Relationship between smoking and smokeless tobacco with Oral squamous cell carcinoma

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Abstract:

The aim of study was to assess the relationship between smoking and smokeless tobacco with oral squamous cell carcinoma. Forty five male and 55 female patients aged 31 years and above 71 years having oral squamous cell carcinoma. Both male and female of 41 - 50 years age group were more affected and buccal mucosa was predominant (45.6%) site of involvement. Forty out of 45 male patients and 54 out of 55 female patients had the habit of smokeless tobacco use. Twenty three out of 45 males were smokers and no female were smoker. Data regarding the size, presentation of the lesion, clinical staging and histological grading was obtained by clinical examination and relevant investigation. The use of smokeless tobacco by females was found significant for the development of Oral Squamous Cell Carcinoma. The study indicated strong association between development of squamous cell carcinoma and tobacco consumption, specially in the smokeless form.

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Introduction:

Cancer is one of the most common causes of morbidity and mortality today. The global burden of cancer continues to increase mostly because of increasing adoption of cancer causing behaviors particularly smoking and smokeless tobacco forms in developing countries[1].

Oral squamous cell carcinoma is malignant epithelial neoplasm affecting the oral cavity with a half million new cases diagnosed per year[2]. Oral squamous cell carcinoma has one of the highest recorded incidences in developing countries, comprising 20 - 30% of all neoplasms[3]. Oral tobacco has long been referred to as a major contributor to oral cancer incidence. The overall mortality rate for oral cancer remains high at approximately 50% even with modern medical services[4].

According to International Agency for Research on Cancer (IARC) smoking of tobacco is practiced worldwide by over one thousand million people (IARC, 83). Tobacco is used in a number of forms in South Asia[5]. About half of Bangladeshi men and one fifth of women use tobacco in either smoking or in a smokeless form and the awareness about its harmful effects is low[6]. Smoking Cigarettes and Biris (Beedi) are common habits among the general male population in Bangladesh (Choudhury *et al*., 2007). Tobacco is used in a number of forms in South Asia[5]. The prevalence of at least one form of tobacco in Bangladesh ranged between 33.4% and 41%[7]. The overall prevalence of smoking, chewing tobacco and gul usage was 20.5%, 20.6% and 1.8% respectively[8].

Oral use of smokeless tobacco is practiced worldwide in many forms[9]. In developing countries in Southeast Asia and Pacific Rim the habit of tobacco chewing is usually associated with the use of areca nut, which may have a synergistic effect on the development of cancerous and precancerous lesion. A number of studies have characterized smokeless tobacco (ST) as an etiological factor in the development of cancer of the oral cavity and the esophagus[9]. A Swedish study showed that snus dipping (snuff dipping) increased the risk of oral cancer by 5 to 6 fold[9].

Tobacco is usually consumed as smokeless and smoking form. Smokeless tobacco is not a homogeneous category, Smokeless tobacco exists in two major forms. (1) Snuff and (2) Chewing tobacco. Snuff may be moist & dry. Moist snuff is very popular in Sweden, where it is called snus. Dry snuff is a fermented, fired cured tobacco & pulverized into powder & its original use was through nasal inhalation

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(Rodu and Jansson, 2004). Moist snuff consists of fire- and air- cured dark tobaccos that are finally cut & fermented which is the most popular form in the U S and Sales of this has increased by 77% over a period of 15 years (Federal Trade Commission, 2001).

The betel quid is usually known as "paan" in this sub continent which is a package form from the leaf of the piper betel plant. Paan is taken along with other ingredients including slices of areca nut, slaked lime (calcium hydroxide), tobacco, spices and a variety of ingredients depending on availability, geographical location and ceremonial occasion. The package is folded into a triangular quid and chewed and sometimes even swallowed. People are habituated with smokeless tobacco combined with betel leaf (paan), sliced areca nut, areca catechu, and / or powdered slaked lime; and with smoking tobacco as cigarette, biri (beedi), tobacco pipe, hukka and reverse smoking.

Materials and method:

01. Type of study

Cross sectional study.

02. Period of study

The study was carried out from July 2012 to June 2014.

03. Study place

The study was conducted in the Department of Oral and Maxillofacial Surgery, Dhaka Dental College and Hospital, Dhaka.

