Original Research Article

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Prevalence of Oral Cavity Carcinoma Among High-Risk Populations: A cross-sectional study in a tertiary care hospital

Shamima Siddiqui[a]*, Md. Miftahul Hossain Chowdhury[b]

[a]Medical Officer, Department of Radiology, National Institute of Cancer Research & Hospital (NICRH), Dhaka

[b]Associate Professor, Department of Ophthalmology. National Institute of Ophthalmology (NIO&H), Dhaka

*Correspondence to:

Dr. Shamima Siddiqui

Abstract: *Background*: Oral cavity carcinoma is a major public health concern, especially among high-risk populations in developing countries like Bangladesh. Lifestyle factors such as tobacco use, alcohol consumption, and betel nut chewing significantly contribute to the prevalence of this malignancy. Early detection and diagnosis are crucial for improving outcomes, yet many cases are diagnosed at advanced stages. This study assesses the prevalence and factors associated with oral cavity carcinoma in high-risk populations. *Objectives:* To assess the prevalence, risk factors, and clinical characteristics of oral cavity carcinoma in high-risk populations at BSMMU. *Methods:* This cross-sectional study was conducted at the Radiology & Imaging Department of BSMMU from June 2017 to May 2018. A total of 132 patients diagnosed with oral cavity carcinoma were included. Data were collected through chart reviews, patient interviews, and imaging reports. Statistical analysis was performed using SPSS version 22, focusing on demographic data, risk factors, and clinical characteristics. Ethical approval was obtained from BSMMU's Ethics Committee. *Result:* Among the 132 patients, the majority were aged 41-50 years (30.3%), with a mean age of 47.5 ± 10.8 years. Males comprised 66.7% of the population. Buccal mucosa carcinoma was the most common site (37.9%). Squamous cell carcinoma was the most prevalent histopathological type (72%). Stage III was the most frequent at diagnosis (37.9%). Treatment involved surgery for 45.5%, radiotherapy for 22.7%, and chemotherapy for 15.2%. Tobacco use was the primary risk factor (68.2%). *Conclusion:* This study underscores the high prevalence of oral cavity carcinoma in high-risk populations, emphasizing early detection and intervention.

Keywords: Oral Cavity Carcinoma, High-Risk Populations, Tobacco Use, Alcohol Consumption, Betel Nut Chewing, Squamous Cell Carcinoma.

Introductions

Oral cavity carcinoma, commonly referred to as oral cancer, is one of the most prevalent and deadly malignancies worldwide. It accounts for approximately 3% of all cancers globally, with a higher incidence in developing countries due to lifestyle factors such as tobacco use, alcohol consumption, and betel nut chewing[1]. In Bangladesh, oral cancer ranks as one of the leading causes of cancer-related mortality, particularly in rural areas where tobacco and betel nut consumption is widespread[2]. The Radiology & Imaging Department at BSMMU has seen a notable number of patients diagnosed with oral cavity

carcinoma over the past years, reflecting the increasing burden of this disease in the country. The prevalence of oral cavity carcinoma among high-risk populations, such as tobacco smokers, alcohol users, and individuals with poor oral hygiene, is significantly higher compared to the general population[3]. Several studies have indicated that the early detection and diagnosis of oral cancer can lead to better treatment outcomes and higher survival rates[4]. However, most oral cavity carcinoma cases are diagnosed at advanced stages, primarily due to delayed clinical presentation and a lack of awareness among the general population[5]. In this context, identifying high-risk groups is crucial for targeted prevention and early detection strategies[6].

Research has demonstrated a strong correlation between lifestyle factors like smoking, alcohol consumption, and the development of oral cancers, with betel nut chewing also emerging as a significant risk factor in some Asian countries[7]. Moreover, there has been a growing focus on understanding the molecular and genetic alterations associated with oral cancer to identify potential biomarkers for early diagnosis and treatment[8]. Imaging modalities, including computed tomography (CT) and magnetic resonance imaging (MRI), have become indispensable in evaluating the extent of disease spread, aiding in treatment planning and staging[9]. Despite advancements in diagnostic tools and treatment techniques, the five-year survival rate for oral cavity carcinoma remains low, particularly in low-income and middle-income countries[10]. This highlights the need for effective public health interventions aimed at raising awareness, improving early detection, and reducing risk factors[11]. Furthermore, the importance of multidisciplinary care, including the use of radiological imaging, surgery, chemotherapy, and radiotherapy, cannot be overstated in the comprehensive management of oral cavity carcinoma[12]. To assess the prevalence and various associated factors of oral cavity carcinoma among high-risk populations in a tertiary care hospital.

