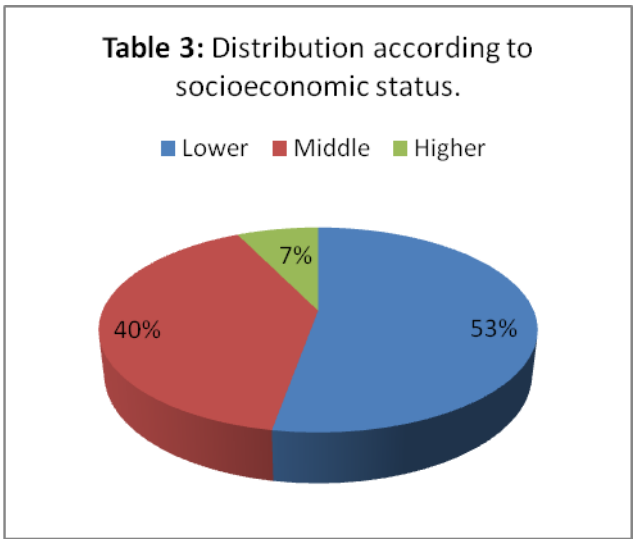
According to our study, out of 4000 subjects, 3576 were male and 424 females. Subjects were divided into 7 groups according to their age as shown in Table 1. Maximum number i.e. 896 and 904 of study subjects belonged to 30-39 and 40-49 years of age group. Higher values of CPI were evident in males than females.

Table 2: Habit wise distribution of study subjects

Habit	Male	Female	Total
Tobacco chewer	1928	328	2256
Tobacco smoker	856	32	888
Both	784	72	856

Table 2 shows that 1928 males and 328 females were chewer of either pan, tobacco, gutka or betel nut, 856 males and 32 females were smokers of either bidi or cigarette and 784 males and 72 females were both chewers and smokers.





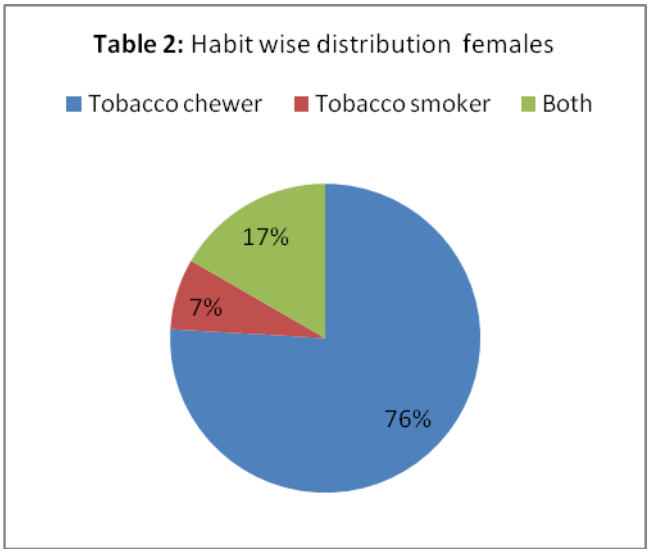


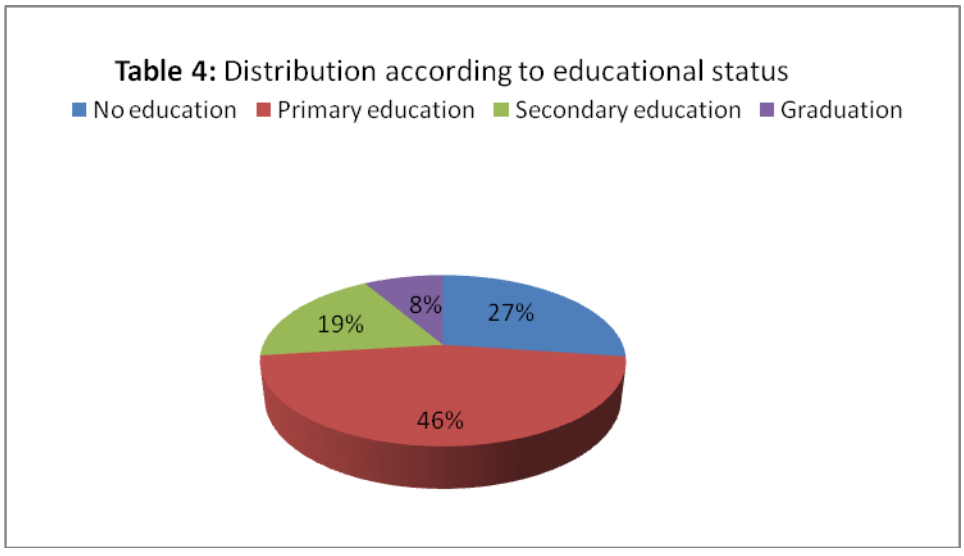
Table 3: Distribution according to socioeconomic status.

