International Journal of Research and Technology (IJRT)

International Open-Access, Peer-Reviewed, Refereed, Online Journal

ISSN (Print): 2321-7510 | ISSN (Online): 2321-7529

| An ISO 9001:2015 Certified Journal |

Evaluation Of Awareness and Early Screening Practices for Oral Cancer Among High-Risk Population

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Abstract

Oral cancer is a major public health problem in India because its leading risk factors are common, its early lesions are visible to trained health workers, and many cases continue to be diagnosed at advanced stages. India recorded 143,759 new cases of lip and oral cavity cancer and 79,979 deaths in 2022, making it the second most frequent cancer site in the country according to GLOBOCAN estimates.1,2,3 High risk groups such as users of smoked or smokeless tobacco, areca nut, betel quid and alcohol require focused awareness and periodic visual oral examination under primary health care and community screening platforms. Among 200 participants, 71.0% were males and 75.0% were current tobacco users. Good awareness was observed among 27.0% participants, moderate awareness among 45.0%, and poor awareness among 28.0%. Only 30.0% had ever undergone oral cancer screening or oral visual examination. Screening practice was significantly better among participants with good awareness and among those who previously had a dental or oral examination. The leading barriers were absence of symptoms, lack of knowledge about where to go, low perceived risk, cost/time constraints, fear and stigma.

Keywords: Oral Cancer, Fear, Stigma, Risk Factors

I. INTRODUCTION

Oral cancer is a preventable and detectable cancer that remains a major concern for public health systems in countries where tobacco and areca nut consumption are common. The mouth is an accessible site, and many premalignant changes and early cancers can be noticed by trained health workers during a simple visual oral examination. Despite this advantage, a substantial proportion of patients reach health facilities only after pain, ulceration, difficulty in chewing, restricted mouth opening or neck swelling becomes severe. This delay increases treatment cost, reduces survival and places a heavy social and economic burden on families. Globally, cancer continues to increase with population growth, ageing and changes in exposure to modifiable risk factors.1,5 The public health importance of oral cancer lies in the fact that prevention, early detection and referral are possible through relatively low-cost strategies. Primary prevention focuses on stopping tobacco, areca nut and harmful alcohol use, while secondary prevention focuses on detection of oral potentially malignant disorders and early cancer. In high-risk populations, awareness is not only knowledge of the disease name; it also includes understanding that a persistent oral ulcer, red or white patch, unexplained bleeding,

loose tooth, difficulty in swallowing or change in voice can be a warning sign that needs assessment. When people fail to recognize such signs, they may continue harmful habits and postpone seeking care.

Oral cancer generally refers to malignant tumours arising from the lip, anterior two thirds of tongue, buccal mucosa, floor of mouth, gingiva, hard palate, retromolar trigone and other parts of the oral cavity. The most common histological type is squamous cell carcinoma. It may be preceded by oral potentially malignant disorders such as leukoplakia, erythroplakia, oral submucous fibrosis and lichen planus. The clinical course often begins with asymptomatic mucosal changes, followed by persistent ulceration, induration, pain, functional limitation and regional lymph node involvement. Since early lesions may not be painful, individuals may ignore them or use home remedies for a long time.6 The disease process is influenced by long-term exposure to carcinogens, chronic mucosal irritation, nutritional deficiency, immune status, infections and socio behavioural factors. Oral cancer is often described as a disease of inequality because higher burden is observed among populations with lower education, poverty, occupational vulnerability, poor access to dental care and high exposure to tobacco products. From a public health perspective, oral cancer cannot be controlled only through hospital-based treatment; it needs health promotion, risk factor reduction, screening, prompt referral and follow-up at the community level.

II. LITERATURE REVIEW

Bray et al. (2024) reported that the global cancer burden in 2022 included approximately 20 million new cases and 9.7 million deaths, reflecting the continuing rise of cancer as a public health issue.1 Lip and oral cavity cancer formed a significant component of the global head and neck cancer burden, with higher rates in SouthCentral Asia, Melanesia and parts of Europe. Global variations are shaped by tobacco use, areca nut chewing, alcohol consumption, HPV-related factors, socioeconomic conditions and access to early diagnosis.

