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ORIGINAL RESEARCH

ANALYSING ORAL CANCER AND PRECANCER BURDEN IN INDIAN POPULATION

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ABSTRACT

Background: The incidence of oral cancer is rising quickly among Indian people, primarily in the lower socioeconomic strata. Individuals who are economically and socially marginalised are more susceptible to mouth cancer.

Aim: to determine the incidence of mouth cancer and precancerous lesions in participants who are Indian.

Methods: To determine the prevalence, the oral cavity of 658 participants was clinically examined for any tissue growths, leathery changes, ulcerative changes, and white or red lesions.

Results: In the current study, the overall prevalence of smoking and smokeless tobacco use was 65.2% (n=429) and 78.8% (n=518), respectively. Oral malignant and precancerous lesions were detected in 39.8% (n=262) of the samples. Of the individuals, 36.2% (n = 238) had positive samples from the buccal mucosa, whereas 6.1% (n = 40) had positive samples from the labial mucosa.

Conclusions: Due to the high rates of tobacco use and related behaviours, oral cancer is quite common among Indian subjects, making the cessation centre a priority. To get better results, early screening and detection are also essential.

Keywords: Cancer detection, cancer screening, Oral cancer, precancerous lesions, survey

INTRODUCTION

India has the largest recorded incidence of oral cancer worldwide, making it a key contribution to the disease's burden. Oral cancer can be caused by certain lifestyle choices and related behaviours, such as using tobacco-containing paste made from slaked lime and areca nuts, betel leaf, tobacco-based flavourings and colourings, tobacco-based sweeteners, catechu, lime, and

areca nuts, pan masala, tobacco, alcohol, and/or smoking. [1] Indian folks are more likely to engage in these activities. The most popular type of tobacco among Asians is smokeless tobacco.

In addition to the traditional agents such as tobacco-containing tooth powder, tobacco-containing lime, pan masala, betel quid, and areca nuts, the use of newer tobacco-containing products is on the rise in male subjects as well as in dental and medical students, teenagers, young children, and female subjects who are of reproductive age [2,3]

In India, where it accounts for roughly 30% of all cancer cases, oral cancer is a significant global health problem. Due to varying risk factors that are common, there are regional differences in the incidence and prevalence of oral cancer. Affected people have increased death rates due to delayed diagnosis [4]. Better treatment outcomes and a higher survival percentage can be achieved with early identification. However, patients from lower socioeconomic groups have a higher incidence of oral cancer and have less access to prompt treatment, which delays diagnosis and management and lowers survival rates [5].

Data from earlier studies indicate that oral cancer is highly prevalent, often occurring, and a cause for concern at various time points. A sizable portion of the Indian populace comes from low-income families, which further restricts their access to dental treatment due to societal prejudice, inadequate healthcare, communication problems, illiteracy, and/or poverty [6].

In more than 90% of the afflicted people, alcohol and tobacco use are the most prevalent causative factors for oral cancer. According to earlier literature data from Indian research, smoking and smokeless tobacco use are seen to be prevalent among Indian participants from poor socioeconomic backgrounds. Additionally, it is said that over 50% of participants from poor socioeconomic backgrounds who were older than 15 years old smoked tobacco, either in smokeless or smoking form. Additionally, participants utilising smokeless or smoking tobacco form showed medium levels of nicotine dependence [7].

These findings indicate that Indians from lower socioeconomic groups have a significant incidence of oral precancerous lesions and cancer. Nevertheless, there is a dearth of information in the literature about this problem [8].

Therefore, the purpose of the current study was to assess the incidence of oral cancer and precancerous lesions among Indian participants belonging to the lower socioeconomic category.

MATERIAL AND METHODS

The current cross-sectional descriptive clinical study set out to assess the incidence of oral cancer and precancerous lesions in Indian participants belonging to lower socioeconomic strata. After receiving approval from the relevant institutional ethical committee, the study was carried out. Upon the subjects' signed informed permission form, the research population was selected from the Institute's outpatient department.

