ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 11 | November - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PREVALENCE AND RISK FACTORS ASSOCIATED WITH OPMDs & OSCC: A RETROSPECTIVE INSTITUTIONAL STUDY (2006-22)

Dentistry

Dr. Jigna Shah Professor And Hod Department Of Oral Medicine And Radiology, Government Dental College And Hospital, Ahmedabad

Dr. Kinjal Joshi* Post Graduate Student Oral Medicine & Radiology Government Dental College And Hospital Ahmedabad-380016 *Corresponding Author

ABSTRACT

Background- To reduce the significant mortality and morbidity associated with Oral Squamous cell carcinoma (OSCC), one approach is to enhance early detection of OSCC by case discovery or organised screening programmes. **Objectives-** The present study reported analysis of 17 years institutional study (2006-2022) and aimed to assess potentiality & risk factor of Oral potentially malignant disorders (OPMDs) & OSCC. The objective of the study is to determine occurrence of OPMDs & OSCC (smoking /smokeless tobacco) & their occurrence according to age, gender, type & duration of habit. **Material & Method-** 5,46,334 OPD patients visited to our institute during 17 years study period (2006-2022). Out of these individuals, clinically diagnosed OPMDs and OSCC were examined in detail. **Results-** Present study showed a changing pattern of OPMDs and OSCC prevalence based on age, gender, and habit-related lesion. Out of 12233 OPMDs, 52.8% had OSMF, 26 % had leukoplakia, 4.9 % had smoker's palate, 9.4% had tobacco quid lesion, and 6.7 % had lichen planus. OPMDs have increased in the preceding ten years as a result of increased tobacco consumption and advertising. In addition, the male to female ratio has changed. **Conclusion-** To minimize the incidence rate, educate the public about the risk factors, early symptoms of OPMDs, which allows us to encourage preventative efforts and thereby lower morbidity and death rates.

KEYWORDS

Changing pattern, OPMDs, OSCC

INTRODUCTION:

Oral squamous cell carcinoma (OSCC) is the most common cancer and a serious health problem in developing nations, accounting for the main cause of death [1]. The frequency of OSCC is significant in Asian nations, particularly Southeast Asians, who have distinct cultural traditions such as betel quid chewing as well as diverse patterns of tobacco and alcohol consumption, both of which are key risk factors for OSCC. Furthermore, changes are being noticed in a variety of characteristics in Asian nations, including site of occurrence, male to female ratio, age, and occurrence among persons with no recognised risk practices [2]. Tobacco use (smoking and smokeless tobacco) is the primary cause of the development of oral potentially malignant diseases (OPMDs) and OSCC. OPMDs are tissue changes that may take malignant tumor character at any time, but on the other hand, may remain stable for a considerable period of time [3]. Oral submucous fibrosis (OSMF), Leukoplakia, erythroplakia, smoker's palate, tobacco quid lesion (TQL), Oral lichen planus (OLP) & actinic keratosis are OPMDs. OPMDs lesions are not only site-specific predictors of malignancy but also increase risk for future malignancy elsewhere in (clinically normal appearing) mucosa.

Although the mouth cavity is apparent oral cancers tend to be identified late. Patients' lack of awareness, as well as the period of negation and eliminating the symptoms, are the reasons for not visiting a doctor straight away, and this is termed the "first loss of time." The "second loss of time" happens owing to a lack of knowledge among medical and dental experts, as well as a delay in diagnosis. The "third loss of time" is the delay between diagnosis and therapy initiation [4].

One method to reduce the significant mortality and morbidity associated with this OSCC is to enhance early detection of OSCC by case discovery or organised screening programmes. The registration of these lesions at the hospital and national levels will raise awareness in the public sector. Case categorization would result in the pooling of total data for OPMDs and OSCC.

Till today various prevalence studies of OPMDs & OSCC are reported with approximately 2 to 4 years retrospective data. Very few studies are reported with 8 to 10 years retrospective data [5,6]. The present study reported analysis of 17 years institutional study (2006-2022) and aimed to assess potentiality & risk factor of OPMDs & OSCC.

