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PREVALENCE OF CLINICAL TYPES OF ORAL LEUKOPLAKIA REPORTED IN A PRIVATE DENTAL INSTITUTION : A RETROSPECTIVE STUDY

Nauma Hafeez¹, Dr.T.N.Uma Maheshwari²

¹Saveetha Dental College & HospitalsSaveetha Institute of Medical and Technical

SciencesSaveetha University, Chennai-77

²Professor & Head of AdminDept. of Oral Medicine and RadiologySaveetha Dental College

& HospitalsSaveetha Institute of Medical and Technical SciencesSaveetha University,

Chennai-77

¹151501002.sdc@saveetha.com,²umamaheshwaritn@saveetha.com

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ABSTRACT:

Oral leukoplakia is widespread amongst the Indian population due to the use of tobacco. It is a premalignant condition and if not diagnosed early has a risk causing oral morbidity and cancer. The study was conducted in Saveetha Dental College and Hospitals among a sample size of 97 patients who have been reported positive for leukoplakia. The main aim of the study was to assess the prevalence of clinical types of leukoplakia in patients reporting to Saveetha Dental College. Age and gender for prevalence were studied along with the tobacco association. Statistical analysis was done using the SPSS software. Statistical analysis was done using SPSS software. Inferential statistics was done using Chi square test and a p value of < 0.05 was considered statistically significant. Study reveals homogenous leukoplakia is the most common as 76%. Smoking tobacco is more predominantly associated with leukoplakia. The study also reveals a strong male predilection for the disease. The prevalence rate agrees with other studies done on leukoplakia. This gives us an idea of the epidemiology of this condition as most of the potentially malignant cases can be studied in a private university and hospital set up where more cases are reported.

INTRODUCTION

Leukoplakia was first described through clinical/medical reviews as early as 1969. At that time leukoplakia was rare and being newly discovered was not very well known in terms of its clinical features. Over the years leukoplakia became more widespread and the risks associated with it became known (Muthukrishnan and Bijai Kumar, 2017). Prompting WHO to officially define it. In the year 1978 WHO proposed a definition for leukoplakia: "a white patch or plaque that cannot be characterized clinically or pathologically as any other disease."(Dharman and Muthukrishnan, 2016), this early definition had its limitations. The definition relies solely on clinical examination, no suggestion for further testing for confirmation is suggested (Subha and Arvind, 2019). This can be misleading as numerous other white lesions exist. Further, the definition itself is highly vague and general. The shortcomings of the definition surfaced and several efforts to propose a reliable definition came about, in the year 2005 WHO proposed its latest definition to date "a white plaque of questionable risk, having excluded known diseases or disorders that carry no increased risk for cancer" (Misra et al., 2015; Maheswari et al., 2018).

Though studies have shed light on the indefiniteness of the definition no further modifications have been made thus far. Leukoplakia is linked to substance abuse (Muthukrishnan and Warnakulasuriya, 2018). Its association with tobacco cannot be overlooked. Studies over the years have suggested various other factors like diet and local irritants (sharp teeth etc) (Choudhury *et al.*, 2015; Patil *et al.*, 2018). The above statement suggests the prevalence of leukoplakia in populations with high tobacco/alcohol use. India is high on the list with the most leukoplakia cases reported (Chaitanya *et al.*, 2017). India is also not so surprisingly the hub for oral cancer given the fact that oral cancer is linked to substance abuse and the high prevalence rate of leukoplakia which is a premalignant condition (Venugopal and Uma Maheswari, 2016).

According to a study by Anil K et al leukoplakia had a 40.8% chance of turning cancerous/malignant. The WHO diagnostic criteria is to date the standardized system for diagnosing leukoplakia, clinical evaluation though important is not conclusive and thus there is a need for histopathological confirmation. Histologically epithelial atypia, the keratinization, and thickness of epithelium along with cellular abnormalities are checked to make a diagnosis and rule out dysplasia.

The studies thus make clear the risk of being diagnosed with leukoplakia, the high prevalence rate in India should ring an alarm of caution and awareness when dealing with this lesion. Thus the study aims at mapping out the prevalence of the different types of oral leukoplakia amongst patients visiting saveetha dental College to evaluate current trends of the lesion and improve diagnosis and identification of leukoplakia and form an understanding on the association of tobacco with the different clinical types.

