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PREVALENCE OF MOST COMMONLY REPORTED POTENTIALLY MALIGNANT DISORDERS OF ORAL CAVITY IN THE REGION OF WESTERN MAHARASHTRA

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ABSTRACT
Prevalence of most commonly reported Potentially Malignant disorders of Oral Cavity in the region of western Maharashtra. **Background:** Oral cancer is the commonest cause of morbidity and mortality worldwide. India alone contributes one third of oral cancer cases reported globally. Almost all the oral cancer cases are preceded by potentially malignant disorders (PMD's). Numerous studies reported wide range of prevalence of these disorders. In this study we tried to find out the current prevalence of most commonly reported potentially malignant disorders in the region of western Maharashtra. **Material and methods:** 13010 patients were screened to find out prevalance of PMDs. Data was collected and analyzed using Statistical Package for the Social Sciences software, version 20.0 (IBM Corp.Released 2011, IBM SPSS Statistics for windows version20.0, Armonk, NY: USA) $P < 0.05$ was considered as statistically significant. **Result:** prevalence of leukoplakia was found highest among PMDs. Majority of patients were in the 40–50 years of age group 190 and least number were in <20 years of age group $n = 21$,]. There was a statistically significant difference between the age of Leukoplakia and other PMDs patients ($P = 0.001$). **Conclusion:** Early recognition of PMD and implementing national preventive programs can reduce impending complications and increase the life expectancy of affected patients.

KEYWORDS: PMD, Leukoplakia, Oral submucous fibrosis.

INTRODUCTION
Cancer of the oral cavity accounts for approximately 3% of all malignancies. Oral cancers are one of the leading cancers worldwide.[1,2] In India today a significant number of these cases would present initially with precursor lesions that are further classified as precancerous lesions and precancerous conditions.[3]

A precancerous lesion is a morphologically altered tissue in which oral cancer is more likely to occur than in its apparently normal counterpart, for example, Leukoplakia, Erythroplakia etc. A precancerous condition is a generalized state associated with a significantly increased risk of cancer, for example, submucous fibrosis, Lichen planus etc.[3]

However, in a World Health Organization (WHO)[4] Workshop, held in 2005, it was decided to use the term "potentially malignant disorders (PMD)" as it conveys that not all disorders described under this term may transform into cancer. Tobacco has been established as a risk factor for the development of PMDs of oral mucosa. The most important consideration is the relation between the use of tobacco and related products and the development of lesions. The present study is conducted to evaluate the prevalence Potential Malignant disorders.

MATERIALS AND METHODS
A human research ethical approval was obtained throughthe Institutional Ethical Committee IECDYPDS. This was a chart review study of patients who attended a Private dental school with the intention to capture variable population distributed in the districts of western

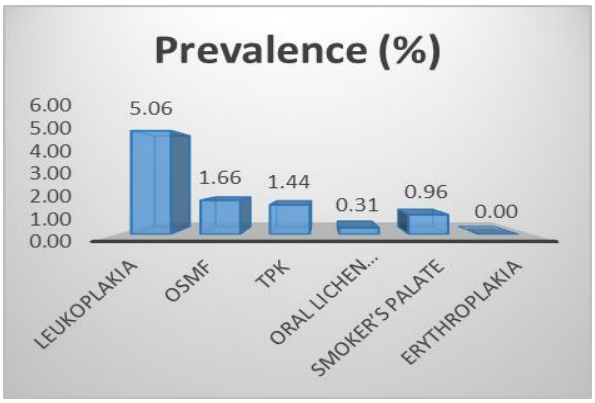
Maharashtra and Pune, Maharashtra, India between 2016 to 2019. Eligible cases included patients with oral lesions clinically consistent with either "potentially malignant disorders (PMD)"of different grades. A data collection sheet was created to collect data on patient age, gender, risk factors (smoking, smokelesstobacco and alcohol consumption), site of the lesion and clinical diagnosis. At the end of the study, data was collected and analyzed using Statistical Package for the Social Sciences software, version 20.0 (IBM Corp.Released 2011, IBM SPSS Statistics for windows version20.0, Armonk, NY: USA) $P < 0.05$ was considered asstatistically significant.

