



Prevalence of smoking in patients with aphthous stomatitis: A retrospective case-control study

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ABSTRACT

Aphthous stomatitis represents one of the most common ulcerations occurring in the oral cavity. This ulcer has an exclusive predilection of affecting the non-keratinized mucosa only. The aim of this study was to assess the prevalence of smoking in patients with aphthous stomatitis. Seventy-six patients with recurrent aphthous stomatitis attending Saveetha Dental Hospital, Chennai were included in the study. The data gathered was entered into an excel table, and the data analysis was done in SPSS. The data analysis revealed that the mean age of the collected samples of 76 patients was 32.21 years, and 67.1% of the samples were males. Analyzing the clinical variants, 70 patients had minor aphthous stomatitis, five patients had major aphthous stomatitis, and one patient had herpetiform aphthous stomatitis. Results showed that patients who are not smokers have a higher rate of recurrence of recurrent aphthous stomatitis compared to patients who are smokers with 6.6% being the prevalence rate for smokers and 93.4% being the prevalence rate for non-smokers. Data analysis was done using a chi-square analysis between the clinical variants of recurrent aphthous stomatitis and smoking habits (chi-square-1.132; df-2; p-0.05) we found the results were statistically significant (P=0.05) which implies there were less self-reported diabetics in this study. Prevalence of smoking in patients with recurrent aphthous stomatitis is significantly lower than patients who are not smokers. The reason for the decreased occurrence of aphthous stomatitis in smokers may be due to the increased keratinization of the mucosa.



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INTRODUCTION

Oral ulcers are the most common dental mucosal disease. The most common causes of oral ulcer are the idiopathic recurrent aphthous stomatitis (RAS). The next most common cause is the chronic non-healing ulcer that occurs as a prequel of the development of oral malignancies. In the Indian population, the use of tobacco products is very high and hence oral cancer is one of the most common malignancies in India. When we look at cases of oral ulcer have the probability of malignancy as one of the causal fac-

tors has to be borne in mind (Steele *et al.*, 2015; War-nakulasuriya and Muthukrishnan, 2018). In recent years, various commercial preparations are known as pan masala, and gutkha have become available in India and in many parts of Asia. Many brands of these products contain areca nut and tobacco, both of which have been implicated in the occurrence of oral cancer.

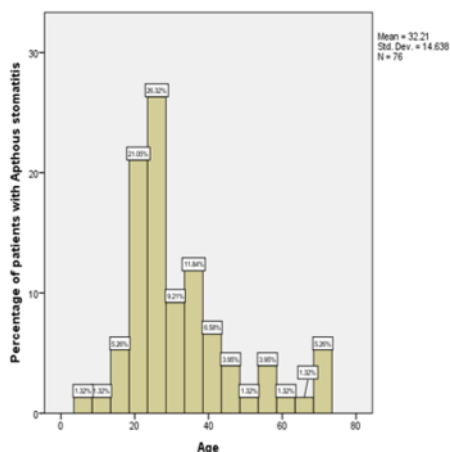


Figure 1: Histogram depicts the age distribution of patients with recurrent aphthous stomatitis.

The investigators have also observed that smoking and chewing of tobacco and betel quid act synergistically in oral carcinomas and that persons with mixed habits form a substantially high-risk population (Grady *et al.*, 1992). RAS is a common oral mucosal disease that typically starts in childhood as recurrent, usually painful, small ulcers that can be single or multiple. Its prevalence rate ranges from 5%–60%.

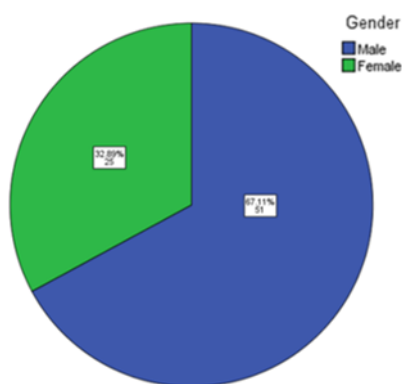


Figure 2: Pie chart shows the gender distribution of patients with recurrent aphthous stomatitis.

(Jurge *et al.*, 2006) RAS is of unknown etiology; precipitating factors include stress, physical or chemical trauma, food sensitivity, and genetic predisposition (Woo and Sonis, 1996). Persons with RAS may have an alteration of local cell-mediated immu-

nity. The lesions can be associated with some individuals with systemic conditions such as Behçet’s disease, gastrointestinal disease, or immune defects such as HIV/AIDS (Boras and Savage, 2007). The still unclear etiology has resulted in treatments that are largely empiric and aimed at symptom reduction. RAS in the oral cavity presents itself in three different sub types. The commonest variant is the minor aphthous stomatitis. The minor variant most commonly presents as two to three lesions which are small well-circumscribed and surrounded by an erythematous halo in non keratinized mucosa. The ulcer self heals in a span of 4-5 days. Major aphthous stomatitis presents as solitary ulcers with sloping edges, and the size of the ulcer is around 1-2 cm.

