Original Article

Prevalence of Oral Cancer and OPMDs(Oral Potentially Malignant Disorders) in Patients Visiting a Tertiary Care Centre in West Bengal: A Cross-Sectional Study

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How to cite this article: Abhishek Ghosh, Rudra Prasad Chatterjee, Santanu Sen Roy et. al. Prevalence of Oral Cancer and OPMDS in Patients Visiting a Tertiary Care Centre in West Bengal: A Cross-Sectional Study. Indian Journal of Public Health Research and Development / Vol. 16 No. 1, January-March 2025.

Abstract

Background: Oral Cancer is the 6th most common cancer in the world. Most of these oral cancers develop from pre-existing Oral potentially malignant disorders (OPMDs), previously known as pre-malignant lesions and conditions. The aim of this study was to investigate the prevalence & clinico-epidemiological parameters in patients with Oral Cancer and OPMDs visiting a tertiary care hospital.

Materials and Methods: This is a hospital based cross sectional study. The patients attending the outpatient department of this tertiary care hospital were selected after thorough clinical screening with a view to detect the presence OPMDs and OSCC. After obtaining written informed consent, all the details including habit history were recorded in a specially prepared clinical record sheet through active interrogation and proper clinical examination. This data were tabulated in the excel sheet to facilitate further statistical analysis.

Results: Fourth and fifth decades are the most prevalent age groups for development of Oral Cancer & OPMDs when considered together. OSMF was more prevalent in relatively younger age group of 20 to 29 years, with an increasing prevalence among women. All three forms of oral habits i.e. tobacco chewing, smoking and alcohol drinking are prevalent among males; whereas females have prevalent habit of smokeless tobacco. Cheek and tongue were the prevalent sites for development of lesions.

Conclusion: The study shows the association between OPMDs & oral cancer with various epidemiological and habit parameters along with relative prevalence; which may help the policy makers to identify the target population and frame appropriate preventive policies.

Key-words: Oral cancer, OPMDs, Precancer, Tobacco habits.

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Submission date: April 25, 2024 **Revision date:** May 30, 2024 **Published date: December 28, 2024:**

Introduction

WHO International Classification of Diseases defines *oral cancer* as a neoplasm arising in the lips, oral cavity, oropharynx, nasopharynx or hypopharynx. It is the 6th most common cancer in the world.[1,2] 90% of all oral malignancies are Oral squamous cell carcinomas (OSCC), with incidence rates of 12.8 and 7.5 per 1 lakh population in men and women respectively.[3,4]

Most of these oral cancers develop from pre-existing Oral potentially malignant disorders (OPMDs), previously known as pre-malignant lesions and conditions. WHO (2007) defined it as " the risk of malignancy being present in a lesion or condition either during the time of initial diagnosis or at a future date". Multiple disease processes fall under OPMDs of which Oral Leukoplakia(OLKP), Erythroplakia, Oral Sub-mucous Fibrosis (OSMF), Oral Lichen Planus (OLP) are important.[5,6]

Cross sectional studies are important in estimating the prevalence of a disease in the population and identifying high risk populations. The association between OPMDs & oral cancer with various epidemiological and habit parameters along with relative prevalence had been studied in various other states in India; but very few studies had been conducted in the state of West Bengal. Hence the objectives of this study was to record the clinico - epidemiological profile of the patients with OPMDs and OSCC visiting this tertiary care hospital and to evaluate the risk factors including the oral habits with respect to occurrence of the disease processes.

Methods

Study design: A hospital based cross-sectional study

Setting: The study was conducted in the Department of Oral and Maxillofacial Pathology of a tertiary care centre and Dental teaching institute during the period of January 2021 to May 2022. The entire study was accorded ethical clearance from the institute.

Selection of Study Subjects:

All the patients attending the outpatient department were screened clinically with a view to detect the presence OPMDs and OSCC on the basis of clinical guidelines laid down by Neville et al, [7]. Out of total number of 33,085 patients screened, one hundred and sixty six (166) patients either having OPMDs or OSCC were selected for the study. Informed consents were taken from the study subjects for participation. Due precautions and sterilization protocols were followed during the clinical examination of the patients to prevent any such contamination. The following inclusion and exclusion criteria were laid down.