RESULTS

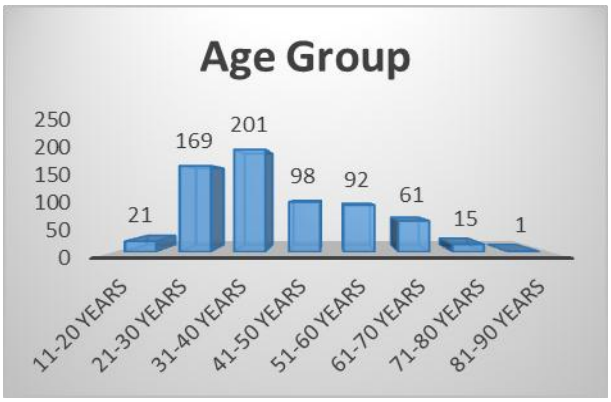
There were total of 13010 subjects, with most of the cases reported in 2016–2019 (1226). Most common PMD reported was Leukoplakia with prevalence of 5.06 followed by oral submucous fibrosis, tobacco pouch keratosis, smoker's palate and lichen planus. Chisquare analysis which is a test of association was carried out to find out if there is any association between the variables. There was a statistically insignificant difference between the number of cases of leukoplakia and other PMDs (P = 1.000). There were 1077 males (69.52%) and 149 females (30.48%), with a ratio of 2.28:1. There was a statistically significant difference between the gender predilection of leukoplakia and other PMDs patients (P = 0.005). Median age of patients was 43 years (ranged between 18and 72 years; mean age of 42.64 years). Majority of patients were in the 40–50 years of age group 190 and least number were in <20 years of age group n = 21,]. There was a statistically significant difference between the age of Leukoplakia and other PMDs patients (P = 0.001).

Table 1: Prevalence of Potentially Malignant Disorders.

Pmd	Frequency	Percentage	Prevalence
Leukoplakia	658	53.67	5.06
Osmf	216	17.62	1.66
Tpk	187	15.25	1.44
Oral lichen planus	40	3.26	0.31
Smoker's palate	125	10.20	0.96
Erythroplakia	0	0.00	0.00



Graph 1: Prevalence of potentially malignant disorders.



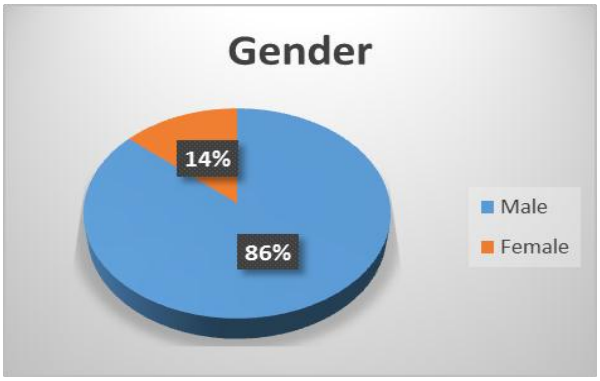
Graph 2: Leukoplakia Age Distribution.

Table 2: Leukoplakia Age distribution.

Age Group	Frequency	Percentage
11-20 Years	21	3.2
21-30 Years	169	25.7
31-40 Years	201	30.5
41-50 Years	98	14.9
51-60 Years	92	14.0
61-70 Years	61	9.3
71-80 Years	15	2.3
81-90 Years	1	0.2
TOTAL	658	100.0

Table 3: Leukoplakia Gender Distribution.

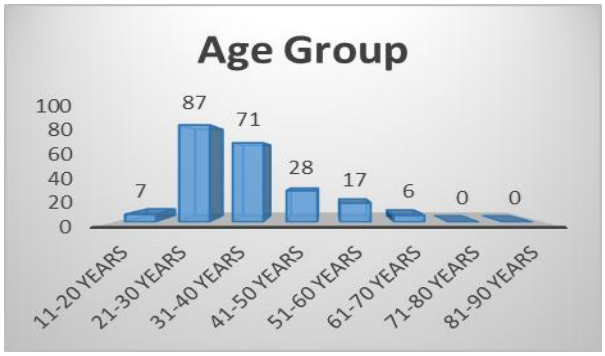
Gender	Frequency	Percentage
Male	569	86.5
Female	89	13.5
TOTAL	658	100.0



Graph 3: Leukoplakia Gender Distribution.

Table 4: OSMF Age Distribution.