Method and Materials

Study Design
This cross-sectional study was conducted at the Radiology & Imaging Department of BSMMU, Dhaka, Bangladesh, from June 2017 to May 2018. The study included a total of 132 patients who were diagnosed with oral cavity carcinoma. The study aimed to assess the prevalence and characteristics of oral cavity carcinoma in high-risk populations.

Data Collection Procedure
Data for this study were collected through retrospective chart reviews and patient interviews conducted in the Radiology & Imaging Department of BSMMU. Clinical records of patients diagnosed with oral cavity carcinoma during the study period were reviewed to extract demographic information, clinical history, risk factors, diagnostic imaging reports, and histopathological findings. The patients were also interviewed to gather details about their lifestyle habits, including tobacco and alcohol use, occupation, and other relevant factors. Informed consent was obtained from all participants, and confidentiality was maintained throughout the data collection process.

Inclusion Criteria
Patients diagnosed with oral cavity carcinoma confirmed by histopathological examination.
Patients aged 18 years and older.
Patients who attended the Radiology & Imaging Department of BSMMU during the study period from June 2017 to May 2018.

Exclusion Criteria
Patients with previous head and neck cancers or other malignancies.
Patients who had undergone prior treatments for oral cavity carcinoma (e.g., chemotherapy, radiotherapy, or surgery).
Patients who were unable to provide informed consent due to cognitive or communication barriers.

Statistical Analysis
The data collected were analyzed using SPSS version 22. Descriptive statistics, including frequencies, percentages, mean, and standard deviation, were used to summarize the demographic and clinical characteristics of the study population. The prevalence of oral cavity carcinoma was calculated, and associations between risk factors (such as tobacco use, alcohol consumption, and occupation).

Ethical Consideration

The study was conducted in compliance with the ethical guidelines set by the Bangladesh Medical Research Council (BMRC). Ethical approval was obtained from the BSMMU Ethics Committee prior to the commencement of the study. All participants were informed about the purpose of the study, and their written informed consent was obtained before participation. Patient confidentiality and privacy were strictly maintained, and personal identifiers were anonymized in the analysis and reporting of results.

Results

Table 1: Demographical table for the study population. (n=132)

Variable	Frequency (n)	Percentage (%)
Age Group (years)		
20-30	15	11.4
31-40	25	18.9
41-50	40	30.3
51-60	30	22.7
>60	22	16.7
Gender		
Male	88	66.7
Female	44	33.3
Occupation		
Manual Laborer	50	37.9
Office Worker	30	22.7
Unemployed	20	15.2
Others	32	24.2

Table 1 presents the demographic characteristics of the study population of 132 patients, including age, gender, and occupation. The age distribution shows that the highest number of patients were in the 41-50 years group (30.3%), followed by 51-60 years (22.7%) and 31-40 years (18.9%). The mean age of the patients was 47.5 ± 10.8 years. In terms of gender, the study population had a higher prevalence of males (66.7%) compared to females (33.3%). The most common occupations among the patients were manual laborers (37.9%) and office workers (22.7%), with unemployed patients representing 15.2%.

Table 2: Distribution of Patients by Tobacco and Alcohol Consumption Habits

Habit	Frequency (n)	Percentage (%)
Tobacco Users	90	68.2
Non-Tobacco Users	42	31.8
Alcohol Consumers	55	41.7
Non-Alcohol Consumers	77	58.3

Table 2 categorizes patients based on their tobacco and alcohol consumption. A significant portion of the study population, 68.2% (90 patients), reported tobacco use, highlighting its strong association with oral cavity carcinoma. Regarding alcohol consumption, 41.7% (55 patients) of the patients reported using alcohol, while 58.3% (77 patients) did not consume alcohol.