Socioeconomic status	Male	Female	Total
Lower	1912	200	2112
Middle	1376	224	1600
Higher	288	00	288
Total	3576	424	4000

Most of the subjects belonged to lower and middle economic classes.

Table 4: Distribution according to educational status of study subjects.

Educational status	Male	Female	Total
No education	888	200	1088
Primary education	1672	160	1832
Secondary education	696	48	744
Graduation	320	16	336
Total	3576	424	4000



Among 4000 study subjects, 1088 were illiterates and 2912 were literates. Most of the subjects belonged to the group with primary education and least number to the group of graduates. This low literacy rate explains the relative correlation in increased values of CPI index (periodontal status).

Table 5 (a): Values of CPI recorded in tobacco patients

CPI Values	Number of patients
0	528
1	696
2	1280
3	752
4	744
Total	4000

Table 5(a) shows that the non-smokers had higher prevalence of CPI 0 (healthy periodontium) than the number of patients with poor oral hygiene (presence of plaque and calculus and shallow pockets i.e. 4-5mm) corresponding to CPI 2&3. Greater values of CPI 2&3 are directly proportional with the patients having a habit of both chewing and smoking.

Table 5 (b): Values of TN recorded in tobacco patients

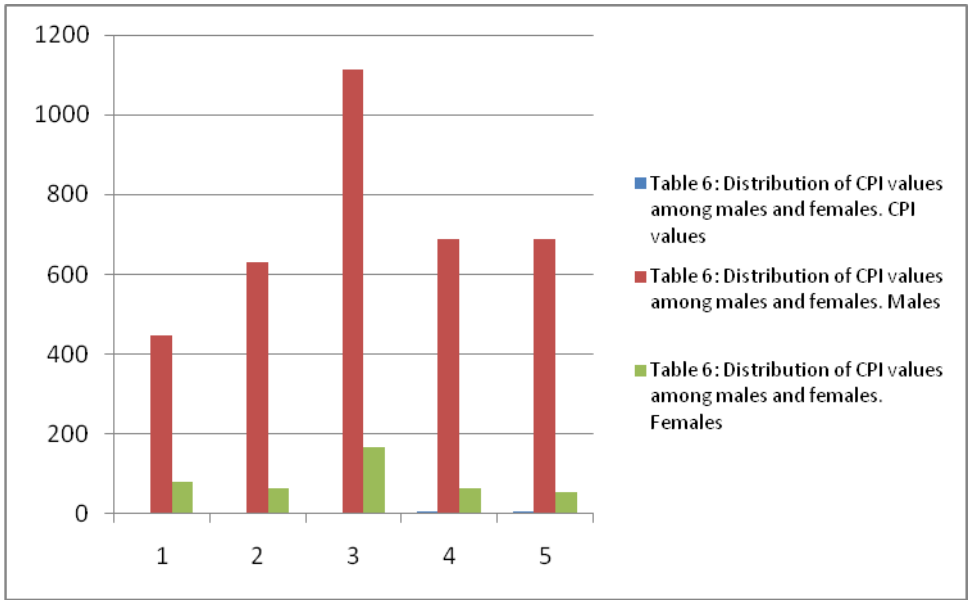
TN Values	Number of patients
0	528
I	696
II	2032
III	744
Total	4000

Table 5(b) shows the grading of TN in tobacco consuming patients. Most of the patients (2032=50.8%) depicted treatment needs of TN II in grading which in turn corresponded to the combined patients of CPI 2 & 3.

