PREVALENCE OF LEUKOPLAKIA AMONG PATIENTS VISITING A PRIVATE DENTAL HOSPITAL-AN INSTITUTIONAL STUDY

Type of study: Cross-sectional study

Running title: Prevalence of leukoplakia in a private dental hospital

ABSTRACT

Background: The oral mucous membrane is an integral part of the oral cavity and oral premalignancy plays an intermediate stage. Oral leukoplakia otherwise called smoker's keratosis is a potential premalignant disorder and if not diagnosed early has a risk of causing oral morbidity and cancer. It is a non-scrapable white patch or plaque which might be homogeneous or nonhomogeneous and is strongly associated with smoking, tobacco, alcohol consumption, chronic irritation, infections, and ultraviolet exposure. The etiology is idiopathic. The main aim of the study was to assess the prevalence of leukoplakia in patients reporting to a university dental hospital.

Methodology: The present study was a retrospective observational study wherein 239 leukoplakia cases were reported to a private dental hospital located in Chennai from June 2020 to April 2021. Data was collected from DIAS and was tabulated in Excel. Data analysis was done in SPSS software Version 20.0. Descriptive statistics and the relation between variables were determined using the chi-square test where done. $p<0.05$ was considered statistically significant.

Results: The results of this study reveal that oral premalignant leukoplakia has a strong male predilection (95.4%) and the age group of 50-60 years (29.71%) was the most commonly affected when compared to the other age groups.This study further results that homogenous type (75.5%) of oral leukoplakia was commonly prevalent in the right buccal mucosa (29.29%) followed by the left buccal mucosa (23.43%) of the oral cavity associated with the history of excess smoking

(38.08%). Pearson chi-square test shows p-value is 0.00, (p-value < 0.05).Hence, it is statistically significant.When association was done between the site of the lesion in the oral cavity by the number of participants, 28.03% of the male participants were presented with the lesion on the right buccal mucosa. Pearson chi-square test shows p-value is 0.99, (p-value > 0.05).Hence, it is statistically not significant.

Conclusion: The results of this study reveal that oral premalignant leukoplakia has a strong male predilection and the age group of 50-60 years was most commonly affected when compared to the other age groups.This study further results that homogenous type of oral leukoplakia was commonly prevalent in the right buccal mucosa followed by the left buccal mucosa of the oral cavity associated with the history of excess smoking.

Keywords: oral leukoplakia, prevalence, smoking, tobacco chewing, innovative technology, novel method.

INTRODUCTION

The oral mucous membrane is an integral part of the oral cavity (1). Oral premalignancy is considered an intermediate stage. A premalignant lesion is defined as “a morphologically reformed tissue in which oral cancer is more likely to occur than in its seemingly normal counterpart”.Oral leukoplakia is considered a potential premalignant disorder (2) and is graded histologically as mild, moderate, and severe dysplasia depending on the level of involvement of the epithelium by the WHO (3). These lesions are largely asymptomatic, and the clinical relevance of oral leukoplakia is primarily tied to its association with oral squamous cell carcinoma. Thus, timely workup and effective management of these lesions can reduce the risk of malignant transformation. If it’s not diagnosed earlier, it can even cause morbidity (4). Oral leukoplakia is a non-scrapable white patch or plaque which might be homogeneous or

nonhomogeneous and is strongly associated with smoking. Risk factors include all forms of tobacco, including cigars, cigarette, beedi, and pipe (5). Other synergistic risk factors include alcohol consumption, chronic irritation, fungal infections such as candidiasis, oral galvanism due to restorations, bacterial infections, sexually transmitted lesions like syphilis, combined micronutrient deficiency, viral infections, hormonal disturbances, and ultraviolet exposure (6,7). The etiology of oral leukoplakia is multifactorial, and many causes are idiopathic. A well-defined leukoplakia is said to be associated with various factors such as poor diet, poor oral hygiene, local irritants such as caries, sharp teeth, alcohol, and tobacco (8–10). The prevalence of leukoplakia varies among scientific studies. According to a global review point, there is a prevalence of 2.6% and a malignancy conversion rate ranging from 0.1% to 17.5%. The statistical analysis from several studies concluded the prevalence of leukoplakia ranging from 0.2% to 5.2% and the malignant transformation of 0.13% to 10% in India. This alarming increase in the prevalence of leukoplakia in India could be mainly due to its cultural, ethnic, and geographic factors(11). When a tissue cell is exposed to any type of carcinogen, it tries to adapt to it. In the oral epithelium, a hastened growth phase (hyperplasia) is the earlier sequelae(12). When the irritant persists further, the epithelium shows features of cellular degeneration, a well-characterized feature of adaptation (atrophy). When the stage of adaptation and revocable cell damage ends, the cells gradually reach a stage of irrevocable cell damage, manifesting as either apoptosis or malignant transformation via tumor suppressor genes (p53). As an adaptive response, the hastened pace of cell division noted at the earlier stages of transformation facilitates further genetic damage, thereby forcefully pushing the cells further along the path to malignant transformation(13). Our team has extensive knowledge and research experience that has translated into high-quality publications (14–17)(5)(18,19)(20–22)(23–25)(26,27)(28–30)(31,32). The main aim of the study was to assess the prevalence of leukoplakia among patients visiting a private dental hospital.