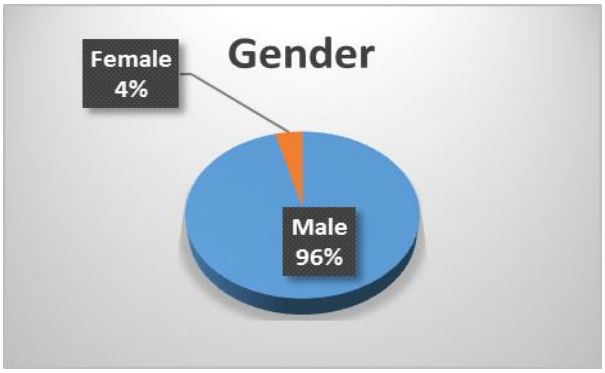
Age Group	Frequency	Percentage
11-20 Years	7	3.2
21-30 Years	87	40.3
31-40 Years	71	32.9
41-50 Years	28	13.0
51-60 Years	17	7.9
61-70 Years	6	2.8
71-80 Years	0	0.0
81-90 Years	0	0.0
TOTAL	216	100.0



Graph 4: OSMF Age distribution.

Table 5: OSMF Gender distribution.

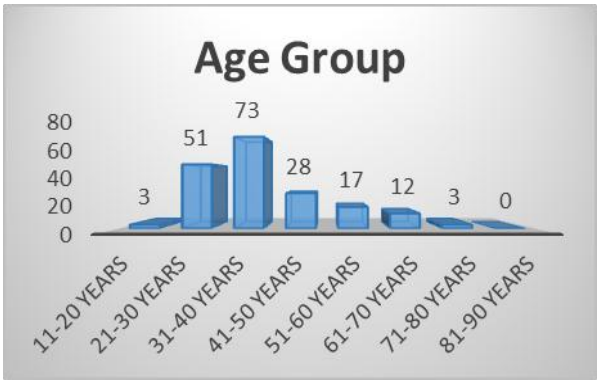
Gender	Frequency	Percentage
Male	207	95.8
Female	9	4.2
TOTAL	216	100.0



Graph 5: OSMF Gender Distribution.

Table 6: Tobacco Pouch Keratosis Age Distribution.

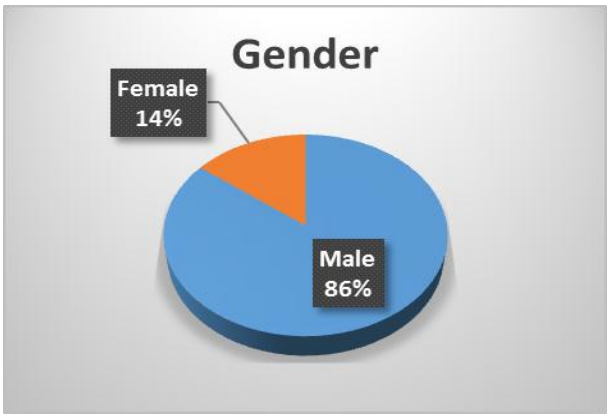
Age Group	Frequency	Percentage
11-20 Years	3	1.6
21-30 Years	51	27.3
31-40 Years	73	39.0
41-50 Years	28	15.0
51-60 Years	17	9.1
61-70 Years	12	6.4
71-80 Years	3	1.6
81-90 Years	0	0.0
TOTAL	187	100.0



Graph 6: Tobacco Pouch Keratosis Age Distribution.

Table 7: Tobacco Pouch Keratosis Gender Distribution.

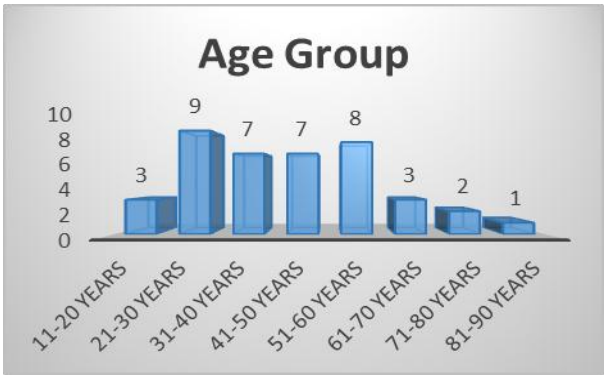
Gender	Frequency
Male	160
Female	27
TOTAL	187



Graph 7: Tobacco Pouch Keratosis Gender Distribution.

Table 8: Oral Lichen Planus Age Distribution.

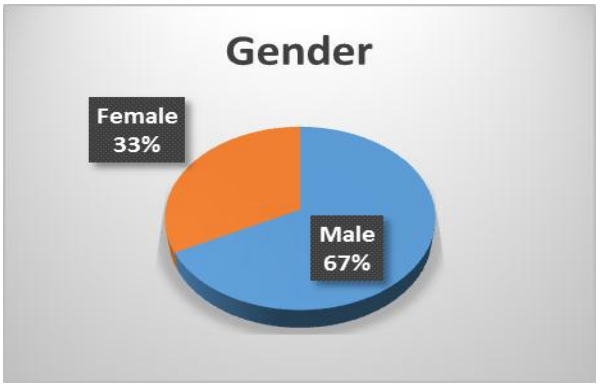
Age Group	Frequency	Percentage
11-20 Years	3	7.5
21-30 Years	9	22.5
31-40 Years	7	17.5
41-50 Years	7	17.5
51-60 Years	8	20.0
61-70 Years	3	7.5
71-80 Years	2	5.0
81-90 Years	1	2.5
TOTAL	40	100.0



Graph 8: Oral Lichen Planus Age Distribution.

