



## Association of Tobacco Habits with Severity of Gingivitis among 18-35-year-old's attending a Private Dental College in Chennai - A Retrospective Study

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### ABSTRACT

Gingivitis is a reversible periodontal disease which does not destruct the supporting tissues. Studies have shown the relationship of smoking with gingivitis. There is no solid evidence of the same parameters in the Chennai area. Therefore, the focus of the current study is to find the interrelation between tobacco habit with the severity of gingivitis among 18-35-year-old adults attending a private college in Chennai. This retrospective study included all gingivitis index recorded patients in the age of 18-35-year-old adults. The data was obtained from the patient records in the college from June 2019 to March 2020 and examined by 2 examiners. Gingival index (1967) was used to measure the severity of the gingivitis. Descriptive statistics were expressed by means of frequency and percentage, chi-square was done to assess the association between age, tobacco use and gingivitis. Pearson correlation tests were done to identify the relationship of tobacco use and severity of gingivitis. In the present study with a sample size of 997, 62.19% males and 37.81% females were present. Prevalence of tobacco users in the study population was 25.77%. 52.66% had mild gingivitis, 40.92% had moderate and 6.42% had severe gingivitis. A significant positive correlation was observed between tobacco use and severity of gingivitis using Pearson correlation statistical test. With the results of the current study, it can be presumed that the severity of gingivitis was found to be more among tobacco users.

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### INTRODUCTION

Periodontal disease is broadly categorized as gingivitis and periodontitis with gingivitis being an

earlier reversible form of periodontal disease in which inflammation is confined to the gingiva which does not destruct the supporting tissues. In contrast, periodontitis is the irreversible destruction of the profound structures of the periodontium resulting with connective tissue detachment and alveolar bone loss, deep periodontal pocket, tooth mobility and terminally tooth loss (Azodo and Umoh, 2012).

Ageing is one of the complex multifactorial processes and among elderly individuals, lofty levels of gram-negative bacilli were found as compared to younger individuals. Many studies have proven the association of oral microflora and oral diseases and their importance with nutrition and habit (Mathew, 2020).

Many studies have proved the importance of tobacco

with respect to dental caries and people's attitude and practice about dental caries. There are even ways to prevent dental caries from occurring. studies have proven the use of fluorides to prevent dental caries and use of antimicrobial agents (Prabakar, 2018).

The occurrence of periodontal disease has always been associated with factors such as lower socioeconomic status, poor access to healthcare services and other health-related common risk behaviours such as smoking, alcohol intake, carbohydrate-rich diets and inadequate oral hygiene which are dominant in developing countries (Cruz, 2009). According to WHO GATS 2 report, every 10th adult in India is a tobacco user (Agrawal *et al.*, 2009).

Previous studies have shown some solid evidence that the prevalence of gingivitis has increased in smoking. The habit of smoking plays a major role in the onset, progression and outcome of gingivitis and periodontitis. Tobacco use increases the depth of the periodontal pocket and alveolar bone loss (Bergström *et al.*, 2000; Chatzopoulos, 2016).

The clinical indications of inflammation are comparatively less noticeable in smokers than nonsmokers. Although there were no significant differences in the vascular density of normal gingiva have been observed between smokers and nonsmokers, the response of the microcirculation to plaque accumulation seems to be altered in smokers when compared with nonsmokers (Bergström and Preber, 1994).

Fewer crevicular polymorphonuclear neutrophils (PMNs) and less crevicular phagocytosis could significantly drop the release of lysosomal enzymes resulting in the reduction in the level of inflammation in the ostensible layers of the periodontal tissues. Smoking-induced chronic hypoxia of periodontal tissues causes intense periodontal disease which was observed in smokers (Rivera-Hidalgo, 1986).

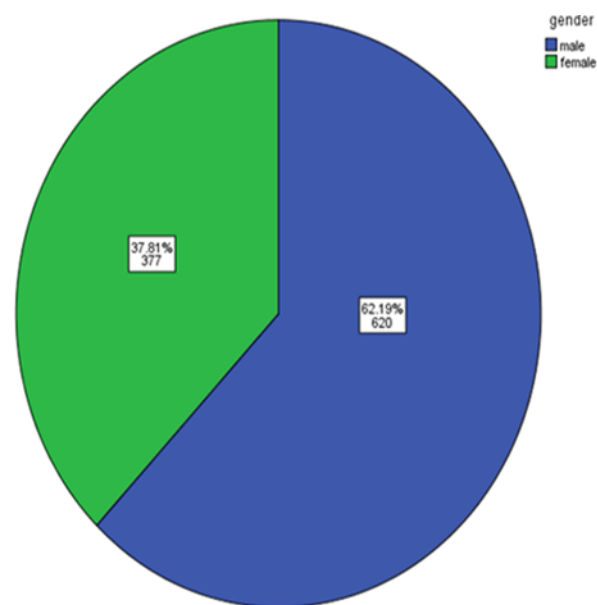
Tobacco and one of its elements nicotine have been established to have adverse effects on cells of the periodontium, including gingival fibroblasts and immune systems and its tissues. An *in vitro* study done by Tanur *et al.* showed that the strength of cell attachment to root surfaces is altered by nicotine (Tanur *et al.*, 2000).