MATERIALS AND METHODS

This was a university dental hospital-based retrospective cross-sectional study conducted among the patients visiting a private dental hospital in Chennai from June 2020 to April 2021. The data were collected by reviewing the patients' records from Dental Information Archiving Software (DIAS). Patients with leukoplakia were included in the study and patients reported with other oral lesions were excluded. 239 oral leukoplakia cases were reported at the specified time. The data was cross verified with photographs and was compiled in Excel Sheet. The tabulated data and the parameters were exported to SPSS software Version 20.0. Descriptive statistics and the relation between variables were determined using the chi-square test. $p<0.05$ was considered statistically significant.

RESULTS

In this study, 239 patients reported leukoplakia in our hospital. Data from the current study revealed that 29.71% of patients reported with oral leukoplakia aged between 50-60 years **(Figure 1).** Among them, 95.4% were males and 4.6% were females **(Figure 2)**. 79.5% of the patient population presented with the homogeneous and 20.5% with non-homogenous type of leukoplakia **(Figure 3)**. Among the reported cases, 38.08% of the patients gave a history of smoking **(Figure 4)**. Right buccal mucosa was the most commonly affected site in the oral cavity with 29.29% followed by left buccal mucosa with 23.43% **(Figure 5).** When association was done between the site of the lesion in the oral cavity by the number of participants, 28.03% of the male participants were presented with the lesion on the right buccal mucosa **(Figure 6).**

