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Prevalence of oral potentially malignant disorders among adult population: A retrospective study

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ABSTRACT

Oral potentially malignant disorders refer to both the precancerous lesions and precancerous conditions of the oral cavity. They possess the risk of cancer development in the oral cavity. Precancerous lesions and conditions are associated with various causative factors such as smoking, smokeless forms of tobacco etc. Early detection of oral, potentially malignant disorders can reduce the risk of development into oral cancer. Therefore, the purpose of this study is to find out the prevalence of oral, potentially malignant disorders among the adult population. The records were obtained through DIAS. This study included histopathological proven oral, potentially malignant disorder. The age, gender, smoking habits, systemic diseases, clinical sites of the oral potentially malignant disorders were noted. The mean age group of the patients who were involved in this study was 44.37. The prevalence of oral, potentially malignant disorders was higher in males [66.7%] compared to females [33.3%]. When assessed for the habits associated with the patients having oral potentially malignant disorders, the smokeless tobacco forms were higher in prevalence [31.1%]. 51.1% of the patients were found to be without any habits. The most common site involved was buccal mucosa [88.9%]. The systemic diseases were absent in most of the patients [82.2%]. The highest prevalence of oral potentially malignant disorder was found to be as Lichen planus of 33.3%. Within the limits of this study, the most common oral potentially malignant disorders were found to be Lichen planus according to this population studied. However, previous studies report that the prevalence of oral potentially malignant disorders differs among different populations.

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INTRODUCTION

Oral potentially malignant disorders are defined by the World Health Organization as the risk of malignancy is present in a lesion or condition either at the time of initial diagnosis or at a future date (Mortazavi *et al.*, 2014). This potentially malignant disorder involves the precancerous lesions and precancerous conditions of the oral cavity. Precancerous lesions are the ones which alter the morphology of the tissue and have a greater risk of transforming into malignancy. Precancerous conditions are those

which do not necessarily alter the morphology of tissue and are associated with the habits of the patient. The WHO also states that not all the lesions and conditions have the potential to transform into malignancy (Paulose, 2020).

Oral cancer is one of the most common cancers that are prevalent globally. Oral cancer occurs in any part of the oral cavity, including the lips, pharynx, tongue, soft tissues, hard palate and so on. This is associated with the smoking and chewing tobacco habits of the patient. This is a malignant form of the lesion and requires invasive treatments. Oral cancer stands as the 6th most common cancer across the globe, but the awareness about the same remains low even in the developing countries. Oral squamous cell carcinoma is the most common cancer in the oral cavity (Rai et al., 2017). The malignant transformation rates of precancerous lesions vary considerably. This malignancy transformation can arise even from the clinically normal mucosa and also from the well-defined precursor lesions such as the leukoplakia (Speight et al., 2018)

The clinician detects the oral potentially malignant disorders through the intraoral and extraoral examination. Depending upon the severity of the lesion, adjunctive aids are used. The adjunctive aids that are used are the Papanicolaou smear, biopsy, swab culture and so on. These detect the lesion and assess the severity and risk associated with it (Lingen, 2017). Apart from the usual visual and tactile examination, use of adjunctive aids provides an accurate report of the potentially malignant disorders and even the malignant transformation cases. Hence, proven histopathological lesions are important to assess the prevalence in a population.

The most common risk factors associated with oral potentially malignant disorders is the usage of tobacco which can be the smoke and the smokeless forms. The oral hygiene of the patient influences the occurrence of potentially malignant disorders (Subashri and Maheshwari, 2016). The precancerous lesions and the conditions as given by WHO nomenclature is as follows. Precancerous lesions include the Leukoplakia, erythroplakia, palatal lesions in reverse smokers. Precancerous conditions include the submucous fibrosis, actinic keratosis, lichen planus, discoid lupus erythematosus (Warnakulasuriya et al., 2007).

Previous studies report that the prevalence of potentially malignant disorders of the oral cavity varies globally. The study conducted based on the rural population in Brazil reported a higher prevalence of oral potentially malignant disorders (Ferreira, 2016). Previous studies report that the lack of awareness among the public and knowledge of the medical professionals leaves the potentially malignant disorders undiagnosed (George, 2011). The diagnosis followed by histopathological examination should be made to assess the prognosis and severity of the lesion. The oral lesions can present with variable clinical presentations (Dharman and Muthukrishnan, 2016).