MATERIALS & METHOD:

A) General Study Details:

5,46,334 OPD patients visited to our institute during 17 years study period (2006-2022). Out of these individuals, clinically diagnosed OPMDs and OSCC were examined in detail. This retrospective study was started in 2006 & ended in 2022. The study was approved by the Institutional Ethics Committee (IEC GDCH/OMR.16/2023) [Supplementary Appendix 1 & 2]. The study was conducted according to ethical guidelines established by the Declaration of Helsinki and other guidelines like Good Clinical Practice Guidelines and those established by ICMR.A written informed consent was obtained from each participant.

b) Participants:

Huge task of data collection was possible only due to significant contribution by OMR clinician (PG students & faculties of the department).

Inclusion Criteria:

All subjects whether suspected or proven for OPMDs and OSCC and fits into the standard WHO clinical criteria were enrolled in the study.

Exclusion Criteria:

- Patients with incomplete data
- who had already been reported to the institution during this time period

Objective:

1) What is the incidence rate of OPMDs and OSCC during the previous decade?
2) How common are OPMDs and OSCC in terms of age, gender, habit type, and duration?

c) Study methodology:

Patients provided demographic information (such as age, gender, and occupation), oral adverse personal habits (type and duration of habit), major complaints, and site of involvement which were utilised to fill in the proforma.

d) Statistics:

Data were recorded in Microsoft excel and reported to the Statistical Package for the Social Sciences (SPSS) version and subjected to statistical analysis. Descriptive analysis was performed for the obtained results and comparison between the obtained data using Chi-square tests. $P < 0.05$ was considered statistically significant.

Table 1- According to clinical variants of OPMDs and OSCC.

OPMDs (N=12233)		No. of lesions
OSMF (N=6458) (52.8)	Grade I -Very early	349 (5.4)
	Grade II- Mild	2004 (31)
	Grade III- Moderate	2243 (34.7)
	Grade IV- Severe	1524 (23.6)
	Grade V- Extreme severe	338 (5.2)
Leukoplakia	Homogenous	2341 (73.5)

(N=3186) (26)	Non- homogenous	845 (26.5)
Tobacco quid lesion (N=1151) (9.4)	Wrinkled (pouch keratosis)	592 (51.4)
	Plaque	246 (21.4)
	Lichenoid	79 (6.9)
	Nodular leukoplakia type	167 (14.5)
	Erosive	67 (5.8)
Lichen planus (N=839) (6.9)	Reticular	353 (42)
	Papular	72 (8.6)
	Plaque	179 (21.3)
	Erosive	235 (28)
Smoker's palate (N=599) (4.9)	Grade I	212 (35.4)
	Grade II	246 (41)
	Grade III	137 (22.9)
	Grade IV	4 (0.7)
OSCC (N=2539)	Ulcerative	569 (22.4)
	Ulceroproliferative	1275 (50.2)
	Growth	695 (27.4)

Table 2: OPMDs & OSCC - Age wise distribution

Age	OPMDs (N=12233)							OSCC (N=2539)
	OSMF (N=6458)	Homogenous leukoplakia (N=2341)	Non homogeneous leukoplakia (N=845)	Tobacco quid lesion (N=1151)	Lichen planus (N=839)	Smoker's palate (N=599)	Total	
1-18 years	18 (0.3)	0	0	2 (0.2)	0	(0)	20 (0.2)	0
19-30 years	1970 (30.5)	298 (12.7)	54 (6.4)	228 (19.8)	229 (27.3)	40 (6.7)	2819 (23)	272 (10.7)
31-45 years	2837 (44.5)	853 (36.4)	340 (40.2)	401 (34.8)	385 (45.9)	249 (41.6)	5065 (41.4)	1036 (40.8)
46 years and above	1633 (25.3)	1190 (50.8)	451 (53.4)	520 (45.2)	225 (26.8)	310 (51.7)	4329 (35.4)	1231 (48.5)
Chi square value – 1449.181 P value – **0.005 (HS)**								