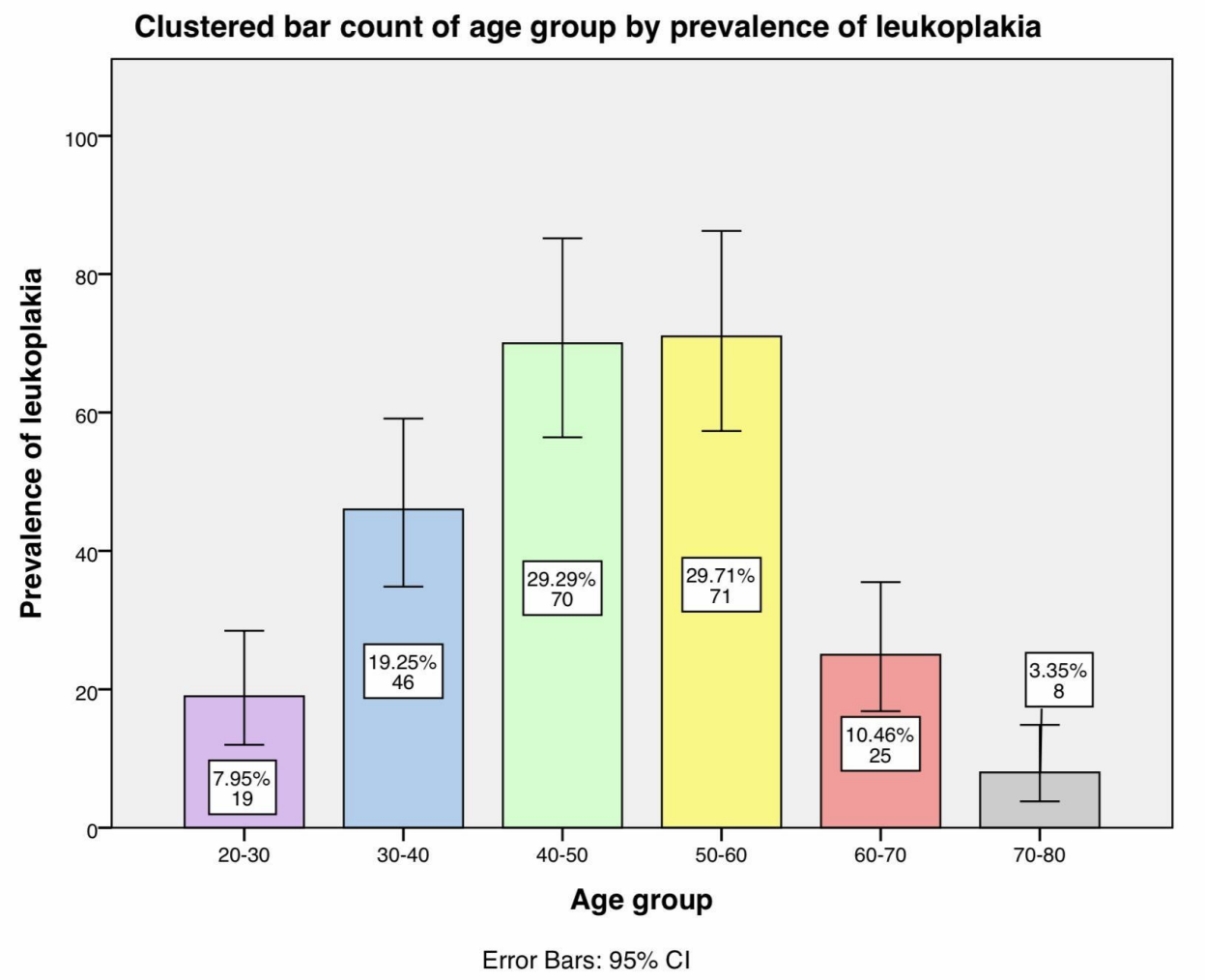

Figure 1:The above bar graph represents the association between the prevalence of leukoplakia among different age groups. X-axis represents the age group while Y-axis represents the percentage of prevalence of leukoplakia. Pearson chi-square test shows p-value is 0.00, (p-value < 0.05).Hence, it is statistically significant.