Gupta et al. (2016) described head and neck cancers as a continuing global challenge because their distribution is strongly related to exposures that are unevenly spread across regions.25 Oral cancer is particularly important for low- and middle-income countries because risk exposure may be high while access to early diagnosis and comprehensive cancer care may be limited. Therefore, prevention and early detection are essential components of cancer control.

Oral Cancer Burden in India

Ferlay et al. (2024) and IARC (2024) estimated that lip and oral cavity cancer was the second most frequent cancer in India in 2022, with 143,759 new cases and 79,979 deaths.2,3 The burden was especially high among males, in whom lip and oral cavity cancer ranked first. These estimates indicate that oral cancer is not a rare disease but a major public health priority for India.

Sathishkumar et al. (2022) used National Cancer Registry Programme data to estimate the cancer burden in India and project future cases.4 The study emphasized that India is likely to face rising cancer numbers due to population growth, ageing and continued exposure to risk

factors. For oral cancer, registry-based evidence reinforces the need for tobacco control, early detection and equitable access to treatment services.

Common Risk Factors of Oral Cancer

Petti (2009) reviewed lifestyle risk factors for oral cancer and concluded that tobacco, alcohol and diet-related factors play important roles in disease occurrence.

Warnakulasuriya (2009) similarly emphasized the causal relationship between tobacco, alcohol and oral cancer, while also noting controversies and emerging factors such as HPV in selected head and neck sites. In India, smokeless tobacco and areca nut exposure require special attention because these products are used frequently and held in the mouth for long periods. IARC (2004) classified betel quid with tobacco, betel quid without tobacco and areca nut as carcinogenic to humans. This evidence is highly relevant for India because gutkha, pan masala, khaini, zarda and betel quid practices are culturally and commercially widespread. The carcinogenic process is cumulative; hence duration and frequency of use are important for risk assessment.

Awareness Regarding Oral Cancer

Elango et al. (2009) evaluated oral cancer awareness in a high-risk semi-urban population in India and found that awareness was influenced by education, risk habits and exposure to health information.14 The study demonstrated that high exposure to risk factors does not automatically translate into high awareness. Many individuals with risk habits may not know the warning signs or may underestimate their personal risk.

Chowdhury et al. (2021) assessed oral cancer awareness among a rural Indian population and reported gaps in knowledge of risk factors and early signs. The study highlighted the importance of health education in rural communities where access to dental care and cancer information may be limited. Awareness programmes need to be repeated, locally understandable and linked to available screening services.

Knowledge of Signs and Symptoms of Oral Cancer

Silverman (1988) emphasized that early diagnosis of oral cancer depends on recognition of initial signs and timely professional examination.31 Warning signs such as non-healing ulcer, red or white patch, induration, unexplained bleeding, loose teeth, difficulty in tongue movement or restricted mouth opening should trigger clinical assessment. However, because early lesions are often painless, individuals may delay care.

Lingen et al. (2008) critically evaluated diagnostic aids for oral cancer detection and noted that conventional visual and tactile examination remains central to the detection process. Adjunctive aids may support assessment in some settings, but public health screening still relies heavily on trained observation, risk history and referral for biopsy when needed.

III. MATERIALS AND METHODS

Study Design

A community-based cross-sectional descriptive analytical study design was adopted. This design was appropriate because awareness and screening practices were assessed at a single point of time among high-risk adults. The analytical component allowed assessment of association between awareness, screening practice and selected sociodemographic variables.

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Study Area/Study Setting

The study was conducted in selected urban and semi-urban community areas served by primary health facilities. The setting included households, community outreach sites and health camp locations where high-risk adults could be identified with the help of community health workers.