Inclusion Criteria:

1. Patients above 12 years of age .
2. Patients having clinical signs of OPMDs or OSCC.

Exclusion Criteria:

1. Mentally retarded patients .
2. Individuals not willing to give consents to participate in the study.

Recording of Clinical Data:

After obtaining written informed consent, all the details were recorded in a specially prepared clinical record sheet through active interrogation and proper clinical examination. The demographic details, habit history of patients and clinical presentations were recorded, after prior calibration. This data were tabulated in the excel sheet to facilitate further statistical analysis to be performed.

Statistical Analysis:

The data was entered using MS Excel 2016. The data was analysed using IBM SPSS Statistics (Version 25). As the comparison was done between two groups and the distribution of data followed normalcy, parametric tests of significance (one way anova) was used.

Results

In the present study, analysis of a total number of 166 subjects with OSCC and OPMDs were performed after screening the patients attending the Out-Patient Department (OPD) during the period from January, 2021 to May, 2022. The sample population frame included 33,085 participants, among which 166 study subjects matched the eligibility criteria and were recruited for the study. The prevalence of the cases was calculated to be 0.5%.

Distribution of the Study Subjects According to Different Patho-physiological Conditions:

After careful clinical examination of 166 diseased subjects with OPMDs and Oral cancer, forty (24.1%) patients were provisionally diagnosed with

Leukoplakia, six (3.6%) with Erythroplakia, while forty four (26.5%) of them with Oral sub-mucous fibrosis, twenty eight (16.9%) with Oral Lichen Planus and forty eight (28.9%) with Oral cancer. Their presence in the study population was found to be significant. [Figure 1]

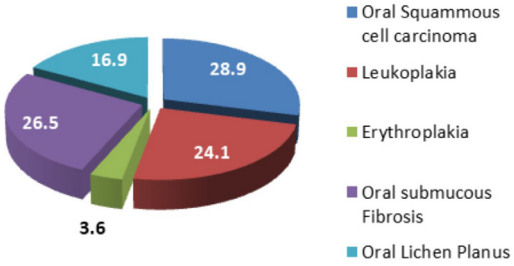

Fig 1: Pie chart representation showing distribution of study subjects according to different patho-physiological conditions

Distribution of Study Subjects According to Age:

While analyzing the clinico-epidemiological demographic parameters, all the study subjects were divided into SIX age groups. Group I: 20 to 29 years, Group II: >29 to 39 years, Group III: >39 to 49 years, Group IV: >49 to 59 years, Group V: >59 to 69 years and Group VI: >69 years. A considerable number of patients (28.3 %) were in the age group III (>39 to 49 years); followed by 22.3% in the age group II; 18.1 % in each group IV and V; 9% in age group I and lastly, 4.2% in age group VI. [Figure 2]

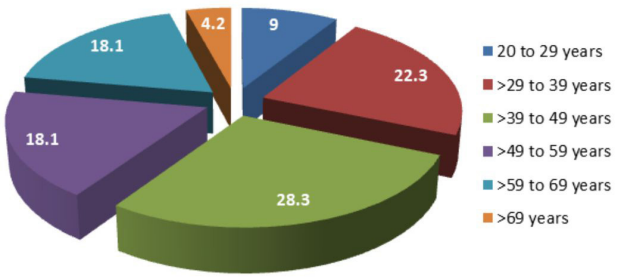

Fig 2: Pie chart representation of distribution of study subjects according to age

Distribution of Study Subjects According to Sex:

While analyzing the sex distribution among the study subjects, significant number of them were male (68.1 %) and 31.9% % were female. [Figure 3]

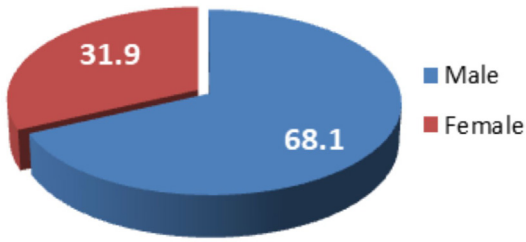

Fig 3: Pie chart representation of distribution of study subjects according to sex

Distribution of Study Subjects According to Place of Residence:

Places of residences of the study subjects revealed that significant number of 84.3% were urban population residing at Municipal areas and 15.7% were rural population from Panchayet areas.