04. Summary of methodology

Data were collected for a definite period by structured questionnaire with consent and convenience of the subjects. A data collection sheet, including questionnaire and checklist, was designed to obtain information about age, sex, income group, history of tobacco use, site, size, presentation, duration and histologic grade of the lesion etc. Data regarding the size, presentation of the lesion, clinical staging and histological grading was obtained by clinical examination and relevant investigation.

05. Data Processing and Analysis

Data was compiled and was analyzed using Statistical Package for Social Science (SPSS) version 17 where mean and standard deviation was used for continuous data and frequency table for categorized data. c^2 test along with

association between smokeless and smoking tobacco habit with TNM staging of lesion and size of lesion and practice using for p-value was analyzed.

06. Ethical Issues

- Ethical clearance was taken from the "Ethical Committee" of Dhaka Dental College.
- Patient and / or attendant was explained about the procedure and outcome of the research in details and informed written consent was obtained.
- Confidentiality of the respondents was strictly maintained.

Results:

This chapter presents the findings of the study obtained from analysis and interpretation of the data. This cross-sectional study was conducted to assess the relationship between smoking & smokeless tobacco with Oral Squamous Cell Carcinoma (OSCC) among the respondents who were diagnosed irrespective of age and sex, and fulfilling the basic requirements of inclusion and exclusion criteria. Data were collected by administering a questionnaire on 100 respondents. Data were analyzed by SPSS version 17. The overall results of the study are presented in tabular and narrative form.

Table-I

Distribution of the respondents by Age group (n=100)

Age of respondents(In years)	Male		Female		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
31 - 40 years	8	17.8	14	25.5	22	22.0
41 - 50 years	18	40.0	24	43.6	42	42.0
51 - 60 years	8	17.8	12	21.8	20	20.0
61 - 70 years	9	20.0	5	9.1	14	14.0
71 + years	2	4.4	-	-	2	2.0
Total	45	100.0	55	100.0	100	100.0
Mean Age	51.91 ± 11.94		48.98 ± 9.40		50.30 ± 10.67	

Table-II

Distribution of the male and female respondents by site of lesion (n=100)

Site of the lesion	Male		Female		Total	
	N	%	N	%	N	%
Lip	1	1.4	1	1.2	2	1.3
Tongue	4	5.5	3	3.5	7	4.4
Floor of the mouth	1	1.4	2	2.4	3	1.9
Buccal mucosa	30	41.1	42	49.4	72	45.6
Alveolar mucosa and gingival	7	9.6	9	10.6	16	10.1
Buccal sulcus	14	19.2	12	14.1	26	16.5
Retromolar trigone	12	16.4	13	15.3	25	15.8
Hard Palate	4	5.5	1	1.2	5	3.2
Soft Palate	-	-	2	2.4	2	1.3
Total	73	100	85	100	159	100

* Total number does not correspond to the total number of cases due to involvement of multiple sites in the same case

Table-III

Distribution of respondents by tobacco consumption (n=100)

Tobacco use	No. of patient	Percent
Yes	99	99.0
No	1	1.0
Total	100	100.00
Male		
Use of only smokeless tobacco	17	37.78
Use of only smoking tobacco	5	11.11
Use of both smoking and smokeless tobacco	23	51.11
No Use of tobacco	0	0
Total	45	100.00
Female		
Use of only smokeless tobacco	54	98.18
Use of only smoking tobacco	0	0
Use of both smoking and smokeless tobacco	0	0
No Use of tobacco	1	1.82
Total	55	100.00

Table-IV

Distribution of the respondents according to habit of tobacco use by type (n=100)

Habitual factor of tobacco use	No. of patient	Percent
Smokeless tobacco habit (Male)		
Chewing	40	88.9
No smokeless habit	5	11.1
Total	45	100.0
Smokeless tobacco habit (Female)		
Chewing	52	94.5
Both chewing & areca nut	1	1.8
Both chewing & gul	1	1.8
No smokeless habit	1	1.8
Total	55	100.0
Smoking tobacco habit (Male)		
Cigarette	23	51.1
Biri (Beedi)	5	11.1
No smoking habit	17	37.8
Total	45	100.0
Smoking tobacco habit (Female)		
No smoking habit	55	100.0
Total	55	100.0

Table-V

Distribution of the male respondents by duration and frequency of smokeless and smoking tobacco use (n=45)