Table 6: Gender wise distribution of values of CPI.

CPI values	Males	Females
0	448	80
1	632	64
2	1112	168
3	696	56
4	688	56
Total	3576	424

A lower level of CPI 1 among smokers was undoubtedly caused by vasoconstriction under the effect of nicotine on the vessels of gingival plexus and an increasing keratinization of gingival epithelium. Highest CPI 2 value (1112) for males shows direct correlation with the increased frequency of tobacco chewing and smoking habit among young adults (aged between 30-39 and 40-49 years) belonging to lower & middle socioeconomic group.



DISCUSSION:

The manifestation and progression of periodontitis, a multifactorial disease with microbial dental plaque as the initiator, is influenced by a variety of determinants and factors. They include subject characteristics, social and behavioral factors, systemic factors, genetic factors, tooth related factors, microbial composition of dental plaque and other emerging factors.[15] Along with these risk factors identified for periodontitis are age, gender, socioeconomic status, education status and certain systemic condition and smoking. Tobacco both in smoked and smokeless form has been found to be a major environmental factor associated with generalized forms of severe periodontitis.

Mahuca and colleagues [16] reported higher plaque and bleeding indices in non-smokers although probing depths and attachment loss were greater in smokers which correlated with our study as CPITN was higher in tobacco consuming subjects of our study. In a clinical study of patients treated in general practice in Northern Ireland, Linden and Mullay reported that the percentage of sites with probing depth more than 4mm to be double in young smokers compared with non- smokers.[17] This fact is in agreement with our survey which shows increased probing depth in the cases of our study. Schenkein and colleagues [18] reported that patients had significantly more extensive periodontitis, more teeth and affected sites and a greater mean loss of attachment than patients who did not smoke. Similarly tobacco consumers in our survey depicted higher values for CPITN indicative of destructive generalized periodontitis.

In a New York population of old and young subjects Zambon[19] and colleagues reported that heavy smokers were more than twice as likely to experience attachment loss and alveolar bone destruction as light smokers were. Holm[20] investigated tooth loss in a Swedish population and identified young males who smoked more than 15 cigarettes per day to be at the most significant risk of tooth loss. Calsina[21] and colleagues reported a 2.7 times greater probability to have established periodontitis in a study of Spanish adults over 20 years old. These investigators also observed a more significant effect in male patients and reported that the increased probability of having disease. Hashim[22] and colleagues examined periodontal attachment loss in a cohort of 914 young adults and determined that smokers had three times the likelihood to develop one or more sites with attachment loss of 4mm or more. These investigators concluded that chronic exposure to smoking was a strong predictor of periodontal disease prevalence in young adults. The results from our study establishing the relation that patients with habit of tobacco exhibites compromised periodontal status strongly corroborates with the above mentioned studies.

Socio-economic disadvantage is associated with persistent smoking and consequently the burden of smoking- related disease falls disproportionately on those with lower social economical status (Harwood et al 2007)[23]. Hence, this group of individuals fell prey to the hazards of tobacco consumption in the present study also. Taking the gender of the respondents into consideration in support of our study it has been reported that men have been shown to exhibit worse periodontal health than women and this difference has been documented in different populations. Several periodontal diseases have been found to be more prevalent among males (Grossi et al 1994)[24].

Thus, the risk of smoking as well as chewing could greatly accelerate tooth loss in this relatively young group of individuals who are already at high risk for progressive periodontal attachment loss.

SMOKING AND HOST RESPONSE

Nicotine metabolites can concentrate in the periodontium and their effects include the promotion of vasoconstriction and the impairment of the functional activity of polymorphs and macrophages. The number of neutrophils in peripheral blood are also increased by tobacco use and their migration through capillary walls is impaired, further they fail to migrate through the gingival crevice, release their enzymes in the vicinity thereby contributing directly to tissue destruction and cell membrane paralysis.[25-26]Cigarette smoking has been demonstrated to activate the release of elastase, which has the capacity to cause tissue damage.[25-26] In addition there is an increased production of oxygen species, which can lower tissue levels of Alpha-1 protease inhibitors so enabling elastase and other enzymes with potential for damaging tissue.[25-26]

RESPONSE TO PERIODONTAL THERAPY

Preber and Bergstrom [27] reported that smokers did not respond as well as non-smokers to non-surgical therapy. Ah and colleagues [28] reported less probing depth reduction and attachment gain in smokers who had been treated by periodontal surgery, corroborated this finding that smokers were poor candidates for successful periodontal care.