Distribution of Study Subjects According to Religion:

Out of 166 number of study subjects, significant numbers were Hindus (91%) and only 9% were Muslims.

Distribution of Study Subjects According to Education:

Out of 166 number of study subjects, significant number of subjects were having secondary education (34.3%), graduates (24.7%), HS qualified (24.1%), followed by primary education (11.4%), illiteracy (4.8%) and Post-graduates (0.6%). [Table 1]

Table 1: Distribution of Study Subjects According to Education:

	Frequency	Percent	Chi Square	P Value
Illiterate	8	4.8	85.422	<0.0001*
Primary	19	11.4		
Secondary	57	34.3		
Higher secondary	40	24.1		
Graduate	41	24.7		
PG	1	0.6		
Total	166	100.0		

Distribution of Study Subjects According to Occupation:

Out of 166 number of study subjects, significant numbers were businessmen (42.8%), while others included housewives (24.1%), service holders (16.9%), followed by retired persons (7.8%), labourers (3.6%), students (1.8%) agriculture (1.2%), health workers (1.2%) and unemployed persons (0.6%). [Table 2]

Table 2: Distribution of Study Subjects According to Occupation:

	Frequency	Percent	Chi Square	P Value
Agriculture	2	1.2	248.651	<0.0001*
Business	71	42.8		
Health Worker	2	1.2		
Housewife	40	24.1		
Labourer	6	3.6		
Retired	13	7.8		
Service	28	16.9		
Student	3	1.8		
Unemployed	1	.6		
Total	166	100.0		

Distribution of Study Subjects According to Average Monthly Income:

On the basis of average monthly income, all the study subjects were divided into FIVE groups. Group I: Upto 5 thousand, Group II: 5-10 thousand, Group III: 11- 25 thousand, Group IV: above 25 thousand, and Group V: Nil. A considerable number of 27.9% were in income group III : 11-25 thousand; 24.2% had nil income; 23.6% were in income Group II: 5-10 thousand; followed by 18.2% from income Group I: Upto 5 thousand and only 9% from income Group IV: above 25 thousand [Table 3]

Table 3: Distribution of Study Subjects According to Average Monthly Income:

Average Monthly Income:	Study Subjects (N=166)
Group I: Upto 5 thousand	31 (18.2%)
Group II: 5-10 thousand	39 (23.6%)
Group III: 11- 25 thousand	46 (27.9%)
Group IV: above 25 thousand	10 (6%)
Group V: Nil	40 (24.2%)

Prevalence of Oral Habits Among Study Subjects:

While analyzing the oral habits among 113 male subjects, significant number of them (65.5%) had tobacco-chewing habit, considerable number of 52.2% had habit of tobacco smoking while 35.4% had habit of alcohol consumption. On the other hand, 66% of 53 female subjects had only tobacco chewing habit. None of the female subjects had habit of smoking and alcohol consumption. [Table 4]

Table 4: Prevalence of Oral Habits among Study Subjects

Habits	Male	Female
Smoking Tobacco	52.2%	--
Smokeless Tobacco	65.5%	66%
Alcohol consumption	35.4%	--

Prevalence of the Oral Cancer and OPMDs Based on Gender:

Oral Squamous Cell Carcinoma was more prevalent among men (31%) than women (24.5%). The same was evident for Leukoplakia men (31.9%) & women (7.5%), whereas Erythroplakia was noted more in women (5.7%) than men (2.7%). More or less equally prevalence of OSMF was noted among men (24.8%) and women (30.2%). OLP is more prevalent in women (32.1%) than in men (9.7%).[Table 5]

Table 5: Prevalence of the Oral Cancer and Opmds Based on Gender:

	Male		Female		Chi Square	P Value
	Frequency	Percent	Frequency	Percent		
Oral Squammous cell carcinoma	35	31.0	13	24.5	12.783	<0.0001*
Leukoplakia	36	31.9	4	7.5		
Erythroplakia	3	2.7	3	5.7		
Oral submucous Fibrosis	28	24.8	16	30.2		
Oral Lichen Planus	11	9.7	17	32.1		
Total	113	100.0	53	100.0		