Table 3: OPMDs & OSCC- Gender wise distribution

Gender		Clinical diagnosis						
	OPMDs (N=12233)							OSCC (N=2539)
	OSMF (N=6458)	Homogeno us leukoplakia (N=2341)	Non homogeneous leukoplakia (N=845)	Tobacco quid lesion (N=1151)	Lichen planus (N=839)	Smoker's palate (N=599)	Total	
Males	5012 (77.6)	1989 (84.9)	728 (86.1)	910 (79.1)	152 (18.1)	518 (86.5)	9309 (76.1)	1918 (75.5)
Females	1446 (22.4)	352 (15.1)	117 (13.9)	241 (20.9)	687 (81.9)	81 (13.5)	2924 (23.9)	621 (24.5)
Chi square value – 263.876 P value – **0.009 (HS)**								

Table 4: OPMDs & OSCC- Habit wise distribution

Habit	OPMDs (N=12233)							OSCC (N=2539)
	OSMF (N=6458)	Homogeno us leukoplakia (N=2341)	Non homogeneous leukoplakia (N=845)	Tobacco quid lesion (N=1151)	Lichen planus (N=839)	Smoker's palate (N=599)	Total	
Tobacco habit								
Smokeless	6254 (96.8)	0	0	1030 (89.5)	3 (0.4)	0	7287 (59.6)	1882 (74.1)
Smoking	21 (0.3)	2022 (86.4)	618 (73.1)	30 (2.6)	2 (0.2)	524 (87.5)	3217 (26.3)	341 (13.4)
Both	183 (2.8)	319 (13.6)	227 (26.9)	91 (7.9)	0(0)	75 (12.5)	895 (7.3)	316 (12.4)
No habit	0(0)	0(0)	0(0)	0(0)	834 (99.4)	0(0)	834 (6.8)	0(0)
Chi square value – 23200.253 P value – **0.003 (HS)**								

Table 5: OPMDs & OSCC- Duration of habit

Duration	OPMDs (N=11394)						OSCC (N=2539)
	OSMF (N=6458)	Homogenous leukoplakia (N=2341)	Non homogeneous leukoplakia (N=845)	Tobacco quid lesion (N=1151)	Smoker's palate (N=599)	Total	OSSC
<1-2 years	316 (4.9)	146 (6.2)	26 (3.1)	103 (8.9)	124 (20.7)	715 (6.3)	346 (13.6)
3-5 years	1085 (16.8)	277 (11.8)	119 (14.1)	270 (23.5)	138 (23)	1889 (16.6)	520 (20.5)
5-10 years	1859 (28.8)	490 (20.9)	145 (17.2)	352 (30.6)	165 (27.5)	3011 (26.4)	894 (35.2)
More than 10 years	3198 (49.5)	1428 (61)	555 (65.7)	426 (37)	172 (28.7)	5779 (50.7)	779 (30.7)
Chi square value – 473.355 P value – **0.007 (HS)**							

RESULTS:

