

# Differences of oral cancer in men and women of West Bengal, India

Tathagata Bhattacharjee<sup>1</sup>, Mrinmoy Kerketa<sup>2</sup>, N Aravindha Babu<sup>3</sup>

<sup>1</sup>Department of Oral Pathology and Microbiology, North Bengal Dental College and Hospital, Darjeeling, <sup>2</sup>Department of Dentistry, N. R. S. Medical College and Hospital, Kolkata, West Bengal, <sup>3</sup>Department of Oral Pathology and Microbiology, Sree Balaji Dental College and Hospital, Chennai, Tamil Nadu, India

## Abstract

**Introduction:** Oral cancer constitutes a major public health problem in South East Asia, as it causes profound social and economic consequences for people in this area. Nowadays, pattern of tobacco and alcohol use among females is changing and at the same time incidence of oral squamous cell carcinoma (SCC) among females is increasing.

**Objectives:** The aim of the study was to evaluate the possible differences between male and female patients suffering from oral SCC.

**Materials and Methods:** One hundred and sixteen patients with oral SCC, who were diagnosed between 2017 and 2018, were evaluated retrospectively. Special attention was paid to tobacco and alcohol use, as well as to patients without the risk factors. Data obtained were entered into a Microsoft Excel Spreadsheet and then were analyzed by SPSS 24.0.

**Results:** The men: women ratio was 2.5:1. Mean age for diagnosis of oral cancer in men was 57.5 and mean age for diagnosis of oral cancer in women was 46.33. Majority of men oral cancer patients had smoking habits (61.45%) and majority of women oral cancer patients had chewing habits (66.67%). Tongue was the most common site for women oral cancer patients and palate, retromolar area and tonsillar area were the most common site for men oral cancer patients who never used any habit products.

**Conclusion:** Compared to earlier studies women gets diagnosis of oral cancer earlier than men in our study. Gutkha use in men and Gudaku use in women were associated with oral cancer in early age. Further studies should be performed in women tongue cancer patients and men patients with cancer of maxillary area, retromolar and tonsillar area without risk factors to find etiology.

**Keywords:** Alcohol, females, gender distribution, oral cancer, tobacco

**Address for correspondence:** Dr. Mrinmoy Kerketa, Dhulatair, P.O. Atrai, Dakshin Dinajpur - 733 158, West Bengal, India.


E-mail: drtatha.dent@gmail.com

**Submitted:** 24-Nov-2020, **Accepted:** 20-Feb-2021, **Published:** 14-May-2021

## INTRODUCTION

Oral cancer is recognized as one of the major causes of morbidity and mortality around the globe. As per report

of GLOBOCAN-2018; around the world, 1 among 6 women develop cancer during their lifespan and 1 among 11 women die from cancer.<sup>[1]</sup>

Access this article online	
Quick Response Code:	Website: www.jomfp.in
	DOI: 10.4103/jomfp.jomfp_476_20

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** WKHLRPMedknow\_reprints@wolterskluwer.com

**How to cite this article:** Bhattacharjee T, Kerketa M, Babu NA. Differences of oral cancer in men and women of West Bengal, India. J Oral Maxillofac Pathol 2021;25:200-1.

In India, both sex combined, breast cancer is the most commonly observed cancer. In terms of incidence, breast cancer is followed by cancers of lip and oral cavity (10.4%).<sup>[2]</sup>

Oral cancer is the 4<sup>th</sup> most common cancer among Indian women (4.3%). Cancer of oral cavity and lips is also the 3<sup>rd</sup> most leading cause of cancer-related death (5.6%) among women of India.<sup>[2]</sup>

It is considered that smoking and alcohol consumption is very less among women, but various studies has shown that men: women ratio of oral cancer is rapidly declining due to change in lifestyle of women.<sup>[3]</sup> Few studies says that women start smoking at late age and their health consequences are more than men.<sup>[4]</sup>

One hypothesis in respect to lung cancer says that women may be more susceptible to the effect of tobacco. Therefore, it would be of great interest to investigate whether this hypothesis could be supported for cancer of oral cavity too.<sup>[5]</sup>

A study conducted by Muscat *et al.* in 1996 to estimate gender differences and risk for oral cancer. They found that women with smoking habits had higher risk of developing oral cancer compared to men smokers.<sup>[3,6]</sup> They also found that, there was increased risk among women for developing oral cancer with the habit of smoking and alcohol intake when compared to men.<sup>[3,6]</sup> They opined that hormonal alterations, nutritional deficiencies of iron, riboflavin, other vitamins and minerals increase the risk of oral cancer among older women.<sup>[3,6]</sup>

Vatanasapt *et al.* in 2011 studied on a population of Thailand, and found the rate of oral cancer incidence to be significantly higher in women compared to men.<sup>[3,7]</sup>

The main aim of our study is to rule out the possible differences in women and men suffering from oral cancer based on sociodemographic parameters, site distribution as well as distribution of tobacco habits, its frequency and duration.