Cigarette smoke condensate can interfere with myofibroblastic differentiation. Results of the study by Silva *et al.* showed that cigarette smoking, even without nicotine, may remarkably alter cell viability, cell migration, and myofibroblastic differentiation in gingival mesenchymal cells (Silva, 2012). But these

researchers faced some challenges in their studies like their lack of radiological evidence, recall bias about the pattern of tobacco use and relatively small sample size.

As dental students have a wide knowledge with respect to other subjects in prevention and intervention methods, it is mandatory to have a proper cognition about the prevention and intervention of periodontal diseases and to identify the highly susceptible individuals based on their lifestyle. This study is needed as gingivitis is a risk factor for periodontitis also for several systemic disorders. Also, there is no proper evidence of the related studies done in the Chennai area. Therefore, the focus of the current study is to find the interrelationship between tobacco habit with the severity of gingivitis among 18-35-year-old adults attending a private college in Chennai.

## MATERIALS AND METHODS



**Figure 1: Shows the gender distribution in the study population representing male predilection (males (62.19%) and females (37.81%))**

### Study setting

The present retrospective study was institution-based, which was conducted in Saveetha dental college. Data collection was done from the patient records of Saveetha dental college. Ethical approval was obtained by the Institutional ethical board at Saveetha University. The data was examined by 2 examiners.