During the 17-year study period, a total of 5,46,334 dental OPD patients were documented. There were 12233 cases of OPMDs and 2539 cases of OSCC recorded among them. Out of 12233 OPMDs, 6458 (52.8%) patients had OSMF, 3186 (26 %) had leukoplakia (homogeneous = 2341 & non homogeneous = 845), 599 (4.9 %) had smoker's palate, 1151 (9.4 %) had tobacco quid lesion, and 839 (6.7%) had lichen planus. [Table 1] Out of 12233 patients, 5065 (41.4%) had OPMDs between the ages of 31 and 45, 4329 (35.4 %) more than 45 years of age, 2819 (23 %) between 19 to 30 years of age and 20 (0.2 %) under the age of 18. Out of 2539 OSCC patients, 1231 (48.5 %) were above the age of 45, 1036 (40.8 %) between 31 to 45 years of age, 272 (10.7 %) between 19 to 30 years of age and not a single patient was under the age of 18 [Table 2]. Out of 12233 OPMDs, 9309 (76.1 %) were males & 2924(23.9 %) were female. Out of 2539 OSCC patients, 1918 (75.5 %) were males and 621 (24.5 %) were females [Table 3]. Out of 12233 OPMDs, 11394 (93.2 %) patients had an associated tobacco habit (smoking/ smokeless/ both), whereas 834 (6.8 %) LP were not associated with tobacco habit. Out of 2539 OSCC patients, 1882 (74.1 %) used smokeless tobacco and not a single patient found without any habit [Table 4]. Out of 11394 OPMDs, maximum patients, 5779 (50.7 %) were recorded more than 10 years of duration of habit consumption whereas minimum 715 (6.3 %) were recorded in duration of less than 1-2 years of habit consumption. Out of 2539 OSCC, maximum patients, 894 (35.2 %) were recorded between 5 to 10 years of duration of habit consumption whereas minimum 346 (13.6 %) were recorded in duration of less than 1 to 2 years [Table 5]. Year wise ratio of gender, age & occurrence of OPMDs & OSCC were also discussed shown in table 6 & graph 1, 2 (supplementary appendix).

DISCUSSIONS:

The objective of this research was to assess the prevalence of OPMDs and OSCC in the Indian population, as well as the potential risk factors for their occurence. The study's strength was that it used a greater number of participants than needed for the study, which helped to improve the accuracy of the study's results. The face-to-face interview helped to reduce incomplete submissions, and any problems with the questionnaire were resolved on the spot.

Over a 17-year study period, OPMDs and OSCC were 2.2% and 0.5%, respectively. Manthapuri [5] found in an institutional-based study incidence of OPMDs was 4.3. There is slight geographical heterogeneity in the occurrence and type of OPMDs. Mello (2018) [6] found in systemic review & meta -analysis of OPMDs and showed that the prevalence of OPMDs was 4.5%. Being dental institute all OPMDs were diagnosed at our institute but this was not same for OSCC. Because the Cancer Institute is located on the same campus. Several studies have demonstrated a high incidence rate of OSCC (10-40%) in cancer institutes.

The study was also aimed to see the changing patten of OPMDs & OSCC in respect to age, gender & occurrence from 2006 to 2022. According to the present study, the male-female ratio was 3.8 from 2006 to 2010, and 3 from 2011 to 2022 (graph 1). Males were more reported by OPMDs and OSCC in the early 2000s, but the male to female ratio shifted after the 2000s. It grew over time as a result of female employment opportunities and cultural practices. The most common age for OPMDs and OSCC from 2006 to 2010 was 31 to 45 years, while from 2011 to 2022, the most common age group for OPMDs was 19 to 45 years (graph 2). OPMDs occurrence shift from third decade to second decade of life from 2000 to 2022. The easy availability and marketing of areca nut products, particularly gutkha and pan masala, in public areas has influenced the general population in India, leading to a rise in the prevalence of OPMDs & OSCC [7].

Major difference noted in occurrence of 3 OPMDs i.e TQL, OLP & smoker's palate. Chen [8] reported the prevalence rate of OLP increased significantly from 1.3 (per 10^5) in 1996 to 12.8 (per 10^5) in 2013. Patients' awareness about of the lesion, diagnostic and therapeutic strategy showed rise in the prevalence rate of above mentioned OPMDs. Despite government policy advertisements, the prevalence of OPMDs and OSCC has grown in the previous 17 years.