Table 9: Oral Lichen Planus Gender Distribution.

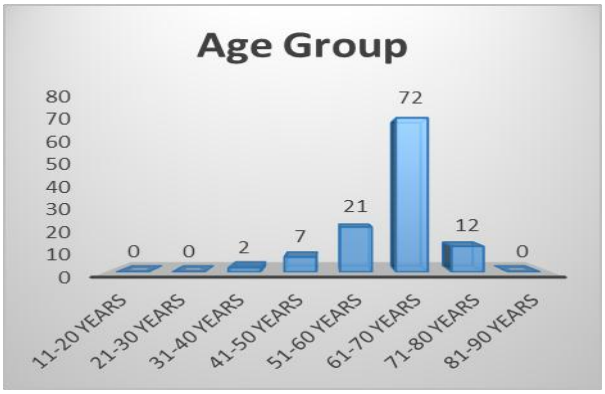
Gender	Frequency	Percentage
Male	27	67.5
Female	13	32.5
TOTAL	40	100.0



Graph 9: Oral Lichen Planus Gender Distribution.

Table 10: Smoker's Palate Age Distribution.

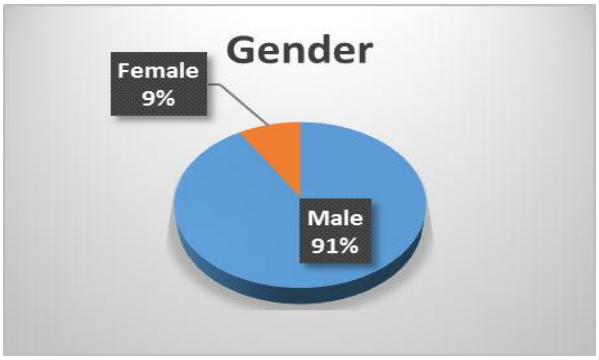
Age Group	Frequency	Percentage
11-20 Years	0	0.0
21-30 Years	0	0.0
31-40 Years	2	1.8
41-50 Years	7	6.1
51-60 Years	21	18.4
61-70 Years	72	63.2
71-80 Years	12	10.5
81-90 Years	0	0.0
TOTAL	114	100.0



Graph 10: Smoker's Palate Age Distribution.

Table 11: Smoker's Palate Gender Distribution.

Gender	Frequency	Percentage
Male	114	91.2
Female	11	8.8
TOTAL	125	100.0



Graph 11: Smoker's Palate Gender Distribution.

DISCUSSION

OSCC accounts for approximately 3% of all malignancies and more than 90% of all head and neck cancers. The National Cancer Registry Programme of the Indian Council of Medical Research released an alarming report pointing out an increase in cancer rate incidence in India, with over seven lakh people being registered yearly. From all types of cancer, OSCC is the most common in males and third most common in females.[5-7] Both PMD and OSCC have common risk factors such as tobacco in various forms, areca nut, alcohol, chronic exposure to ultraviolet radiation, genetic abnormalities andhuman papillomavirus infection. Early stages of OSCC are typically managed with surgery and radiotherapy. Whereas in advanced stages, chemotherapy can be added. The mortality rate of OSCC continues to be the same for thepast decades with a 5 year survival rate of 50%, even with the advancement in treatment modalities. Pindborg in 1966 defined OSMF as "an insidious chronicdisease affecting any part of the oral cavity and sometimes pharynx. Although occasionally preceded by and or associated with vesicle formation, it is always associated with juxta epithelial inflammatory reaction followed by fibroblastic changes in the lamina propria, with epithelialatrophy leading to stiffness of the oral mucosa causing trismus and difficulty in eating."[8] Lichen planus was first described in 1869 by Erasmus Wilson as an eruption of pimples remarkable for their color, their figure, their structure, their habits of isolated andaggregated development, their habitat, their local andchronic character and for the melasmic stains which they leave behind them when they disappear.[9] Squamous cell carcinoma is defined as a malignant neoplasm exhibiting squamous differentiation as characterized by formationof keratin and/or the presence of intercellular bridges.[10.11]