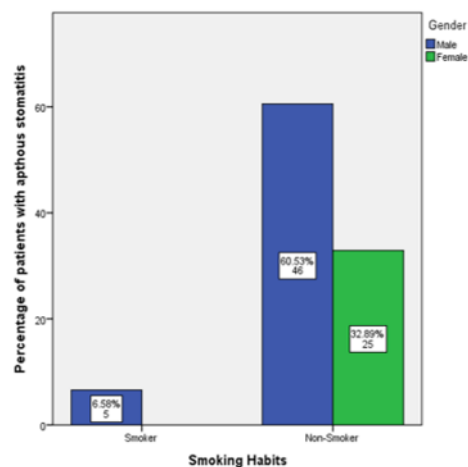


Figure 3: Bar graph showing the relationship between the prevalence of smoking practices across the genders.

This ulcer is excruciatingly painful does not self-heal, and the ulcer with proper management heals in about 3 to 4 weeks. The last type of RAS is the herpetiform aphthous stomatitis. This variant presents as numerous multiple ulcers occurring in crops resembling herpetic infection and hence the name of herpetiform aphthous stomatitis. Unlike the minor variant, it is also easy to manage (Preeti *et al.*, 2011). In general, RAS has a tendency to affect non keratinized mucosa and smoking tends to alter the keratinization process and render the non keratinized mucosa mildly keratinized in a hypothetical factor which renders that people who are smokers have a lesser chance of developing RAS (Preeti *et al.*, 2011). The purpose of the study was to investigate the prevalence of smoking in patients with aphthous stomatitis in patients visiting Saveetha Dental Hospital, Chennai.

MATERIALS AND METHODS

In order to assess the condition, we took data from the patients visiting the dental OP of Saveetha Dental College. A total of 8600 case sheets from the time period of June 2019 to March 2020 were taken up for analysis. The data showed 76 patients with aphthous stomatitis were recorded during this time period. Ethical approval for this study was obtained from the institutional ethical committee (ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320). The upside of the study is the presence of validated data. The downside, however, is the geographic restrictions as the study was only conducted in one specific area. The ethical approval for the study as it involves the patient data was obtained from the Institutional ethics committee of Saveetha Dental College.

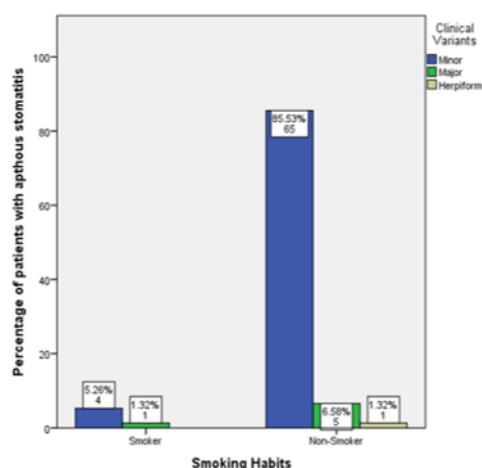


Figure 4: Bar graph showing the relationship between the distribution of smoking among the clinical variants of recurrent aphthous stomatitis.

There were two reviewers involved in the study with data taken from patients visiting Saveetha Dental College from June 2019 to March 2020. Cross-checking of data was done by random verification. Patients with incomplete follow-ups were called on the telephone. Random verification was done for 10% of the patient's sample. The internal validity is done by creating a study design followed by complete data collection and verification of the data. The external validity is close by creating a study design followed by setting up a clinical setup and creation of duplicate data.

The collected data was then entered in excel sheets and copied into SPSS software for statistical results. A correlation test was done with two-variables to obtain the result. Aphthous stomatitis and smoking were the variables chosen. Data analysis was done by the SPSS system with independent variables

such as aphthous stomatitis and smoking. Dependent variables present are age and gender. Data analysis was done using a chi-square analysis between the clinical variants of recurrent aphthous stomatitis and smoking habits (chi-square-1.132;df-2;p-0.05) we found the results were statistically significant (P=0.05) which implies there were less self-reported diabetics in this study.

RESULTS AND DISCUSSION

A total of 76 patients belonging to the age group of 6-73 were taken with the mean age of the patients being 32.21 years. The age of the patients when plotted as a histogram with a normal curve shows the age distribution was following a Gaussian distribution. Figure 1 shows the gender distribution of the patients was such that 51 (67.1 %) of them were males and 25 (32.9%) of them were females. Figure 2 Table 1 On analyzing the clinical variant, it was found that 76 patients, 70 patients had aphthous minor, five patients had aphthous major, and one patient had herpetiform aphthous stomatitis Table 2.

On analysis of the habit history, it was found that only five patients out of the 76 had a habit of smoking. All five patients were males. Figure 3 Among the five smokers, 4 had minor forms of aphthous stomatitis with only 1 having the major form of aphthous stomatitis Figure 4.

Table 1: Gender distribution of the patients with aphthous stomatitis.