Prevalence of the Oral Cancer and OPMDs Based on Age:

Oral Squamous Cell Carcinoma was mostly prevalent in the age group >59 to 69 years (53.3%) followed by age group >49 to 59 years (30%). More so, Erythroplakia was more prevalent in the same age group as OSCC (6.7%). In contrast, Leukoplakia mostly occurred in the much lower age group age group >29 to 39 years (32.4%) and >39 to 49 years (29.8%). OSMF too was prevalent in younger age group 20 to 29 years (66.7%) followed by >29 to 39 years (29.8%). Nearly equal distribution of OLP patients was noted in the age group >69 years (28.6%) and >49 to 59 years (26.7%). [Table 6]

Table 6: Prevalence of the Oral Cancer and OPMDs Based on Age:

	20-29 years		>29-39 years		>39-49 years		>49-59 years		>59-69 years		>69 years	
Lesions	N	%	N	%	N	%	N	%	N	%	N	%
Oral Squammous cell carcinoma	2	13.3	7	18.9	12	25.5	9	30.0	16	53.3	2	28.6
Leukoplakia	0	0	12	32.4	14	29.8	7	23.3	5	16.7	2	28.6
Erythroplakia	1	6.7	0	0	1	2.1	2	6.7	2	6.7	0	0
Oral submucous Fibrosis	10	66.7	13	35.1	13	27.7	4	13.3	3	10.0	1	14.3
Oral Lichen Planus	2	13.3	5	13.5	7	14.9	8	26.7	4	13.3	2	28.6
Total	15	100.0	37	100.0	47	100.0	30	100.0	30	100.0	7	100.0
Chi Square	2.27											
P Value	0.05*											

Prevalence of Oral Cancer and OPMDs Based on The Sites:

OSCC was most prevalent on the cheeks (79.2%) and tongue (31.3%) followed by retro-molar region (12.5%), gingiva (10.4%), palate (8.3%), lips (4.2%), floor of mouth (4.2%) and pharynx(2.1%). Leukoplakia predominantly affected cheeks (87.5%), tongue (10%), palate (10%) and lips (7.5%)., whereas Erythroplakic lesions were prevalent on cheeks and gingiva (16.7%). In case of OSMF, cheeks (86.4%), soft palate (15.9%), retro-molar area (4.5%) and pharyngeal wall (2.3%) were the prevalent sites of involvement. OLP was prevalent on cheeks (46.4%) & tongue (46.4%), followed by gingiva (17.9%), lips

(10.7%) and retro-molar areas (3.6%). Thus significant number of patients had involvement of cheek and tongue in Oral cancer and various OPMDs. (<0.0001) [Table 7]

Table 7: Prevalence of Oral Cancer and Opmds Based on the Sites:

Site	Lip		Cheek		Gingiva		Tongue		RMT		FOM		Palate		Pharynx	
Lesions	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Oral Squammous cell carcinoma	2	4.2	38	79.2	5	10.4	15	31.3	6	12.5	2	4.2	4	8.3	1	2.1
Leukoplakia	3	7.5	35	87.5	3	7.5	4	10.0	2	5.0	0	0	4	10.0	0	0
Erythroplakia			6	100.0	1	16.7			0	0	0	0	1	16.7	0	0
Oral submucous Fibrosis	3	6.8	38	86.4			6	13.6	2	4.5	0	0	7	15.9	1	2.3
Oral Lichen Planus	3	10.7	13	46.4	5	17.9	13	46.4	1	3.6	0	0	1	3.6	0	0
Chi Square	0.417		10.246		2.062		5.009		0.995		1.244		.830		.400	
P Value	0.796		<0.0001*		0.088		0.001*		0.412		.294		.508		.808	

*Statistically significant

Discussion

In this prospective study, after careful clinical examination of 166 study subjects, prevalent age distribution was found to be in the group of >39 to 49 years (28.3%) and >29 to 39 years (22.3%), followed by >59 to 69 years group (18.1%) and >69 years(18.1%) age group. Singh et al (2021) also reported that maximum disorders were seen in age group of 31–40 years, followed by 41–50 years, 21–30 years, 51–60 years, >60 years, 11–20 years and 0–10 years .[8] Thus, it can be put forward that fourth and fifth decades are the most prevalent age groups for development of Oral Cancer &OPMDs when considered together.