Study Population

The study population consisted of adults aged 30 years and above belonging to highrisk categories for oral cancer. High-risk status included current or previous use of smoked tobacco, smokeless tobacco, areca nut, betel quid, regular alcohol consumption, family history of cancer, or history of suspicious oral lesions.

Study Duration

The study duration was six months, including preparation of tools, validation, pilot testing, data collection, data entry, analysis and report writing.

Sample Size

The sample size for the study was 200 high-risk adults. The sample size was considered adequate for descriptive estimation of awareness and screening practices and for exploratory association analysis between key variables.

Sampling Technique

A purposive sampling technique was used to identify high-risk individuals from selected community areas. Households and outreach sites were visited, and individuals meeting the eligibility criteria were invited to participate after explaining the study purpose and obtaining informed consent.

Inclusion Criteria

Adults aged 30 years and above; individuals with current or previous tobacco, areca nut, betel quid or alcohol use; individuals willing to provide informed consent; individuals available during data collection; and individuals able to understand and respond to the questionnaire were included.

Exclusion Criteria

Individuals previously diagnosed with oral cancer and currently under treatment; individuals who were seriously ill or unable to participate; individuals with communication barriers preventing interview; and individuals unwilling to provide informed consent were excluded.

Data Collection Tool

A structured interview schedule was used for data collection. The tool contained sections on socio-demographic profile, risk factor profile, awareness regarding oral cancer, screening practice, sources of information and barriers to screening. The questionnaire was prepared after reviewing relevant literature and programme guidance.

Description of Questionnaire Section

A included socio-demographic information. Section B included risk factors such as tobacco use, alcohol consumption, areca nut/betel quid use and family history. Section C included awareness items related to oral cancer definition, risk factors, signs and symptoms, prevention

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and screening methods. Section D included screening practice and previous oral/dental examination. Section E included sources of information and barriers to screening.

IV. DATA ANALYSIS AND INTERPRETATION

This section presents analysis and interpretation of data collected from 200 high-risk adults. The analysis includes socio-demographic characteristics, risk factor distribution, awareness regarding oral cancer, early screening practices, sources of information, barriers and association between selected variables. Percentages are calculated using the total sample size unless otherwise specified.

Socio-Demographic Profile of Study Participants

Table 1: Socio-demographic profile of study participants (n=200)

Variable	Category	Frequency	Percentage
Age group	30-39 years	62	31.0
	40-49 years	66	33.0
	50-59 years	48	24.0
	60 years and above	24	12.0
Gender	Male	142	71.0
	Female	58	29.0
Education	No formal education	35	17.5
	Primary	48	24.0

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	Secondary	68	34.0
	Graduate and above	49	24.5
Occupation	Daily wage work	54	27.0
	Agriculture	42	21.0
	Business/vendor	38	19.0
	Service	32	16.0
	Homemaker/other	34	17.0
Socioeconomic status	Lower	64	32.0
	Lower middle	82	41.0
	Upper middle	54	27.0

Table 1 shows that the highest proportion of participants belonged to the 40-49 years age group (33.0%), followed by 30-39 years (31.0%). Males constituted 71.0% of the sample. More than half of the participants had education up to primary or secondary level. Daily wage workers and agricultural workers formed a large part of the sample, indicating that preventive messages must be planned for people with limited time and variable income patterns.

