

## Pattern of Oral Cancer between Smokers and Smokeless Tobacco Chewers in a Tertiary Care Hospital.

Hasan M.M.B.<sup>1\*</sup>, Biswas B.K.<sup>2</sup>, Akhter T.<sup>3</sup>, Awal M.A.<sup>4</sup>, Bayzid A.H.M.<sup>5</sup>,  
Ashfaquzzaman A.<sup>6</sup>, Khatun S.<sup>7</sup>

### Abstract

**Background:** Oral cancer is one of the most common cancers in Bangladesh and subcontinent region. In countries where tobacco consumption is common and had social recognition, there oral cancer shows the highest prevalence. In Bangladesh many people are under multiple risk factors of oral squamous cell carcinoma. The objective of this study is to evaluate the pattern of oral cancer between smokers and smokeless tobacco chewers and to see the association of oral cancer with smoking and smokeless tobacco habits.

**Methods:** This cross-sectional, observational study was conducted in the Bangabandhu Sheikh Mujib Medical University, Dhaka. The study included 90 oral cancer patients who chewed smokeless tobacco or smoked. A detailed history was taken and relevant clinical examination was done regarding the variables of study. Data was analyzed to assess the pattern of oral cancer with the type of tobacco consumption. The descriptive and inferential statistics were calculated using SPSS software. Ethical clearance for the study was taken from institutional review board, BSMMU, Dhaka, Bangladesh.

**Results:** Maximum patients (66.7%) were smokeless tobacco chewers. But, 24.4% patients were both smoker and smokeless tobacco chewers and 8.9% patients were only smoker. The most common habit of tobacco consumption in oral cancer patients was betel quid with zarda with gul (32.2%), followed by betel quid with zarda with sada pata (30.0%). Majority of the subjects reported with oral cancer at buccal mucosa (26.7%), followed by gingivobuccal sulcus (15.6%) and buccal mucosa with gingivobuccal sulcus (14.4%). Among the smokers maximum (37.5%) oral cancer involved the hard palate, followed by buccal mucosa (25.0%). Among the smokeless tobacco chewers, oral cancer involved mostly the buccal mucosa (30.0%) followed by in buccal mucosa with gingivobuccal sulcus (20.0%). Among smoker with smokeless tobacco chewers oral cancer involved the buccal mucosa (22.7%) followed by gingivobuccal sulcus (18.2%).

**Conclusion:** According to this study, smokeless tobaccos alone or in association with smoking were observed as the main risk factors for oral cancer. Only smoking was observed as the less significant risk factors for oral cancer.

**Keywords:** oral cancer, smoking, smokeless tobacco.

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1. **Md. Masud Bin Hasan**, Lecturer, Dept. of Periodontology, Sir Salimullah Medical College, Dhaka.
2. **Binoy Kumar Biswas**, Lecturer, Dept. of Maxillofacial Surgery, Sir Salimullah Medical College, Dhaka.
3. **Tanjhila Akhter**, Lecturer, Dept. of Science of Dental Material and Engineering, Sir Salimullah Medical College, Dhaka.
4. **M A Awal**, Lecturer, Dept. of Maxillofacial Surgery, Sir Salimullah Medical College, Dhaka.
5. **Al Hasan Md Bayzid**, Assistant Registrar, Department of Oral and Maxillofacial Surgery, Dhaka dental College, Dhaka
6. **Ahmed Ashfaquzzaman**, Assistant Professor, Department of Orthodontics, Sir Salimullah Medical College, Dhaka
7. **Shohada Khatun**, Ex Professor, Dept. of Oral & Maxillofacial Surgery, BSMMU.