While considering the prevalence of oral cancer with respect to age, the present study recorded that OSCC was more prevalent in the age group >59 to 69 years (53.3%) followed by age group >49 to 59 years (30%). S P Khandekar et al (2006), in a study among 117 OSCC patients , reported the peak incidence to be in 5th & 6th decades of life.[9] Thus OSCC is more prevalent in the higher age range.

Leukoplakia was more prevalent in the age group >29 to 39 years (32.4%) and>39 to 49 years (29.8%) in this study. Bánóczy revealed the prevalence of leukoplakia in the age-group of 51-60 years. [10] While comparing with the earlier reports, this study clearly states that there is a tendency of decrease in age prevalence of Leukoplakia. This may be attributed to the increasing trend of tobacco habits from very tender age, specially among the school and college goers, due to peer pressure or other social factors.

This study revealed that OSMF was more prevalent in relatively younger age group 20 to 29 years (66.7%) followed by >29 to 39 years (29.8%). Study by Nigam et al (2013) reported that the maximum number of OSMF cases were seen in the age group of 3640 years.[11] Thus it can be put forward that those in the 20-40 years age group are more susceptible for development of OSMF.

While analyzing cases of Oral Lichen Planus, Regezi et al reported that most of the OLP patients were between 40 and 70 years of age; it is a disease of adulthood and children are rarely affected.[12] When compared with earlier reports, the present study indicates little higher age prevalence of OLP patients.

Considering the gender in all the age groups, men are more affected than women. In India, men are two to four times more affected than women due to the changes in the behavioral and lifestyle patterns. [3] The present study revealed that Oral Squamous Cell Carcinoma (OSCC) was more prevalent among men (31%) than women (24.5%). The same was evident for Leukoplakia, which was more prevalent in men (31.9%) than women (7.5%), whereas Erythroplakia was slightly more prevalent in women (5.7%) than men (2.7%). OSMF was more or less equally prevalent among

men (24.8%) and women (30.2%), with increasing trend among women. On the contrary, OLP is more prevalent in women (32.1%) than in men (9.7%).

M P Singh et al (2015) also reported prevalence of oral cancer amongst males (75.9%) than in females (24.1%).[13] While considering gender prevalence of OSMF, Sinor et al found male predominance in OSMF cases in India .[14] Nigam et al also reported Male- female ratio, in their study to be 6.9:1. [11] The increasing trend of OSMF among women, as evident in the present study, can be attributed to the tobacco chewing habits specially among housewives, in this part of the state.

The present study reported that 84.3% of the study subjects were urban and 15.7% were from rural areas. This may be due to the fact that the place of study is located in urban area and the main patient base was from the adjoining municipal areas. Apart from that, lack of awareness or negligence to seek medical attention by the rural population may also be considered.

While analyzing the distribution as per religion, 91% were Hindus and 9% were Muslims in the present study. P N Wahi, in a study in Agra district, noted no significant difference by religion except that the rate for Jains was found significantly higher than the average.[15] Location of this hospital in Hindu predominated area may be attributed to the prevalence of Hindus in this study.

Significant variation in the distribution of study population on the basis of educational status was noted in the present study. Out of total study subjects (166), significant number of them passed secondary exam (34.3%), graduation (24.7%) and HS (24.1%), followed by primary (11.4%), illiterates (4.8%) and Post-graduates (0.6%).

These findings were corroborated to earlier reports of Kaveri H et al (2018), who reported higher prevalence of OPMDs among Secondary passed study subjects (28.43%), followed by College (24.81%), illiterates (20.33%), primary (8.19%) and middle school (16.01%), lastly post-graduates (2.24%). [16] This may be attributed to the chance or probability of acquiring tobacco habits among the school goers from their peer groups.

