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Assessment of Awareness and Knowledge Regarding Tobacco-Related Oral Cancer and Potentially Malignant Disorders Among Dental Patients

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Abstract

Background: Tobacco use is a leading risk factor for oral cancer and oral potentially malignant disorders (OPMDs). However, awareness of these conditions is often limited, which can delay early detection and preventive actions.

Objective: This study aimed to evaluate the prevalence and patterns of tobacco use, sociodemographic associations, and awareness of oral cancer and OPMDs among dental OPD attendees.

Methods: A cross-sectional study was conducted with 155 participants visiting a dental OPD. Structured questionnaires captured information on sociodemographic characteristics, tobacco use, awareness of oral cancer and OPMDs, knowledge of risk factors, and preventive behaviors. Associations between tobacco use and gender, age, and education were analyzed using chi-square tests.

Results: Overall, 35.5% of participants reported using tobacco, with males showing significantly higher prevalence than females (44.4% *vs.* 23.1%; $\chi^2 = 6.62$, $p = 0.010$). Tobacco use was inversely related to education: 88.9% of individuals with less than 10th-grade education used tobacco, compared to only 8.3% of postgraduates ($\chi^2 = 42.31$, $p < 0.001$). Tobacco consumption increased with age, reaching 63.2% among those aged 60–80 years ($\chi^2 = 10.07$, $p = 0.018$). Awareness of oral cancer was high (99.3%), but only 21.3% of participants were aware of OPMDs, and just 27.1% had ever performed a self-oral examination. Media, family, and schools were the most frequently cited sources of information, and participants preferred public talks, school-based programs, and newspaper campaigns for improving awareness.

Conclusion: Tobacco use remains common among dental OPD attendees, particularly among men, older adults, and those with lower educational levels. While awareness of oral cancer is generally high, knowledge of OPMDs and engagement in preventive behaviors are inadequate. Focused educational programs and community-based strategies are essential to promote early detection and reduce the burden of tobacco-related oral diseases.

Keywords: Tobacco Use; Oral Cancer; Oral Potentially Malignant Disorders (OPMDs); Awareness; Self-oral Examination; Dental OPD

Introduction

Oral cancer remains a significant global health challenge, particularly in low- and middle-income countries where access to healthcare services and public awareness are limited. According to GLOBOCAN 2022 estimates, there were approximately 389,846 new cases and 188,438 deaths due to lip and oral cavity cancers worldwide [1]. This highlights the urgent need for effective prevention, early detection, and treatment strategies.

In India, the burden is especially severe, with oral cancer ranking among the top three types of cancers affecting the population. The country accounts for about one-fourth of the global disease burden, with an estimated 135,929 new cases and 75,290 deaths annually [2]. This high prevalence is closely associated with widespread tobacco use, including both smoking and smokeless forms [3].

Tobacco consumption is a well-established etiological factor in the pathogenesis of oral squamous cell carcinoma (OSCC) and oral potentially malignant disorders (OPMDs). OPMDs such as leukoplakia, erythroplakia, oral submucous fibrosis (OSMF), and lichen planus are considered precancerous lesions or conditions with a known risk of malignant transformation, particularly when associated with chronic tobacco exposure [4, 5]. Smokeless tobacco products, commonly used in various forms like gutkha, khaini, zarda, and betel quid with tobacco, have been directly implicated in the development of OSMF and leukoplakia, especially among younger individuals in India [4, 5].

Despite strong clinical evidence linking tobacco to oral cancer and its precursor lesions, there exists a significant gap in public knowledge regarding these associations. Many individuals remain unaware of the early signs and symptoms of oral cancer or the nature of OPMDs, leading to late diagnosis and poor prognosis [6]. Lack of awareness not only delays professional consultation but also contributes to the persistence of harmful habits. Early diagnosis of OPMDs plays a pivotal role in preventing their progression to malignancy, yet this can only be achieved if the population is well-informed about the warning signs and associated risk factors [6].

Dental professionals are in a strategic position to identify these lesions early during routine oral examinations. As a result, dental clinics serve as critical points for screening, patient education, and tobacco cessation counseling [7]. Dental patients, by virtue of their access to oral healthcare services, represent an important population to assess for awareness and knowledge regarding tobacco-associated oral diseases. Studies have shown that targeted educational interventions in dental settings can significantly improve patient knowledge and encourage positive behavioral changes.

