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Research Article

Risk factor profile of oral cancer patients in North East India

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Abstract

Background : India has one of the highest rates of oral cancer with a rampant tobacco smoking and chewing habits. Use of betel quid is very common in India especially in North Eastern India where it is regularly used even by women. In recent years, tobacco use has become more common among the younger people including school children.

Methods : 100 cases of oral cancer belonging to both sexes and confirmed by histopathology were included in the study. A predesigned questionnaire to obtain information about the demographic profile, socio-economic status and risk factors was given to all the study participants.

Findings : An analysis of the data collected revealed that 70% of the sites of ulcer have been on the left portion of the oral cavity. On hypothesizing chewing of tobacco with the occurrence of ulcers on left side based on the collected data of usage of tobacco primarily in the left portion of the mouth by the patients, analysis revealed a high correlation between chewing tobacco with these types of cancers. This trend was strongly evident in case of ulcer on the left of buccal mucosa. This was validated both for the males and females, the former being more statistically significant. In the case of females, as they are primarily tobacco chewers in contrast to smoking habits of males, addressing this issue specifically through health education programmes, awareness, etc can reduce the incidence of cancer in this gender substantially.

Keywords: Oral cancer, chewing tobacco, smoking

1. Introduction

Oral cancer includes a variety of tumors seen in different parts of the oral cavity with different outcomes and is one of the commonest cancers and a leading cause of death world wide. According to WHO, mortality due to oral cancer is highest among other cancers in 2008, an estimated 1.13 million deaths occurred due to cancers with large number of cases from India.[1] In India, tobacco alone is responsible for 1.5 lakh cancers every year. There is a rampant habit of tobacco chewing in India and has one of the highest rates of oral cancer in the world and accounts for one third of total cancer burden with 50-70% mortality due to cancer.[2,3] There are more than 250 million smokers in the South East Asian region and an almost similar number of tobacco users. Tobacco is the single most avoidable risk factor for cancer as it causes about 22% of deaths due to cancer every year globally. It is observed that as many as 2500 persons die every day due to tobacco related diseases in India. Studies across several countries have shown a strong association between tobacco and alcohol use with risk of oral and other related cancers.[3,4,5] In India, high incidence of oral cancer is due to continued use of tobacco in various forms like smoking, chewing and applying. Smokeless tobacco users in India and Pakistan together have been estimated to number 100 million. It is estimated that the number of betel quid users globally is 600 million.[6] 40% of men and 15% of women use tobacco on a regular basis and statistics show that in certain pockets of the country these values may

be as high as 85% in men and 65% in women. The Age Standardized Mortality Rate due to oral cavity cancer is in general found to be higher for males than females. It is particularly high among men in whom it is the eight most common cancer worldwide.[7,8,9] 12% of all cancers in men and 8% of all cancers among women are cancers of the oral cavity.[10] The mortality rate is relatively high for low and middle income countries when compared to western industrialized nations. The countries also have less access to health care facilities. Use of smokeless tobacco is widely prevalent. Recently International Agency for Research on Cancer has confirmed that there is evidence that smokeless tobacco can cause oral cancer. Use of betel quid with areca nut, tobacco, aqueous calcium hydroxide and some spices are accepted socially and culturally in many parts of India. Most studies suggest that 4-6% of oral cancers now occur at ages younger than 40 years.[11] In recent years, use of commercially available mixture of areca nut, lime, condiments with or without tobacco has become common among the younger Indians. Studies from India have shown that one third of school children less than 15 years of age have used tobacco in various forms. However, the prevalence of risk factors in some sections of the society in India is decreasing in general due to awareness crerated among the population through health education programs.[12] Studies have shown that chronic intake of alcohol is associated with nutrient deficiency which may also contribute independently to the occurrence of oral cancer. It is also estimated that around 43% of cancer deaths are due to tobacco use, alcohol consumption, low levels of physical activity, unhealthy diets and infections.[13] In individuals aged 15 years and over, 47% use tobacco in various forms.[14]

The present study was taken up to assess the risk factor profile of oral cancer patient reporting to the cancer hospital and to study the relation between different forms of tobacco to oral cancer as not many studies are available in this regard from North east India particularly Tripura.