### \*Corresponding Author:

**Dr. Md. Masud Bin Hasan**, Lecturer, Dept. of Periodontology, Sir Salimullah Medical College, Dhaka.  
Email: mbhasan2014@gmail.com

## Introduction

Oral cancer is a significant health concern worldwide with half a million new cases reported per year. The etiology of oral cancers is complex and may have multiple factors. Chewing tobacco, smoking, and alcohol usage are the most strongly linked risk factors for developing oral squamous cell cancer. Other risk factors including chewing areca nut, chronic irritation, certain viruses, oral candidiasis, exposure to industrial products, ionizing radiation, age, familial or genetic predisposition.<sup>1</sup>

The association between tobacco and oral cancer is well established. Smoking is considered one of the most important risk factors for the development of oral cancers.<sup>2</sup> The incidence of oral cancer among patients with the habit of tobacco smoking was 8.4 fold higher than that among patients who did not.<sup>3</sup> Oral use of smokeless tobacco is practiced worldwide and its use is relatively high in South and South-East Asia. Tobacco is being chewed in multiple forms and modes as with betel leaf and areca nut, Zarda and Gul.<sup>4</sup> Tobacco consumption varies across countries by habits, availability, accessibility, sociocultural acceptance, companion and local legislations.

Current smokeless tobacco use prevalence is especially high (>15%) among adults in Myanmar, Bangladesh, India, Bhutan, Nepal, Pakistan, and Sri Lanka.<sup>5</sup> Approximately one fourth of adults in Bangladesh and India use smokeless tobacco. Smokeless tobacco use is considered as the predominant form of tobacco use in Bangladesh, whereas 23% of adults' smoke and 27% of adults use smokeless tobacco.<sup>6</sup> In countries where such habits were tobacco consumption is common and had cultural importance, there oral cancer shows the highest prevalence. In Bangladesh many people are under multiple risk factors of oral squamous cell carcinoma.

No substantial advances in the treatment of oral cancer have been discovered in recent years. The primary prevention, such as cessation of tobacco consumption is important to lessen the prevalence of oral cancer.<sup>7</sup> The objective of this study is to evaluate the pattern of oral cancer between smokers and smokeless tobacco chewers and to see the association of oral cancer with smoking and smokeless tobacco habits.

## Materials and Method

This is a cross-sectional, observational study conducted

from October 2019 to September 2020 in the Oral and Maxillofacial Surgery Department at Bangabandhu Sheikh Mujib Medical University, Dhaka. The study included an estimated sample of 90 patients who were diagnosed with Oral Squamous Cell Carcinoma based on histology and who chewed smokeless tobacco or smoked. The sample size is determined by the following formula:  $n = (z^2pq)/d^2$  where prevalence of oral cancer is assumed to 5.4% and at 95% confidence level with 5% allowable error. A detailed history was taken and relevant clinical examination was done regarding the variables of study. The data was collected by interview and clinical examination of oral cavity and neck. Data was analyzed to assess the pattern of Oral Squamous Cell Carcinoma along with the habit of smoking and smokeless tobacco use. The descriptive and inferential statistics were calculated using SPSS software. Ethical clearance for the study was taken from institutional review board, BSMMU, Dhaka, Bangladesh.

## Results

The mean age of the oral cancer patients was 55.4 ( $\pm 10.2$ ) years. Minimum age 30 and maximum 78 years. Maximum patients (41.1%) were between 51 to 70 years age group followed by 41-50 years age group (27.8%). Maximum patients (66.7%) were smokeless tobacco chewers. But, 24.4% patients were both smoker and smokeless tobacco chewers and 8.9% patients were only smoker (Table 1). No Significant difference was found in age groups according to smokeless tobacco consumption and smoking (Table 2). Female were predominant than male (68.9% vs 31.1%). Female patients were significantly higher (98.3%) in smokeless tobacco chewers group and male were majority (86.4%) in smoker with smokeless tobacco chewers group. Within smoker group 100% patients were male (Table 3).

The mean duration of smoking was 32.5 ( $\pm 10.0$ ) years; chewing smokeless tobacco was 34.1 ( $\pm 11.7$ ) years and smoking with smokeless tobacco chewers was 31.4 ( $\pm 9.3$ ) years. There was significant difference of duration of habits among three groups. Mean frequency of smoking, chewing tobacco and both showed significant difference between three groups (Table 4).

The most common habit of tobacco consumption in oral cancer patients was betel quid with zarda with gul (32.2%), followed by betel quid with zarda with sada pata (30.0%). Betel quid with zarda with Gul along

with smoking was reported in 14.4% and only smoking reported in 8.9% patients (Table 5).