## MATERIALS AND METHODS

This is a cross-sectional study conducted to rule out differences between men and women oral cancer patients. The study procedures were approved by the Institutional Human Ethics Committee, NRS Medical College and Hospital, Kolkata.

Oral cancer patients, those who gave consent for the study, irrespective of their age, sex, occupation and income were included for the study. Subjects, without histopathologically proven oral cancer; immunocompromised patients and unwilling patients for the study, were excluded.

Histopathologically, proven oral cancer cases came in the Department of Dentistry NRS Medical College for 1 year from 2018 were interviewed regarding age, gender, occupation, habits (tobacco, areca and alcohol consumption) and socioeconomic status. Frequency and duration of habits were also noted.

Intraoral examination was done using mouth mirror, tongue depressor and artificial light to note size, site, extent and severity of the lesion.

Same series of data were also collected from archive of the Department of Dentistry NRS Medical College for the past 1 year as all data required for the study were available in archive.

The data collected in this manner was put into a chart and statistically analyzed.

## Statistical methods

For statistical analysis, data were entered into a Microsoft Excel Spreadsheet and then were analyzed by SPSS 24.0 (IBM corporation, New York City, NY, USA).

Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables.

Student's independent sample's *t*-test was applied to compare normally distributed numerical variables between groups; unpaired proportions were compared by Chi-square test or Fisher's exact test, as appropriate.  $P \leq 0.05$  was considered statistically significant.

## RESULTS

One hundred and sixteen oral cancer patients were included in our study. Among them, 83 (71.6%) were men and 33 (28.4%) were women. Hence, the men: women ratio was 2.5:1.

The mean age of our study population was 54.33. The mean age of men was 57.5 and the mean age of women was 46.33.

In our study, highest numbers of oral cancer patients were from the age group of 60–69 years, followed by from age group 50–59. Distribution of oral cancer patients based on age groups is described in Figure 1.

In this present study, the most prevalent age group for men cancer patients was 60–69 years; whereas for women the age group was 50–59 years.

Gender-based age group distribution of oral cancer patients in this study is compared in Figure 2.

The most predominant occupation among oral cancer patients in our study were manual labor. The occupation-based distribution of oral cancer patients is described in Figure 3.

In our study population, uneducated people were most, followed by primary educated people. The education distribution of oral cancer patients is described in Figure 4.

Most of women patients in our study were homemakers (81.8%). Among men, manual labor was the most predominant occupation (71.1%).

Maximum number of men patients in our study population was primary educated (38.5%) and maximum numbers of women patients were uneducated (54.5%).

Gender-wise distribution of education and occupation is described in Table 1

In our study, among oral cancer patients; buccal mucosa and buccal vestibule was the most prevalent site (34%), followed by tongue (25%). The site distribution of oral cancer patients is described in Figure 5.

For men as well as women, buccal mucosa-vestibule was the most prevalent site for oral cancer. Women had more oral cancer in buccal mucosa-vestibule and gingival-alveolar ridge compared to oral cancer of men in these locations. Site distribution of oral cancer based on gender is described in Figure 6.

12.93% of all oral cancer patients had no history of habits in our study. 33.33% of all women oral cancer patients and 4.8% of all men oral cancer patients had no history of cancer causing habits. 65.52% patients had individual habit; among them 39.47% had smoking habits and 60.53% had chewing habits. Among all our patients, 20.69% had combinations of habits.

Among men oral cancer patients, smoking (61.45%) was the most predominant cancer causing habit and among women oral cancer patients, chewing (66.67%) was the most predominant cancer causing habit.

Gender-based distribution of different habits among oral cancer patients is described in Table 2.

Bidi smoking habit was the most prevalent habits (59.0%) of men oral cancer patients, whereas pan with areca nut

and tobacco use was the most prevalent habits (30.3%) of female oral cancer patients.