2. Methods

A hospital based cross - sectional study was done in Tripura Medical College and Agartala cancer Hospital. 100 cases of oral cancer belonging to both sexes in the age group of 20-80 years were included in the study. All cases of oral cancer confirmed by histopathology were included in the study. A pre-designed questionnaire to assess the risk factors for oral cancer was given to all study participants and information about demographic profile, socio-economic status, personal history and family history were taken. A specific history of use of tobacco in various forms and alcohol and its duration of use were included in the study. Information about stage of the disease was obtained. Any associated medical history, use of drugs, investigations undertaken were also sought from the patients and recorded. A careful clinical history about the signs and symptoms and treatment options given and any adverse effects during treatment if any were noted. A written informed consent was taken from all patients/subjects included in the study. The institutes Ethics committee permission was obtained to conduct the study.

3. Results

Table 1 : Mean Age and Standard Deviation of study subjects

Cases	Mean Age (Years) ± Standard Deviation (SD)
Study Subjects (Total)	56.51 ± 12.46
Males	57.45 ± 11.87
Females	54.21 ± 12.66

Mean age of occurrence of cancer in the study group was 56.51 years.

Table 2 : Demographic profile of study subjects

Characteristics	No. of subjects
Age (in Years)	
< 30	0
31 – 40	13
41 – 50	20
51 – 60	38
61 – 70	18

> 70	11
Sex	
Male	71
Female	29
Socioeconomic status (income in Rs)	
Upper (> 15000)	1
Upper middle (9000 - < 15000)	3
Lower middle (3000 - < 9000)	52
Lower upper (1500 to < 3000)	43
Lower (<1500)	1

Most cases of oral cancer are in the age group 51 – 60 years with more number of males in the lower middle and lower upper income groups. (Table 1, Figure 1 & 2)

Fig 1. Graph showing distribution of study subjects according to age groups

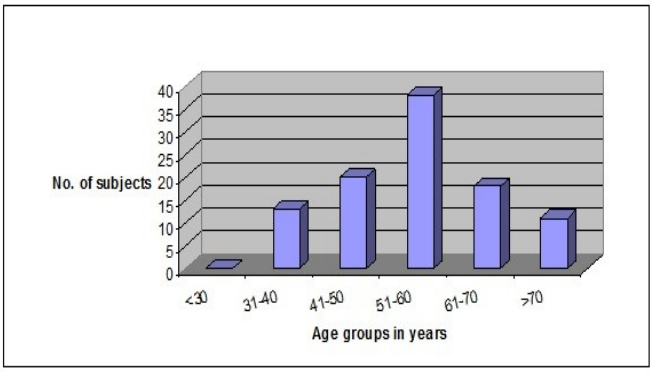
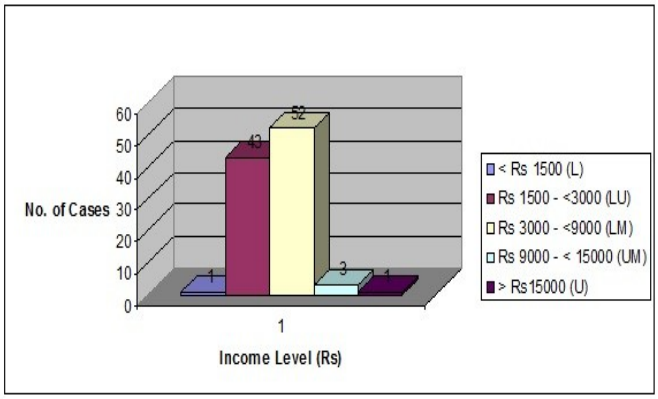


Fig 2. Graph showing socio economic status



Majority of the subjects belonged to the lower middle (52) and lower upper (43) income groups indicating that low socioeconomic status is associated with oral cancer.

Table 3 : Distribution of study subjects according to tobacco habits

	Characteristics	No. of subjects
Form of tobacco used	Chewing	21
	Smoking	58
	Both chewing & smoking	20
Duration (in years)	< 10	0
	10 – < 20	7
	20 - < 30	24
	> 30	68
Dose (g/day)	< 20	27
	20 – 40	2
	> 40	0
No of cigarettes / bidis smoked / day	< 20	9
	21 – 30	54
	> 30	15

This indicates that 20 g and less of tobacco per day itself can lead to oral cancer if used continuously for a sustained period of time of more than 20 years. Most cases (54) of oral cancer occurred in those cases who smoked for more than 20 cigarettes / bidis per day.