Majority of the subjects reported with oral cancer at buccal mucosa (26.7%), followed by gingivobuccal sulcus (15.6%) and buccal mucosa with gingivobuccal sulcus (14.4%). Table 6 showed, among the only smokers maximum (37.5%) OSCC involved the hard palate, followed by buccal mucosa (25.0%). Again, out of 60 smokeless tobacco chewers, oral cancer involved mostly the buccal mucosa (30.0%) followed by in buccal mucosa

with gingivobuccal sulcus (20.0%). Among smoker with smokeless tobacco chewers oral cancer involved the buccal mucosa (22.7%) followed by gingivobuccal sulcus (18.2%).

Oral cancer with only smoking habit was reported as maximum patient with grade I (62.5%), smokeless tobacco chewers reported grade I of 56.7% and smoker with smokeless tobacco chewers reported both Grade I and Grade II as 36.4% (Table 7).

**Table 1.** Distribution of the patients by smoking and smokeless tobacco chewers.

Type of tobacco consumption	Frequency	Percentage (%)
Smoker	8	8.9
Smokeless tobacco chewers	60	66.7
Both	22	24.4
Total	90	100.0

**Table 2.** Distribution of different age groups according to tobacco consumption type.

Age group (years)	Tobacco consumption			p-value
	Smoker	Smokeless tobacco chewers	Smoker with smokeless tobacco chewers	
	No. (%)	No. (%)	No. (%)	
31-40	2 (25.0%)	5 (8.3%)	2 (9.1%)	0.348 <sup>ns</sup>
41-50	1 (12.5%)	19 (31.7%)	5 (22.7%)	
51-60	5 (62.5%)	21 (35.0%)	11 (50.0%)	
61-70	0 (0.0%)	10 (16.7%)	4 (18.2%)	
>70	0 (0.0%)	5 (8.3%)	0 (0.0%)	
Total	8 (100.0%)	60 (100.0%)	22 (100.0%)	

Chi-square test was performed to see the association, ns= not significant

**Table 3.** Distribution of gender according to tobacco consumption types.

Gender	Tobacco consumption			p-value
	Smoker	Smokeless tobacco chewers	Smoker with smokeless tobacco chewers	
	No. (%)	No. (%)	No. (%)	
Male	8(100.0%)	1(1.7%)	19(86.4%)	<0.001 <sup>s</sup>
Female	0(0.0%)	59(98.3%)	3(13.6%)	
Total	8(100.0%)	60(100.0%)	22(100.0%)	

Chi-square test was performed to see the association, s=significant

**Table 4.** Duration and frequency of tobacco consumption types.

Duration & frequency	Tobacco consumption			p-value
	Smoker	Smokeless tobacco chewers	Smoker with smokeless tobacco chewers	
	Mean±SD	Mean±SD	Mean±SD	
Duration (years)	32.5±10.0	34.1±11.7	31.4±9.3	<0.001 <sup>s</sup>
Frequency (/day)	21.9±9.2	20.8±6.33	16.7±5.9	<0.001 <sup>s</sup>

ANOVA test was performed to compare, s=significant

**Table 5.** Distribution of oral cancer cases by type of tobacco consumption.

Type of smokeless tobacco	Frequency	Percentage (%)
Betel quid+Zarda+Gul	29	32.2
Betel quid+Zarda+Sada pata	27	30.0
Betel quid+Zarda+Khoine	4	4.4
Smoking	8	8.9
Betel quid+Zarda+Gul+smoking	9	10.0
Betel quid+Zarda+Sada pata+smoking	13	14.4
Total	90	100.0