This research was needed to fulfil the need that early detection of oral potentially malignant disorders prevents the malignant transformation rates. More literature should be brought out on the epidemiology of the potentially malignant disorders. This study fulfils the lack of awareness among the public about the potentially malignant disorders. This could invariably provide more knowledge on potentially malignant disorders to the medical professionals.

Therefore, this study aims at assessing the prevalence of oral, potentially malignant disorders among the adult population.

MATERIALS AND METHODS

The study was conducted with the approval of the Institutional Ethics Committee [SDC/SIHEC/2020/DIASDATA/0619-0320].

This retrospective study was conducted by data obtained from Saveetha Dental College and Hospitals. The records of the patient were obtained through DIAS.

Inclusion criteria

1. Oral precancerous lesions and precancerous conditions

2. Histopathological proven lesion

3. Adult population

Exclusion criteria

1. Other lesions such as red and white, ulcerative and bullous lesions were excluded.

Since this study was conducted in a university setting, the retrieval of data was easier, and the incidence of various oral potentially malignant disorders was known. This study involved only a specific population and cases of the specific time period. Hence, convenience sampling was done. This study included only the histopathological proven lesion. The ethical approval to obtain the records was obtained from the Institutional Scientific Review Board, Saveetha Dental College and Hospitals.

A total of 610 case sheets were reviewed for the prevalence of oral, potentially malignant disorders. The case sheets were verified for clinical photographs and histopathology. The study population was clearly identified and the random sampling technique was used. Since this study was based on the university setting, data obtained was accurate and crossed verified with photographs and histopathology for errors. The results of this study can be generalized and involve one ethnic group with a bigger sample size.

The categories that were taken into account were the age, gender, clinical site, smoking habits, systemic diseases, and the potentially malignant disorder. The cases without histopathology were excluded. The data obtained was imported in SPSS for statistical analysis. The independent variables will be the gender, age, habits and the histopathology proven potentially malignant disorder will be the dependent variables. Since this is a retrospective study, correlation and association were performed, and the results were analyzed.

RESULTS AND DISCUSSION

Out of the 610 case sheets reviewed, 45 cases were found as the histopathological proven oral, potentially malignant disorders.
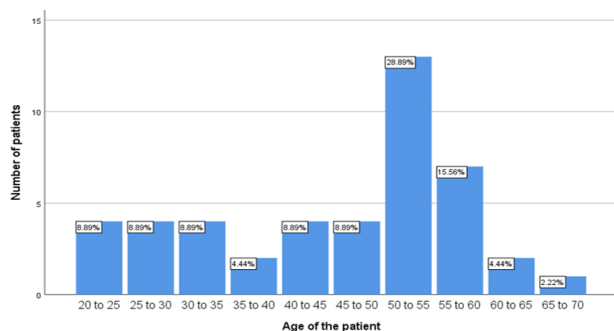

Graph 1: Bar graph showing the age groups associated with the oral potentially malignant disorders