Fig 3. Graph showing percentage of cases attributed to tobacco habit

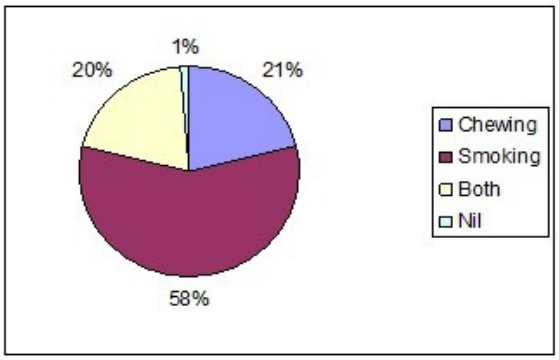
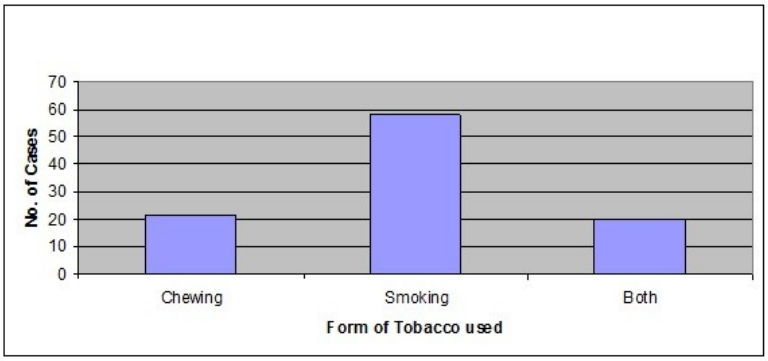


Fig 4. Graph showing tobacco habits



It is seen that the above distribution when classified on the basis of gender, is further skewed towards the males when it comes to smoking and towards chewing tobacco when it comes to females. The following table and the graph gives the distribution of tobacco usage among the two genders.

Table 4 : Distribution of study subjects based on gender according to usage of tobacco in various forms

Form of tobacco used	No. of subjects	
	Male	Females
Smoking	55	3
Chewing	1	20
Both	15	5
None	-	1

The form of tobacco used in males is smoking whereas in females chewing is more prominent as also seen in Figure 5 & 6.