However, limited data is available on the level of awareness specifically among dental patients in India regarding tobacco-related oral cancer and potentially malignant disorders. Most existing studies focus either on general public awareness or on specific groups such as students or tobacco users. There remains a need to evaluate the understanding of dental patients who might already be at risk or exhibit early signs of disease. This study aims to fill this gap by assessing the awareness and knowledge of tobacco-related oral cancer and OPMDs among dental patients. The findings will help identify deficiencies in current knowledge and serve as a foundation for designing effective educational programs within dental care settings.

Materials and Methods

This was a cross-sectional, questionnaire-based study conducted among dental patients attending the outpatient department of a dental college in Nagpur, over a period of a month. A total of 155 participants were enrolled in the study using convenience sampling. Inclusion criteria consisted of patients aged 18 years and above, capable of understanding the questionnaire and willing to provide informed consent. Patients with a known diagnosis of oral cancer or OPMDs undergoing treatment were excluded to minimize bias in awareness levels.

Ethical clearance for the study was obtained from the Institutional Ethics Committee (IEC/RDDC & RC/PG/ORAL PATH/APRIL-25). A structured, self-administered questionnaire was developed based on an extensive review of the literature related to awareness and knowledge of tobacco-associated oral cancer and potentially malignant disorders.

The questionnaire consisted of sections covering:

Demographic details (age, gender, education, tobacco habits).

Awareness of oral cancer and OPMDs.

Knowledge regarding signs, risk factors, and preventive measures.

The content validity of the questionnaire was assessed by a panel of subject experts.

he Content Validity Index (CVI) was calculated to ensure the relevance and clarity of the items. The overall CVI score was 0.97, indicating excellent content validity.

Data Collection Procedure

Participants were approached in the waiting area of the dental OPD and were provided with the questionnaire in local language. Instructions were explained verbally, and assistance was provided when required to ensure complete and unbiased responses. The responses were collected anonymously.

Statistical Analysis

Data were compiled and entered into Microsoft Excel and analyzed using SPSS software version 20. Descriptive statistics were used to present demographic data and frequency of responses. The level of awareness and knowledge was analyzed using frequency distribution and percentage. Inferential statistics such as chi-square test were used to assess associations between demographic variables

Table 1: Sociodemographic Characteristics of Study Participants (N = 155).

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	90	58.1
	Female	65	41.9
Age Group (years)	<20	—	—
	20–40	—	—
	40–60	—	—
	60–80	—	—
Education Level	Below 10th	9	5.8
	10th pass	24	15.5
	12th pass	29	18.7
	Graduate	79	51.0
	Postgraduate	14	9.0

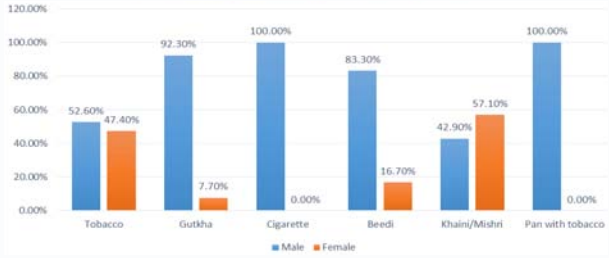

Chart 1: Tobacco Type Consumption Among Gender.

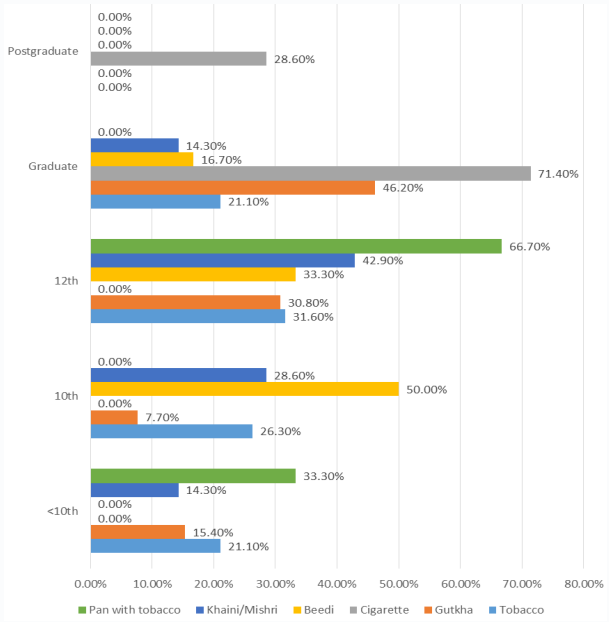

Chart 2: Tobacco Type Consumption Among Education Level.