### Study population

The study population included in the age group from

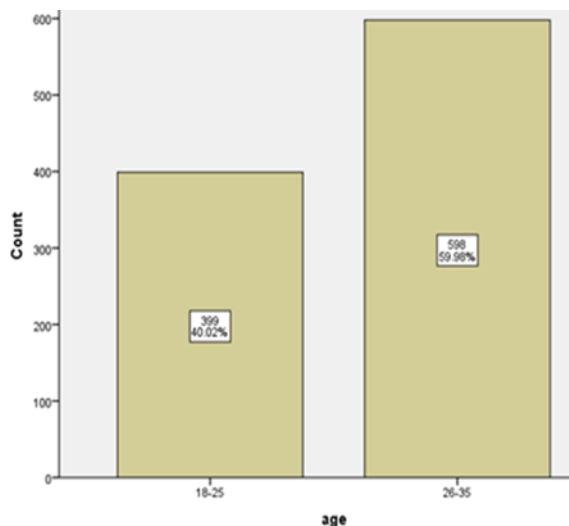


Figure 2: Shows the distribution of age groups

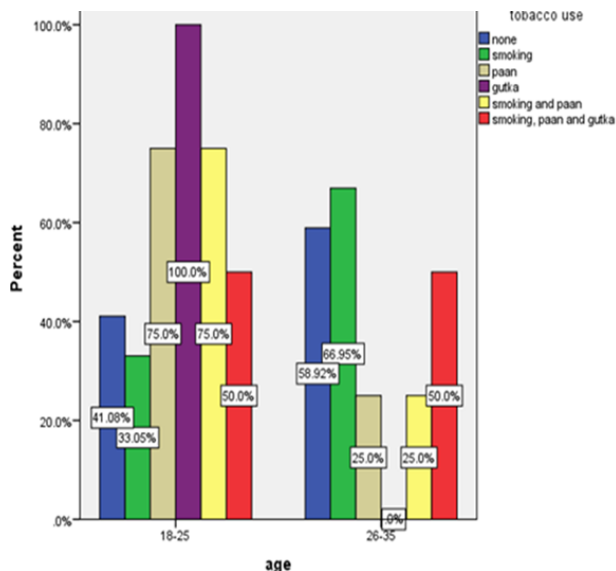


Figure 5: Representing the significant association between age and tobacco use

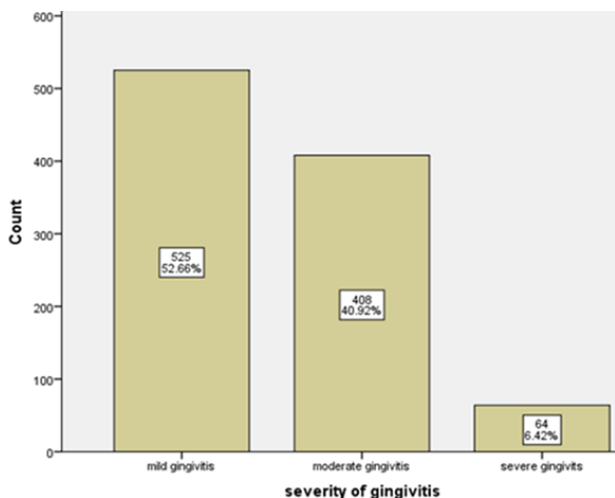


Figure 3: Shows the distribution of gingivitis

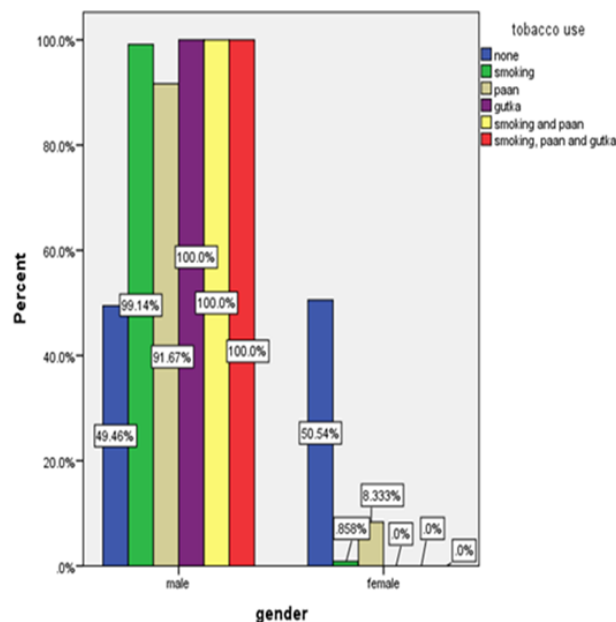


Figure 6: Representing the association between gender and tobacco use

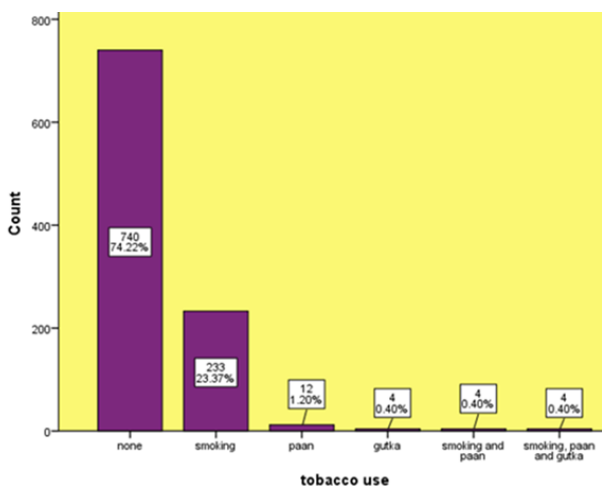


Figure 4: Shows the distribution of tobacco use

18-35 and those who have attended the college from June 2019 – March 2020.

### Sample size and sampling

All the gingival index patients who have been interpreted were included in the study and 997 case sheets were reviewed by means of simple random sampling technique. Cross verification was done by photographic verification and diagnosis of the patient.

### Index used

The Gingival Index developed for the evaluation of the gingival condition and records of qualita-

tive changes in the gingiva. It scores the marginal and interproximal tissues separately with the score range of 0 to 3. The bleeding is evaluated by probing benevolently by the side of the wall of the soft tissue of the gingival sulcus. The scores of the four areas of the tooth can be aggregated and dissected by four to give the individual score for the particular tooth. The Gingival index for an individual should be determined by the summation of all the values of each tooth and cleaving it by the number of teeth examined. The GI is utilized to determine the prevalence and severity of gingivitis in persons, community and even larger populations. A range of scores from 0.1-1.0 delineates mild inflammation; 1.1-2.0 delineates moderate inflammation and 2.1-3.0 delineates severe inflammation.

### Data collection

Dental Information Archiving System (DIAS) is a software used in Saveetha dental college for storing patient information, diagnosis and treatment records. It is a form of Electronic Health Records (EHR) which is used only in the particular college. The software has details of patient ID, age, sex, photograph, radiograph if any, diagnosis and treatment timeline etc. we can also track the records of a particular treatment and their list of patients.