Fig 5. Graph showing form of tobacco used in males

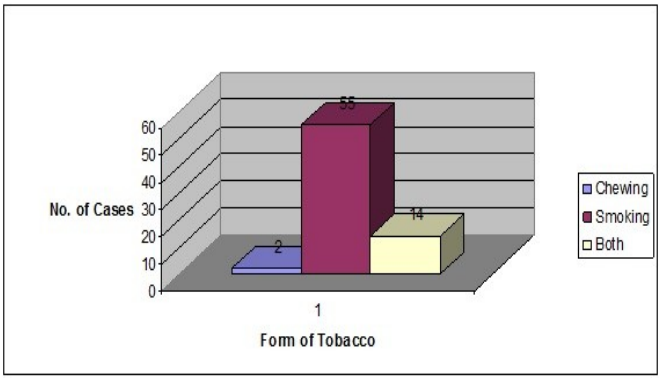


Fig. 6 Graph showing form of tobacco used in females

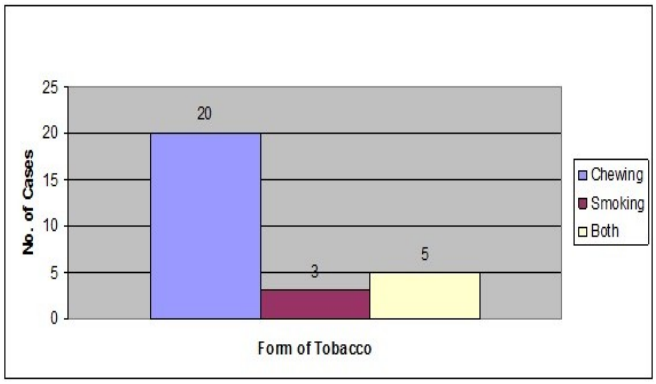
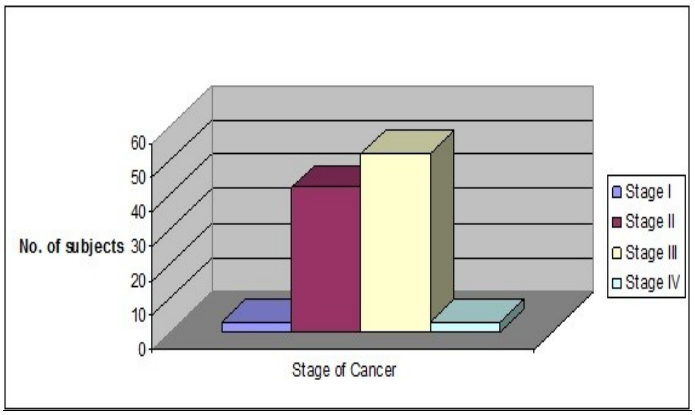


Table 5 :Distribution of study subjects according to clinical grading of cancer

Staging (TNM)	No. of subjects (%)
Stage I	3
Stage II	42
Stage III	52
Stage IV	3

Fig 7. Graph showing distribution of cases according to stage of cancer



52% of the cases were in stage III of the disease, 42% in stage II and 3% each in stages I and IV.

The commonest age group is fifth to sixth decade of life with 38 subjects (38%). 20% of the cases were between 40 and 50 years and only 18% between 60 and 70 years and no cases below 30 years of age. Similar observations were reported in previous studies. Poor oral hygiene and discolouration teeth and gums was observed in all the cases.

In the gender, male cases were far more common than female cases comprising of 71 males and 29 females, **2.4 : 1** ratio.

Fig 8. Graph showing gender distribution of oral cancer patients

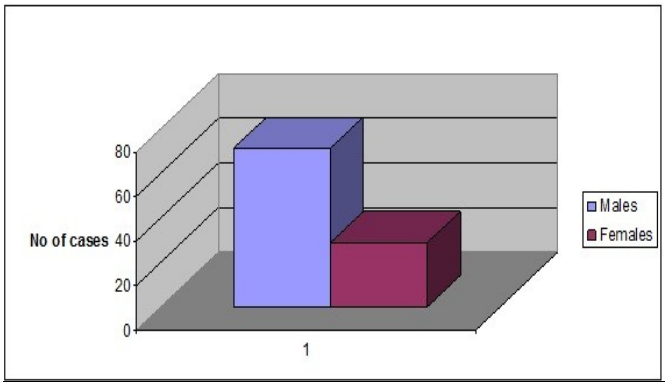
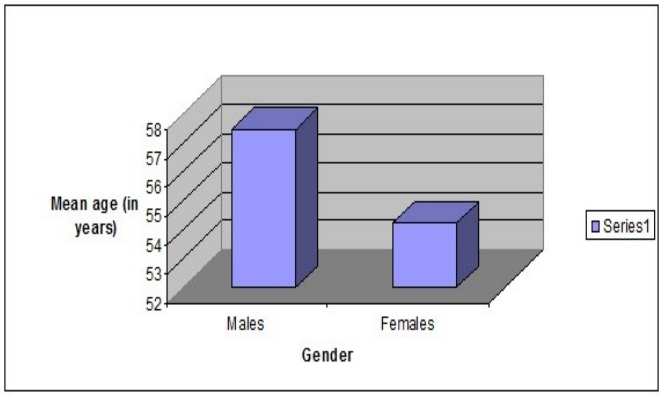


Fig 9. Graph showing mean age of male and female cases of oral cancer



The most common site involved in males is left buccal mucosa with 18 cases followed by involvement of tongue in 17 cases, hard palate in 9 cases and right buccal mucosa in 8 cases. In females, left buccal mucosa was involved in 9 cases and tongue in 5 cases.

