

Epidemiology of surgically treated oral cancer patients in a tertiary care hospital in Bangladesh: A retrospective study

ABSTRACT

Background: Oral cancer is the third most common cancer and a major health issue in Bangladesh. This study aimed to see the prevalence rate, age, site of involvement, gender and its relation with habits, histopathological grading, staging of diseases, and lymph node status.

Material and Methods: Biopsy-proven oral cancer patients registered in the Oral and Maxillofacial Surgery unit of Anwer Khan Modern Medical College and Hospital, Dhaka, Bangladesh, affiliated with the University of Dhaka under the Faculty of Medicine. Patients included in this study were all surgically treated during 2017 to 2021. A total of 103 patients were included for this retrospective analysis.

Result: The median age was 60.5 years (range: 31–90 years) with a mean [$\pm$ standard deviation (SD)] of (58.88 $\pm$ 11.35) years [95% confidence interval (CI): 61.10–56.67], where 55.3% were male and 44.7% were female; the maximum involved site was lower gingiva-buccal sulcus extending to retro molar trigone, 34%. The maximum number of patients were betel quid chewer (betel leaf, areca nut mixed, chewing tobacco with slaked lime), that is, 61.2%.

Conclusion: Most of the patients presented with stage IV disease (56.3%). This study aimed to see prevalence of oral cancer patients in a tertiary hospital.

Keywords: Betel quid, prevalence, lymph node, squamous cell carcinoma, tobacco

INTRODUCTION

Oral and pharyngeal cancer is the sixth most common cancer in the world.^[1] Oral cancer is a major health problem in developing countries. The worldwide annual incidence rate of new cases exceeds 275,000.^[2] Oral cancer is the carcinoma of the stratified squamous epithelium; about 96% of cases of oral cancer are squamous cell carcinoma.^[3] With respect to head and neck cancer statistics, it has been reported that 30% of all malignancies in Southeast Asia are those of the head and neck region, whereas in Bangladesh, it is reported to be 20%.^[4] Oral cavity cancer includes tumors of the buccal mucosa, retro molar trigone, alveolus, hard palate, anterior two-third of the tongue, floor of the mouth, and mucosal surface of the lip.^[5] Incidence is higher in males than in females in most countries as they smoke and tobacco usage is combined at a higher rate. The ratio of males to females is about 1.5:1 for oral cavity cancer globally. About 90% of

the oral SCC (squamous cell carcinoma) in Southeast Asia is attributable to tobacco use in its different forms, and in Bangladesh, it is the main etiological factor.^[6] The buccal mucosa is the most common site to develop oral cancer in the Asian population due to betel-quid/tobacco chewing

MOTIUR R. MOLLA, MAUSUMI IQBAL, MD. NAZRUL ISLAM, AKHILANAND CHAURASIA¹
Oral and Maxillofacial Surgery Department, Anwer Khan Modern Medical College and Hospital, Dhaka, Bangladesh,
¹Oral Medicine and Radiology, King George’s Medical University, Lucknow, Uttar Pradesh, India

Address for correspondence: Dr. Motiur R. Molla, House 17, Road 8, Dhanmondi, Dhaka, Bangladesh.
E-mail: moti.molla@gmail.com

Received: 30 November 2023, **Revised:** 20 December 2023, **Accepted:** 13 February 2024, **Published:** 28 April 2025

Access this article online	
Website: https://journals.lww.com/njms	Quick Response Code 
DOI: 10.4103/njms.njms_197_23	

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How to cite this article: Molla MR, Iqbal M, Islam MN, Chaurasia A. Epidemiology of surgically treated oral cancer patients in a tertiary care hospital in Bangladesh: A retrospective study. Natl J Maxillofac Surg 2025;16:140-4.

habits, whereas the tongue is the most common site among European and United States (US) populations.^[7]

Many risk factors are directly or indirectly associated with the development of oral cancer. The most common are the betel quid chewer (betel leaf, areca nut, chewing tobacco mixed with slaked lime) and alcohol consumption; others are radiation, iron deficiency, vitamin A deficiency, oncogenic viruses such as human papilloma virus (HPV), and genetic predisposition.^[8]

MATERIAL AND METHODS

This retrospective descriptive study was conducted from July 2017 to December 2021 in the Department of Dental and Maxillofacial Surgery. All the patients with oral cancer confirmed by histopathological examination were included in this study. Prior approval was taken from the Institutional Review Board (IRB) of AKMMC (University of Dhaka) to proceed with this retrospective study before collecting data.