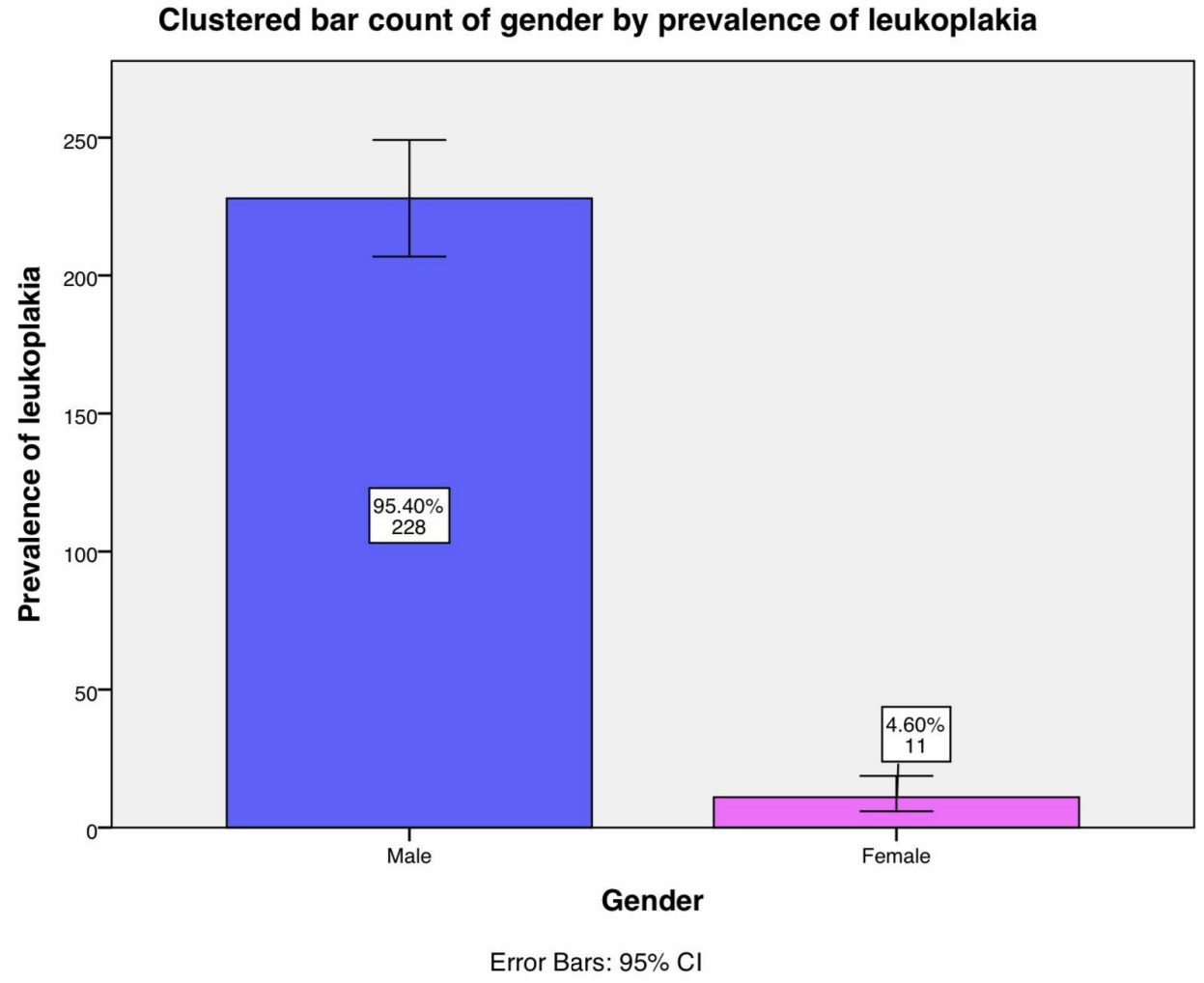

Figure 2:The above bar graph represents the association between the prevalence of leukoplakia among males and females. X-axis represents the gender while Y-axis represents the percentage of prevalence of leukoplakia. Pearson chi-square test shows p-value is 0.00, (p-value < 0.05). Hence, it is statistically significant.