In the present study majority of patients had a habit of smokeless tobacco. As a result, the majority of patients reported having a lesion associated with smokeless tobacco. Maximum patients reported in present study had a habit of smokeless tobacco. So, maximum patients reported had a lesion associated with smokeless tobacco. Out of 6458 OSMF patients, the majority (34.7 %) were in the moderate stage, as their main complaint was restricted mouth opening [Table 1]. The most prevalent clinical manifestation of OSMF was white blanched region. As a result, the patient should be made aware of the potential complications of OSMF. According to Yang et al [9], the prevalence rate of OSMF increased from 8.3 (per 105) in 1996 to 16.2 (per 105) in 2013. Males exhibited a considerably greater frequency of OSMF than females. Out of 1151 patients of TQL, the majority (51.4 %) exhibited wrinkled TQL (pouch keratosis) and were asymptomatic. White plaque of buccal mucosa was the most prevalent clinical appearance, followed by a mixed red and white lesion. In present study, a nodular variety (14.5 %) of TQL was reported in the depth of the vestibule caused by smokeless type of tobacco.

In the present study second most common OPMDs found in was leukoplakia (26 %) with smoking tobacco habit. Compared to non-homogenous leukoplakia (26.5 %), people with homogenous leukoplakia (73.5 %) were shown to be more prevalent. In present study, smoker's palate (4.9 %) was reported. Grade II smokers' palates (42 %) were more prevalent than other grades. Patients with homogenous leukoplakia, leukoedema, and smoker's palate grade I were mostly asymptomatic. Hyperpigmentation was the most prevalent clinical manifestation in all of these lesions, followed by white plaque, oedematous surface, and mixed red and white lesion. Majority of lesions were caused by smoking tobacco habit. In India, the prevalence of leukoplakia ranges from 0.2% to 4.9% [10]. Trushna Rahangdale's [11] study on 9954 central Indians found a 5.6% frequency of leukoplakia. Males are affected more commonly than females, the ratio of male-to-female was 3.9:1. Majority of leukoplakia cases occur as increasing the age, between the ages of 35 and 45 [10,11]. Smoking tobacco use was the most important etiological factor in the development of Leukoplakia. The most common sites are the buccal mucosa, alveolar mucosa, and lower lip; however, lesions in the floor of mouth, lateral tongue, and lower lip are most likely to show dysplastic or malignant changes.

In present study, the prevalence of OLP was 6.9 %. Out of 826 patients, the majority (42 %) had reticular variety of OLP, the major complaint of burning sensation when consuming hot and spicy meals. The most prevalent clinical manifestation of lichen planus was peripheral striae, followed by a mixed red and white appearance. In present study, OLP primarily affected female patients between the ages of 31 and 60 (81.6 %). Women are more susceptible to some immune-mediated inflammatory diseases than men. Reasons are that female hormone levels, such as estrogen and progesterone, tend to fluctuate, especially during menstruation or menopause, and that different social roles may lead to the body being in a state of stress. OLP is a T-cell–mediated immunological disease [12]. In the present study, not a single lichen planus patient had a habit of tobacco was reported.

In present study, OSCC exhibited a peak age frequency around the 4th-5th decade of life and a male predilection. Tobacco to be a strong predictor (100%) of the development of OSCC. Clinical presentation in OSCC was ulcero-proliferative growth, followed by growth. Higher incidence of OSCC among male patients between the age of 31 to 60 year of age. It means that lack of nutritional care which increase the susceptibility to develop the OSCC relative risk increases approximately 12-folds from the third to seventh decade [13]. Location of OSCC is thought to be a direct indicator of the type & nature of oral adverse habits [14]. Gingivobuccal sulcus involvement is more prevalent for development of OSCC associated OSMF. The gingivobuccal sulcus is a longer-term tobacco placement site & lack of oxygen flow to the mucosa promotes dysplastic changes in the mucosa.

Limitation:

The present study solely contained clinical diagnostic criteria; no further investigation research was conducted. It is potential that differences in perspective may impact the outcomes. The study did not include information on the age at which tobacco use began and the rate of lesion development.

CONCLUSION:

The present study assesses the incidence of OPMDs and OSCC in order to aid in early diagnosis and raise awareness. To reduce the incidence rate, educate the public about the risk factors and early signs of OPMDs, allowing us to urge preventative measures and thereby reduce morbidity and mortality. A large sample size prospective research examined the changing trends of age, gender, and lesion incidence in OPMDs and OSCC. As tobacco usage grows, so does the prevalence of OPMDs.