Histopathologically proven oral cancers of different sub-types involving different sites of oral cavity (C00-C14) by the tenth revision of International statistical classification of diseases (ICD) were included in the study.^[9]

Detailed information regarding the patient's demographic status, clinical presentation, histopathological sub-types, tumor grading and stage of diseases, diagnosis, and lymph node status was retrieved from the hospital records. Stages were assigned according to the 8th edition published by the American Joint Committee on Cancer (AJCC), published in 2017 and corrected in 2018.^[10]

Data were collected using a pre-tested data collection sheet. Clinical history, physical findings, histopathological findings, and treatment history were recorded in the prescribed questionnaire.

Initial pre-treatment work-up of the patients consisted of detailed clinical examination done in the out-patient department of Oral and Maxillofacial Surgery. Each patient was subjected to routine hematological and radiological investigations for planning the treatment. Computed tomography (CT) and/or magnetic resonance imaging (MRI) scan of the oral cavity and neck area were done to see the primary involvement and lymph node status.

All the collected data were entered into the computer database organized and analyzed using Statistical Package for the Social Sciences (SPSS) software version 29. Categorical

data were presented as frequency and percentage, and the continuous variables were expressed as mean and standard deviation.

Data availability statement

The research data used to support the findings of this study are included within the article.

Ethical committee clearance obtained from AKMMC, DB (Institutional Ethics Review Board) dated: 10 Mar 24.

RESULTS

Demographic studies

During the study period, a total of 103 patients with oral cancer cases were included for this retrospective analysis; among them, 46 were female (44.7%) and 57 were male (55.3%). Oral cancer incidence was observed to be higher in males than in females in our study [Figure 1]. The age of the study population ranged from 31 to 90 years with a mean [$\pm$ standard deviation (SD)] of (58.88 ± 11.35) years. There is age-wise distribution among 103 cases, 31–40 years (5), 41–50 years (23), 51–60 years (30), 61–70 years (28), 71–80 years (16), and 81–90 years (1). Among them, most of patients were in between 41 and 60 years (29.1%) [Table 1]. The most common factor associated with development of oral cancer is chewing of betel nut with paan and jorda mixed with slaked lime (betel quid; smokeless tobacco), 61.2%, and the second highest factor was none, that is, not associated with any habits (15.5%); other habitual factor distributions were smoking, 9.7%; alcohol consumption, 2.9%; betel nut with paan, jorda, and slaked lime (betel quid) and smoking, 6.8%; and betel nut with paan, jorda, and slaked lime (betel quid) and gul (betel quid with tobacco

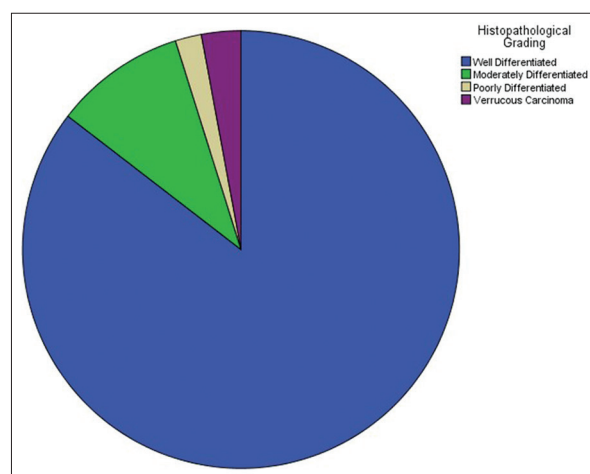


Figure 1: Distribution of 103 oral cancer patients according to histopathological grading (well, moderately, and poorly differentiated and verrucous carcinoma)

into the areca–lime–tobacco mixture, i.e., snuff dipped into oral mucosa), 3.9% [Table 2]. According to this study, males were more associated with combined different habits than females. Females (35%) are more habituated with betel nut with paan and jorda mixed with slaked lime, that is, betel quid or smokeless tobacco, than males (27%). Smoking (9.7%) and alcohol consumption (2.9%) habits are more common in males than in females. Factors not associated with any habits are also more common in male (8.7%) patients than in females (6.8%) [Table 2].

The clinical staging of oral cancer in all cases has been classified based on TNM classification. The table shows the stage-wise frequency of oral cancer in the study population. In the study population, the highest oral cancers were in the T2N0Mx (33.0) stage, followed by T4N0Mx (24.6%) and T4N1Mx (14.6%) [Table 3].

Clinical feature

Among 103 cases, oral cancer occurring at the lower gingivo-buccal sulcus (28.2%) is the highest, tongue cancer is the second (21.4%), followed by buccal mucosa (18.4%) and upper gingivo-buccal sulcus (15.5%), and the least involvement sites are the palate or maxilla, 6.8%, retro molar trigone, 5.8%, and the floor of mouth, 3.9%. In our study, the lower gingiva-buccal sulcus, upper gingiva-buccal sulcus, and buccal mucosa comprise the most involved sites (64 patients; 62.1%) [Table 4].