MATERIALS AND METHODS

The research study has been thoroughly planned for the methodology used to conduct this study. The study has been performed retrospectively in a private dental institution. This provides a large dataset to work on with a straightforward course of action. It also has the advantage of reducing the hassle and time to evaluate each patient independently for the inclusion Since the study involves patients reporting to SDC the study criteria. population is mostly centered around the hospital thus lacking diversity in terms of location and socioeconomic status, which may not directly represent the general population. Prior to conducting the study permission to access patient reports was obtained and ethical clearance was provided by the ethical board. The patient database was used to review and analyze data specific to leukoplakia. Patient reports were collected after thorough confirmation using histopathological reports and clinical pictures. The collected data were tabulated in excel sheets and statistical analysis was done using the SPSS software. Incomplete reports were excluded from the study to prevent distortion and bias. Frequency distribution test was done in terms of age, gender and type of leukoplakia. Further in order to correlate leukoplakia and its prevalence between the genders and the type of tobacco products used among them Chi square test was performed and a p value of less than 0.05 was considered to be statistically significant. Data was analyzed from a dataset consisting of 97 patients of which 92 males and 5 females were present.

RESULTS AND DISCUSSION

Oral leukoplakia is an oral potentially malignant disorder with the highest rate of malignant transformation rate. With an overall rise in oral cancers throughout the world, the need for its early diagnosis and management becomes crucial in controlling the situation. One definite way of doing this is prevention. Preventing premalignant lesions to progress into cancers is a promising step forward. This study looked into the association of leukoplakia with age, gender, and tobacco usage, to map out its prevalence and thus assess its course. This gives a better understanding on identifying and diagnosing this condition amongst the dental community (Steele *et al.*, 2015; Subashri and Maheshwari, 2016) and discover newer methods to treat the same (Chaitanya *et al.*, 2018)

The present study involves a total of 97 patients that were reported positive for leukoplakia, this was confirmed using the patient reports and clinical pictures. The study population varied in age from 21 - 80, with the mean, affected age being 41 - 60, with 76.3 % affected with homogeneous leukoplakia and 23.7% affected with non-homogeneous leukoplakia. The study has been thoroughly analyzed and can be summarized into 5 main points as seen from graphs 1-5.

The study reveals the gender predilection of the disease. It is noted that males show a higher prevalence rate when compared to females. The majority of patients are males at 95% and the remaining 5% are females giving an M: F ratio of 19: 1 (graph 1). The study further analyses the age distribution of the study group. A majority of 57.73% of the affected population is in the 41 to 60 age group category followed by 26.8% in the 21 to 40 age group category and the remaining 15.5% in the 61 to 80 age group category. This graph thus

suggests middle age predilection of the disease (graph 2). Looking into the prevalence of clinical types of leukoplakia, it can be noted that non-homogeneous leukoplakia had an occurrence rate of 23.7% when compared to 76.3% for homogeneous leukoplakia. Among the non-homogeneous leukoplakia category, verrucous leukoplakia was found to be most prevalent at 43% followed by speckled leukoplakia and nodular leukoplakia at 39% and 17% respectively (graph 3). However when considering the overall prevalence rate, verrucous leukoplakia, speckled leukoplakia and nodular leukoplakia and nodular leukoplakia have a prevalence rate of 10.31, 9.3 and 4.1% respectively.

Next, the prevalence of the type of tobacco prevalent in homogeneous leukoplakia and non-homogeneous leukoplakia was studied. With respect to homogeneous leukoplakia, it can be noted that smoking tobacco is found to be the most common followed by paan and gutka. The prevalence of the type of tobacco prevalent in non-homogeneous leukoplakia shows smoking tobacco is found to be the most common followed by paan and gutka. However, it is also important to note that 34% do not use any form of tobacco (Chi square value - 1.243, p-value =0.743). This was found to be statistically not significant (graph 4). The study further reveals the correlation between the gender and type of oral leukoplakia, it was observed that males had a higher prevalence rate in both homogeneous and non-homogeneous leukoplakia (Chi square value - 3.838, p-value =0.05), which is statistically significant (graph 5).

Oral cancer is on the rise and so are the occurrences of the premalignant lesions (Muthukrishnan, Bijai Kumar and Ramalingam, 2016). Understanding its epidemiology can greatly help in retarding its progression and thus preventing further complications (Rohini and Jayanth Kumar, 2017). This study has thus correlated leukoplakia prevalence with age, gender, and tobacco usage to focus on factors most associated with its occurrence and hence help provide better strategies to control the same.

The study shows male: female ratio of 19:1, this suggests a very high male predilection. Although various studies report and similar findings the ratio varies greatly. A study by Boker et al shows the ratio of males: females ranging from 4:1 to 1:1 in some places. Although narrowing down to studies conducted within the Indian population shows a strong male predilection which is in consensus with the present study (Bokor-Bratić, 2003).

It is observed that patients in the 41 to 60 years age group are most affected which agrees with various other studies. However, some studies suggest increasing prevalence with age which does not agree with the present study (El Toum *et al.*, 2018). This could be due to varied age distribution across the studies and could also be attributed to the medical negligence by the older age population resulting in fewer hospital consultations from this age group.