Out of 45 patients, the mean age group was found to be 44.37. The highest prevalence of oral, potentially malignant disorders was found to be among the age group of 55. [13.3%]. The age distribution of the patients associated with oral potentially malignant disorders is given in Graph 1. [Blue colour depicts the different age groups] X-axis represents the age of patients who had OPMD and Y-axis represents the frequency of patients. The graph shows a higher prevalence of OPMD in the age group of 50 to 55 [28.89%].
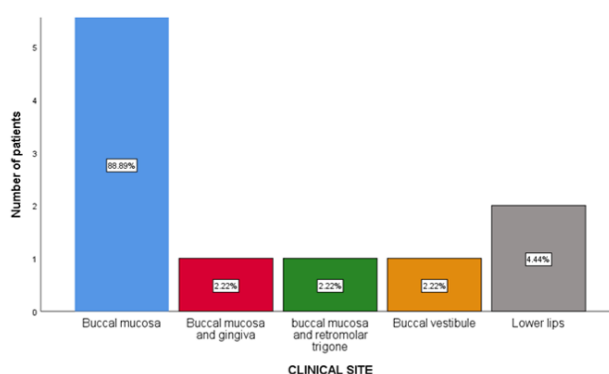
The gender distribution of the patients was reported as males [66.7%] and females [33.3%]. The preva-
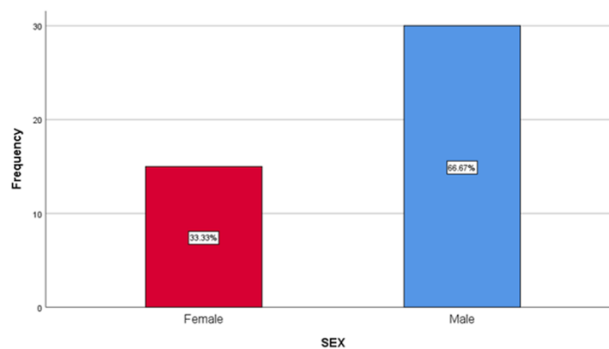
Graph 2: Bar graph showing the gender associated with the prevalence of oral potentially malignant disorders
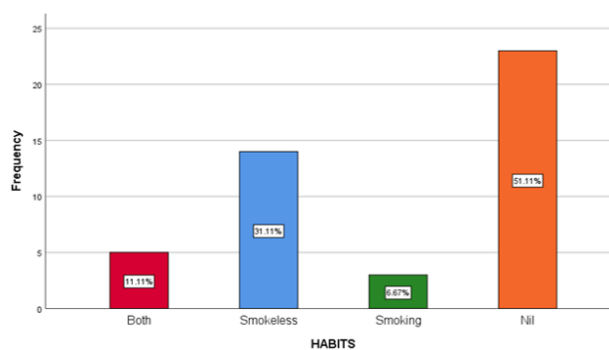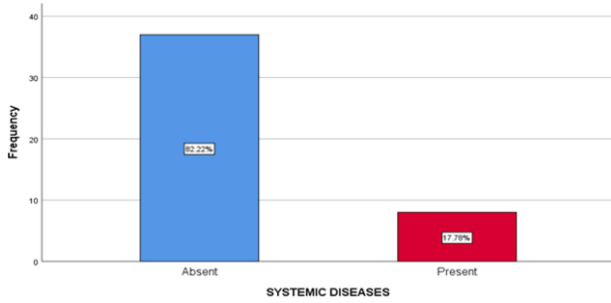

Graph 3: Bar graph showing the habits associated with the patients having oral potentially malignant disorders
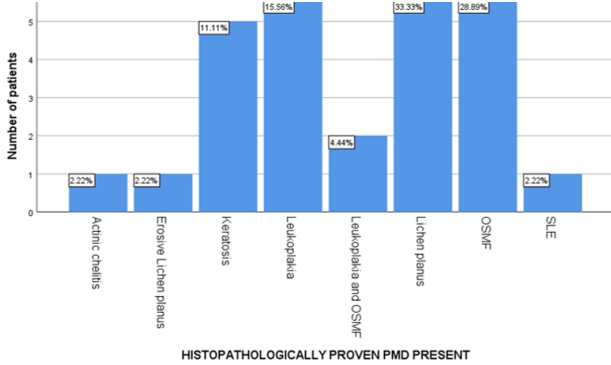

Graph 4: Bar graph showing the clinical sites associated with the oral potentially malignant disorder

lence of oral, potentially malignant disorders was higher in males than females. This gender distribution associated with oral potentially malignant disorders is illustrated in Graph 2. [Blue colour graph depicts male, red-females] Here, X-axis represents the gender of the patients involved in this study and Y-axis represents the number of patients involved. The graph shows the higher prevalence of males [66.7%] than females. [33.3%].
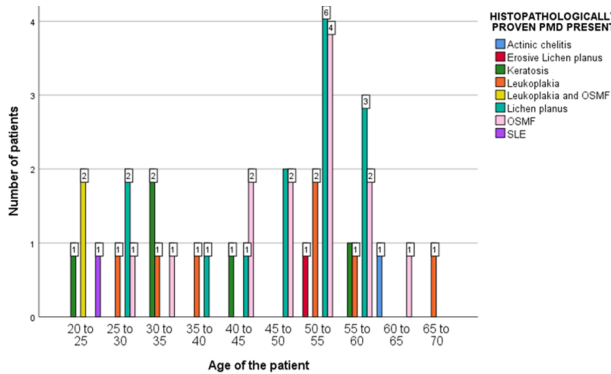
Among the patients who had the habit of smok-

