

RESEARCH ARTICLE

Epidemiological Study of Premalignant and Malignant Lesions of the Oral Cavity

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Abstract

A community based cross-sectional study was conducted to investigate the prevalence of premalignant and malignant lesions of the oral cavity in age group of 20 years and above in Urban Health Training Centre, Jaitala. In the study population of 800 study subjects, 422(52.75%) were males and 378(47.25%) were females. Prevalence of leukoplakia, oral submucous fibrosis and oral malignancy was found to be 0.63%, 2.62% and 0.75% respectively. Premalignant and malignant conditions of oral cavity were more common in 28(87.5%) males as compared to 4(12.5%) females. The male to female ration was 7:1. Oral submucous fibrosis was more common in 20-39 years of age group as compared to leukoplakia which was common in 40-49 years of age group. Oral malignancy was found to be a disease of older age group which was common in 50 and above years of age group. Buccal mucosa was found to be the commonest site for oral malignancy. The findings of the study indicate a strong association between tobacco chewing and smoking habit and premalignant and malignant conditions of oral cavity. There was synergistic effect of tobacco chewing, smoking and alcohol consumption. There was an inverse relationship between socio-economic status and premalignant and malignant conditions of oral cavity.

Keywords: Cross-sectional study, oral cavity, malignant lesions, leukoplakia, tobacco chewing, smoking.

Introduction

Oral malignancy can literally wipe off the smile of your face. The oral malignancies are known since centuries. There were many misbeliefs about its causation and accordingly the age old remedies were used. In ancient medical literatures, The Hippocrates (460-370 BC) has described about ulceration along tongue border (Peter, 2007). The Ebers Papyrus (1500 BC) mentioned about the eating ulcers of gum and illness of tongue (Silverman, 1998). The Sushruta, "father of Shalyakarma Chikitsa" has described a term "Vidari" in Ayurveda which refers to the sub-mucous fibrosis, a known premalignant condition for oral cancer (Pindborg *et al.*, 1968). The term "Oral Cavity" refers to the lips, the mucosal lining of the cheeks, the floor of the mouth, the anterior 2/3rd of the tongue, the upper and lower gingivae (gums) and the hard palate (Peter, 2007). Leukoplakia and Erythroplakia are the well known premalignant lesions whereas; oral submucous fibrosis (OSMF) and Lichen planus are the well known premalignant conditions of the oral cavity (WHO, 1992; Ahmad *et al.*, 2006). OSMF is a chronic disease of oral mucosa characterized by inflammation and progressive fibrosis of lamina propria and deeper connective tissues, followed by stiffening of an otherwise yielding mucosa resulting in difficulty in opening the mouth (WHO, 1984). The disease was first reported in 1952 by Schwartz and its precancerous nature reported by Paymaster in 1956 (Silverman, 1998).

Oral malignancy is one of the 10th most common malignancies in the world. Each year about 5,70,000 new cases and 3,20,000 deaths occurs due to oral malignancies worldwide. Oral cancer ranks 5th in males, 6th in females and 7th in both sexes (WHO, 1992). In the South and South East Asia (India, Bangladesh, Pakistan and Sri Lanka), the malignant disease of the oral cavity constitutes the most important group of malignancies. WHO experts warned that oral malignancy may become an epidemic in South East Asia, unless the current trends of smoking and tobacco chewing habits are slowed down or reversed (WHO, 1984; 1992). In India, it is the most common type of malignancy and accounts for about a one third of all malignancies. Incidence of oral malignancies has reached to one lakh per year in India. These cases have very poor prospects of survival. Approximately 90% of oral malignancy in this region of the world can be correlated to habit of tobacco chewing and smoking (WHO, 1984). In India, National cancer registry program was launched in 1982 by Indian Council of Medical Research (ICMR) to provide true information on cancer prevalence and incidence. A total of 3.3% of the population is covered by these registries. Data from population based registries indicate that "Oral Cavity" is the leading site for malignancy in males and third commonest site in females. In India, more number of persons suffering from oral cavity malignancies than malignancies of other parts of the body.