Distribution of diseased study subjects (OSCC and OPMDs), on the basis of occupation was found to be significant. Considerable number of them were businessmen (42.8%), while other included housewives (24.1%), service holders (16.9%), retired persons (7.8%), labourers (3.6%), students (1.8%) agriculture (1.2%), health workers (1.2%) and unemployed persons (0.6%).

Kaveri H et al , in a recent study (2018) had reported higher prevalence of tobacco use among drivers, tailors, tea seller, cleaner and maid; followed by labourers, shopkeepers, homemakers, teachers and unemployed, with resultant increase in habit related lesions. [16]

Thus it may be put forward that individuals pursuing occupations with greater uncertainty and risks get easily indulged in tobacco habits, ultimately leading to increased prevalence of oral lesions. However the higher prevalence among housewives in the present study may be attributed to their frank admissions that they had acquired such habits from peer groups and often used when alone in their leisure times.

Distribution of study subjects as a whole showed a great variation on average monthly income. A considerable number(27.9%) were in income group of 11-25 thousands, i.e. middle class; 24.2% had no income i.e. mainly homemakers; 23.6% were in income group 5-10 thousands; followed by 18.2% from income group upto 5 thousands, i.e, lower economic class and only 9% from income group above 25 thousands.

These findings were in accordance with earlier reports of S P Khandekar et al (2006),who divided his study subjects into lower, middle and upper socio-economic status and found most cases belonging to lower middle and lower socio economic scales. Low socio-economic status may be a risk factor for poor oral hygiene, further increasing the risk of oral cancer in tobacco chewers.[9]

The present study critically analyzed the prevalence of oral habits based on different demographic parameters. It revealed that all three forms of oral habits i.e. tobacco chewing, smoking and alcohol drinking are prevalent among males; whereas females have prevalent habit of smokeless

tobacco. M P Singh et al (2016) had reported that OSSC was most prevalent in individuals having habit of smokeless tobacco (45%) followed by persons having habit of both smokeless and smoking tobacco (41.8%), together accounting for 86.8% prevalence. Conversely, in females, the frequency of OSCC was highest in smokeless tobacco users, accounting for 72.8% prevalence. [13] Kaveri et al (2018) also reported 92.8% prevalence of smokeless tobacco habits among males & only 7.2% among females. [16]

In south-east Asian countries, the OSCC location varies due to different forms of tobacco usage as reported by Prabhu et al. [17] Among European and US populations, tongue is the most common site accounting to nearly half of all oral cancers reported. But in Asian countries like India, buccal mucosa is the most common site of oral cancer as reported in Maharashtra, India, by Neha Gupta et al.(2016) [18]

While considering the OPMDs, Nevil et al & Axéll et al (1996) found that Leukoplakia was commonly present in buccal mucosa (76%), alveolar sulcus (19%), and tongue (5%) [19] Nigam et al had reported that the common sites involved in OSMF are buccal mucosa, labial mucosa, retro-molar pads, soft palate and floor of the mouth.[11] Thus it can be put forward that cheek and tongue are the prevalent sites for development of disease processes in OSCC and OPMDs when considered together.

The main limitation of this study is the possibility of information bias , mainly under-reporting of oral habits by female participants owing to associated social taboo. Moreover it appears that further in depth studies with more number of samples are required for proper association of clinico-epidemiological factors to the development of lesions.

Conclusion

This study showed the distribution of Oral cancer and OPMDs on different clinic-epidemiological parameters. It revealed that there was an increasing trend of Gutkha use among both sexes; along with increasing incidences of OSMF among women. Distribution on the basis of educational background warrant the probability of acquiring tobacco habits among the school goers from their peer groups. The appropriate authorities may be approached to include book chapters on tobacco ill effects, as well as organize seminars regarding it. Ban on sale of tobacco products should be imposed strictly in the vicinity of the schools. Due to changing patterns in the prevalence of oral habits and mucosal lesions, it is necessary to conduct further surveys to understand the psycho-social aspects and devise effective control and prevention strategies.

Ethical clearance: vide GNIDSR/IEC/20-23/30 dated 21/01/2021

Source(s) of support: Nil

Conflict of interest: No

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