Graph 5: Bar graph showing the systemic diseases associated with the patients having oral potentially malignant disorders
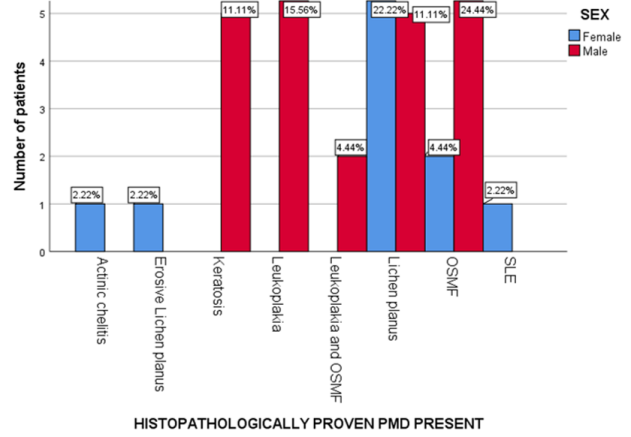

Graph 6: Bar graph showing the prevalence of potentially malignant disorders

Graph 7: Bar graph showing the association of age with the prevalence of OPMD

Graph 8: Bar graph showing the association of gender with the prevalence of OPMD
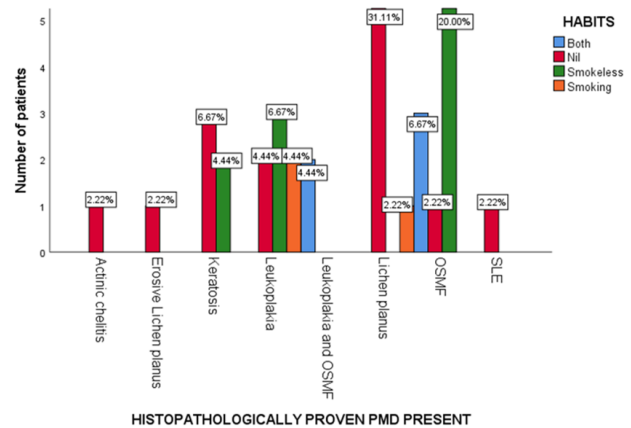
Graph 9: Bar graph showing the association of habits of the patient with the prevalence of OPMD
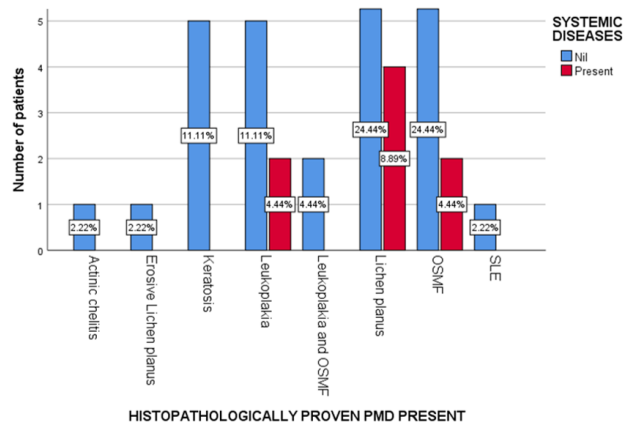
Graph 10: Bar graph showing the association of systemic diseases of the patient with the prevalence of OPMD

ing and chewing tobacco, the highest prevalence of habit in patients with potentially malignant disorders was found to be the smokeless tobacco [31.1%]. This was followed by smoking tobacco [6.7%] and cases, where both smoking and smokeless tobacco was used, was 11.1%. This study reported that 51.1% of the patients have no habits associated. Thus, according to this study, the prevalence of oral, potentially malignant disorders is more common in patients who were independent of any habits. The illustration of habits associated with oral potentially malignant disorders is given in Graph 3. [Blue