Subjects who completed a written consent form and were at least 15 years old, regardless of gender, met the inclusion requirements. Individuals receiving treatment for precancerous lesions or oral cancer, those with impaired immune systems, and those unwilling to participate in the study were excluded from the study.

Following final inclusion, all individuals in the outpatient department of oral medicine and radiology had their demographic information gathered.

The subject's ID (Aadhar card) was used to validate the collected data. The study had 658 people of both genders in its sample size. Following the collection of demographic information, two highly qualified oral examiners performed a clinical examination of each participant's oral cavity.

One examiner was affiliated with the Department of Oral Medicine, while the other belonged to the Department of Oral Pathology. The mouth cavity was visually inspected as part of the clinical examination. Any tissue growths, leathery changes, ulcerative modifications, and/or red or white lesions were looked for in the oral cavity. The 1997 WHO criteria were employed to diagnose precancerous lesions and illnesses. The participants who were thought to have possible premalignant lesions were identified and referred to the tobacco cessation centre for counselling in order to help them kick their habit.

The collected data was statistically evaluated to determine the prevalence, which was expressed as a percentage. The findings were presented as mean, standard deviation, percentage, and numerical values. At a significance threshold of $p<0.05$, the chi-square test was utilised to assess the prevalence of lesions in males and females.

RESULTS

Of the 658 participants in the research, 49.54% (n=326) were female and 50.45% (n=332) were male. The subjects' mean ages were 40.2±2.24 years for males and 37.4±2.22 years for females. As shown in Table 1, the overall prevalence of smoking and smokeless tobacco use in the current study was 65.2% (n=429) and 78.8% (n=518), respectively.

In male subjects, the prevalence of precancerous and cancerous lesions was 57.2% (n=182) subjects and in females, it was 42.7% (n=136) subjects. The difference was statistically non-significant with p=0.07 (Table 2).

Regarding distribution by location, there were no growth/ulceration, white lesion, red lesion, or oropharynx, gingiva, palate, floor of the mouth, or vestibule seen. In the tongue and labial mucosa, white lesions and red lesions were observed in 0.3% (n = 2), 0.60 percent (n = 4), and 41.64% (n = 274) of the participants, respectively. There were 41.64% (n = 274) and 9.11% (n = 60) of participants with white lesions and red lesions, respectively. Among the research individuals, 0.3% (n = 2) had ulceration or growth. Table 1 displays the percentage of research individuals with leathery changes: 19.14% (n =126), 16.10% (n =106), 6.38% (n =42), 0.3% (n =2), 11.24% (n =74), 1.21% (n =8), 16.41% (n =108), and 28.26% (n =186). To distinguish dysplastic tissues, toluidine blue staining was applied. 39.8% (n=262) of the samples in the current investigation tested positive for malignant and precancerous oral cavity lesions. Out of the total, 44% (n = 289) of the men and 35.6% (n = 234) of the females had positive staining. According to Tables 3 and 4, the buccal mucosa had the greatest percentage of positive samples—36.2% (n = 238) and the labial mucosa—with 6.1% (n = 40) of patients.

DISCUSSION

A sizable portion of the populace in most emerging nations comes from a lower socioeconomic background and a sizable portion of them are members of socially marginalised groups. This demographic is impoverished and has restricted access to healthcare services. Srivastava R et al

[9] show that these patients are prone to developing harmful behaviours, such as tobacco usage, which results in a high prevalence of oral lesions.

According to a 2009 study by Warnakulasuriya S[10], those with a lower socioeconomic position had a 1.8-fold increased risk of oral cancer. The study's findings on tobacco use and associated behaviours revealed a significant incidence of precancerous and cancerous lesions in 57.2% (n=182) of the male subjects and 42.7% (n=136) of the female individuals.

With p=0.07, the difference was statistically not significant. This tobacco use was influenced by peers and cultural norms. According to Khanna S [11] in 2012 and Palliyal SA [12] in 2019, the behaviours were carried down from generation to generation, with a mean age of 14.5±2.1 years. This indicates that the habits began early in life and persisted for a longer period of time. Taking hunger and poverty head-on were further contributing causes. According to the study's findings, 39.8% (n=262) of the samples stained positively for precancerous and cancerous lesions of the oral cavity after toluidine blue staining. Of the males, 44% (n = 289) and the females, 35.6% (n = 234) showed positive staining.