Table 3: Site of Oral Cavity Carcinoma Among Patients

Site of Carcinoma	Frequency (n)	Percentage (%)
Buccal Mucosa	50	37.9
Tongue	35	26.5
Floor of Mouth	20	15.2
Lip	15	11.4
Other Sites	12	9.0

Table 3 shows the site of carcinoma within the oral cavity. The majority of patients had buccal mucosa carcinoma (37.9%), followed by tongue carcinoma (26.5%), and floor of mouth carcinoma (15.2%). Lip carcinoma was observed in 11.4% of patients, while other sites accounted for 9.0% of the total study population.

Table 4: Histopathological Variants of Oral Cavity Carcinoma

Histopathological Type	Frequency (n)	Percentage (%)
Squamous Cell Carcinoma	95	72.0
Verrucous Carcinoma	20	15.2
Adenocarcinoma	10	7.6
Others	7	5.3

Table 4 summarizes the histopathological types of oral cavity carcinoma among the patients. Squamous cell carcinoma was the predominant type, affecting 72.0% (95 patients). Verrucous carcinoma was the second most common histological type, found in 15.2% (20 patients), while adenocarcinoma was diagnosed in 7.6% (10 patients). Other rare histological variants were present in 5.3% (7 patients) of the population.
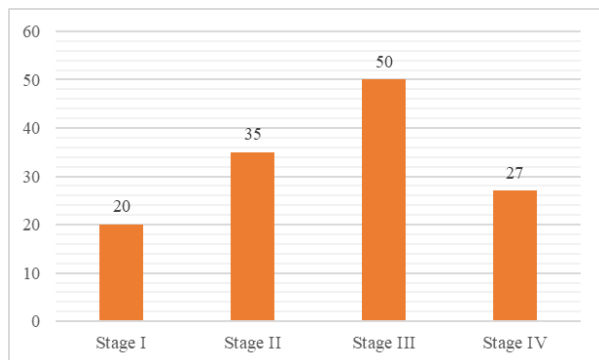

Figure 1: Stage of Oral Cavity Carcinoma at Diagnosis

Figure 1 shows the staging of oral cavity carcinoma at the time of diagnosis. The most frequent stage at diagnosis was Stage III (37.9%), followed by Stage II (26.5%) and Stage IV (20.4%). Fewer patients were diagnosed at Stage I (15.2%).

Table 5: Treatment Modalities Received by Patients

Treatment Modality	Frequency (n)	Percentage (%)
Surgery	60	45.5
Radiotherapy	30	22.7
Chemotherapy	20	15.2
Combination Therapy	22	16.7

Table 5 presents the treatment modalities administered to the patients. Surgical treatment was the most commonly used approach, with 45.5% (60 patients) undergoing surgery. Radiotherapy was administered to 22.7% (30 patients), and chemotherapy was provided to 15.2% (20 patients). A combination of surgery and other treatments was utilized in 16.7% (22 patients).
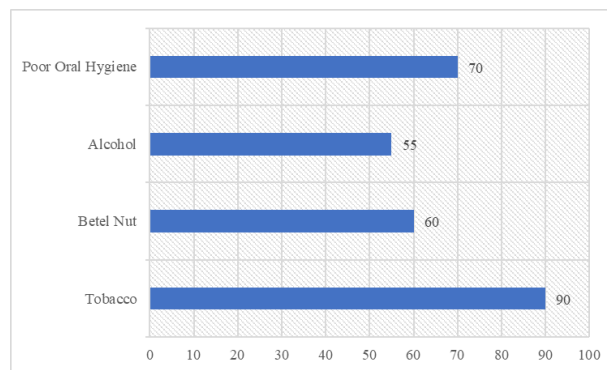

Figure 2: Risk Factors Associated with Oral Cavity Carcinoma

Figure 2 shows the risk factors for oral cavity carcinoma. Tobacco use was the most significant risk factor, affecting 68.2% (90 patients). Betel nut consumption was noted in 45.5% (60 patients), while alcohol consumption was reported by 41.7% (55 patients). Additionally, poor oral hygiene was associated with 53.0% (70 patients) of the study population.