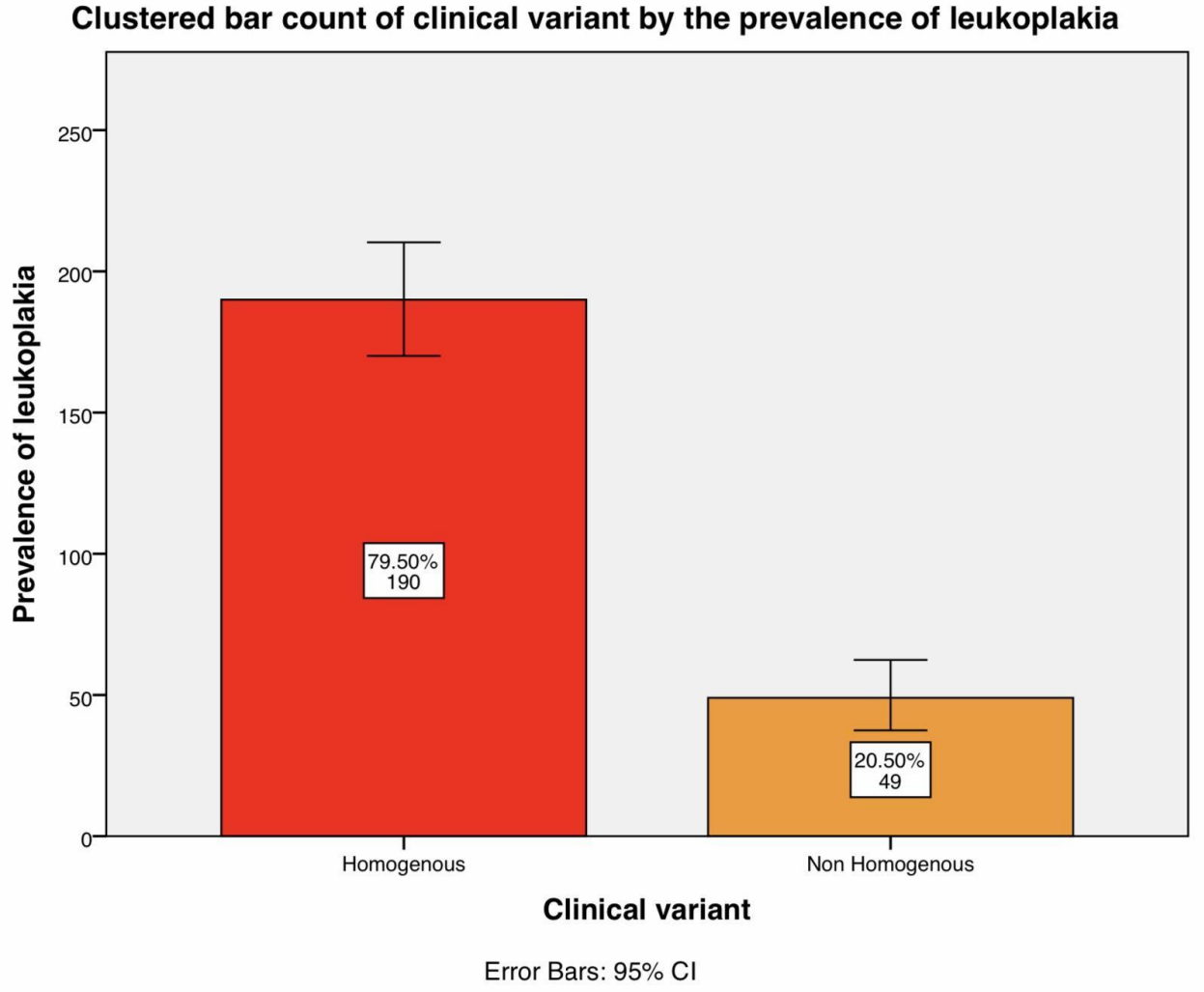

Figure 3:The above bar graph represents the association between the prevalence of leukoplakia with different clinical variants. X-axis represents the clinical variant of leukoplakia while Y-axis represents the percentage of prevalence of leukoplakia. Pearson chi-square test shows p-value is 0.00, (p-value < 0.05).Hence, it is statistically significant.