Graph 11: Bar graph showing the association of the clinical site of OPMD with the prevalence of OPMDs
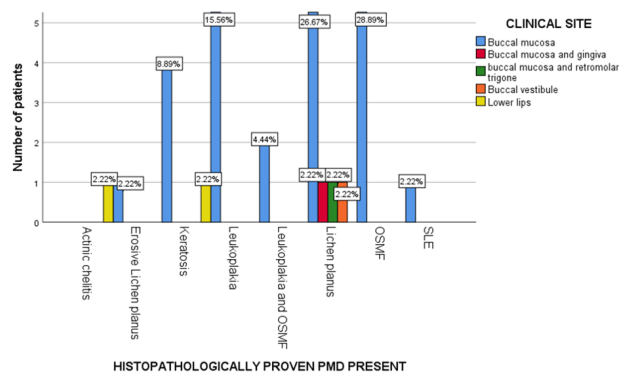
colour graph depicting smokeless forms of tobacco, red-both smoking and smokeless forms, a green-smoking form of tobacco, orange- no habits] X-axis of this graph represents the personal habits of the patient, and Y-axis represents the number of patients. This graph shows the higher prevalence of OPMD in patients with no habits [51.1%] than the smokeless forms [31.1%], smoking [6.7%] and both forms [11.1%].

The clinical sites associated with the oral potentially malignant disorders were more common in the buccal mucosa [88.9%]. The other sites in which it was prevalent was buccal mucosa involving retromolar trigone [2.2%], buccal vestibule [2.2%] and lower lips [2%], buccal mucosa involving gingiva [2.2%]. This distribution of the clinical sites associated with oral potentially malignant disorders is given in Graph 4. [Red colour graph depicts buccal mucosa, blue-buccal mucosa involving gingiva, green-buccal mucosa involving retromolar trigone, orange- buccal vestibule, grey-lower lips] Here, X-axis represents the various clinical sites of occurrence of OPMD and Y-axis represents the frequency of clinical sites involved. This graph shows the higher prevalence of OPMD in the buccal mucosa. [88.9%]

This study reported that patients with oral potentially malignant disorders, most commonly have no association with systemic diseases [82.2%]. The systemic diseases were present in 17.8% of the patients. This distribution of the systemic diseases associated with oral potentially malignant disorders is given in Graph 5. [blue graph depicting the absence of systemic diseases, red- the presence of systemic diseases] X-axis represents the presence and absence of systemic diseases in patients with OPMD and Y-axis represents the number of patients involved. This graph shows a higher prevalence of absence [82.2%] of systemic diseases in patients

with OPMD than presence [17.78%]

The study reported that there was a higher prevalence of Lichen planus [33.3%] among the population studied. The other prevalence of disorders was oral submucous fibrosis [28.9%], Leukoplakia [15.6%], Keratosis [11.1%], Leukoplakia with OSMF [4.4%], Erosive lichen planus, actinic cheilitis, lupus erythematosus [2.2%]. This prevalence of oral potentially malignant disorders is illustrated in Graph 6. [Depicted as a blue colour graph showing the various OPMD] X-axis represents the cases of OPMD which was histopathologically proven, and the Y-axis represents the number of patients who had OPMD. This graph shows the higher prevalence of lichen planus [33.3%] followed by OSMF [28.8%] and the others.

From Graph 7, [Depicted as a blue colour graph for actinic cheilitis, red - erosive LP, green- keratosis, orange- leukoplakia, yellow- leukoplakia with osmf, pink- OSMF, purple -SLE] X-axis represents the age of the patient and Y-axis represents the number of patients who had OPMD. This graph shows the higher prevalence of lichen planus [6.67%] among the age of 50 to60 than the other OPMDs present. However, this was statistically significant (Pearson's chi-square test; p value=0.018 - significant)

From Graph 8, [Depicted as a blue colour graph showing females and red- males] X-axis represents the various OPMD, and Y-axis represents the number of patients who had OPMD. This graph shows the higher prevalence of OSMF among males [24.4%] than females [4.4%] and the higher prevalence of lichen planus [22.2%] than the females [11.1%]. However, this was statistically significant (Pearson's chi-square test; p value=0.002 - significant).