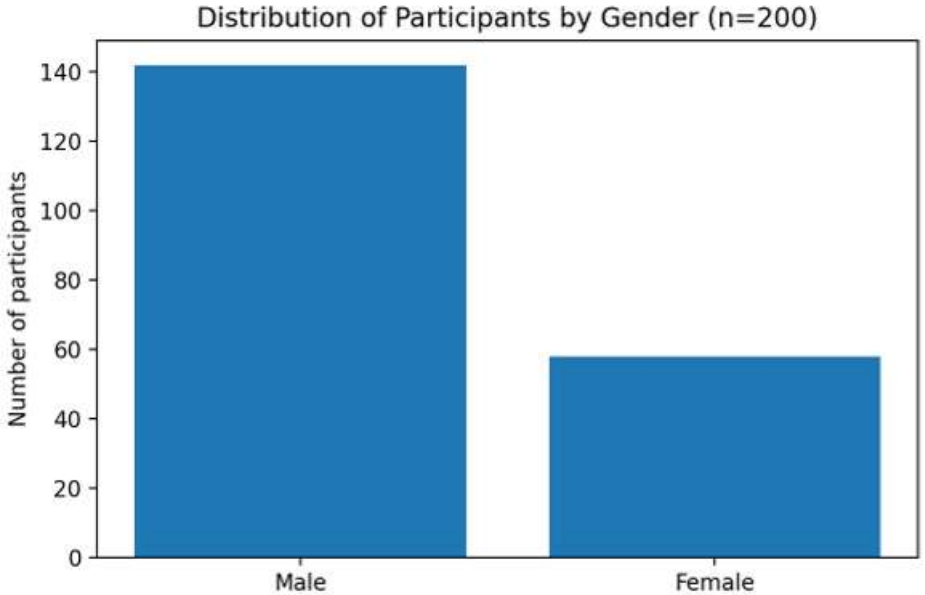

Figure 2: Distribution of participants by gender

Table 2: Distribution of oral cancer risk factors among participants (n=200)

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Risk factor	Frequency	Percentage
Current tobacco use	150	75.0
Former tobacco use	25	12.5
Smokeless tobacco use	128	64.0
Smoked tobacco use	54	27.0
Areca nut/betel quid use	96	48.0
Current alcohol consumption	54	27.0
Family history of cancer	18	9.0
Previous dental/oral examination	72	36.0

Table 2 shows that 75.0% participants were current tobacco users and 64.0% reported smokeless tobacco use. Areca nut or betel quid use was present among 48.0% participants, while 27.0% reported current alcohol consumption. Only 36.0% had a previous dental or oral examination. This pattern confirms that the study population had substantial exposure to recognized oral cancer risk factors and limited preventive oral health service contact.

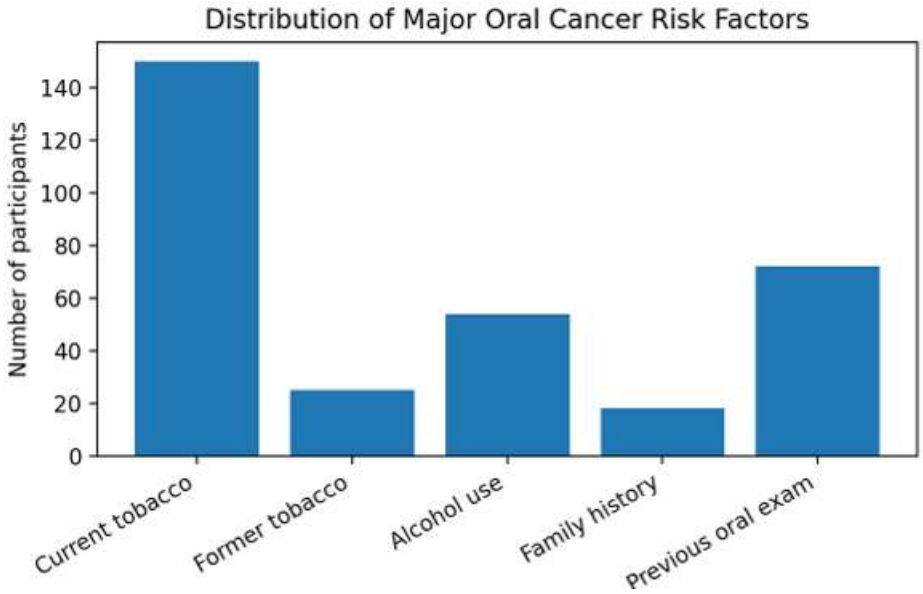

Figure 3: Distribution of major oral cancer risk factors

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Awareness Regarding Oral Cancer

Awareness was assessed across domains of disease familiarity, risk factors, signs and symptoms, prevention and screening. Participants were considered aware of an item when they answered correctly without prompting. Overall awareness was mixed: many participants had heard the term oral cancer, but detailed knowledge of early warning signs and screening methods was less consistent.