Poverty, illiteracy and poor health standards are the important reasons for advanced disease at first contact in our country (Bhowate *et al.*, 1991). High incidence reported by various observers is thought to be due to practice of chewing betel nut, pan, slaked lime with tobacco, smoking, alcohol, poor dental and oral hygiene, diet poorer in vitamins, syphilis and oral sepsis by trauma (WHO, 1984). In the words of Sir Oberling (1944) "The golden hours pass and with it the last chance of the patient". Oral malignancy has a public problem hence, the health system has been channelized in such a way that every attempt is being made to uproot the tree of oral malignancies which is terminating human lives (Deshmukh *et al.*, 1994). This study is an attempt to investigate oral premalignant conditions and its association with risk factors as a community health problem with the following objectives.

1. To find out the prevalence of premalignant and malignant conditions of oral cavity in age group of 20 years and above in an urban slum area.
2. To study the various risk factors and their association in relation to oral premalignant and malignant conditions.
3. To make suitable recommendation based on the study.

Materials and methods

Study area: This study was carried out in adopted community of urban health training centre (UHTC) Jaitala, a field practice area under the administrative control of department of preventive and social medicine, N.K.P. Salve Institute of Medical Sciences and Research Center (NKPSIMS), Nagpur. UHTC, Jaitala is situated about 6 km away from NKPSIMS, Nagpur. Institutional ethical committee of NKPSIMS, Nagpur has given approval to carry out this investigation.

Study population: Data regarding population of Jaitala was obtained from health survey register (2004-05) of urban health training centre, Jaitala. Accordingly total population of Jaitala was 20,342. The population of 20 years and above was 12,105 comprised the study sample.

Research design: The study is a community based cross-sectional study conducted during Dec 2005-June 2007. The total population served by urban health training center (UHTC) is 20,342 as per health survey register (2004-05). There were total 3195 households in its area. As per record, only those households were numbered which were having at least one or more person of 20 and above years of age and these included all the households. The population of 20 years and above was 12195. After numbering these households, first household was chosen randomly as 5th household among first 16 households and thereafter every 16th household was selected as per random systematic sampling technique to reach estimated sample size (Mehta *et al.*, 2006).

In this way, 199 households were surveyed, in which 800 subjects were covered. Thus, selected household were visited by researcher and eligible subjects were registered. After establishing a good rapport, preliminary information of the study subject was obtained and purpose of study was explained. At every visit to community, 5-6 eligible subjects were interviewed. Study subjects were asked to come to the UHTC for detailed history, local examination and investigations.

Statistical analysis: The obtained data was analyzed in percentage and Chi-square analysis was carried out to find the association between tobacco chewing and smoking habit and premalignant and malignant conditions of oral cavity. Epi-Info statistical software of Version 3.2 was used in this study.

Results and discussion

It was observed from Table 1 that there were total 800 study subjects out of which 422(52.75%) were males and 378(47.25%) were females. Thus, giving male to female (M: F) ratio as 1.11:1. Maximum numbers, 231(28.87%) of study subjects belonged to 30-39 years of age group. It was observed that, out of total 800 study subjects, maximum number 705(88.12%) had no complaints. Maximum number of males and females had complaints of burning sensation in mouth that is 31(7.34%) and 17(4.49%) respectively (Table 2). Dysphagia and hoarseness of voice were the complaints of advanced disease which was present in 7(1.65%) and 5(1.18%) males respectively. None of the females had the complaint of dysphagia and hoarseness of voice.

Table 1. Age and sex-wise distribution of study subjects (N=800).

Age group (Years)	Study subjects		Total (%)
	Male (%)	Female (%)	
20-29	103(12.88)	76(9.5)	179(22.38)
30-39	124(15.5)	107(13.37)	231(28.87)
40-49	95(11.87)	102(12.75)	197(24.62)
50-59	61(7.62)	55(6.87)	116(14.5)
60 and above	39(4.87)	38(4.75)	77(9.62)
Total	422(52.75)	378(47.25)	800(100)

Table 2. Presenting complaints of the study subjects (N=800).