**Table 6.** Distribution of oral cancer sites according to tobacco consumption types.

Sites	Tobacco consumption			Total
	Smoker	Smokeless tobacco chewers	Smoker with smokeless tobacco chewers	
	No. (%)	No. (%)	No. (%)	No. (%)
Lip	0 (0.0%)	2 (3.3%)	1 (4.5%)	3 (3.3%)
Alveolus	1 (12.5%)	1 (1.7%)	0 (0.0%)	2 (2.2%)
Floor of mouth	0 (0.0%)	1(1.7%)	2(9.1%)	3(3.3%)
Buccal mucosa	2 (25.0%)	18(30.0%)	4(18.2%)	24(26.7%)
Tongue	0 (0.0%)	1(1.7%)	2(9.1%)	3(3.3%)
Gingivobuccul sulcus	0 (0.0%)	9(15.0%)	5(22.7%)	14(15.6%)
Hard palate	3 (37.5%)	0(0.0%)	0(0.0%)	3(3.3%)
Retromolar trigone	0 (0.0%)	4(6.7%)	0(0.0%)	4(4.4%)
Buccal mucosa + Lip	0 (0.0%)	1(1.7%)	0(0.0%)	1(1.1%)
Alveolus + Floor of mouth	0 (0.0%)	0(0.0%)	1(4.5%)	1(1.1%)
Buccal mucosa + Alveolus	0 (0.0%)	1(1.7%)	0(0.0%)	1(1.1%)
Buccal mucosa + Floor of mouth	0 (0.0%)	0(0.0%)	1(4.5%)	1(1.1%)
Floor of mouth + Tongue	0 (0.0%)	1(1.7%)	0(0.0%)	1(1.1%)
Buccal mucosa + Retromolar trigon	0 (0.0%)	1(1.7%)	1(4.5%)	2(2.2%)
Buccal mucosa + Tongue	0 (0.0%)	2(3.3%)	0(0.0%)	2(2.2%)
Buccal mucosa + Gingivobuccul sulcus	0 (0.0%)	12(20.0%)	1(4.5%)	13(14.4%)
Gingivobuccul sulcus + Retromolar trigone	0 (0.0%)	2(3.3%)	1(4.5%)	3(3.3%)
Soft tissue + Oropharynx	0 (0.0%)	0(0.0%)	1(4.5%)	1(1.1%)
Hard palate + Retromolar trigone	1 (12.5%)	0(0.0%)	1(4.5%)	2(2.2%)
Hard palate + Oropharynx	1 (12.5%)	0(0.0%)	0(0.0%)	1(1.1%)
Buccal mucosa + Floor of mouth + Alveolus	0 (0.0%)	1(1.7%)	0(0.0%)	1(1.1%)
Buccal mucosa + Gingivobuccul sulcus + Retromolar trigone	0 (0.0%)	1(1.7%)	1(4.5%)	2(2.2%)
Buccal mucosa + Gingivobuccul sulcus + Hard palate	0 (0.0%)	1(1.7%)	0(0.0%)	1(1.1%)
Buccal mucosa + Alveolus + Gingivobuccul sulcus + Retromolar trigone	0 (0.0%)	1(1.7%)	0(0.0%)	1(1.1%)
Total	8 (100%)	60 (100%)	22(100%)	90 (100%)

**Table 7.** Distribution of histological grade according to tobacco consumption types.

Grade	Tobacco consumption			p-value
	Smoker	Smokeless tobacco chewers	Smoker with smokeless tobacco chewers	
Grade I	5 (62.5%)	34 (56.7%)	8 (36.4%)	0.364 <sup>ns</sup>
Grade II	2 (25.0%)	17 (28.3%)	8 (36.4%)	
Grade III	1 (12.5%)	4 (6.7%)	5 (22.7%)	
Grade IV	0 (0.0%)	5 (8.3%)	1 (4.5%)	
Total	8 (100%)	60 (100.0%)	22 (100.0%)	

Chi-square test was performed to see the association, ns= not significant

## Discussion

Oral cancer is a major and growing problem worldwide. Its incidence, aetiology and natural history vary considerably in different population groups. Variation in incidence is related to exposure to known aetiological factors such as tobacco and betel nut chewing, smoking, smokeless tobacco chewing, alcohol consumption.<sup>8</sup> In Bangladesh where betel quid chewing with tobacco is common practice among the people and many people have habit of betel quid chewing with tobacco and smoking. Certainly the major risk factors of oral cancer are different from those of western world.