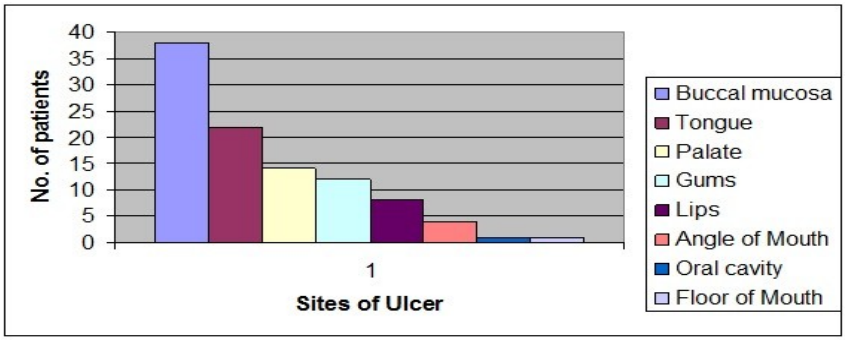
Table 6 : Involvement of various sites in oral cancer by percentage

SI. No	Site of Ulcer	Overall	Chewing	Smoking	Both
1	Buccal Mucosa total	38%	(11) 52.38%	(19) 33.92%	(8) 42.11%
	BML	27	(8) 38.09%	(12) 21.43%	(7) 36.84%
	BMR	11	(3) 14.28%	(7) 12.5%	(1) 5.26%
2	Tongue	21%	(2) 9.52%	(13) 23.21%	(6) 31.57%
	Anterior	14	(1) 4.76%	(9) 16.07%	(4) 21.05%
	Left	2	(0)	(1) 1.78%	(1) 5.26%
	Right	5	(1) 4.76%	(3) 5.36%	(1) 5.26%
3	Gums	12%	(3) 14.28%	(9) 16.07%	0
	Left upper	7	(2) 9.52%	(4) 7.14%	0
	Left lower	3	(1) 4.76%	(2) 3.57%	0
	Right lower	2	(0)	(3) 5.36%	0
4	Lips	7%	(2) 9.52%	(3) 5.36%	(1) 5.26%
	Upper lip	2	0	(2) 3.57%	0
	Lower lip	5	(2) 9.52%	(2) 3.57%	(1) 5.26%
5	Hard palate	10%	(1) 4.76%	(8) 14.29%	(1) 5.26%
6	Palate	4%	(1) 4.76%	(2) 3.57%	(1) 5.26%
7	Angle of mouth	4%	(1) 4.76%	(1) 1.79%	(2) 10.53%
	Left	3	0	(1) 1.79%	(2) 10.53%
	Right	1	(1) 4.76%	0	0
8	Floor of mouth	1%	0	(1) 1.79%	0
9	Oral cavity	1%	0	0	(1) 5.26%

As seen in table 6 & graph 10 involvement of buccal mucosa in the disease was highest (38%) with more cases involving Left buccal mucosa (27%) and 52.38% of the cases were due to chewing habits.

Tongue accounted for 21% of the cancer cases with more lesions on the anterior aspect of tongue. This was followed by gums, hard palate, lips, angle of mouth, floor of mouth and whole oral cavity.

Fig 10. Graph showing sites of ulcer in oral cancer patients



Among males who smoked, 23 cases smoked the first cigarette within 5 min of waking up in the morning, 32 cases within 30 min and 7 cases within the first one hour of waking up. In females, very few cases smoked and none of the cases

smoked within the first 5 min of waking up and 5 cases smoked within 30 min and 3 cases smoked within 60 min of waking up.

Among smokers in both sexes, 42 cases (55.26%) found it difficult to give up the first cigarette of the day smoked in the morning and 33 cases (43.42%) found it difficult to give up any other cigarette of the day. Only 9 cases of cancer also consumed alcohol.

4. Discussion

Oral cancer is one of the commonest cancers in India. High proportion of cases among males is due to high prevalence of tobacco consumption in males. Tobacco is consumed in both chewing and smoking form in males whereas in females smoking is less common in India. In the present study, most of the subjects belonged to lower and upper lower socioeconomic scale. The low socioeconomic state maybe a risk factor for poor oral hygiene which further increases the risk of oral cancer in tobacco chewers. In the present study majority of cases had lesions of buccal cavity which is probably due to betel quid kept in the mouth for a long period of time mostly the quids were kept under the lips and between the lips and the gums from where it is absorbed gradually after diluting with the saliva. The tongue, floor of the mouth and the gums are affected by precancerous lesions which lead to oral cancer later. Tobacco consumption is well established risk factor for oral cancer. It is related to dose and duration of tobacco consumption.[15,16,17] Number of betel leaves chewed per day by an individual is also high which continuously irritates the buccal mucosa. Several studies from India in the past have shown that the tongue is the most common site involved in the malignant process. However, in the present study we have seen that the common site of cancer is buccal mucosa particularly the left side.