Financial Support And Sponsorship:

Nil.

Conflicts Of Interest:

There are no conflicts of interest

REFERENCES:

1. Gupta S, Shah JS, Parikh S, Limbdiwala P, Goel S. Clinical correlative study on early detection of oral cancer and precancerous lesions by modified oral brush biopsy and cytology followed by histopathology. Journal of cancer research and therapeutics. 2014; 10 (2):232-8.
2. Elaiwy O, El Ansari W, AlKhalil M, Ammar A. Epidemiology and pathology of oral squamous cell carcinoma in a multi-ethnic population: Retrospective study of 154 cases over 7 years in Qatar. Annals of Medicine and Surgery. 2020; 60:195-200.
3. Ferreira AM, de Souza Lucena EE, de Oliveira TC, da Silveira EJ, de Oliveira PT, de Lima KC, et al. Prevalence and factors associated with oral potentially malignant disorders in Brazil's rural workers. Oral Diseases. 2016; 22(6):536-42.
4. Sanja Hadzic, Mirjana Gojkov-Vukelic, Enes Pasic, Almir Dervisevic. Importance of Early Detection of Potentially Malignant Lesions in the Prevention of Oral Cancer. Mater Sociomed. 2017; 29(2): 129-133
5. Manthapuri S, Sanjeevareddygari S. Prevalence of potentially malignant disorders: An institutional study. Int. J. Appl. Dent. Sci. 2018 ;4(4):101-3.
6. Mello FW, Miguel AF, Dutra KL, Porporatti AL, Warnakulasuriya S, Guerra EN, Rivero ER, et al. Prevalence of oral potentially malignant disorders: a systematic review and meta.analysis. Journal of Oral Pathology & Medicine. 2018; 47(7):633-40.
7. Srivastava R, Jyoti B, Pradhan D, Siddiqui Z. Prevalence of oral submucous fibrosis in patients visiting dental OPD of a dental college in Kanpur: A demographic study. Journal of family medicine and primary care. 2019; 8(8):2612.
8. Chen YT, Wang YH, Yu HC, Yu CH, Chang YC. Time trend in the prevalence of oral lichen planus based on Taiwanese National Health Insurance Research Database 1996–2013. Journal of Dental Sciences. 2018; 13(3):274-80.
9. Yang SF, Wang YH, Su NY, Yu HC, Wei CY, Yu CH, Chang YC, et al. Changes in prevalence of precancerous oral submucous fibrosis from 1996 to 2013 in Taiwan: A nationwide population-based retrospective study. Journal of the Formosan Medical Association. 2018; 117(2):147-52.
10. Aggarwal N, Bhateja S. Leukoplakia-potentially malignant disorder of oral cavity-a review. Biomed J Sci Tech Res. 2018 ;4(5):4219-26.
11. Rahangdale T, Phulambrikar T, Dosi T, Naphade V, Barkalle G, Somani A, et al. Prevalence of Oral Leukoplakia in 9954 Central Indian Patients: a Prospective, Cross-sectional Study.
12. Li C, Tang X, Zheng X, Ge S, Wen H, Lin X, Chen Z, Lu L, et al. Global prevalence and incidence estimates of oral lichen planus: a systematic review and meta-analysis. JAMA dermatology. 2020; 156(2):172-81.
13. Saalim M, Sansare K, Karjodkar FR, Johaley S, Ali IK, Sharma SR, Mehra A, Rahman B, et al. The prevalence of oral squamous cell carcinoma with oral submucous fibrosis. Journal of Cancer Research and Therapeutics. 2021; 17(6):1510.
14. Siriwardena BS, Jayawardena KL, Senarath NH, Tilakaratne WM. An evaluation of clinical and histopathological aspects of patients with oral submucous fibrosis in the background of oral squamous cell carcinoma. BioMed research international. 2018 9;2018.