Presenting complaints*	Study subjects	
	Male (N=422)	Female (N=378)
No complaints	358(84.83)	347(91.80)
Burning sensation in mouth	31(7.34)	17(4.49)
Inability to open the mouth	23(5.45)	04(1.05)
Alteration of taste	21(4.97)	12(3.17)
Increased salivation	15(3.55)	08(2.11)
Ulcer in mouth	11(2.60)	03(0.79)
Decreased salivation	07(1.65)	08(2.11)
Dysphagia	07(1.65)	00
Hoarseness of voice	05(1.18)	00

*Multiple responses were allowed.

Table 3. Sex-wise distribution of study subjects according to tobacco chewing, smoking and alcohol consumption habits.

Habits	Study subjects		Total (%) (N=800)
	Male (%) (N=422)	Female (%) (N=378)	
Chewing			
Chewer	219(51.89)	142(37.56)	361(45.13)
Non-chewer	03(48.10)	236(62.43)	439(54.87)
Smoking			
Smokers	103(24.40)	-	103(12.88)
Non-smokers	319(75.59)	378(100)	697(87.12)
Alcohol consumption			
Alcoholics	72(17.06)	-	72(9)
Non-alcoholics	350(82.94)	378(100)	728(91)

Table 4. Distributions of premalignant and malignant lesions of oral cavity (N=800).

Oral premalignant and malignant lesions	No. (%)
Premalignant lesions	
Leukoplakia	05(0.63)
Erythroplakia	-
Lichen planus	-
Oral submucous fibrosis	21(2.62)
Malignant lesions	
Oral malignancy	06(0.75)
Total	32(4%)

Higher number of complaints in males than females was observed as most of the premalignant and malignant conditions were present in male study subjects. It was observed from Table 3 that 361(45.13%) study subjects were chewer of either pan, tobacco, gutka or betel nut, 103(12.88%) study subjects were smoker of either bidi or cigarette and 72(9%) study subjects were consuming alcohol daily. None of the females had tobacco smoking as well as alcohol consumption habit. Table 4 shows that prevalence of leukoplakia, oral submucous fibrosis and oral malignancy was found to be 0.63%, 2.62% and 0.75% respectively. Total prevalence of premalignant and malignant conditions of oral cavity was found to be 4%. Similar findings were reported by Wahi and Mittal (1970) indicated prevalence of oral premalignant and malignant conditions is 3.5%. Mehta *et al.* (1969) reported the prevalence of OSMF as 1.73%, which is lower than present study. Khandekar *et al.* (2006) reported the prevalence of OSMF as 5.83% which is higher than present study and prevalence of leukoplakia as 0.83% which is similar to present study. It is observed from Table 5 that premalignant and malignant conditions of oral cavity were more common in 28(87.5%) males as compared to 4(12.5%) females. The male to female ratio was 7:1.

Table 5. Age and sex-wise distribution of premalignant and malignant conditions of oral cavity.

Age group (Years)	Premalignant conditions (%)				Malignant conditions (%)		Total (%)
	Leukoplakia (%)		OSMF (%)		Male	Female	
	Male	Female	Male	Female			
20-29	-	-	08(42.10)	01(50)	-	-	09(28.12)
30-39	01(33.33)	01(50)	09(47.36)	01(50)	-	-	12(37.5)
40-49	02(66.67)	01(50)	02(10.52)	-	01(16.66)	-	06(18.75)
50-59	-	-	-	-	02(33.33)	-	02(6.25)
60 and above	-	-	-	-	03(50)	-	03(9.37)
Total	03(100)	02(100)	19(100)	02(100)	06(100)	-	32(100)

Table 6. Distribution of study subjects according to site of involvement of oral premalignant and malignant lesions/conditions.