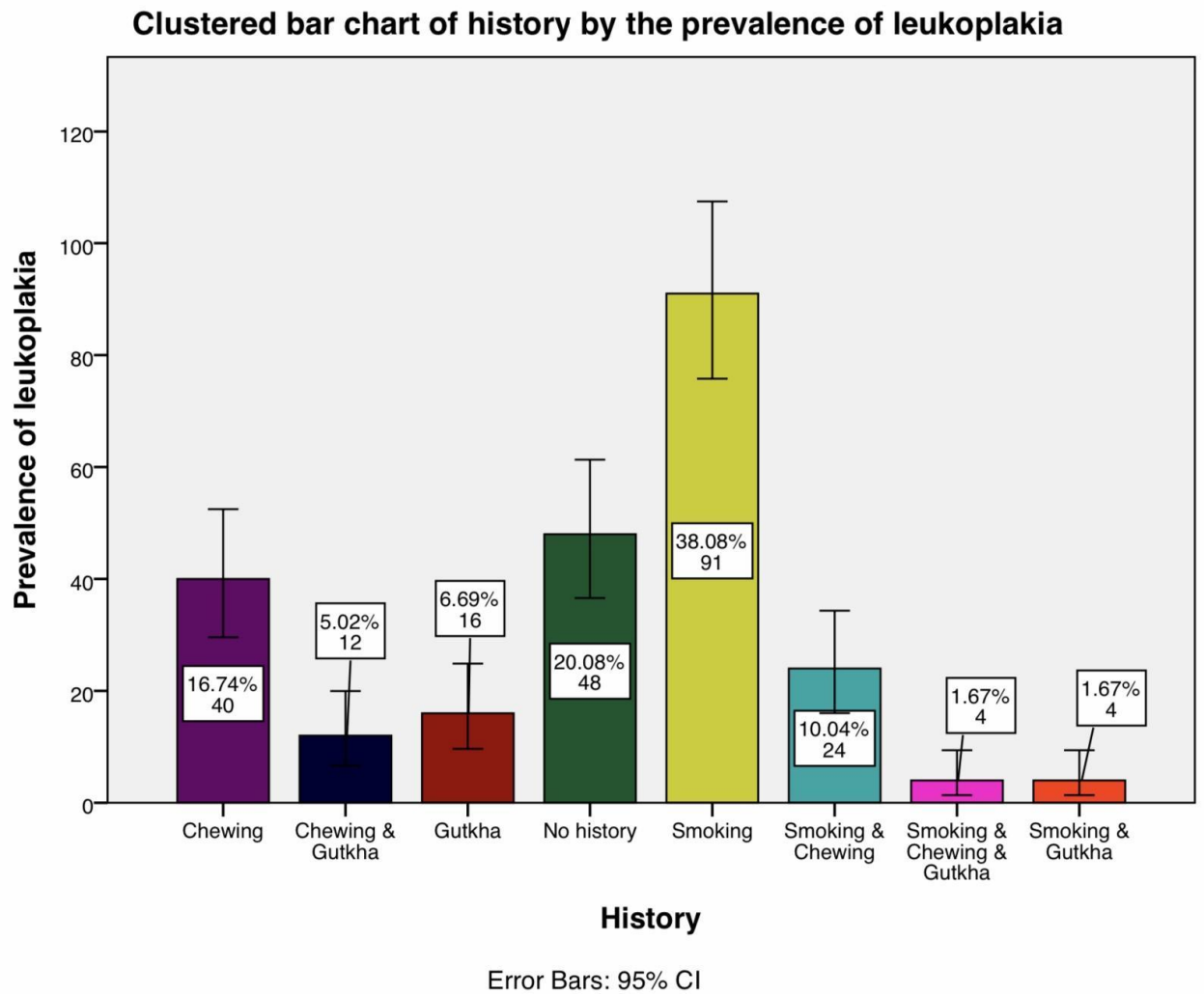

Figure 4:The above bar graph represents the association between the prevalence of leukoplakia with the history of the habit of the patient. X-axis represents the history of the patient while Y-axis represents the percentage of prevalence of leukoplakia. Pearson chi-square test shows p-value is 0.00, (p-value < 0.05).Hence, it is statistically significant.

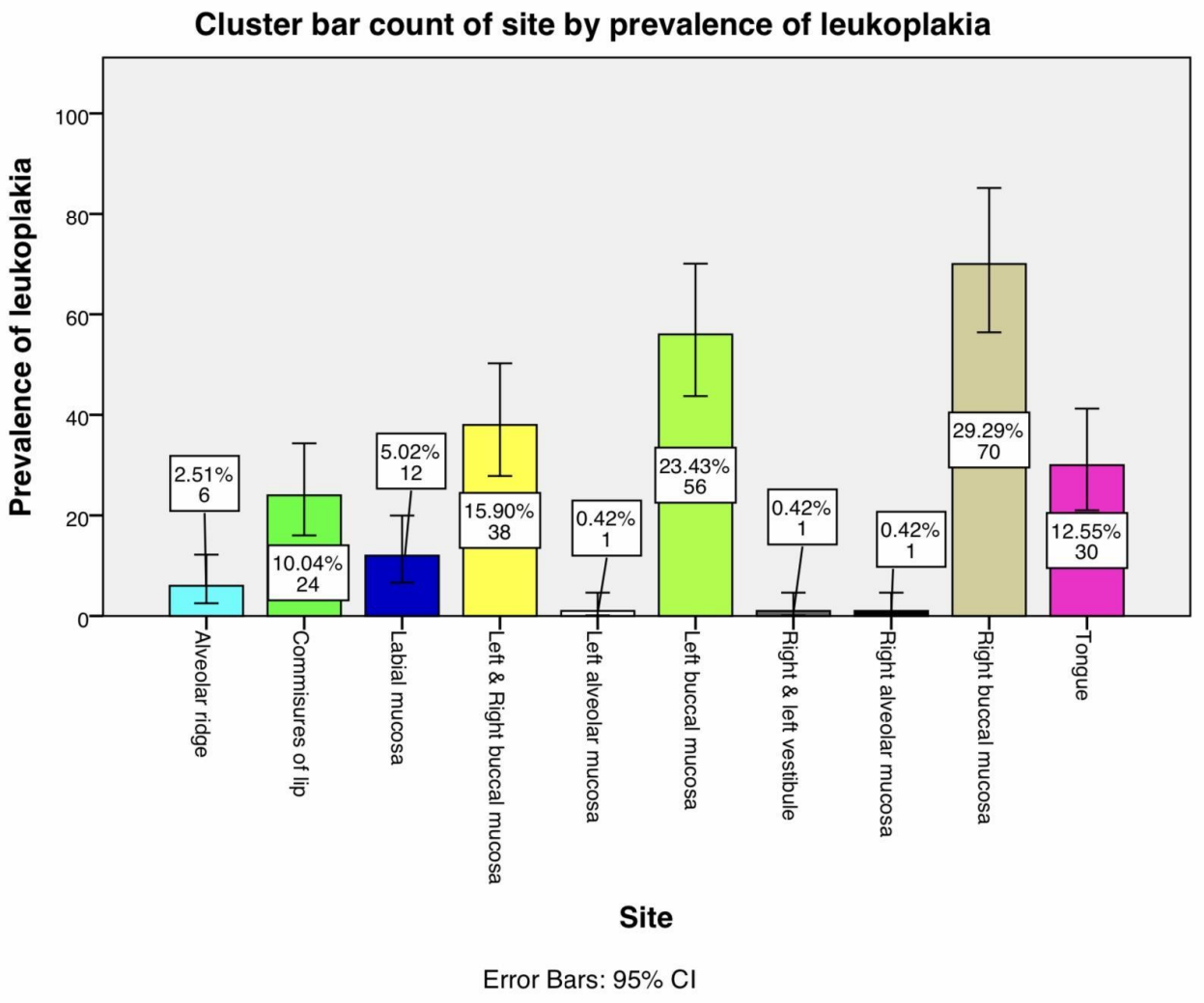

Figure 5:The above bar graph represents the prevalence of leukoplakia in different sites of the oral cavity. X-axis represents the site of the oral cavity while Y-axis represents the percentage of prevalence of leukoplakia. Pearson chi-square test shows p-value is 0.00, (p-value < 0.05).Hence, it is statistically significant.