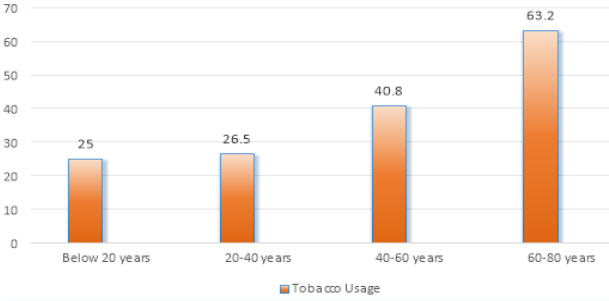

Chart 3: Age Group wise Tobacco Usage.

and awareness levels. A p-value of <0.05 was considered statistically significant.

Results

A total of 155 questionnaires were analyzed. The study consisted of 65 females and 90 males, with participants distributed across age groups ranging from below 20 years to 80 years.

Sociodemographic Characteristics

Sociodemographic data, including gender, age, and education levels, are summarized in Table 1. In terms of education, all participants had some level of schooling, with the majority being graduates (51%), followed by individuals educated up to 12th standard (18.7%), 10th standard (15.5%), postgraduates (9%), and a small proportion educated below 10th (5.8%) (Table 1).

Tobacco Use Prevalence and Association with Sociodemographic Factors

In the present study, 35.5% of the participants reported using tobacco in either smoking or smokeless forms.

Gender-wise Distribution of Tobacco Use: A significantly higher proportion of males (44.4%) consumed tobacco compared to females (23.1%) ($\chi^2 = 6.62$, $p = 0.010$) (Chart 1).

Education-wise Distribution of Tobacco Use: Tobacco use showed a strong inverse correlation with education; individuals with less than 10th-grade education reported the highest usage (88.9%), whereas postgraduates showed the lowest usage (8.3%), indicating a statistically significant association ($\chi^2 = 42.31$, $p < 0.001$) (Chart 2).

Age-wise Distribution of Tobacco Use: Age-wise, tobacco use increased with advancing age, lowest among those <20 years (25%) and highest among those 60–80 years (63.2%) ($\chi^2 = 10.07$, $p = 0.018$) (Chart 3).

Awareness of Oral Cancer and Oral Potentially Malignant Disorders

Awareness of Oral Cancer: Awareness of tobacco-associated oral cancer was high across the population, with 99.3% of participants reporting awareness, and only 0.7% were unaware (Table 2).

Awareness of OPMDs: Awareness of oral potentially malignant disorders (OPMDs) was considerably lower; 78.7% of the study population were not aware of OPMDs, while only 21.3% reported awareness (Table 2).

Knowledge of Signs and Symptoms: Regarding knowledge of signs and symptoms of oral cancer, 68% of the subjects were not aware, 22% had awareness limited to oral cancer alone, and 10% were aware of both oral cancer and OPMDs (Table 2).

Awareness of Tobacco-Related and Betel-Quid Related Risk Factors

Betel-Quid Chewing Risks: Awareness of risk factors related to betel-quid chewing revealed that 32% of participants were unaware of the risks, 58% recognized its association with oral cancer, and 10% were aware of its association with both oral cancer and OPMDs. Most of the study population lacked awareness of other risk factors,

Table 2: Awareness of Oral Cancer and Oral Potentially Malignant Disorders (OPMDs).

Awareness Domain	Category	Frequency (%)
Awareness of Oral Cancer	Aware	99.3
	Not aware	0.7
Awareness of OPMDs	Aware	21.3
	Not aware	78.7
Knowledge of Symptoms	Not aware	68
	Aware of oral cancer only	22
	Aware of both OC & OPMDs	10
Risk of Betel Quid	Not aware	32
	Aware of OC only	58
	Aware of OC + OPMDs	10
Risk of Tobacco Chewing	Not aware	23

Table 3: Tobacco Consumption Patterns (Among Users).

Variable	Category	Percentage (%)
Type of Tobacco	Cigarette	—
	Beedi	—
	Gutkha	—
	Khaini/Mishri	—
	Pan with tobacco	—
Duration of Use	3–5 years	24
	5–10 years	34
	10–20 years	29
	>20 years	23
Association with Education	—	$\chi^2 = 34.19$, $p = 0.025$*
Association with Gender	—	$\chi^2 = 13.62$, $p = 0.018$*

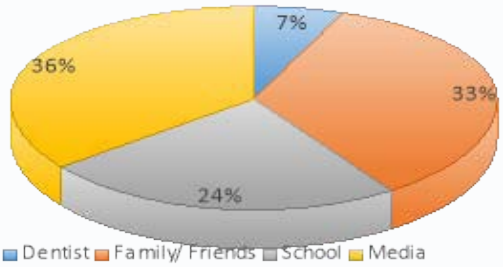

Chart 4: Sources of Information.

including smoking, alcohol consumption, areca nut chewing, betel leaf use, and nutritional deficiencies (Table 2).