From Graph 9, [Depicted as a blue colour graph showing patients with both smoking and smokeless forms habit, red- no habits, green- smokeless tobacco, orange -smoking tobacco] X-axis represents the various OPMD, and Y-axis represents the number of patients who had OPMD. Most patients had no habits associated with Lichen planus [31.11%] than the patients who had habits of smokeless tobacco [20%]. However, this was statistically significant (Pearson's chi-square test; p value=0.00 - significant).

From Graph 10, [Depicted as a blue colour graph showing the absence of systemic diseases and red - presence] X-axis represents the cases of OPMD which was histopathologically proven, and the Y-axis represents the number of patients who had OPMD. Most patients did not have any systemic diseases associated with OPMD such as lichen planus [24.4%] than the presence of systemic diseases [8.89%].

However, this was statistically not significant; (Pearson's chi-square test; p value=0.826 - not significant).

From Graph 11, [Depicted as a blue colour graph showing the buccal mucosa, red- buccal mucosa and gingiva, green- buccal mucosa involving retromolar trigone, orange- buccal vestibule, yellow- lower lips] X-axis represents the cases of OPMD which was histopathologically proven, and Y-axis represents the number of patients who had OPMD. This graph shows the higher prevalence of OPMD in the sites of buccal mucosa [26.67%] in cases of Lichen planus, OSMF [28.89%]. However, this was not statistically significant (Pearson's chi-square test; p value=0.259 - not significant).

In this study, conducted for the prevalence of oral potentially malignant disorders among the adult population, the following results were obtained. There was a higher prevalence of oral, potentially malignant disorders in the age group of 55. The females were most commonly affected, and smokeless tobacco was the most common habit associated with oral potentially malignant disorders. The clinical site, which is most commonly affected was buccal mucosa. Systemic diseases were most commonly absent. The most prevalent oral potentially malignant disorder was Lichen planus.

The mean age group of the patients associated with oral, potentially malignant disorders was 44.37, according to this study. The age group most commonly involved is 55. In the study conducted by YS Kumar et al., on the prevalence of oral potentially malignant disorders among the workers of Udupi taluk, there was a higher prevalence of disorders among the age groups greater than 40 years (Kumar et al., 2015). This was in conjunction with the present study. The study conducted by Naveen Kumar et al., among the dental patients in Jordan, reported that the prevalence of oral potentially malignant disorders was lesser in patients greater than 40 years (Kumar et al., 2019). This was in contrast with the present study. However, the overall consensus is that the prevalence of oral potentially malignant disorders is greater in the adult population whose age groups are higher and greater than 40 years on an average.

The prevalence of the oral potentially malignant disorder in this study was greater in males than females. Most of the previous literature is in agreement with the present study. The study conducted by HK Amarasinghe et al. reported the derivation and validation of a risk factor model for the detection of oral potentially malignant disorders. The study reported a higher prevalence in males which was 67.6% (Amarasinghe et al., 2010). The study which is contrary to this is the higher prevalence of oral potentially malignant disorders in females [53.5%] in the Puerto Rico population (Li et al., 2011). The study reported a higher prevalence in females due to the smoking and drinking factors associated with that population. The overall consensus is that most of the previous literature reports the higher prevalence of oral potentially malignant disorders in males. This is due to the contributing factors such as the smoking and smokeless forms of tobacco.

This study reported that there was a higher prevalence of habits associated with the patients of oral potentially malignant disorders. Among the patients who had habits, the smokeless forms of tobacco were more commonly associated than the smoking forms of tobacco. In a study conducted by Benly George et al., for assessing the precancerous lesion in adults, he reported that there was a higher prevalence of no habits associated with the oral potentially malignant disorders (George, 2019). However, in contrast to this, the previous study reports the higher prevalence of oral potentially malignant disorders in smokeless forms of tobacco such as the betel quid chewing and areca nut. The study reports the strong association of tobacco and the oral potentially malignant disorders (Sivakumar et al., 2018). The study conducted by Arvind et al., reports a strong association of smokeless forms of tobacco with oral potentially malignant disorders (Warnakulasuriya and Muthukrishnan, 2018). However, the consensus is that the prevalence of potentially malignant disorders is strongly associated with the smoking and smokeless forms of tobacco. The reason for the higher prevalence of no habits in the present study could be due to the incorrect data and history obtained from the patient.