The advantage of collecting data in DIAS is its easy and flexible data retrieval. Incomplete data were excluded from the study. The data was collected and reviewed by 2 examiners and entered in the MS Excel sheet. The variables of the results were explained using tables and graphs directly from SPSS software.

### Statistical analysis

Data was imported in IBM SPSS software version 20.0. the independent variables were age and sex while the dependent variables were tobacco use and interpretation of gingival index. Descriptive statistics were expressed by means of frequency and percentage, chi-square was done to the association between age, tobacco use and gingivitis. Pearson correlation tests were done to identify the relationship of tobacco usage and severity of gingivitis at the correlation value at  $p < 0.01$ .

## RESULTS AND DISCUSSION

In the present study, after excluding the incomplete data, the sample size was 997 in which 62.19% males and 37.81% females were distributed (Figure 1).

The age groups were divided into 18-25, and 26-35 years old in which 40.02% and 59.98% were distributed (Figure 2), in which the X-axis represents

**Table 1: Represents the correlation between the severity of gingivitis and tobacco use**

Groups	Pearson correlation	P-value
Severity of gingivitis Tobacco use	0.267	0.001**

\*\* Correlation is significant at the 0.01 level (2-tailed)

the age groups and the Y-axis represents the number of people present in each group.

Out of 997 participants, 52.66% had mild gingivitis, 40.92% had moderate gingivitis and 6.42% had severe gingivitis (Figure 3), in which the X-axis represents the severity of gingivitis and Y-axis represents the number of study samples present in each group.

In the sample, only 25.77% had a habit of tobacco use out of which 23.37% were using only smoking tobacco, 1.2% were using paan, 0.4% were using Gutka; 0.4% were using both smoking tobacco and paan and 0.4% were using tobacco in smoking, paan and Gutka (Figure 4), in which the X-axis represents the type of tobacco use and the Y-axis represents the number of study samples present in each group.

There was a significant association found between age and tobacco use in the chi-square test ( $p < 0.02$ ) (Chi-square value = 19.383<sup>a</sup>) (Figure 5). The X-axis represents age groups and Y-axis portrays tobacco use.

There was a significant difference between gender with tobacco use in the study ( $p < 0.01$ ) (Chi-square value = 198.025<sup>a</sup>) (Figure 6). The X-axis represents gender and Y-axis represents tobacco use.

There was a significant association found between the tobacco use and severity of gingivitis ( $p < 0.001$ ). To confirm the association, Pearson correlation was done in which positive correlation has been observed between tobacco habit and severity of gingivitis at the significance ( $p < 0.05$ , Pearson correlation value = 0.267. ), (Table 1).

In the current study, more males (62.19%) participated than females. Similar findings were found which is 59.4% males and 40.6% females in a study done in South India (Rao *et al.*, 2018). In another study, there were contrastive findings in which 52.14% females participated which is done by TS Sekhon *et al.* (Gambhir *et al.*, 2015).

In the present study, more participants were present in the age group of 26-35 years old (59.98%) and less number of people were present in the

younger group. In a similar study by TS Sekhon et al., less number of samples (24.5%) was found in the 15-29 years age group (Gambhir et al., 2015). In contrastive research done by SS Oberai et al., equal numbers of participants were present in each age group (Oberoi, 2016).

In this retrospective study, the distribution of tobacco users(25%) is less than non-tobacco users(75%). Homogenous findings were found in research in which 46.44% were only tobacco users (Naderi et al., 2015). But in a contrastive study done by Bastiaan et al. where 50% were tobacco users were found (Bastiaan and Waite, 1978).

In the present study, 52.66% had mild gingivitis and less than 10% had severe gingivitis. There were similar findings found in a study by Bhavya et al. in which less than 10% had severe gingivitis. But in a contrastive study more prevalence of moderate gingivitis was found (D'Cruz and Aradhya, 2013).

In the present study, among tobacco users, smoking tobacco users were more than non-smoking tobacco users. Similar findings were found in a study by Vivek et al. in which bidi and cigarette were more prevalent (Yadav et al., 2010). The opposite finding was found in which 90% study population used smokeless tobacco (Janakiram and Joseph (2016).

In the present study, there was a positive correlation found between the strength of gingivitis and tobacco use ( $p < 0.01$ ). Similarly, significant difference between smoking and tobacco usage in a study by Arrak (1957) but opposite results were found in research by Bastiaan and Waite (1978). But the findings of our study were parallel to the findings in the major cited articles so that the consensus is agreed.

### Limitations

There were certain limitations to the study. One was a retrospective study design. Detailed tobacco use pattern was not recorded in the study. Lack of external validity and small sample size are other limitations.