Tobacco Chewing Risks: Awareness of risk associated with tobacco chewing showed that 23% of subjects were not aware, 68% were aware of its association with oral cancer, and 9% were aware of its association with both oral cancer and OPMDs (Table 2).

Awareness of Combined Risk Factors: In total, 93% of participants demonstrated no awareness of combined risk factors for OPMDs, whereas only 7% had adequate knowledge (Table 2).

Tobacco Consumption Patterns

Forms of Tobacco Used: Regarding tobacco consumption patterns, all tobacco users in the study consumed some form of smoking or smokeless tobacco, including gutkha, khaini/mishri, pan with tobacco, cigarettes, or beedi (Table 3).

Duration of Tobacco Use: Duration analysis showed that 34%

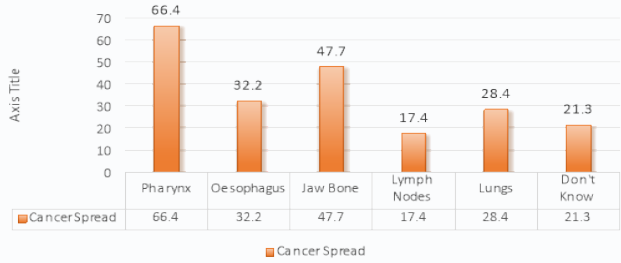

Chart 6: Cancer Spread.

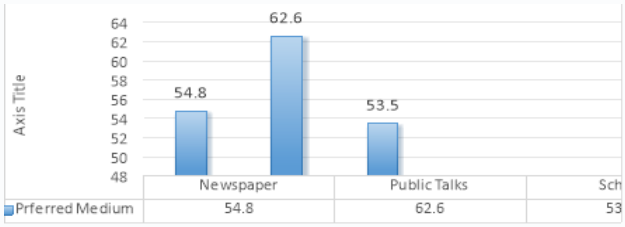

Chart 7: Preferred Medium.

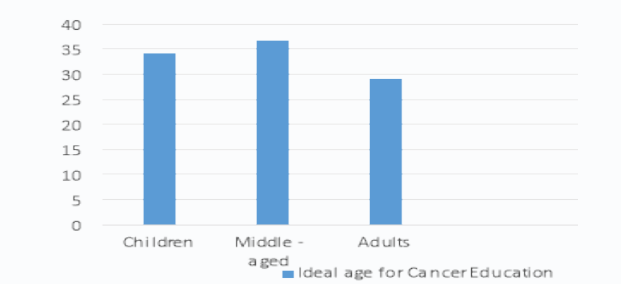

Chart 8: Ideal Age for Cancer Education.

of participants had been using tobacco for 5–10 years, 29% for 10–20 years, 24% for 3–5 years, and 23% for more than 20 years (Table 3).

Association with Education and Gender: The type of tobacco consumed showed a significant association with education ($\chi^2 = 34.19$, $p = 0.025$) and gender ($\chi^2 = 13.62$, $p = 0.018$), with cigarette and gutkha use predominant among males, while khaini/mishri use was slightly higher among females (Table 3).

Sources of Awareness and Preventive Knowledge

Sources of Information: Awareness sources revealed that participants received information predominantly from media (78.1%), family and friends (73.5%), school (52.9%), and dental professionals (15.5%) (Chart 4).

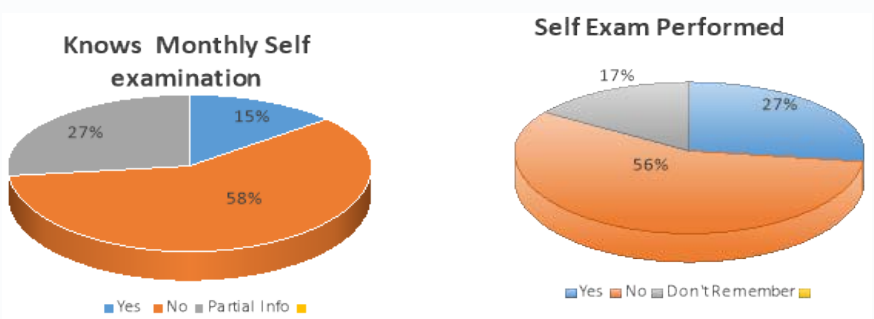

Chart 5: Preventive Knowledge.