Tobacco use	Smokeless habit		Smoking habit			
	Chewing		Cigarette		Biri (Beedi)	
	N	%	N	%	N	%
Duration:						
< 5 years	5	12.5	4	17.4	-	-
5-10 years	6	15.0	3	13.0	1	20.0
10-15 years	8	20.0	4	17.4	3	60.0
15-20 years	11	27.5	6	26.1	-	-
> 20 years	10	25.0	6	26.1	1	20.0
Total	40	100.0	23	100.0	5	100.0
Frequency:						
< 5 sticks /day	2	5.0	5	21.7	-	-
5-10 sticks /day	12	30.0	4	17.4	3	60.0
10-15 sticks /day	25	62.5	12	52.2	2	40.0
> 15 sticks/day	1	2.5	2	8.6	-	-
Total	40	100.0	23	100.0	5	100.0

Table-VI

Distribution of the female respondents by duration and frequency of smokeless tobacco use (n=55)

Tobacco use	Chewing		Areca nut		Gul	
	N	%	N	%	N	%
Duration:						
< 5 years	5	9.3	1	100.0	-	-
5-10 years	16	29.6	-	-	-	-
10-15 years	12	22.2	-	-	1	100.0
15-20 years	10	18.5	-	-	-	-
> 20 years	11	20.4	-	-	-	-
Total	54	100.0	1	100.0	1	100.0
Frequency:						
< 5 times/day	7	13.0	1	100.0	1	100.0
5-10 times/day	12	22.2	-	-	-	-
10-15 times/day	31	57.4	-	-	-	-
> 15 times/day	4	7.4	-	-	-	-
Total	54	100.0	1	100.0	1	100.0

Table-VII

Relationship of smokeless and smoking Tobacco habit with Oral Squamous Cell Carcinoma (OSCC)

Tobacco habit	No. of respondent	%	χ^2-value	df	p (at 5%)	Results
Use of smokeless tobacco (Male) :						
Chewing habit	40	88.9	0.445	2	0.801	Not significant at p <0.05
No habit	5	11.1				
Both smokeless & smoking tobacco (Male) :						
Both habit	23	51.1	0.570	4	0.966	Not significant at p <0.05
Single habit	22	48.9				
Use of smoking tobacco (Male) :						
Cigarette/Biri	28	62.2	1.077	4	0.898	Not significant at p <0.05
No habit	17	37.8				
Use of smokeless tobacco (Female) :						
Chewing habit	54	98.2	20.435	1	0.015	Significant at p <0.05
No habit	1	1.8				

Discussion:

A total of 100 purposively selected patients of oral cancer were included in the present study. Among them, highest (42%) were found in the 41 - 50 years age group[10] in his study reported maximum (57.69%) occurrence of oral squamous cell carcinoma in the 41 - 50 years age group, which is consistent to the findings of the present study[11] in a prospective study reported maximum (27.78%) occurrence of oral cavity cancer in the age group of 41 - 50 in patients below 40 years and[12] reported maximum (38%) occurrence of oral squamous cell carcinoma in the age group of 41 - 50 years which correlates with the present study. In contrast to the present finding,[13] reported highest (56%) occurrence in 51 - 60 years age group.

Forty five (45%) of the 100 cases were male and 55 (55%) were female in the present study with a male female ratio of 9 : 11[10] in his study reported 38.46% occurrence in male and 61.54% occurrence in female which is in accordance with the findings of the present study.[13] reported that 58.6% of oral cancer patients were male which do not corresponds with the findings of present study. In contrast to the present finding,[13] reported more (68%) occurrences in male. A study in Iraq reported the predominance of male over female with a male female ratio of 2 : 1[14] which do not correspond to the findings of the present study and this might be due to marked difference between study populations.

When compared the involvement of different sites in the current study, buccal mucosa was found to be the predominant site with 45.6% involvement, followed by buccal sulcus (16.5%), retromolar trigon (15.8%), alveolar mucosa and gingiva (10.1%) and tongue (4.4%). In agreement with the present findings[10] reported buccal mucosa as the predominant (31.88%) site of involvement. A study by[15] on 263 patients at Southern Taiwan found that the most common site of oral squamous cell carcinoma was the buccal mucosa (37.4%) which corresponds to the findings of the current study.[16] reported that buccal mucosa is the commonest site in a study in Bangladesh and[12] reported the highest (34%) involvement of buccal mucosa in a study at Abbottabad of Pakistan which are in accordance with the findings of the present study.[17] also found buccal mucosa to be the site at greater risk of malignancy in pan-tobacco chewers as compared to other intraoral sites which coincides with present findings.