At diagnosis, the patients mostly were in stage IV (47 patients, 56.3%), followed by stage II, (34 patients, 33%), then stage III (15 patients, 3.9%), and stage I (7 patients, 6.8%), AJCC 8th edition [Table 4].

Histological characteristics

Squamous cell carcinoma (SCC) was the most common histologic type (94.1%), followed by verrucous cell carcinoma (2.91%). Among patients with SCC, the highest number of cases was well differentiated (85.4%), while 9.7% were moderately differentiated, and 1.9% were poorly differentiated [Figure 1].

When diagnosis was confirmed through histopathology, treatment planning was done for every patient as surgical resection of primary tumor including soft and hard tissue, frozen section biopsy, neck dissection, and reconstruction as needed. All the patients undergo R0 resection, that is, no cancer cells seen microscopically at the primary tumor site except one patient.

Table 1: Socio-demographic characteristics (gender, age, mean, median, and SD of age) of 103 oral cancer patients by number and percentage

Gender	Number of patients (n=103)	Percentage (%)
Male	57	55.30%
Female	46	44.70%
Age (In Years)		
31-40	5	4.90%
41-50	23	22.30%
51-60	30	29.10%
61-70	28	27.20%
71-80	16	15.50%
81-90	1	10%
Median of age	Mean of age $\pm$ SD	
60.50	58.88 $\pm$ 11.35	

Table 2: Distribution of habits among gender of 103 oral cancer patients by number and percentage

Habits	Total number of cases (n=103, %)	Male (n, %)	Female (n, %)
Betel nut with paan and jorda mixed with slaked lime (betel quid; smokeless tobacco)	63 (61.20%)	27 (26.2%)	36 (35%)
Smoking	10 (9.70%)	10 (9.7%)	0 (0.0%)
Alcohol	3 (2.90%)	3 (2.9%)	0 (0.0%)
Smokeless tobacco with smoking	7 (6.80%)	7 (6.8%)	0 (0.0%)
Smokeless tobacco chewer with snuff dipping	4 (3.90%)	1 (1.0%)	3 (2.9%)
None	16 (15.50%)	9 (8.7%)	7 (6.8%)

Table 3: The clinical TNM staging and related frequency table in study population

Clinical_TNM	Frequency	Percentage
T1N0Mx	7	6.8
T2N0Mx	34	33.0
T2N1Mx	7	6.8
T3N0Mx	4	3.9
T3N1Mx	4	3.9
T4N0Mx	25	24.3
T4N1Mx	15	14.6
T4N2Mx	7	6.8
Total	103	100.0

Among 103 cases, before surgery, 33 (32.0%) patients have palpable or CT suspecting enlarged lymph nodes; among them, metastasis was seen in 17 (51.5%) patients; 16 (48.5%) patients did not show any lymph node metastasis. Before surgery, 70 (68.0%) patients did not have palpable or CT suspecting lymph node enlargement; among them, metastasis was seen in 4 (5.7%) patients and 66 patients (94.3%) did not show any lymph node metastasis [Table 5].

Table 4: Clinical features (site of lesion, stage of disease) of 103 oral cancer patients by number and percentage

Site of Lesion	Number of patients (n=103)	Percentage (%)
Buccal mucosa	19	18.40%
Upper Gb sulcus	16	15.50%
Lower Gb sulcus	29	28.20%
Retromolar trigone	6	5.80%
Palate or maxilla	7	6.80%
Tongue	22	21.40%
Stage Of Disease		
Stage I	7	3.80%
Stage II	15	4%
Stage III	34	33%
Stage IV	47	56.30%

Table 5: Pre-operative (palpable/CT suspecting) and post-operative (metastasis/no metastasis seen) lymph node status of 103 oral cancer patients by number and percentage

Pre-operative lymph node	Post-operative lymph node		Total (n=103 cases)
	Metastasis seen (n, %)	No metastasis. (n, %)	
Palpable/Ct suspecting	17 51.5%	16 48.5%	33 100%
Not palpable	4 5.7%	66 94.3%	70 100%

DISCUSSION

This retrospective observational study was conducted in a tertiary care hospital in Dhaka, Bangladesh; all cases were histologically confirmed oral squamous cell carcinoma. According to analytical viewpoints, this work also supports prevalence based on different age groups, anatomical site, gender, and habitual factors. All national, global, and internationally reported works on cancer prevalence supported more or less the same inference.