Self-Oral Examination and Preventive Awareness: Only 27.1% had ever performed a self-oral examination, and 14.8% were aware of the recommended monthly self-examination practice. Preventive awareness was limited, with only 41.3% agreeing that lifestyle modifications reduce cancer risk (Chart 5).

Knowledge of Early Symptoms and Cancer Spread: Knowledge of early symptoms was poor, with just 22.6% acknowledging that oral cancer can be painless initially. Regarding cancer spread, participants identified the pharynx (66.4%), jawbone (47.7%), esophagus (32.2%), and lungs (28.4%) as possible sites (Chart 6).

Preference for Oral Cancer Education and Delivery Methods

Preferred Modes of Education: Most participants (81.9%) expressed a need for more information regarding oral cancer. Public talks (62.6%), newspapers (54.8%), and school-based programs (53.5%) were the preferred modes for receiving information (Chart 7).

Preferred Age for Cancer Education: The ideal age for cancer education was reported as middle age (36.8%), followed by childhood (34.2%) and adulthood (29%) (Chart 8).

Discussion

In this cross-sectional study, 155 participants were evaluated to assess tobacco-use patterns, awareness of oral cancer, and knowledge of oral potentially malignant disorders (OPMDs). The overall prevalence of tobacco use (35.5%) was slightly higher than the national estimate from GATS-2 (28.6%) [8]. This difference may be attributed to regional patterns, cultural influences, and the easy availability of smokeless tobacco products.

A significant gender disparity was observed, with males reporting a higher prevalence of tobacco use compared to females. This aligns with national and global evidence highlighting male predominance in tobacco consumption due to social acceptability and occupational influences [9, 10].

One of the strongest findings in the present study was the inverse association between education level and tobacco use. Individuals with lower educational attainment (<10th standard) reported substantially higher tobacco consumption, whereas graduates and postgraduates showed markedly lower usage. This pattern is well supported by previous population-based studies, including analyses by Sreeramareddy et al. [11]. and Singh & Ladusingh [12], both of which identified education as a key determinant of tobacco-use behavior. Education is known to improve health literacy, risk perception, and decision-making, thereby reducing susceptibility to tobacco initiation and continuation.

Tobacco use increased with age, with the highest prevalence observed among individuals aged 60–80 years. Similar age-related trends have been reported in national surveys, indicating long-standing habitual use among older adults and cumulative addiction over time [8, 10].

While awareness of oral cancer was remarkably high (99.3%), knowledge regarding OPMDs was strikingly low (21.3%). This mirrors findings from earlier studies in Indian populations, where individuals often recognize the term oral cancer but lack understanding of its precursor lesions [13, 14]. Moreover, only 22.6% were aware that oral cancer may be painless in early stages, a knowledge gap linked with late presentation and poorer prognosis, as highlighted by Warnakulasuriya [15].

Risk-factor awareness was also limited. Nearly one-third of participants were unaware of the dangers of betel-quid chewing, despite well-established evidence of its association with OSMF and oral cancer [16]. Awareness of combined risk factors—such as the synergistic effects of tobacco, alcohol, and areca nut—was particularly low (7%), consistent with previous studies reporting superficial public understanding of oral cancer etiology [13].

Patterns of tobacco consumption revealed the use of both smoking and smokeless products, consistent with national trends reported by GATS-2 [8]. Significant associations between type of tobacco used and sociodemographic variables (education and gender) further support existing literature that demographic factors influence product preference [10, 12].

Although mass media and interpersonal networks were major sources of information, the contribution of dental professionals was minimal. This gap reflects findings from earlier studies suggesting the need for increased involvement of oral health providers in tobacco cessation and cancer-prevention counseling [17]. Low engagement in self-oral examination (27.1%) highlights an unmet need for community-based awareness initiatives, aligned with recommendations for early detection and screening strategies [15].

Finally, the strong preference for public talks, newspapers, and school-based programs for receiving cancer-related information indicates a positive attitude toward preventive education. Similar findings from community studies have shown that structured health education programs can significantly improve awareness and reduce harmful habits [18].

Conclusion

Our study confirms many patterns reported in prior research while emphasizing specific challenges within the dental patient population. High general awareness does not translate into in-depth knowledge or preventive behavior. These findings reinforce the need for targeted health education, especially among less educated and older adults, and for leveraging dental OPDs as platforms for early screening and patient-centered counseling.

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