Clinically, we diagnosed OSMF as a lesion with palpable submucosal band in buccal and labial mucosa, restrictedmouth opening, restricted tongue movement, leatheryappearance of the mucosa, leukoplakia as a flat

toslightly elevated, gray/white translucent plaque whichwas either fissured/wrinkled, OLP as a lesion with fine lacelike network of white lines, i.e., Wickham's striae, predominantly bilateral. The early diagnosis of OPMD can be helpful in cancer prevention and reducing related mortality and morbidity.To achieve this goal, dentists play a pivotal role in educating the public, diagnosis and long term follow up of patients at risk and to avoid local recurrence and lymph node metastases. Most of the PMD, prevalence literature have been carried out among patients visiting dental institutes which may result in masking the true prevalence of the disease.

The main aim of the current study was to obtain epidemiological profile of PMD in the last 3 years in Pune districts of western Maharashtra to obtain better estimate of total cases. Based on our data, the prevalence of PMD in Pune district might be linked to a rise in the usage of tobacco in various forms, areca nut and alcohol, compared to other districts. In addition, most of the PMD cases were in the fourth decade similar to Misra *et al*.[12] However, Scott and Waldern[13,14] found most of their cases in sixth and seventh decades, respectively, which might be due to the cumulative effect of tobacco carcinogens. Our study showed higher prevalence of leukoplakia as compared to other PMDs which is similar to study done by Dagli et al.[7] Our findings of male preponderance are similar to Gowhar *et al.* and Maia *et al*.[15,16] This could be due to higher consumption of tobacco compared to females. The mean age of PMD patients was 46.87 years. This is similar to Misra *et al*. who reported amean age of 53.15. The younger population involved in our study could be due to easier accessibility of tobacco products and alcohol to this age group in the study area. On analyzing risk factors, that majority of included patients had chewing tobacco habit in the form of gutkha (A chewable mixture of tobacco, betel nut and sweetenersin an attractive pack) and betel quid (betel leaf withslaked lime, betel nut and tobacco). In addition, alcohol consumption was a contributing factor in the causationof PMD, similar to the results reported by Ray *et al*.[17]

The most common site of PMD was buccal mucosa (33.01%), which is similar to what have been reported by Naga *et al*.[18] and Gowhar *et al.*[15] and related to the site used for chewing smokeless tobacco. The cultural habit of people of western Maharashtra of using gutkha could be one of the main reason.When geographical variations were considered, Bhopal, in India had the highest incidence worldwide of both mouth cancers (9.6) and tongue (10.9) in males. Whereas the highest incidence of oropharyngeal cancers in males was seen in Trivandrum, India. The highest incidence of cancer in relation to tobacco usage was seen in the districts of Central, Southern and North East India. Pondicherry also showed a high incidence of mouth cancer among men (8.9/100,000). In a study in Belgaum, Karnataka,tobacco chewing was found to be the main risk factor for PMD and with leukoplakia, OSMF and OSCCaccounting for the prevalence of 13.4%, 28.3% and 6.3%,respectively. Considering the current results, the use of recent advances in oral screening and detection aids such as Vizylite and Velscope for PMD and OSCC at early stage could serve as a helpful adjunctive tool. The ease of use, accessibility and reasonably cheaper price could be attractive factors. However, the sensitivity and specificity of these adjunctive tools have been always in question. Along with improved diagnostic modalities and treatment strategies, patient education on cessation of smoking habits is very important in reducing risk of PMDs. Studies regarding prevalence patterns in different regions of India may aid in formulating such strategies.

This study has several limitations. First, the study had a smaller sample size. Second, only patients who visited one dental school were included. Third, a complete history of the disease and smoking history was not available for few patients. The management of PMD in developing countries as India is challenging compared to Western countries. Lack of resources, follow up and access to care are some of the challenges to provide standard of care in addition to conducting clinical trials. Shortage in cancer treatment facilities, lack of standardized protocols for cancer management and cost are all limiting factors. Hence, it is recommended for constituting multidisciplinary cancer units in regional hospitals all around India and epidemiological profile studies may help in formulating national cancer policies.

CONCLUSION

The incidence of PMD in India is on the rise with a predilection for younger age groups, due to the increase in consumption of gutkhas and pan masala. Early recognition of PMD and implementing national preventive programs can reduce impending complications and increase the life expectancy of affected patients.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/havegiven his/her/their consent for his/her/their images andother clinical information to be reported in the journal. The patients understand that their names and initials willnot be published and due efforts will be made to concealtheir identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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