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Original Research Article

Burden of premalignant and malignant oral lesions in rural field practice area of tertiary care hospital: a cross-sectional study

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ABSTRACT

Background: Head and neck cancers rank third in most common malignancies encountered in both genders globally. Known risk factors of oral cancer or precancer include tobacco smoking, alcohol consumption, smokeless tobacco use. Several studies among rural, semi-urban and urban populations, have proven the higher likelihood of tobacco consumption in rural settlements.
Methods: A hospital based cross sectional study was conducted in rural health training centre, Paithan under government medical college, Chhatrapati Sambhajinagar. The objectives of the study being to estimate burden of oral cancerous lesions and to determine other factors related to tobacco consumption.
Results: A total of 166 individuals were included in the study. Sociodemographic details of all participants are shown in Table 1. Mean age of all participants was calculated as 47.4±17.19 years. Prevalence of oral premalignant lesions was estimated to be 37.3%, and of oral squamous cell carcinoma 3%.
Conclusions: India being the second largest consumer of tobacco products in the world, the need to heighten our concern about tobacco usage being a leading cause of death and debilitating disease in our country.

Keywords: Tobacco, Oral cancer, Prevalence, Rural

INTRODUCTION

Head and neck cancers rank third in most common malignancies encountered in both genders globally. A subtype of head and neck cancers is oral cancer (OC), which is described as a cancerous growth in the mouth.[1] An astounding majority (~95%) of malignancies diagnosed in oral cavity are SCC originating in the mucosa lining mouth, tongue and lips whereby latter two are most commonly recorded sites.[2]

An oral potentially malignant disorder (OPMD) is defined as any oral mucosal abnormality that is associated with a statistically increased risk of developing oral cancer. OPMDs include leukoplakia, proliferative verrucous leukoplakia, erythroplakia, oral submucous fibrosis, oral lichenoid planus, oral lichenoid lesions, actinic keratosis, palatal lesions in reverse smokers and dyskeratosis congenita. OPMDs are a heterogenous group of lesions, and the transformation rates to cancer vary from 1.4% to 49.5%; the presence of epithelial dysplasia is the most significant predictor.[1]

Established risk factors of oral cancer or precancer include tobacco smoking, alcohol consumption, smokeless tobacco use, chewing areca nut products (including betel quid) with or without tobacco, and infection with human papillomavirus type 16 (HPV-16) are classified by the international agency for research on cancer (IARC) monographs Programme as carcinogenic to humans (group 1) and are established risk factors for cancers of the oral cavity.[3] The oral cavity is the entrance to the gastrointestinal tract. It is bounded anteriorly by the lips, posteriorly by the faucial arches anterior to the tonsils, laterally by the cheeks (buccal mucosae),

superiorly by the palate, and inferiorly by the muscular floor. The space between the labial mucosae of the lips or the buccal mucosae of the cheeks and teeth is defined as the oral vestibule.[3] Tobacco consumption also remains the most important avoidable risk factor for oral cancer. Tobacco related cancers account for nearly 50% of all cancers in men and 25% in women.[4]

Cigarette smoking is common in big cities while bidi is predominantly smoked in rural parts and smaller cities. Among smokeless tobacco products Gutka and use of BQ+T is more common in North and East India while Mishri and Mawa are more common in western regions.[5] As per NFHS 4(2015-16) data from rural India around 9.1% of women and 63.6% men consume tobacco in one or the other form (smoking or smokeless form).[6]

Chewing and smoking of tobacco along with consumption of alcohol beverages have become common social habits in India.[7] Tobacco was introduced in India by the Portuguese nearly 400 years ago and since then it rapidly became a part of socio-cultural milieu in various communities.[8] In 2011 the government of India, under the food safety and standards regulations announced a sweeping ban on gutkha. gutkha a popular smokeless tobacco product being a potent cocktail of areca nut, tobacco and sweeteners and also the leading cause of oral cancer in India, though it is still rampantly available illegaly.[9]

In confirmation with the 43rd world health assembly, to curb the problem of tobacco parliament of India in 2003 enforced "The cigarettes and other tobacco products Act". The act was implemented to ensure strict regulation in the trade, commerce, production and supply of tobacco through restriction of advertising or public smoking and also ban of sale to minors.[10]

Thus, the objectives of this study being to estimate burden of oral cancerous lesions and to determine other factors related to tobacco consumption.