Of the individuals, 36.2% (n = 238) had positive samples from the buccal mucosa, whereas 6.1% (n = 40) had positive samples from the labial mucosa. With p=0.07, the difference was statistically not significant. These findings were in line with research by Vinay BH et al.[13] from 2014, in which the authors found that male subjects had a significantly higher prevalence of oral precancerous lesions than female subjects did, and research by Srivastava R et al.[9] from 2020, which found that male subjects had a high prevalence of leukoplakia and OSMF.

The buccal mucosa included the bulk of the lesions that were reported in the research. These findings contradicted those of Pullishery F et al. (2018), who found that the majority of participants (45.5%) had lesions in the tongue, with 39% having lesions in the buccal mucosa. The high prevalence was due to tobacco-related habits.

In the current study, the overall prevalence of smoking and smokeless tobacco use was 65.2% (n=429) and 78.8% (n=518), respectively. Other investigations, such as those conducted in 2012 by Khanna et al. [11], in 2016 by Valsan et al. [15], in 2020 by Francis DL. [16], and in 2012 by Valsan et al. [15] revealed 4.2% of participants having oral mucosal lesions. A lower sample size, single-institute evaluation, a shorter monitoring period, and the assessment of patients who were 15 years of age or older were among the study's minor shortcomings. These restrictions may produce unreliable findings and underestimate the true prevalence of oral cancer in the study's target group.

CONCLUSION

When participants from poor socioeconomic backgrounds were examined, oral lesions were found to be highly prevalent in both genders. To stop the epidemic, the report recommends starting national initiatives and smoke cessation centres. Programs for early diagnosis and screening are also necessary to lower the burden of disease.

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TABLES

Site	Leathery changes n (%)	Growth/ulceration n (%)	Red lesions n (%)	White lesions n (%)
Oropharynx	126 (19.14)	0	0	0
Gingiva	106 (16.10)	0	0	0

Palate	42 (6.38)	0	0	0
The floor of the mouth	2 (0.3)	0	0	0
Vestibule	74 (11.24)	0	0	0
Tongue	8 (1.21)	0	2 (0.3)	2 (0.3)
Labial mucosa	108 (16.41)	0	4 (0.60)	4 (0.60)
Buccal mucosa	186 (28.26)	2 (0.3)	60 (9.11)	274 (41.64)
Total	652 (99.08)	2 (0.3)	66 (10.03)	280 (42.55)

Table 1: Site-wise distribution of oral lesions in study subjects

Gender	n (%)	p-value
Males	146 (22.18)	0.07
Females	116 (17.62)	

Table 2: Gender-wise distribution of oral lesions in study subjects

Sr. no.	Site	Number (n)	Percentage (%)
1	Oropharynx	8	1.21
2	Gingiva	14	2.12
3	Palate	6	0.91
4	The floor of the mouth	2	0.3
5	Vestibule	16	2.43
6	Tongue	4	0.60
7	Labial mucosa	40	6.07
8	Buccal mucosa	238	36.28

Table 3: Site-wise distribution of oral lesions in study subjects after Toluidine blue stain

Gender	Oropharynx n (%)	Gingiva n (%)	Palate n (%)	The floor of mouth n (%)	Vestibule n (%)	Tongue n (%)	Labial mucosa n (%)	Buccal mucosa n (%)
Males	4 (0.60)	6 (0.91)	2 (0.3)	0	6 (0.91)	2 (0.3)	28 (4.25)	136 (20.66)
Females	4 (0.60)	8 (1.21)	4 (0.60)	2 (0.3)	10 (1.51)	2 (0.3)	12 (1.82)	102 (15.50)

Table 4: Site and Gender-wise distribution of oral lesion in study subjects after Toluidine blue stain