Table 6: Outcomes and Follow-Up Status of Patients

Outcome	Frequency (n)	Percentage (%)
Complete Recovery	40	30.3
Partial Response	45	34.1
No Response	25	18.9
Death	22	16.7

Table 6 outlines the outcomes and follow-up status of the patients. A significant number of patients achieved complete recovery (30.3%), while 34.1% (45 patients) had partial recovery. 18.9% (25 patients) showed no significant improvement, and unfortunately, 16.7% (22 patients) passed away during treatment or follow-up.

Discussion

This study aimed to evaluate the demographic characteristics, site, histopathological types, staging, treatment modalities, risk factors, and outcomes of oral cavity carcinoma among a cohort of 132 patients. The findings revealed that the most common age group was 41-50 years (30.3%), followed by 51-60 years (22.7%) and 31-40 years (18.9%), with the mean age being 47.5 ± 10.8 years. These results align with existing literature, where

the incidence of oral cancer is more common among middle-aged adults, reflecting the cumulative effect of lifestyle factors such as tobacco use and alcohol consumption over time[13]. In a study conducted in India, the mean age of oral cancer patients was found to be approximately 45 years, with a similar peak incidence observed in individuals aged between 40 and 50 years[14]. The study also found a male preponderance (66.7%), which is consistent with previous studies that report a higher incidence of oral cancer among males compared to females. This gender difference may be attributed to higher exposure to risk factors, such as tobacco smoking and alcohol consumption, which are more prevalent in males, particularly in regions like South Asia[15]. For example, a study in Pakistan reported that 72% of oral cancer patients were male, with tobacco and alcohol consumption being the primary contributing factors to the higher male incidence[16].

In terms of carcinoma sites, buccal mucosa carcinoma was the most prevalent (37.9%), followed by tongue carcinoma (26.5%) and floor of mouth carcinoma (15.2%). This distribution is similar to findings in other studies, where the buccal mucosa is commonly affected in South Asian populations, largely due to the frequent use of smokeless tobacco and betel nut chewing[17]. A study conducted in Sri Lanka found that the buccal mucosa was the most common site (40%), followed by the tongue (28%), which further supports our findings[18]. The histopathological analysis revealed that squamous cell carcinoma (SCC) was the predominant type (72.0%), consistent with global reports. SCC is the most common type of oral cavity carcinoma, accounting for approximately 90% of cases[19].

This is supported by a study conducted in Bangladesh, where SCC was reported as the dominant histological type in 75% of patients with oral cancer[20]. Verrucous carcinoma (15.2%) and adenocarcinoma (7.6%) were less common, aligning with studies that show these subtypes are relatively rare compared to SCC[21]. The staging results revealed that the majority of patients were diagnosed at advanced stages, with 37.9% diagnosed at Stage III and 20.4% at Stage IV. These findings are consistent with the general trend of late-stage diagnosis in oral cancer, which is often attributed to delayed symptom recognition and poor access to healthcare in lower-income countries[22].

A study from India found that 45% of oral cancer patients were diagnosed at Stage III or IV, which is similarly reflective of the late-stage presentation observed in our cohort[23]. In terms of treatment modalities, surgical treatment was the most common (45.5%), followed by radiotherapy (22.7%) and chemotherapy (15.2%). The use of multimodal treatment approaches, including surgery, radiation, and chemotherapy, is supported by global treatment guidelines for oral cancer, which advocate for a combination of therapies depending on the stage and site of the tumor[24]. A similar study in Nepal reported that 50% of patients underwent surgery, with a combination of radiotherapy and chemotherapy used for advanced-stage patients[25].

Conclusion

This study highlights the prevalence of oral cavity carcinoma among high-risk populations in a tertiary care hospital, emphasizing the need for early detection and intervention. The findings suggest that tobacco and alcohol consumption, poor oral hygiene, and betel nut chewing are major risk factors for the development of oral cavity carcinoma. Squamous cell carcinoma was identified as the predominant histological type, and the majority of patients were diagnosed at advanced stages. The study has several limitations, including the retrospective nature of data collection, which may have resulted in incomplete or missing information. The study was conducted in a single tertiary care hospital, which may limit the generalizability of the findings to other settings or regions.

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