



Prevalence of Tobacco Usage in Oral Leukoplakia: A Retrospective Study

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ABSTRACT

Tobacco is a common name for the plants belonging to the genus *Nicotiana* and nightshade family. It contains a highly addictive stimulant which is used in cigarettes and other smokeless forms of tobacco. The product has a lot of carcinogens and other harmful mixtures which lead to the causation of oral submucous fibrosis, leukoplakia and erythroplakia. In this study, we would be seeing how common it is to have a history of tobacco usage in the patients diagnosed with Leukoplakia between march 2019 and march 2020 in Saveetha dental college. Materials and methods: This study was done in Saveetha dental college, Chennai, Tamilnadu, India. The study data were taken between March 2019 to March 2020. We took patients reporting with oral leukoplakia and checked their history for Smoking or smokeless tobacco usage. These data are recorded by the dental students in saveetha dental college. A total of 100 patient's record was taken and among the patients with smoking, history was identified. The number of patients with and without smoking/smokeless tobacco usage record was deduced. Results: There were a total of 100 participants, in which 95 were males and 5 were females who reported to the clinic with oral leukoplakia. In this sample, a total of 76 patients had a homogenous variant of leukoplakia while 24 patients had a non-homogenous variant. Eighty-four patients had the habit of smoking, while 16 patients had the habit of smokeless tobacco usage. There were 100 participants and with the result deduced from the data obtained from the participants, it is clear that smoking is one of the major etiology of Oral leukoplakia.

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INTRODUCTION

Tobacco usage is very common in the modern-day. A lot of people, despite knowing that it is hazardous to health, tend to continue using it. Most of this is due to the addictive effects of nicotine alkaloid, assuming that it might help reduce anxiety. There is also a tendency to overestimate the body's resistance to the ill effects of tobacco usage. This being the case there is either psychological or physical dependency formed by the users which make them a long term tobacco user; which affects the health very much, from serious systemic illness due to many malignan-

cies which can affect the body due to the long term effect of tobacco usage. Lung cancer is one of the most famous malignancies known to even laymen caused by addiction and prolonged usage of tobacco. But there are many oral pre malignancies and malignancies caused due to tobacco usage. One such pre-malignancy is Leukoplakia (Winn, 2001).

Leukoplakia is “predominantly white non-scrapable plaque of questionable risk having excluded (other) other known diseases or disorders that carry an increased risk of cancer” (Brouns *et al.*, 2013). It appears as a white patch on the mucosal surface, but it cannot be scraped off, unlike the scrapable candidiasis (Amagasa *et al.*, 2011; Patil *et al.*, 2015). It is further divided into two major variants - homogenous variant and non-homogenous variant (More *et al.*, 2011). Leukoplakia is a common oral, potentially malignant disorder (OPMD) seen in the Indian population.

Leukoplakia usually appears as a non-scrapable white patch; it is usually thick hard and slightly raised surface (Amagasa *et al.*, 2011). Its common site in the oral cavity is buccal mucosa, labial mucosa, tongue; it may also appear on other surfaces covered by mucus membrane in the oral cavity (Amagasa *et al.*, 2011; Martorell-Calatayud *et al.*, 2009).

Although tobacco usage is one of the major etiology of Oral leukoplakia, there are other factors such as dental restorative materials chemical irritants, foreign body irritants, frictional keratosis, Human papillomavirus are some of the other etiologies (More *et al.*, 2011; Parlatescu *et al.*, 2014). Alcohol is not considered directly as an etiology by the association of alcohol along with other etiology worsens the condition (Gupta, 1984; Hashibe *et al.*, 2000). There are two major variants of oral leukoplakia homogeneous and nonhomogeneous (Amagasa *et al.*, 2011; Martorell-Calatayud *et al.*, 2009).

The aim of our study was to assess the tobacco habits present in patients with oral leukoplakia and to look out for any correlations between the type of tobacco habit.