The clinical site that was most commonly affected was buccal mucosa in the present study. Previous literature conducted by Swati et al., for the prevalence of oral potentially malignant disorders in Bhopal, reports the most commonly affected site as the buccal mucosa (Balsaraf et al., 2019). There are no contradictory studies with the present study. The consensus is that most of the literature suggests buccal mucosa as the most commonly affected site.

The present study reports the lower prevalence of systemic diseases, associated with the patients of oral potentially malignant disorders. The study conducted by Sandeep Kumar et al., in the Indian population, reports the lower prevalence of systemic diseases associated with oral potentially malignant disorders. This study had only involved diabetes mel-

litus, and its prevalence was less (Kumar, 2015). There are no contrary studies in association with the present study. The consensus was that not many studies were conducted for the prevalence of systemic diseases in oral potentially malignant disorders patients.

The present study reports that the highest prevalence of oral potentially malignant disorders is Lichen planus, followed by submucous fibrosis. The study conducted by Soma Susan et al., reports Lichen planus as the most commonly found potentially malignant disorder (Varghese, 2016). Another study conducted by Y Hassona reports the higher prevalence of Lichen planus among dental patients in the Jordan population. The prevalence rate was 31.1% (Hassona *et al.*, 2015).

The studies which are in contrast to this present study, reports that Leukoplakia and submucous fibrosis as the most prevalent potentially malignant disorders (Villa and Gohel, 2014). However, FW Mello et al., reported that the prevalence of oral potentially malignant disorders differs between populations (Mello *et al.*, 2018). The consensus is that the population-based studies should be conducted for the prevalence of oral potentially malignant disorders as it differs between populations. Early interventions should be done for the prevention into malignancy (Muthukrishnan and Kumar, 2017).

Oral potentially malignant disorders are considered to be the earliest tissue changes in the oral cavity in patients with smoking and any other forms of tobacco habits (Venugopal and Maheswari, 2016). The underlying pathology in these tissues can be detected in the saliva as it consists of the exfoliated cells from the tissue (Maheswari *et al.*, 2018). Previous studies report that neuropathic pain can be caused by the predisposition of these OPMD, which turns into cancer (Subha and Arvind, 2019). OPMD turning into cancer can cause oral mucositis, and this depends upon the type of cancer and its therapy (Chaitanya, 2017). The role of various analgesics to treat pain is reported in the previous literature (Chaitanya, 2018). The drug-induced complications in the treatment of various oral cavity disorders are explained in the previous literature (Muthukrishnan *et al.*, 2016).

According to the previous studies, oral squamous cell carcinoma stands as the primary and most prevalent oral cancer (Misra *et al.*, 2015). Previous studies report that more training, knowledge is given to clinicians about these disorders (Steele *et al.*, 2015). Similar to this, previous studies were also conducted on the anomalies of the hard tissues (Patil, 2018). The tissue resorption can lead to the inhibition of bone and cementum formation (Choudhury, 2015). The soft tissue changes due to the hard tissue anomalies were reported (Rohini and Kumar, 2017).

Limitations

This study covered only a limited population. Patients who visited Saveetha Dental College and Hospitals were only considered. Convenience sampling was done. This study involves data of specific time periods.

Future studies

Future studies should be conducted more on the prevalence of oral, potentially malignant disorders. This is because of the fact that; early detection of oral potentially malignant disorders can prevent oral cancer. Population-based studies should be conducted more. The management strategies of oral, potentially malignant disorders should be studied. The studies emphasizing on reducing the malignant transformation rates should be conducted more.

CONCLUSION

Within the limits of this study, the Lichen planus was found to be the highest prevalent oral potentially malignant disorder. The oral sub mucous fibrosis follows it and the leukoplakia, keratosis, erosive lichen planus, actinic cheilitis, lupus erythematosus prevails in a lesser manner. The males were most commonly affected, and the clinical site mostly associated was the buccal mucosa. This study reports a higher prevalence of oral potentially malignant disorders in non-smokers and non-tobacco chewers. The systemic diseases associated with the prevalence of potentially malignant disorders were less. The age groups most associated with the prevalence of oral, potentially malignant disorders were 50 to 60. The females were mostly associated with the prevalence of lichen planus than the males.

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Conflict of Interest

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

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