Table 3: Awareness regarding oral cancer risk factors (n=200)

Awareness item	Correct response n	Percentage
Tobacco chewing can cause oral cancer	151	75.5
Smoking can cause oral cancer	134	67.0
Areca nut/betel quid can cause oral cancer	96	48.0
Alcohol increases oral cancer risk	84	42.0
Combined tobacco and alcohol use increases risk	72	36.0
Poor oral hygiene may increase risk	68	34.0
Family history may increase risk	55	27.5

Table 3 indicates that awareness of tobacco chewing as a risk factor was comparatively high (75.5%). However, awareness of areca nut/betel quid, alcohol and combined risk was lower. Only 36.0% knew that combined tobacco and alcohol exposure increases Page 26 risk. This gap is important because many high-risk individuals use more than one product and may not understand cumulative risk.

V. RESULTS

Major Findings Related to Socio-Demographic Characteristics

Among 200 high-risk adults, 33.0% belonged to the 40-49 years age group and 31.0% belonged to the 30-39 years group. Males constituted 71.0% of participants. Most participants had education up to primary or secondary level. A large proportion was engaged in daily wage work, agriculture, small business or informal occupations, which may influence access to screening because of time and opportunity cost.

Major Findings Related to Risk Factors

Current tobacco use was reported by 75.0% participants, and smokeless tobacco use was reported by 64.0%. Areca nut or betel quid use was present among 48.0%, and current alcohol consumption among 27.0%. Only 36.0% had a previous dental or oral examination. These findings show a high-risk exposure profile with limited preventive health service contact.

Major Findings Related to Awareness of Oral Cancer

Good awareness was found among 27.0% participants, moderate awareness among 45.0% and poor awareness among 28.0%. Awareness of tobacco chewing as a risk factor was relatively high, but awareness of areca nut, alcohol, combined risk, oral patches, restricted mouth opening and screening methods was lower. This indicates that awareness was partial rather than comprehensive.

VI. DISCUSSION

Discussion of Socio-Demographic Findings

The study included a high proportion of males and adults in the productive age group. This pattern is consistent with the high male burden of oral cancer in India reported by GLOBOCAN, where lip and oral cavity cancer ranked first among males.3 The male predominance may reflect higher tobacco, areca nut and alcohol exposure, occupational patterns and social acceptance of chewing and smoking among men. However, women should not be neglected because smokeless tobacco use among women may be hidden or normalized in some communities.

Discussion of Risk Factors among Study Participants

The high prevalence of tobacco and areca nut exposure among participants reflects the established role of these products in oral cancer risk. GATS India documented a substantial burden of tobacco use, especially smokeless tobacco, which is directly relevant to oral cancer prevention.8 IARC has classified areca nut and betel quid preparations as carcinogenic, supporting the need for explicit messaging that areca nut without tobacco is not safe.

Discussion of Awareness Regarding Oral Cancer

The study found that only 27.0% participants had good awareness. This finding is similar to Indian studies reporting incomplete awareness among high-risk and rural populations.14,16,18 Awareness of tobacco chewing was higher than awareness of alcohol, areca nut and combined risk. This suggests that tobacco-related messages may have reached communities more effectively than messages on areca nut and alcohol. Health education should therefore clarify that multiple products and combined exposure increase risk.

VII.CONCLUSION

The study concluded that awareness and early screening practices for oral cancer among high-risk population were inadequate. Although many participants knew that tobacco chewing can cause oral cancer, knowledge of areca nut, alcohol, combined risk, early signs and screening methods was incomplete. Only 30.0% participants had ever undergone oral cancer screening or oral visual examination. Education was significantly associated with awareness, and awareness was significantly associated with screening practice. Therefore, improving awareness is essential, but it must be combined with accessible screening services and referral linkage.

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