MATERIALS AND METHODS

The archived patient records of the Department of Oral Medicine and Radiology, Saveetha Dental College were collected and the data was assessed from the time period of June 2019 - April 2020. From the record of 86000 cases, all known cases of leukoplakia were picked up. Ethical clearance was obtained from the Institutional Ethics Committee of Saveetha Dental College. The main advantages of

this study were that the data was all prevalidated and the main disadvantages were that it was an uni-centric study and only a single ethnicity of the population was studied.

The patient data were picked up from the case sheets and the variables recorded were the age, gender, tobacco usage type and the site of the lesion. The assessment was done by two observers. The data was randomly cross-verified by either recalling the patients and having telephonic conversations with the patient. The internal validity of the study was established as the data was collected from a verifiable and standardised database. The external validity is established as the data is from a clinical setup which is duplicatable. Statistical analysis was done with the chi-square test to study the association between the gender and variant of leukoplakia and the type of tobacco habit and the variant of leukoplakia.

RESULTS AND DISCUSSION

The study revealed that a total of 102 participants were recorded during the time period mentioned above. On assessing the records, the case details of 6 patients had discrepancies and the patients were asked to report back to the department for verification of the findings. However, in the group, two patients could not report back and the data were excluded and the final sample size was 100. The age distribution of the patients was in the range of 21 years to 81 years. The mean age of the patients was 48.59 years (Figure 1) and the majority of cases were in the age group of 40-60 years. The histogram below with the superimposed normal curve shows the normal distribution of the patients across the age groups. The gender distribution of the population was such that 95 participants were males and 5 participants were females Figure 2. An analysis of the type of leukoplakia proves that a total of 76 patients had a homogenous type of leukoplakia and 24 patients had a non-homogenous variant of leukoplakia. (Figure 3) In this group of 100 patients with leukoplakia, a total of 84 patients accepted that they have a habit of smoking and 16 patients had the habit of smokeless tobacco. Incidentally, all cases of non-homogenous leukoplakia patients had the habit of smoking. The 16 patients who had the habit of smokeless tobacco usage were in the homogenous type. It was also noted that all patients with non-homogeneous leukoplakia were smokers and the 16 patients of smokeless tobacco users were seen in the homogenous subtype only. There was no significant association between the causation of leukoplakia and the type of tobacco usage ($P > 0.05$) Fig-

Figure 4.

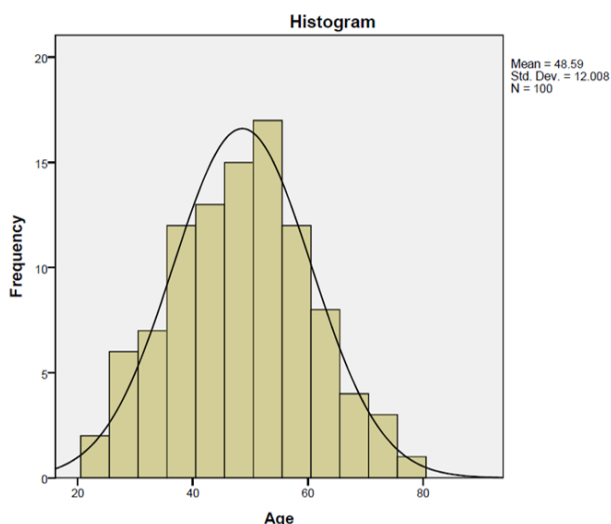


Figure 1: Graph showing the age distribution of leukoplakia patients which is following the Gaussian distribution. Peak incidence noted in the middle ages with a mean of 48.59 years.