Current study revealed that 99% patients had the history of tobacco consumption. Out of them, 5 (5%) patients were smokers, 71 (71%) patients consumed smokeless tobacco and 23 (23%) patients used both smoking and smokeless tobacco. Forty males and 54 females used smokeless tobacco which indicated that females were more addicted to smokeless tobacco than males.[16] found that 32.3% of oral cancer patients were smokers, which agrees with the findings of the present study. At least 80% of oral cancer patients were smokers in the study conducted by[21] which shows disparity with the current study and may be due to differences in habits of population of different geographic areas.

The present study found that 88.9% male consumed smokeless tobacco, 62.2% males were smokers, 51.1% males were both smoker and smokeless tobacco user. Fifty four (98.2%) out of 55 females were smokeless tobacco users. Among these 54 females, 52 had the habit of chewing tobacco only, 1 patient had the habit of chewing tobacco and areca nut, and 1 patient the habit of chewing tobacco and use of gul. Among 45 males, 11 (27.5%) chewing tobacco users and 06 (26.1%) smokers were consumer of tobacco for 15 to 20 years. Twenty five (62.5%) chewing tobacco user males consumed 10 to 15 times/day and 12 (52.2%) smoker males smoked 10 to 15 sticks daily. Out of 54 chewing tobacco user females, 16 (29.6%) patients were consumer for 05 to 10 years and 31 (57.4%) patients consumed 10 to 15 times daily.[13] reported the history of betel nut chewing in 51.7% patients and the second most common habit of smoking was (37.9%).[20] found 59% smokers and 41% tobacco chewers in their study and the most common form of smoking and chewing were found to be cigarette (69%) and zarda (94.4%) respectively[22] found 59% over all prevalence of tobacco consumption, and prevalence of bidi smoking, cigarette smoking and chewing betel quid with tobacco / zarda were 29.6%, 27.8% and 17.5% respectively[23] mentioned in their study that 33% patients were never smokers and 67% of patients had a history of smoking with an average of 49.4 pack/years. These findings do not correlate with current study.

The current study revealed that 99% patients had the history of tobacco consumption, 5% patients were smoker, 71% patients were smokeless tobacco user, and 23% patients were both smoker and smokeless tobacco user which strongly indicated that smokeless tobacco users were more affected by oral squamous cell carcinoma. There was statistically significant relation between the use of smokeless tobacco and the development of Oral Squamous Cell Carcinoma (OSCC). The study found that the use of smokeless tobacco by females is significant for the development of Oral Squamous Cell Carcinoma at 5% level of significance. But, the use of tobacco by males in any form (smokeless tobacco, smoking and, both smokeless and smoking tobacco) is not significant for the development of Oral Squamous Cell Carcinoma at 5% level of significance.[19] Found 92 (77.3%) among 119 patients with oral cancer were tobacco consumer where 70 (76.1%) patients were tobacco chewers and 22 (23.9%) were smokers which correlates with the findings of present study. [17] Found that paan-tobacco chewing to be the major risk factor for cancer of the buccal and labial mucosa which corresponds to the finding of current study.[18] Found that majority (72.55%) patients were tobacco user among 51 patients of oral cancer which is in accordance with present finding. But, their study revealed more (59.52%) smokers than chewable tobacco user which does not correlate with the present findings and is probably due to attendance of more male patients during the study as smoking is mostly common in males than in females in Bangladesh.

Conclusion:

Tobacco is one of the most important public health issues in Bangladesh as it is an important current and future health risk which will cause stress on the health services. Although the health hazards of smoking are now generally accepted in most Western countries, the arguments are not still having much impact on poorer nations. This cross-sectional study found that 99% of the patients had history of tobacco consumption, both in the form of smoking and smokeless tobacco. Out of them, 62.2% males were smokers and 88.9% male and 98.2% female consumed

smokeless tobacco. The study found strong association between tobacco consumption and development of squamous cell carcinoma. The finding would certainly help clinicians to build up public health awareness for prevention of oral squamous cell carcinoma.

Recommendation:

The prevalence of tobacco related oral cancer in Dhaka Dental College and Hospital is quite high. It depends on frequency and distribution of tobacco consumption in various forms like smoking and smokeless tobacco. Hence the awareness among people is required to give up the habit of tobacco consumption. Further study with larger sample size and for a longer duration is hereby recommended for better analysis and result.

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