This study shows males are more vulnerable to oral cancer than females, showing that among 103 cases, 57 (55.3%) patients were males, whereas 46 (44.7%) patients were females. Zhang *et al.* and Sugarman *et al.* in another study showed the same.^[9,11] Most study reveals males more commonly suffer than females as they are more habituated with different forms of tobacco.^[9] This study found the same; males are habituated with different risk habits such as betel nut with pan and jorda mixed with slaked lime, gul, that is, smokeless tobacco and smoking (34%), smoking alone (9.7%), and alcohol (2.9%), whereas females are commonly more habituated with betel nut with pan and jorda mixed with slaked lime with or without gul (37.9%). The ratio not associated with any risk factor is also higher in males (8.7%).

DS Aruna *et al.* in another study showed oral cancer incidence to be higher among males and commonly associated with

different risk habits.^[12] Tobacco use in both chewing and smoking forms acts synergistically in oral carcinogenesis, and also persons with mixed habits are more vulnerable.^[10,11] The age of the study population ranged from 31 to 90 years with a mean ($\pm$ SD) of (58.88 $\pm$ 11.35) years (95% CI: 61.10–56.67). Among them, most patients were in between 41 and 60 years (29.1%). This is almost comparable to other studies found in literature studies worldwide. Tandon *et al.* reported that the age group above 50 years (39.5%) was most commonly affected, while below 20 years, 0.19% was least affected.^[13]

There are several histological types of oral cancer. SCC was the most common histologic type (94.1%), followed by verrucous cell carcinoma (2.91%). Similar results were found in other literature studies.^[14]

In the current study, the highest number of patients had stage IV (47 patients, 56.3%), followed by stage II, (34 patients, 33%), stage III (15 patients, 3.9%), and stage I (7 patients, 6.8%). In 2020, Rajesh Shah conducted a study where the highest number of patients had Stage III (66, 40.7%), followed by Stage IVA (43, 26.5%).^[14]

Among patients with SCC, the highest number of cases was well differentiated, Grade I (85.4%), while 9.7% were moderately differentiated, Grade II, and 1.9% were poorly differentiated, Grade III. Similar results were found by Adhikari *et al.* in 2013, where Grade I was 60.3%, 21, and Rai *et al.* study, in which Grade I was 50.8%.^[15]

A hospital-based study in Hyderabad in India shows the most involved site was buccal mucosa (218), followed by tongue (73).^[16] A study in Allahabad had shown the most common site is tongue (37.8%), followed by buccal mucosa (33.7%), while Byakoli *et al.* stated the most common site is alveolus (32.14%), followed by buccal mucosa (30.35%).^[17] This study found lower GB sulcus (28.2%) is the most frequently involved site for both men and women, followed by tongue (22%) and then buccal mucosa (18.4%); the floor of mouth (3.9%) is the least involvement site. In Bangladesh, the gingiva-buccal complex (alveolar ridge, gingiva-buccal sulcus, and buccal mucosa) is the most common involved site.

In case of oral SCC, regional metastasis occurs through lymphatic channels. The most common site of regional metastasis is the cervical lymph node; metastasis in the lymph node reduces the survival rate by 50%.^[18]

In our study, among 103 cases, before surgery, 33 (32.0%) patients have palpable or CT suspecting enlarged lymph

nodes; among them, metastasis was seen in 17 (51.5%) patients, and 16 (48.5%) patients did not show any lymph node metastasis. Before surgery, 70 (68.0%) patients did not have palpable or CT suspecting lymph nodes enlargement; among them, metastasis was seen in 4 (5.7%) patients and 66 (94.3%) patients did not show any lymph node metastasis.

All patients in our study were surgically treated as diseases demand; following NCCN guidelines, we have done frozen section biopsy for every patient to see margin clearance and reconstruction was also done as required.

Acknowledgements

We thanked Dr. Ikhtear Ibn Mostofa and Dr. Mezbah-Ul-Azeez for their support during data analysis.

Author contributions

Conceptualization: Motiur Rahman Molla; Methodology: Motiur Rahman Molla, Mausumi Iqbal; Data Curation: Motiur Rahman Molla, Mausumi Iqbal, Md. Nazrul Islam; Writing-original draft preparation: Motiur Rahman Molla, Mausumi Iqbal, Md. Nazrul Islam; Akhilanand Chaurasia Writing-review and editing: Motiur Rahman Molla, Mausumi Iqbal, Md. Nazrul Islam; Akhilanand Chaurasia Visualization: Motiur Rahman Molla; Akhilanand Chaurasia Supervision: Motiur Rahman Molla.

Financial support and sponsorship

Departmental research fund and also partly self-funded study

Conflicts of interest

There are no conflicts of interest.

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