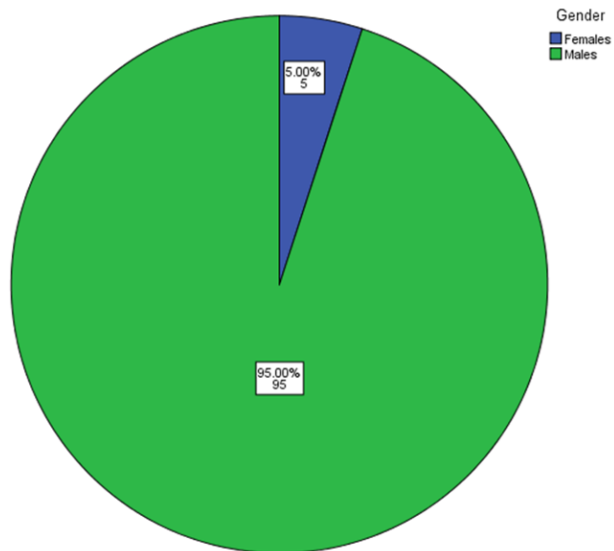


Figure 2: Pie chart showing the gender distribution of leukoplakia patients. Males were 95(95%) and females were 5(5%). Majority of the patients were males.

Tobacco is a common name for the plants belonging to the Genus Nicotina and nightshade family. It is a highly addictive stimulant and is used extensively in cigarettes and other recreational smoking habits. It can also be used in a smokeless form without burning by chewing and keeping it in the corner of the mouth when it is called smokeless tobacco. Regardless of the usage, it is very harmful to human health. They contain a lot of carcinogens and other harmful mixtures of compounds. It is responsible for the causation of several potentially malignant disorders

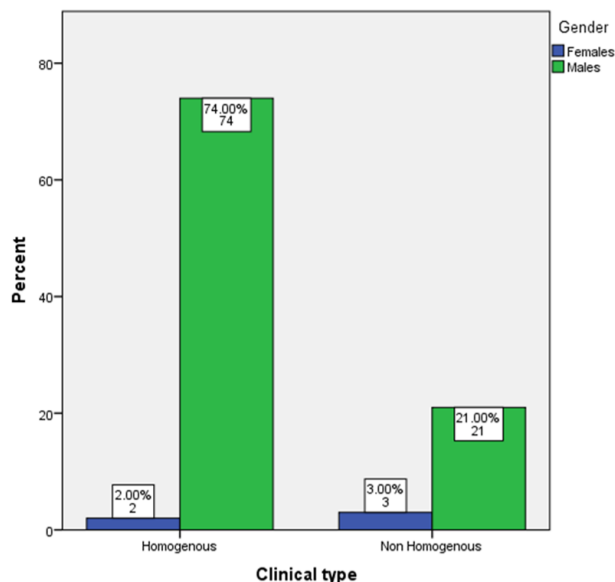


Figure 3: A bargraph showing the association between the clinical variant of leukoplakia and gender.

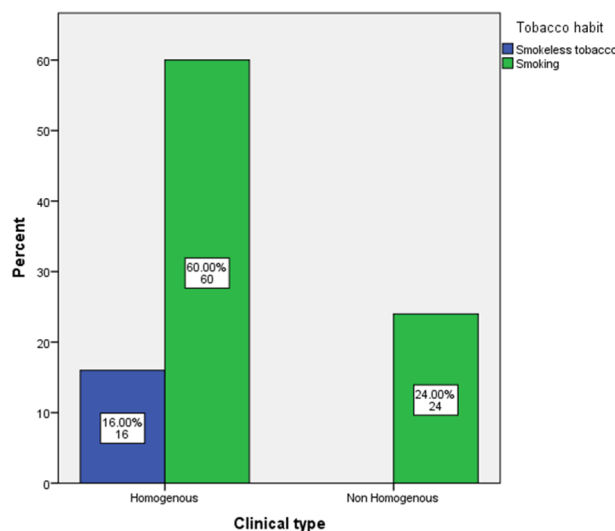


Figure 4: A bar graph showing the association of tobacco habits among the various clinical types of leukoplakia. Smoking habit was predominantly seen in both the groups of leukoplakia.

like leukoplakia, oral submucous fibrosis, erythroplakia ([World Health Organization, 2008](#)).