A total number of 3576 (89.4%) males and 424 (10.6%) females became a part of this study which clearly indicates the preponderance of tobacco habits among males which coincides with nearly all literature involving the relation of habits, periodontal status and epidemiology.[29, 30,31,32,33] Our study revealed that the use of tobacco among males was often social, prompted by friends or other role models. However, females gave the remarkable history of initiation of tobacco habit to decrease the intensity and frequency of dental pain in various decayed teeth. Comparatively females in Indian society are less indulged in smoking or chewing habits as shown in our study.[34] Among men, tobacco chewing habits were maximum as seen in 1928 males followed by 856 smokers. (Table 2). This can be due to the easy availability of smokeless tobacco and its cost-effectivity. Among smokers, bidi smoking was more common as most of the patients belonged to lower socioeconomic status. Majority of the females in the study were tobacco chewers. Similar observations were found in other studies.[30, 31, and 32.] In the current study, majority of the

patients with lesion belonged to the 40-49 years age group which is common to the finding of other studies.[29, 30, and 34]

CONCLUSION:

Tobacco (both in chewing and smoking forms) is a predominant factor that affects the periodontal status. A wide range of demographic factors such as age, educational level and socioeconomic factors have identified to show a positive association over periodontal health.

Thus, if we are to pursue our strategies of prevention, early detection of disease and prompt intervention then the dental profession should continue to target and educate our young patients about the effects of smoking on periodontal health. In this way dentistry will also be making a significant contribution to the general health and well being of our youth and future generations.