METHODS

A hospital based cross sectional study was conducted in rural health training centre, Paithan under government medical college, Chhatrapati Sambhajinagar. Sample size estimation using suitable formula. Anticipating an estimated prevalence of oral precancerous lesions 9.9% from previous study, with absolute margin of error 5% and at 95% confidence interval, the calculated minimum sample size was 137.[11] Considering a non- response rate of 10%, thus minimum sample size comes to 150.

After an in-depth study in the topic of interest from popular research databases like PubMed and google scholar, using keywords like tobacco consumption, oral cancer, premalignant lesions, a pretested, structured questionnaire was applied to collect relevant data. Oral cancer screening OPDs were set up in dental department, all patients above 18 years of age willing to undergo screening for oral lesions were included in the study after taking informed consent, while moribund patients and people reporting of metastasized cancer were excluded from participating in the study. After an I.E.C activity with respect to harmful effects of tobacco consumption as part of world anti- tobacco day celebrations, voluntary screening camp of oral cavity was conducted 3 days a week during the study period from June 2025-August 2025.

Expertise in the screening and diagnosis of oral mucosal diseases were obtained by the primary investigator after undergoing training in state cancer institute, Chhatrapati Sambhajinagar. Screening consisted of preliminary sociodemographic details, white- light visual inspection, digital palpation of oral cavity for premalignant lesions along with neck examination to identify enlarged lymph nodes. A positive clinical oral examination from screening was reconfirmed by an experienced dentist before assigning under case category.

Data was entered systematically in master sheet by using Microsoft Excel 2019 and analysed manually. Descriptive statistics will be calculated in terms of means and standard deviations of categorical variable. A p value<0.05 was considered to be statistically significant.

RESULTS

A total of 166 individuals were included in the study. Sociodemographic details of all participants are shown in Table 1. Mean age of all participants was calculated as 47.4±17.19 years. Most of the participants were in the age group of 21-40 years. With respect to gender an unequal representation of males (86.1%) is noted in the study and majority being Hindus.

Based upon B.G Prasad SES Scale, around 60% of participants fall in the lower classes of socioeconomic order mostly earning through agriculture or elementary occupations (laborer's, taxi drivers etc). Overall oral health status of all participants only 51.2% had good oral hygiene, while dentition had been compromised for around 13% of participants. The prevalence of smokeless tobacco use was found to be 118 (71%), smoking tobacco use was only 23 (13.8%) and of alcohol consumption was 16 (9.6%) (Table 2). On univariate analysis, a significant positive association is noted between presence of oral premalignant lesions or oral squamous cell carcinoma and use of smokeless tobacco product use when analyzed with test of association for attributes (OR=5.11). Observed frequency of association (55) being greater than expected frequency of association (44). Prevalence of oral premalignant lesions was estimated to be 37.3%, and of oral squamous cell carcinoma 3% (Table 3). As seen in Table 4, no significant association is noted between different types of smokeless tobacco products and presence of oral cancerous lesions, as p value is <0.05(95% CI).

Table 1: Socio demographic details.

Socio demographic	N	%	Mean age±SD	Standard error of means of age
Age group (in years)				
0-20	6	3.6	47.4±17.19	2.62
21-40	64	38.5		
41-60	52	31.3		
>60	45	27.1		
Gender				
Male	143	86.1		
Female	23	13.8		
Religion				
Hindu	137	82.5		
Muslim	29	17.4		
Education				
Illiterate	32	19.2		
Primary level	32	19.2		
Secondary level	54	32.5		
Higher secondary level	31	18.7		
Bachelors	14	8.4		
Masters	3	1.8		
Socio economic status				
Class 1	9	5.4		
Class 2	16	9.6		
Class 3	40	24		
Class 4	52	31.3		
Class 5	49	29.5		
Occupation				
Agriculture	76	45.8		
Elementary occupation	55	33.1		
Unemployed	18	10.8		
Professional	13	7.8		
Skilled worker	4	2.4		

Table 2: Oral health status.

	N	%
Oral hygiene		
Good	85	51.2
Average	49	29.5
Poor	32	19.2
Dentition		
>16	116	69.8
5–16	27	16.2
<5	23	13.8

Table 3: Association of smokeless tobacco use with OPMD / OSCC.