Site of involvement	Premalignant cases (%)	Malignant cases (%)
Buccal mucosa	15(57.69)	03(50)
Retro molar region	02(7.69)	-
Floor of mouth	08(30.76)	02(33.33)
Tongue	01(3.84)	01(16.67)
Palate	-	-
Lip	-	-
Mandibular mucosa and sulcus	-	-
Maxillary mucosa and sulcus	-	-
Bilateral involvement	-	-
Total	26(100)	06(100)

Oral submucous fibrosis was more common in 20-39 years of age group as compared to leukoplakia which was common in 40-49 years of age group. It may be due to insidious onset ranging from few months to 10 years and 5 years to 20 years for OSMF and leukoplakia respectively. About 5-10% of the premalignant lesions have been reported to become malignant over 10-20 years period. Oral malignancy was found to be a disease of older age group which was common in 50 and above years of age group. In the study group, buccal mucosa was found to be the commonest site for both the premalignant (57.69%) as well as malignant (50%) lesions of the oral cavity. It may be due to buccal vestibule being commonest site for retaining the betel quid for several years (Table 6). It has been reported that the betel quid can affect the mucosa in many ways, being a constant irritant, tannins can precipitate proteins and hence damage the mucosa, phenol can cause a burning sensation and arecoline (alkaloid) can stimulate fibroblast proliferation and collagen synthesis. Second most common site was found to be floor of the mouth for both the premalignant (30.76%) as well as malignant (33.33%) lesions of the oral cavity. Tongue was found to be the least common site. Wahi and Mittal (1970) and Jussawala and Deshpande (1971) reported that buccal mucosa was the commonest site for both oral premalignant and malignant conditions which is similar to present study. Bhowate *et al.* (1991) and Doifode *et al.* (2000) reported that leukoplakia was more common in 30-49 years of age group whereas, oral malignancy was more common in 5th decade and above. Findings are similar to present study. Khandekar *et al.* (2006) and Hazarey *et al.* (2007) reported that OSMF was more common in 20-39 years of age group which is similar to present study.

Table 7. Distribution of premalignant and malignant conditions of study subjects according to number of habits.

Habits	Premalignant and malignant conditions/lesions (%)		Total (%)
	Present (%)	Absent (%)	
Only tobacco chewer	19(6.09)	293(93.1)	312(100)
Only smokers	-	30(100)	30(100)
Only alcohol	-	20(100)	20(100)
Tobacco + smoker	07(24.14)	22(75.86)	29(100)
Tobacco + alcohol	01(12.5)	07(87.5)	08(100)
Smoker + alcohol	-	32(100)	32(100)
Tobacco + smoker + alcohol	05(41.67)	07(58.33)	12(100)

Table 8. Association of socio-economic status with premalignant and malignant conditions of oral cavity of the study subjects.

Socio-economic status	Conditions			Total (%)
	Premalignant (%)	Malignant (%)	Normal (%)	
Upper	01(2.5)	-	39(97.5)	40(100)
Upper middle	03 (1.52)	01(0.50)	194(97.98)	198(100)
Lower middle	18(3.44)	02(0.38)	504(96.18)	524(100)
Upper lower	03(9.68)	02(6.45)	26(83.87)	31(100)
Lower	01(14.29)	01(14.29)	05(71.42)	07(100)
Total	26(3.25)	06(0.75)	768(96)	800(100)

$\chi^2=21.61$, d.f=1, p<0.0001.

Table 9. Association of number of complaints with premalignant and malignant conditions of oral cavity of the study subjects.

Number of complaints	Conditions			Total (%) (N=95)
	Premalignant (%)	Malignant (%)	Normal (%)	
One complaints	-	-	45(100)	45(100)
Two complaints	08(34.78)	-	15(65.22)	23(100)
Three or more	18(66.67)	06(22.22)	03(11.11)	27(100)
Total	26(27.36)	06(6.32)	63(66.32)	95(100)

$\chi^2=48.07$, d.f=1, p<0.0001.

Table 10. Association of number of habits with premalignant and malignant conditions of oral cavity of the study subjects.