REFERENCES

1. Kickbusch I., Lifestyle & Health. Soc. Sci Med 1986; 22: 117-24.
2. Ferrante M, Saulle R, Ledda C et al (2013). Prevalence of smoking habits, attitudes, knowledge and beliefs among Health Professional School students: a cross- sectional study. Ann 1st Super Sanita 49;143-149.
3. Narain JP, Sinha DN (2011). Tobacco Epidemic in South –East Asia Region; challenges & progress in its control. Indian J Public Health 55; 151-154.
4. Peter S. Essentials of Preventive and Community Dentistry. 4th Ed. India Arya Publishing House. P 136-139.
5. Pradeep SA, Kavitha PK, Chandrashekhar BR, Anil S (2012). Relationship of Smoking and Smokeless Tobacco Use to Tooth Loss in a Central Indian Population. Oral Health Prev. Dent10; 243-252.
6. (2014) Tobacco use and cessation; India: May 31, 2014.
7. Gautam DK, Jindal V, Gupta SC, Tuli A, Kotwal B. et al (2011). Effect of cigarette smoking on the periodontal health status. A comparative cross- sectional study. J Indian Soc. Periodontal 15; 383-387.
8. Mangalath U, Aslam SA, Abdul Khadar AK, Francis PG, Mikacha MS et al (2014). Recent trends in prevention of oral cancer. J Int. Prevent Communit Dent. 4; S 131-138.
9. Neumann MG, Takei H, Carranza FA, Klokkevold PR (cxxxx) Carranza's Clinical Periodontology. 9th Ed. USA. W. B. Saunder's Company, P 251-256.
10. Tin OO MM, Aung TT, Saddki N, Aung TM (2013). Awareness of the effects of Smoking on Oral Health among Dental Patients at the Defense Service General Hospital Myanmar International Medical Journal 20; 1-3.
11. Baig MR, Rajan M (2007). Effects of smoking on the outcome of implant treatment. A literature review. Indian J Dent Res 18;190-195.
12. Bergstrom J, Eliasson S, Preber H (1991). Cigarette smoking and periodontal bone loss. J Periodontal 62; 242-246.
13. Puranik AK, Mishra P, Kumar S, Dhodapkar SV (2013). Dental Patient's Knowledge and Awareness Regarding Effects of Smoking on Oral Health among Smokers and Non- smokers. A Comparative Study. J Orofac Res 3; 77-80.
14. Ainamo J, & Ainamo A : (1994). Validity & Relevance of the Criteria of the CPITN. International Dental Journal. Vol. 44, pp 527-532. ISSN 0020-6539.
15. Numm ME (2003). Understanding the Etiology of Periodontitis: An Overview of Periodontal Risk Factors. Periodontology 2000. Vol.32,pp 11-23. ISSN 0906-6713.
16. Mahuca G, Rosales I, Lacalle JR, Mahuca C, Bullon P. Effect of cigarette smoking on periodontal status of healthy young adults. Journal of Periodontology 2000; 71: 73-78.
17. Linden GJ, Mullally BH. Cigarette smoking & periodontal destruction in young adults. Journal of Periodontology 1994; 65: 718-723.
18. Schenkein HA, Gunsolley JC, Koertge TE, Schenkein JG, Tew JG. Smoking and its effects on early- onset periodontitis. Journal of American Dental Association 1995; 126: 1107-13.
19. Zambon JJ, Grossi S, Machtei EE, Ho AW, Dunford R, Genco RJ. Cigarette smoking increases the risk for subgingival infection with periodontal pathogens. Journal of Periodontology 1996; 67 (suppl): 1050-1054.
20. Holm G. Smoking as an additional risk for tooth loss. Journal of Periodontology 1994; 65: 996-1001.
21. Calsina G, Ramon J-M, Echeverria J-J. Effects of smoking on periodontal tissues. Journal of Clinical Periodontology 2002; 29: 771-776.
22. Hashim R, Thomson WM, Pack ARC. Smoking in adolescence as a predictor of early loss of periodontal attachment. Community Dentistry and Oral Epidemiology 2001; 29(2): 130-135.
23. Harwood, G. A., Salsberry, P., Ferketich, A.K. & Wewers, M. E. (2007). Cigarette smoking, Socioeconomic status, and Psychological Factors: Examining a Conceptual Framework. Public Health Nurs. Vol. 24, No. 4, pp. 361-371. ISSN 0737-1209.
24. Grossi, S. G., Zambon & J.J, Ho, A.W. (1994). Assessment of Risk for Periodontal Disease. 1. Risk Indicators for Attachment Loss. J Periodontol. Vol. 65, pp. 260-267, ISSN 0022- 3492.
25. Renkema TE, Postma DS, Noordhoek JA, Sluiter HJ, Kauffman HF. Influence of in vivo prednisolone on increased in vitro O_2 generation by neutrophils in emphysema. European Respiration. 1993; 6: 90-95.
26. Hind CR, Joyce H, Tennent GA, Pepys MB, Pride NB. Plasma leukocyte elastase concentrations in smokers. Journal Of Clinical Pathology 1991; 44: 232-235.
27. Preber H, Bergstrom J. The effect of non- surgical treatment on periodontal pockets in smokers & non-smokers. Journal of Clinical Periodontology. 1986; 13: 319-323.
28. Ah MKB, Johnson GK, Kaldahl KWB, Patil KD, Kalkwaef KL. The effect of smoking on the response of periodontal therapy. Journal of Clinical Periodontology 1994; 21: 91-97.
29. Khandekar SP, Bagdey PS, Tiwari RR. Oral cancer and epidemiological factors: a hospital based study. Indian Journal of Community Medicine 2006; 31 (3): 50-4.
30. Ray CS, Stewart R, Gupta P, De Beyer. J Economic of tobacco control paper no. 9. Research on tobacco in India. 2003.
31. Chaudhary K, 50 years of tobacco control in India. Tobacco control in India. 2010.0
32. Gupta RC, Bhonsle RB, Murti PR, et al. An epidemiologic assessment of cancer risk in oral precancerous lesions in India with special reference to nodular leukoplakia. Cancer 1989; 63 (11); 2247-52.
33. Thankappan KR, Thresia CU. Tobacco use & social status in Kerala. Indian J Med Res 2007; 126 (4): 300-8.
34. Ganesh R, John J, Saravanan S. Socio- demographic profile of oral cancer patients residing in Tamil Nadu- a hospital based study. Indian J Cancer 2013; 50 (1): 9-13.

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