Looking at the prevalence of clinical types of leukoplakia, it is observed that the majority of leukoplakia cases are homogeneous at a 76% occurrence rate which is in agreement with other studies. The occurrence rates of verrucous leukoplakia were found to be most prevalent at 43% followed by speckled leukoplakia and nodular leukoplakia at 39% and 17% respectively. It should be noted that various studies suggest verrucous leukoplakia to be highly malignant, studies also suggest an overall malignant potential of nonhomogeneous leukoplakia (Mello *et al.*, 2018). Thus the study shows onefourth of the population has an increased risk of malignant transformation.

Looking further into the study it is noted that homogeneous leukoplakia is strongly associated with smoking tobacco, Paan also has a significant association with leukoplakia, however, the present study also shows 31% of the study population do not use tobacco and gutka has a very minor association with leukoplakia. This is in accordance with other studies in people with leukoplakia occurred despite tobacco absence, this could be due to other substance abuse or other reasons (Sabashvili *et al.*, 2018). The tobacco association with non-homogeneous leukoplakia reveals a majority of the affected patients do not use tobacco. This suggests leukoplakia due to substance abuse other than tobacco or other reasons, which shows similar findings to homogeneous leukoplakia. Smoking tobacco has the highest association followed by paan and gutka, this is in consensus with other studies (Sabashvili *et al.*, 2018).

This study was performed in a retrospective manner, and thus has limitations to it. Since the study was performed in Saveetha Dental Hospital the study population is most often people living in close proximity to the hospital, this drastically limits the sample diversity, causing a sample population of similar socio-economic status and location, which in turn affects the study outcome. Also, this may not depict the general population correctly. Another drawback of this study is the limited sample size. The future scope of this study is thus to perform a prospective study on a much larger scale to ensure better understanding of the epidemiology of the disease.



Figure 1 represents the frequency distribution of oral leukoplakia cases in males and females. The X-axis represents the gender and the Y-axis represents the frequency of the leukoplakia cases. It is observed that males (95%) have a higher prevalence of leukoplakia when compared to females (5%).



Figure 2 represents the frequency distribution of leukoplakia cases in different age groups. The X-axis represents the gender and the Y-axis represents the frequency of oral leukoplakia cases. It is observed that the 41-60 years age group revealed the highest prevalence rate of 57.78% followed by the 21-40 and 61-80 years age group with prevalence rate of 26.8% and 15.5% respectively.



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Figure 3 represents the percentage distribution of the clinical type of oral leukoplakia. The X-axis represents the type of leukoplakia and the Y-axis represents its frequency percentage among the study participants. It is noted that homogeneous leukoplakia has a prevalence rate of 76.3% followed by verrucous leukoplakia, speckled leukoplakia and nodular leukoplakia showing prevalence rates of 10.3%, 9.3% and 4.1% respectively.



Figure 4 represents the association between tobacco product used and type of oral leukoplakia. The X-axis represents the clinical types of leukoplakia and the Y-axis represents the types of tobacco product namely smoking tobacco, gutka, paan or no tobacco product used (depicted in blue, green, green, yellow and purple respectively). Association between gender and type of tobacco causing oral leukoplakia was done using Chi-square test (Chi square value - 1.243, p-value =0.743) and was found to be statistically not significant. It was observed that homogeneous leukoplakia had a higher prevalence of smoking

tobacco usage and non-homogenous leukoplakia had a higher prevalence among the non-smoker group followed by smoking tobacco.



Clinical type of leukoplakia

Figure 5: represents the association between the gender of patients diagnosed with oral leukoplakia and type of oral leukoplakia. The X-axis represents the type of leukoplakia namely homogeneous and non homogeneous leukoplakia and the Y-axis represents the gender (male depicted in blue and female depicted in green). Association between gender and type of leukoplakia was done using Chi-square test (Chi square value - 3.838, p-value =0.05) and was found to be statistically significant. It was observed that males had a higher prevalence rate in both homogeneous and non-homogeneous leukoplakia.

CONCLUSION

The results of the study revealed the prevalence and association of clinical types of oral leukoplakia with age, gender, and tobacco usage. The study suggests that leukoplakia has a strong male predilection and the 41 to 60 years age group were the most commonly affected when compared to other age groups. The study results also proved that homogeneous leukoplakia is more prevalent and smoking tobacco is most commonly associated with homogenous leukoplakia. Idiopathic non - homogenous leukoplakia associated with no habits was observed to be highly prevalent. This also gives us an idea of the causes specific to the study population and suggests steps that should be taken effectively for early diagnosis to prevent malignant transformation.

AUTHOR CONTRIBUTIONS:

All authors have equal contribution in bringing out this research work.

CONFLICTS OF INTERESTS:

There were no conflicts of interest as declared by the authors.

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