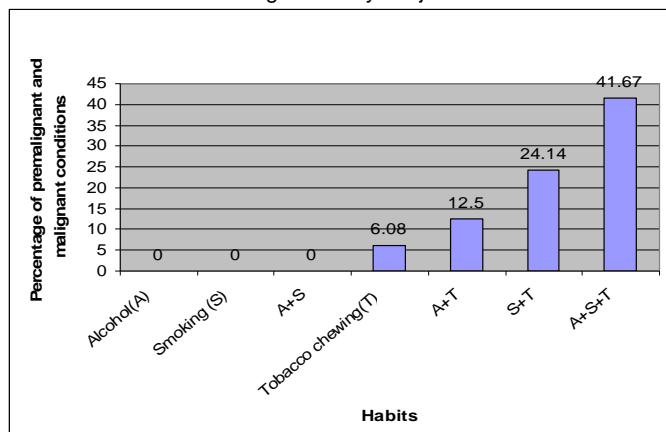
Number of habits	Conditions			Total (%) (N=443)
	Premalignant (%)	Malignant (%)	Normal (%)	
One habit	19(5.25)	-	343(94.75)	362(100)
Two habits	07(10.14)	01(1.44)	61(88.40)	69(100)
Three or more	-	05(41.67)	07(58.33)	12(100)
Total	26(5.87)	06(1.35)	411(92.78)	443(100)

$\chi^2=11.52$, d.f=1, p<0.0001.

It is observed from Table 7 that out of 800 study subjects, 312(70.42%), 30(6.77%) and 20(4.51%) study subjects had the single habit of tobacco chewing, tobacco smoking and alcohol consumption respectively. Prevalence of premalignant and malignant conditions of oral cavity was found to be 6.09% among the study subjects who had the single habit of tobacco chewing. These conditions were also found to be 24.14% and 12.5% among the study subjects with mixed habits of tobacco chewing with smoking and tobacco chewing with alcohol consumption respectively. Premalignant and malignant conditions of oral cavity was found to be 41.67% among the study subjects who had all the three habits of tobacco chewing, smoking and alcohol consumption, showing the synergistic effects (Fig. 1).

Wahi and Mittal (1970), Rao *et al.* (1994) and Deshmukh *et al.* (1994) reported that tobacco chewing, tobacco smoking and alcohol consumption habits shows the synergistic effect in development of oral premalignant and malignant conditions, observation is similar to present study. It is observed from Table 9 that there is an inverse relationship between socioeconomic status and premalignant and malignant conditions of oral cavity. It may be due to poor oral hygiene and high prevalence of tobacco habits among lower socio-economic group. The association of socio-economic status (upper, upper middle and lower middle socio-economic groups were compared with upper lower and lower socio-economic groups) and premalignant and malignant conditions of oral cavity was found statistically significant ($\chi^2 = 21.61$, p<0.0001).

Fig. 1. Premalignant and malignant conditions of oral cavity among the study subjects.



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Wahi and Mittal (1970), Doifode *et al.* (2000) and Khandekar *et al.* (2006) reported that oral premalignant and malignant conditions were more common in lower socio-economic group; observation is similar to present study. It was observed from Table 10 that 34.78% study subjects with two complaints had oral premalignant lesions. All the malignant lesions were presented by study subjects with three or more complaints. All the 45 study subjects with one complaint were normal but might become premalignant later on if ignored. The association of number of complaints (two or less than two complaints) and premalignant and malignant conditions of oral cavity was found statistically significant ($\chi^2 = 48.07$, $p < 0.0001$). Similar findings were reported by Khandekar *et al.* (2006) and Hazarey *et al.* (2007). It was observed from Table 10 that the association of number of habits (one habit was compared with more than one habits) and premalignant and malignant conditions of oral cavity was found statistically significant ($\chi^2 = 11.52$, $p < 0.0001$). Similar findings were reported by Rao *et al.* (1994) and Deshmukh *et al.* (1994).

Conclusion

- The findings of the study indicate a strong association between tobacco chewing and smoking habit and premalignant and malignant conditions of oral cavity. The prevalence of oral malignancy, a scourge to humanity can be minimized, if people refrain from this incriminated risk factor.
- Mass screening of oral premalignant and malignant lesions should be carried out so that early detection and prompt treatment can be assured.
- There is a need of intensive public education regarding hazards of tobacco and motivation for changing life style by the use of mass communication media like radio, television, press, posters and health exhibition etc.
- Legislative measures such as control on production, banning and restricting sale of tobacco products should be strictly applied.