Oral leukoplakia is a potentially malignant disorder with 20% malignant transformation potential. It is mostly tobacco-induced and causes dysplasia. This can be treated by Removal of stimulant or cessation of habit and antioxidant therapy; sometimes it might need surgical excision. Speckled leukoplakia, a variant of Non-homogenous leukoplakia is said to have the highest potential of malignant transformation among all of the variants ([Warnakulasuriya](#)

et al., 2010). A study by Pires et al. with a sample size of 684; among those all leukoplakia cases, 50% showed dysplasia, and 75% had a smoking history (Pinheiro and Pires, 1969). George et al. in the general screening population reported 4.4% had precancerous lesions and more than 75% of the cases had confirmed smoking history (George et al., 2011). In a study by Kumar et al., in Kodagu district in a sample size of 1048, there was a strong positive usage of smoking and leukoplakia. This emphasized the point that smoking has a positive correlation to leukoplakia (Ananda et al., 2019).

Leukoplakia appears like an innocuous asymptomatic lesion and is discovered as an incidental finding. Unlike other OPMDs, this lesion is not diagnosed at an early stage due to the lack of symptoms (Steele et al., 2015). Hence in an initial triaging, it is essential to subject these lesions to a biopsy. However, here again, there is a difficulty in identifying a suitable site for biopsy. Instead of deciding based on the convenience, it is essential to identify a site which may contain the most representative site of the lesion (Warnakulasuriya and Muthukrishnan, 2018). In this scenario, we have several chair-side diagnostic aids like toluidine blue staining, vizilite etc. to identify potential sites of dysplastic changes. Among the non-invasive aids, saliva offers us a potential source for the identification of early dysplastic changes. Salivary microRNA offers us the potential to pick out those cases where dysplasia is present (Maheswari et al., 2018). OPMDs also induce tissue-level changes. In a systematic review, it has been observed that there is an increase in the levels of Matrix Metalloproteinase 9 (MMP9), upregulation of which has been correlated to an increase in the incidence of metastasis (Venugopal and Maheswari, 2016).

The management of leukoplakia centres primarily around the cessation of the habit. After the habit cessation patient can be prescribed antioxidants which helps in scavenging the free radicals and the usage of Vitamin A which helps in reversing the keratinizing effects of leukoplakia (Zhang et al., 2001). Off late, there has been an increased tendency to use LASER and radiation to treat leukoplakia. When radiation is used care should be taken to avoid mucositis (Chaitanya et al., 2017). The necessary precautions have to be taken to avoid the development of complications and improve the overall quality of life for the patient (Chaitanya et al., 2018; Subashri and Maheshwari, 2016; Muthukrishnan et al., 2016).

It is a common tendency among general practitioners of dentistry to advise corticosteroids for the

management of leukoplakia. In cases of leukoplakia, it is not advisable to use the same as it suppresses the immune system and leads to dysplasia development. Ideally, corticosteroids are used in the management of immune-mediated disorders (Dharman and Muthukrishnan, 2016).

The malignant transformation potential of this disease ranges from 6-20% which depends primarily on the clinical variant of the disease (Steele et al., 2015). There are rare cases of leukoplakia being associated with other OPMD (Muthukrishnan and Kumar, 2017) and also with distant metastasis (Misra et al., 2015).

The data for this study had been obtained from our internal archives and similar studies that have been done in the past had matching results with the existing literature evidence (Rohini and Kumar, 2017; Subha and Arvind, 2019). There have also been observational studies done from the archived database which has yielded positive results (Choudhury et al., 2015; Patil et al., 2018).

The limitation of the study was the smaller sample size and the history of smoking was recorded based on a self-declaration by the patients and by the presence of nicotine stains on teeth. This study does not give information on the transformation of homogenous leukoplakia to a non-homogenous variant.

CONCLUSION

Leukoplakia is a very common OPMD in this part of the world. This study shows that all cases of non-homogenous leukoplakia were associated with a smoking form of tobacco usage. This again adds to the fact that smoking is the predominant cause for the formation of leukoplakia. It is noted that the predominant type of leukoplakia is the easily manageable homogenous variant of leukoplakia and which has a smaller malignant transformation potential. Thus early identification of the lesion and timely management with prompt follow up will improve the overall prognosis of the patient.

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Conflict of Interest

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

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