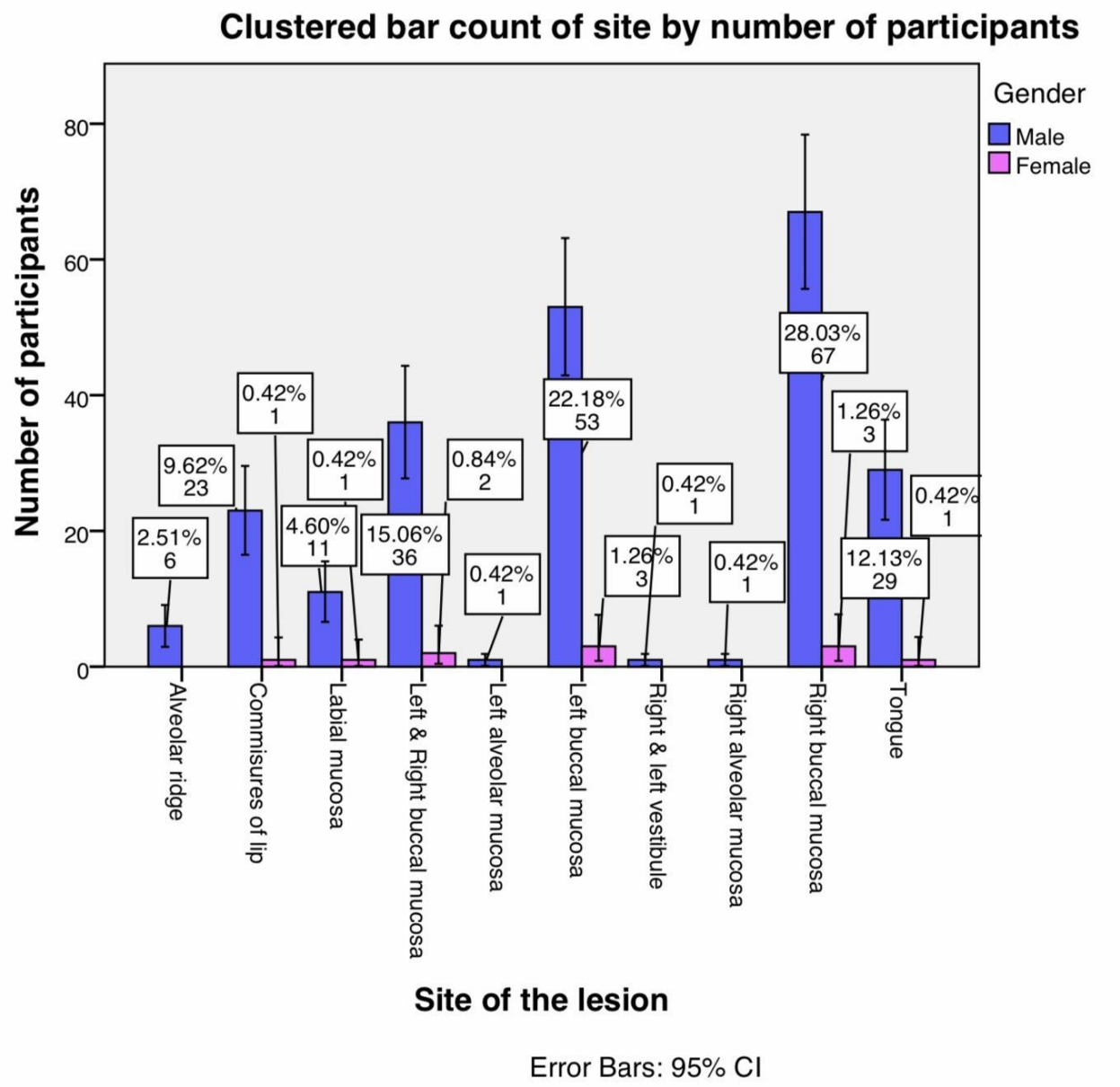

Figure 6:The above bar graph represents the association between the site of the lesion in the oral cavity by the number of population. X-axis represents the site of the lesion in the oral cavity while Y-axis represents the number of participants. Pearson chi-square test shows p-value is 0.99, (p-value > 0.05).Hence, it is statistically not significant.