	OPMD/OSCC present	OPMD/OSCC absent	Total
Use of any smokeless tobacco product	55	63	118
No use of any smokeless tobacco product	7	41	48
	62	104	166

Table 4: Type of smokeless tobacco product use and presence of OPMD/OSCC.

	OPMD/OSCC present	OPMD/OSCC absent	Total	Chi square value	Degrees of freedom	P value
Tobacco	36	51	83	6.74	3	0.0806
Gutka	13	6	19			
Mava	2	4	6			
Betel nut	1	5	6			
Total	52	66	114			

Table 5: Types of smokeless tobacco products in India.[21]

Types of SLT	Ingredients
Mava	Tobacco+ lime+areca
Nass	Tobacco+ ash+cotton oil
Gutka	Tobacco+ areca nut mixed with lime, flavoring agents
Toombak	Tobacco+ sodium bicarbonate
Shammah	Tobacco +ash+ lime
Naswar	Tobacco+ lime
Gudakhu	Tobacco+ molasses
Zarda	Boiled tobacco
Betel quid	Paan+ areca nut+ tobacco
Mishri	Burnt tobacco
Khaini	Tobacco+ lime

DISCUSSION

Tobacco use is a serious public health challenge in several regions of the world. It has assumed the dimension of an epidemic resulting in enormous disability, disease and death. This particular study not only aims to determine the associated factors of tobacco consumption but also to estimate prevalence of oral cancerous lesions in a rural study population based out of Maharashtra.

Multiple studies among rural, semi- urban and urban populations, have proven the higher likelihood of tobacco consumption in rural settlements. The higher prevalence of smokeless tobacco consumption 71% and smoking tobacco 13.8% could be explained using similar results in other studies mostly attributed to lower socio-economic status and literacy in rural areas.[13,14] A significant gender gap is noted among the participants males (86.1%) while females represent only (13.8%), which could be attributed to interviewer's bias. Tobacco staining of teeth, periodontal diseases, poor oral hygiene, increased odds of experiencing tooth pain are all the dental implications of tobacco consumption in this study comparable to other studies done by Sheiham et al, Riley et al.[15,16]

According to the International Agency for Research on Cancer (IARC) monograph1, there is sufficient evidence in humans that tobacco smoking causes cancer of the lung, oral cavity, naso, Oro and hypopharynx, nasal cavity and paranasal sinuses, larynx, oesophagus, stomach, pancreas, liver, kidney (body and pelvis), ureter, urinary bladder, uterine cervix and bone marrow (myeloid leukemia).Smokeless tobacco use was associated with cancers of the lip, oral cavity, pharynx, digestive, respiratory and intrathoracic organs.[17] Smokeless tobacco consumers in this study are 5.11 times more prone to oral cancerous lesions than non-users. Oral smokeless tobacco products are traditionally sold with multiple contents in varied concentrations under different local names. Distinguishing between smokeless tobacco products becomes a priority before attempting to curb their illegal market and abuse. Such products can be broadly categorized as snuff (powdered or ground tobacco) or chewing tobacco (leaf, plug or twist).[17] Prevalence of gutka consumption in our study population comes to 16%, in spite of strict prohibition of its sale implemented by the food safety and standards regulations India in 2011.This could be explained from another study Welding et al where, gutkha manufacturing companies have found ways to circumvent the ban by producing pan masala (a non-tobacco product containing areca nuts, slaked lime, catechu, and seasonings) under the same brand name, with tobacco provided separately in a packet for free, allowing users to prepare their own gutkha. This is known as the two-packet form of gutkha or twin-packet gutkha.[18,19] Areca nut consumption prevalence is 5.2%, which can lead to the production of reactive oxygen species and may cause precancerous lesions including oral submucous fibrosis and oral cancer, cancer of the pharynx, and oesophageal cancer. Salts such as sodium chloride, added to ST as a flavour enhancer and antimicrobial agent, may damage the gastric epithelium, increase the absorption of carcinogens, and contribute to chronic inflammation and tumour promotion.[20]

One of the limitations of this study, that being a hospital-based study it represents a far more severe representation of the public health burden of oral lesions.

CONCLUSION

India being the second largest consumer of tobacco products in the world, the need to heighten our concern about tobacco usage being a leading cause of death and debilitating disease in our country. Strong evidence provided from various studies including ours has linked tobacco use with incidence of cancer. A massive active public awareness campaign against illegal sale and consumption of gutkha has to be sustained in order to deal with the threat to public health.

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