From the above data it maybe seen that 41 (21 only chewing & 20 both) out of 100 cases have chewing habits. However, among the 38 cases having ulcer at buccal mucosa, 19 have chewing habits making it 50%. Though it is not statistically significant (considering the limited number of cases taken up for the study), it denotes a trend of chewing habits being linked with occurrence of oral cancer as due to chewing, cancer at the site of buccal mucosa is likely.

The study reveals that the patients have a habit of keeping the tobacco for sustained periods on the left side. It is seen that the site of ulcer in 43 out of 63 cases is on the left side, be it buccal mucosa, gum or tongue. This translates to about 70% as against the statistical probability of 50%. The prevalence on the left side is 2.15 times higher than that on the right side making it even statistically significant with a p value = 0.046. This is despite the small sample size taken. Analyzing further, at a more specific level of site of ulcer being at buccal mucosa of the mouth, it is seen that in 27 out of 38 cases it is on the left side which works out to 71% of the cases of such type of oral cancer. This is 2.5 times to the number of similar type on the right side. Due to the small sample size, this may not meet the required p values to determine it as statistically significant but it is still significant when compared to other attributes. In the case of ulcer at left buccal mucosa, the percentage of tobacco chewers are 56% as against the 41% in the overall population under study. Despite the small sample size, the p value is just 0.19 in this case vis – a- vis p value of 1 in case of right buccal mucosa making the trend of linkage between chewing habits and cancer of buccal mucosa clearly evident. Analyzing this data gender wise, it is seen that all the nine patients among females having ulcer on the left buccal mucosa are tobacco chewers. Of course, the level of significance is tempered by the fact that 25 out of 29 female patients are tobacco chewers making it less statistically significant. However, 6 out of 18 male patients having ulcer on the left buccal mucosa are tobacco chewers. This is 50% higher than the expected number based on the proportion of male chewers in the male population making it more statistically significant despite the smaller number.

The study also shows that smoking is associated with involvement of anterior aspect of tongue and is correlated with the fact that as against 78% being smokers in the overall population, 93% of cases with cancer on anterior aspect of tongue are smokers (p = 0.29).

However, interpretation of data from a single institution has its limitations. This data reflects the specific population reporting to the hospital and not the community as a whole. Probably, cultural differences in the use of tobacco lead to the variation in geographic and anatomic incidence of oral cancer in accordance with the dose response principle. The trend indicates a clear correlation between chewing of tobacco and incidence of oral cancer particularly left buccal mucosa.

Based on these findings, further studies can be taken up linking the chewing of tobacco and oral cancer in general by drawing samples from the general population as well. Such studies being State specific in Tripura can draw the attention of policy makers, health professionals, media and through them to the general public about the ills of chewing tobacco. While smoking is prohibited in public and public places and can be controlled, being implementable due to its external

visibility, no such measures would be possible in case of chewing tobacco. As such, efforts in this direction to sensitize the above mentioned stake holders will go a long way in reducing the incidence of oral cancer among the people of the state more particularly among the fairer sex as this category are primarily chewers of tobacco as is revealed in the study.

5. Conclusion

On the basis of the findings of this study, health education to the community, regarding hazards of tobacco consumption in various forms, common sites for occurrence of oral cancer and prevention of the disease, is recommended. There is an urgent need for appropriate prevention and cessation strategies for smoking and more particularly smokeless tobacco products by intense educational programs. During the course of the study, it was possible to interact with the oral cancer patients and their family member and friends and tell them about the hazards of tobacco used in various forms giving us a scope to create little awareness among the patients and people who accompanied them.

The findings of this pilot study will also facilitate to start an early detection program incorporating oral self examination, toluidine blue staining, brush biopsy and scalpel biopsy as needed.

Acknowledgement

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