Gender	Frequency	Percentage
Male	51	67.1
Female	25	32.9
Total	76	100

Seventy-six patients data were collected for the study; the age of the patients ranged from 6 to 73 years of age. Out of the age group, 67.1% were males, and 32.9% were females. From the data collected, we found that 6.6% of the patients were smokers with 93.4% non-smokers. This proves the fact that smokers are at a lesser risk of developing aphthous stomatitis compared to a non-smoker (Preeti et al., 2011). A study conducted by Binnur Tüzün et al., 34 patients with. Recurrent aphthous stomatitis was tested, and out of it, 8.8% were active. Smokers compared with a significantly higher percentage, 25.2% among the control subjects (Tüzün et al., 2000; Sr et al., 2018). Our study results are in line with the above-mentioned study.

In the clinical variant aspect, 90.8% of the patients had major forms of aphthous stomatitis, 7.9% of the

patients had minor forms of aphthous stomatitis and 1.3% having herpetiform aphthous stomatitis. Fifty-one patients from the 76 patients in the data sample were males. 90.2% of the males do not have any habits of tobacco, with 9.8% of males having some form of tobacco usage habits. In a study done by P.A. Atkin et al., the number of RAS patients who were smoker were significantly lower than in the control group (Atkin et al., 2002).

Although it is expected that young educated people provide rationally accurate data regarding RAS, the possibility that the RAS reported by the investigated population was caused by other factors can not be excluded (Rivera-Hidalgo et al., 2004). The results of a study also revealed widespread tobacco use among Jordanian university students. Nearly 30% were users of tobacco products and, even in this conservative community, the habit was becoming increasingly common among females (Ussher et al., 2003).

Table 2: Clinical variants of aphthous stomatitis. The minor variant had 69 cases.

Clinical Variant	Frequency	Percentage
Minor	69	90.8
Major	6	7.9
Herpetiform	1	1.3
Total	76	100

There are studies to show that RAS is more prevalent seen in patients who have poor oral hygiene and a higher number of decayed teeth (Subashri and Maheshwari, 2016; Rohini and Kumar, 2017). Although better understanding is needed to understand the immunity to RAS offered by smoking, there remains a hypothesis that smoking increases the keratinization of the mucosa rendering it immune to the development of aphthous stomatitis (Tüzün et al., 2000). There are also changes noted in the saliva content of patients who are smokers (Venugopal and Maheshwari, 2016; Maheshwari et al., 2018).

The mainstay treatment of aphthous is the usage of corticosteroids. As the etiology of the disease is unknown, we prescribe corticosteroids. Corticosteroids are also used in the management of autoimmune diseases (Dharman and Muthukrishnan, 2016). Also, nutritional supplements like Vitamin B complex and Vitamin C have a proactive role in the treatment of aphthous stomatitis (Chaitanya et al., 2018). Vitamin C also has an analgesic property which is used in the management of aphthous stomatitis (Chaitanya, 2017). Despite its recurring nature, there is no malignant transformation asso-

ciated with aphthous stomatitis (Misra et al., 2015; Muthukrishnan and Kumar, 2017).

Though tobacco is regarded as the major etiological factor for the development of oral cancer, which presents as an ulcer, with regards to aphthous, there is no correlation. Tobacco has been identified as irritation and progression of oral cancer. To reduce the mortality and morbidity of the disease it is important to screen all the patients with the history of tobacco habit, and early screening plays a vital role for early intervention and prevention of oral cancer. This oral cancer also has a tendency to metastasize to distant sites. However, considerable research is required to comprehend the actual trends and reliable prevalence in data on tobacco consumption are scarce. Cross-sectional studies are important in, estimating the prevalence of a disease in a population and identifying high-risk populations.

(Venugopal and Maheshwari, 2016) In India, the practice of tobacco consumption varies from one state to another and within each state. Therefore, it is important to gather information about the prevalence of tobacco habits among the local population (Warnakulasuriya and Muthukrishnan, 2018). The incidence of the potentially malignant diseases of the oral cavity is increasing and also showing prediction in the younger age group due to the increase in the intake of the smokeless form of tobacco (Rogers, 1997). The poor oral hygiene practices by the Indian population also has an additive effect on the effects of tobacco (Subashri and Maheshwari, 2016).

This study is done from the stored archives of our case records, and there have been several high impact studies done from this case archive which shows the validity of the case database (Choudhury, 2015; Patil et al., 2018; Subha and Arvind, 2019). The limitations faced while conducting this study was that there were geographic restrictions as all the patients were from the same region in and around Chennai, India. Besides that, there was no equal distribution of cases.

Since we were only analyzing the prevalence between smokers and non-smokers, there were three unrelated sub tests of clinical variants. Another limitation encountered was in terms of ethnicity as the cases in our study consist of only a single racial distribution that can be found due to the geographic restriction. The future scope of our topic prevalence of smoking in patients with aphthous stomatitis is to study the effect of the therapy, with equal distribution of cases between each clinical variant of aphthous ulcer and by carrying out a study with larger samples sizes than the one we

had.

CONCLUSION

RAS is the most common oral ulcer, and ironically smokers have an immunity to it. For reasons which are not known yet, they have an immunity to the disease. And in line with the existing literature, we found a negative epidemiological association between smoking and recurrent aphthous stomatitis.

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Conflict of Interest

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

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