DISCUSSION:

Oral leukoplakia has an increased potential for turning into oral squamous cell carcinoma (16,17,27,28)(33)(34). With an overall rise in oral cancers throughout

the world, the need for its early diagnosis and management becomes crucial in controlling the situation. The present study was a retrospective observational study wherein 239 leukoplakia cases were reported to a private dental hospital located in Chennai from June 2020 to April 2021. The collected data were subjected to descriptive statistical analysis and chi-square tests in SPSS to find the frequencies of age groups, gender, clinical variants, history of the habit and site of the lesion, and bar graphs were charted.

The present study reveals the gender predilection of the disease. The highest prevalence of leukoplakia among age groups was commonly observed in people aged between 50-60 years (29.7%) with the chi-square test showing a p-value of 0.000 which is considered to be statistically significant **(Figure 1)**. According to our study, a higher rate of prevalence was observed in males (95.4%) than females (4.6%) with the chi-square test showing a p-value of 0.000 which is considered to be statistically significant **(Figure 2)**. A previous study conducted by *Boker M et al* showed that oral leukoplakia occurred in men over 40 years of age and in women over 50 years of age (35). However, these results were opposite to a study conducted by *Rivera C et al* where females represented the majority of the prevalence (36)

Tobacco smoking is one of the most important etiological factors in the development of oral leukoplakia. Smokers tend to have a six-fold increase in the risk of developing leukoplakia of the oral mucosa in regard to non-smokers. In our study, people with a history of smoking (38.08%) had a higher prevalence than non-smokers or people with mixed habits with the chi-square test showing a p-value of 0.000 which is considered to be statistically significant **(Figure 4)**. Comparing our study to the one conducted by *Boker M et al* shows the highest prevalence of leukoplakia among smokers (33.3%) (35). A similar study conducted by *Pratik P et al* revealed that smokers have a higher prevalence of leukoplakia (51.4%) (37). This also corresponds to a study conducted by *Bathi R et al* where leukoplakia was reported by 8.2% of the patients with smoking habits and in those who chewed betel quid with tobacco (38).

Looking further into the study it reveals that 79.5% of the patients were diagnosed with the homogenous type and the remaining 20.50% of the patients were diagnosed with the non-homogenous type with the chi-square test showing a p-value of 0.000 which is considered to be statistically significant **(Figure 3)**. A previous study conducted by *Macigo FG et al*, reveals that smokers and patients with mixed habits had a higher prevalence of homogenous type of leukoplakia (10%) than the non-homogeneous type of leukoplakia (0.6%) (39).In another study conducted by *Scheifele C et al*, the prevalence estimates were 0.37% for homogeneous leukoplakia and 0.06% for non-homogeneous leukoplakia (40). A similar study conducted by *Nauma H et al* reveals the prevalence of 76.3% of homogenous type leukoplakia followed by 23.7% of non-homogenous type of leukoplakia among the patients (41).

Our current study reveals that the most common site of the prevalence of leukoplakia in the oral cavity was right buccal mucosa (29.29%) followed by the left buccal mucosa (23.43%) with the chi-square test showing a p-value of 0.000 which is considered to be statistically significant **(Figure 5)**. This is similar to the previous study conducted by *Alshayeb M et al* which shows the prevalence of leukoplakia in the buccal mucosa (40.5%) and *Priya MK et al* which also revealed the buccal mucosa as the common site of the lesion (42,43). A study conducted by *Patil PB et al*, reveals that 40.2% of the population had the highest prevalence of leukoplakia in buccal mucosa of the oral cavity (38). Limitation of this study was less sample size and homogenous population. Further studies with larger sample size should be done to generalize the results.

CONCLUSION

Within the limits of the study oral premalignant leukoplakia has a strong male predilection and the age group of 50-60 years were most commonly affected when compared to the other age groups. This study further results that homogenous type of oral leukoplakia was commonly prevalent in the right buccal mucosa followed by the left buccal mucosa of the oral cavity associated

with the history of excess smoking. This gives us an idea of the causes specific to the study population and suggests steps that should be taken effectively for early diagnosis, treatment, and prevention of any malignant transformation.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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