This present study showed maximum patients (66.7%) were smokeless tobacco chewers, 8.9% patients were only smoker and 24.4% patients were both smoker and smokeless tobacco chewers. In agreement with current study Merletti et al.<sup>9</sup> reported the prevalence of tobacco use was found 43.3% among the adult population (aged 15 and above), of which smokeless tobacco chewers use was higher at 27.2%, exceeding the prevalence of smoking (23%) in Bangladesh. Other studies also suggest that sada pata, zarda, and gul were popularly used in Bangladesh. Different brands of zarda and gul are available in local markets.<sup>10,11</sup>

Present study indicates that female patients were significantly higher in smokeless tobacco chewers (98.3%) and male was majority (86.4%) in smoker with

smokeless tobacco chewers group. Within smoker group 100% patients were male. Most of the patients in this study were 6<sup>th</sup> decade (62.5%) within smoker, 35.0% in smokeless tobacco chewers and 50% in smoker with smokeless tobacco chewers group. No Significant difference of age among three study groups reported the prevalence of smoking is high among males (26.4%) than females (1.5%), use of smokeless tobacco is higher among females than among males in Bangladesh. Zaman et al.<sup>12</sup> noted smokeless tobacco use is high among both men (44%) and women (42.5%) aged 55–64 years. A recent study suggests a significantly increasing trend in the prevalence of current smokeless tobacco use among Bangladeshi men aged 15–49 years (20.2%–23%).

This present study shows that maximum oral cancer was detected in buccal mucosa (55.6%) followed by gingivobuccal in (38.9%) cases, floor of mouth (7.8%), hard palate (7.8%), alveolus (6.7%). In a study by Hannan et al.<sup>13</sup> showed most common site was buccal mucosa 38.8% with the habit of betel quid with tobacco and 2nd habit was betel quid with tobacco and smoking (14%).

This current study showed the oral cancer patients have the most common (32.2%) habit of betel quid with zarda with gul, and then betel quid with zarda with sada pata (30.0%). Betel quid with zarda+ Gul +smoking (14.4%), only smoking (8.9%), In accordance with this



study Choudhury et al.<sup>14</sup> reported proportion of current smoking only was 40.6% and 15.2% cancer patients used smokeless tobacco. Among the smokeless tobacco users, 66.3% used zarda, 33.5% used sada pata and 17.4% used gul.

This present study showed that as a single factor betel quid chewing with tobacco is a major risk factors of oral squamous cell carcinoma in Bangladesh, but it is not possible find out which one is the main contributory factor to develop oral cancer. Hannan et al.<sup>13</sup> reported 49.6% were habituated with betel quid with tobacco and 19.6% were habituated with betel quid with tobacco plus smoking. A study in Southern India smoking and betel quid with tobacco were major independent risk factors of oral cancer.<sup>12</sup> Tarin<sup>15</sup> showed that in Bangladesh 75.6% were habituated with betel quid chewing with tobacco.

The observations of this present study was different from the western study which suggested that oral cancers attributable to tobacco smoking, generally ranging from 75% to 90%.<sup>15,16</sup> People of Bangladesh still now are not aware about the carcinogenic effect of smokeless tobacco. Perhaps, in line with this many people quit smoking but started using smokeless tobacco as a substitute. Considering its public health consequences, the Government of Bangladesh, has already amended the Tobacco Control Act 2005 in 2013 to include smokeless tobacco in the definition of tobacco. There has been a

plateauing of tobacco use in Bangladesh in the past few years.<sup>17</sup> But public awareness is now required to combat the situation, especially the dual usages of tobacco. Besides, all types of smoking products, smokeless products should also be controlled for the betterment of public health.

## Conclusion

Oral cancer has multifactorial risk factors related to different types of tobacco consumption. According to this study, smokeless tobaccos alone or in association with smoking were observed as the main risk factors for oral cancer. Only smoking was observed as the less significant risk factors for oral cancer.

## Conflict of Interest

The authors declare that they have no conflict of interest.

## Ethical Approval

All procedures performed in the study were in accordance with the ethical standards of the institutional guidelines and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

## Informed Consent

Informed written consent was taken from all participants.

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