### CONCLUSION

After considering the limitations of the study, tobacco use is highly associated and positively correlated to the severity of gingivitis which clearly shows that with the consumption of tobacco increases the severity of gingivitis increases in the present study. More prospective studies should be conducted in future with recording the pattern of tobacco use.

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### Conflict of Interest

The authors declare that they have no conflict of interest for this study.

### REFERENCES

- Agrawal, D., Aggarwal, A. K., Goel, S. 2009. Women exposed to second-hand smoke more at home than at workplace: An analysis of GATS Report. *Journal of family medicine and primary care*, 4(10):293–297.
- Arrak, A. 1957. A New Density Function Based on the Poisson Distribution for the Characteristic Curve and Linear at Very Low Densities. *Applied Spectroscopy*, 11:38–44.
- Azodo, C., Umoh, A. 2012. Prevalence of gingivitis and periodontitis in an adult male population in Nigeria. *Nigerian Journal of Basic and Clinical Sciences*, 9(2):65–65.
- Bastiaan, R. J., Waite, I. M. 1978. Effects of Tobacco Smoking on Plaque Development and Gingivitis. *Journal of Periodontology*, 49(9):480–482.
- Bergström, J., Eliasson, S., Dock, J. 2000. Exposure to tobacco smoking and periodontal health. *Journal of Clinical Periodontology*, 27(1):61–68.
- Bergström, J., Preber, H. 1994. Tobacco Use as a Risk Factor. *Journal of periodontology*, 65:545–550.
- Chatzopoulos, G. 2016. Smoking, Smokeless Tobacco, and Alcohol Consumption as Contributing Factors to Periodontal Disease. *Northwest dentistry*, 95(1):37–41.
- Cruz, S. S. 2009. Contribution of periodontal disease in pregnant women as a risk factor for low birth weight. *Community Dentistry and Oral Epidemiology*, pages 527–533.
- D'Cruz, A. M., Aradhya, S. 2013. Impact of oral health education on oral hygiene knowledge, practices, plaque control and gingival health of 13- to 15-year-old school children in Bangalore city. *International Journal of Dental Hygiene*, 11(2):126–133.
- Gambhir, R., Sekhon, T., Grewal, S. 2015. Periodontal health status and treatment needs of the rural population of India: A cross-sectional study. *Journal of Natural Science, Biology and Medicine*, 6(1):111–111.



- Janakiram, C., Joseph, J. 2016. Prevalence and Dependency of Tobacco Use in an Indigenous Population of Kerala, India. *Journal of Oral Hygiene & Health*, 04(01).
- Mathew, M. G. 2020. Evaluation of adhesion of Streptococcus mutans, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial. *Clinical oral investigations*, 24(9):3275-3280.
- Naderi, N. J., Semyari, H., Elahinia, Z. 2015. The Impact of Smoking on Gingiva: a Histopathological Study. *Iranian journal of pathology*, 10(3):214-220.
- Oberoi, S. S. 2016. A cross-sectional survey to study the relationship of periodontal disease with cardiovascular disease, respiratory disease, and diabetes mellitus. *Journal of Indian Society of Periodontology*, 20(4):446-452.
- Prabakar, J. 2018. Comparative Evaluation of Retention, Cariostatic Effect and Discoloration of Conventional and Hydrophilic Sealants - A Single Blinded Randomized Split Mouth Clinical Trial. *Contemporary clinical dentistry*, (9):233-239.
- Rao, S., Balaji, S. K., Lavu, V. 2018. Chronic periodontitis prevalence and the inflammatory burden in a sample population from South India. *Indian Journal of Dental Research*, 29(2):254-254.
- Rivera-Hidalgo, F. 1986. Smoking and Periodontal Disease: A Review of the Literature. *Journal of Periodontology*, 57(10):617-624.
- Silva, D. 2012. Effects of cigarette smoke and nicotine on cell viability, migration and myofibroblastic differentiation. *Journal of periodontal research*, 47(5):599-607.
- Tanur, E., McQuade, M. J., McPherson, J. C., Al-Hashimi, I. H., Rivera-Hidalgo, F. 2000. Effects of Nicotine on the Strength of Attachment of Gingival Fibroblasts to Glass and Non-Diseased Human Root Surfaces. *Journal of Periodontology*, 71(5):717-722.
- Yadav, K., Anand, K., Gupta, V. 2010. Patterns of tobacco use across rural, urban, and urban-slum populations in a North Indian community. *Indian Journal of Community Medicine*, 35(2):245-245.