Gender-based distribution of different habit products among oral cancer patients is described in Table 3.

Table 4 describes site of oral cancer and age group of patients based on different habits.

Oral cancer patients who never used any habit products, among them most were women. Patients (both the gender) who never used any habit product, for them most prevalent site for oral cancer was tongue.

Among smokers (men as well as women) also tongue was the most common site for oral cancer.

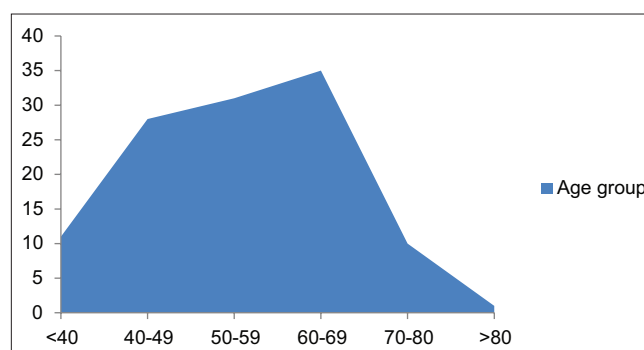


Figure 1: Oral cancer cases based on age group

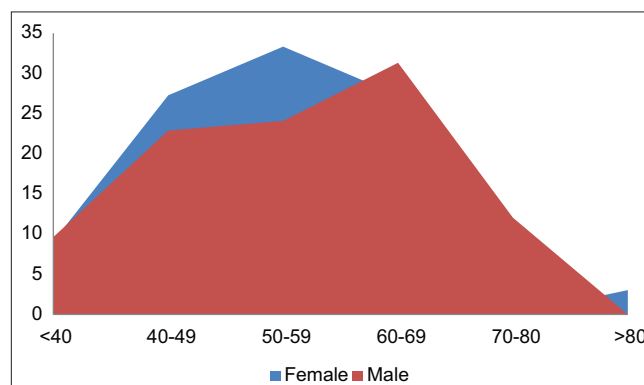


Figure 2: Gender based age group distribution of oral cancer patients

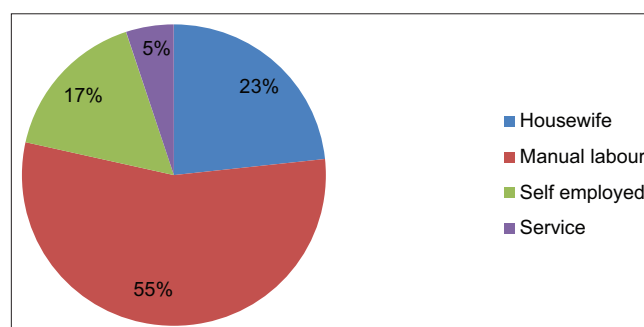


Figure 3: Occupation wise distribution of oral cancer patients

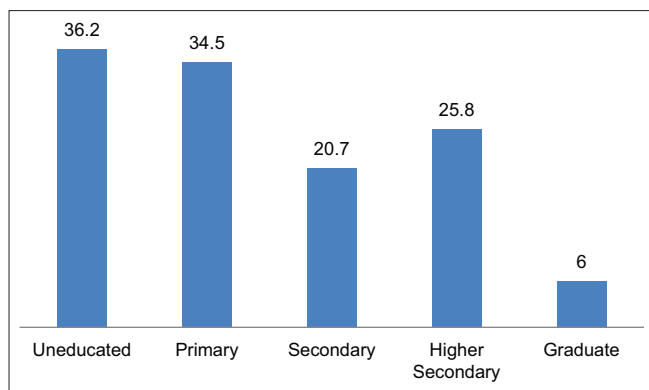


Figure 4: Education wise distribution of oral cancer patients

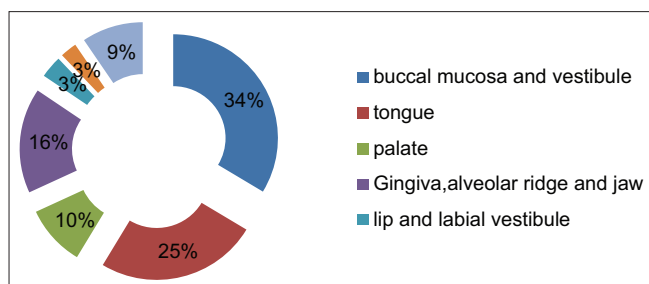


Figure 5: Site distribution of oral cancer patients

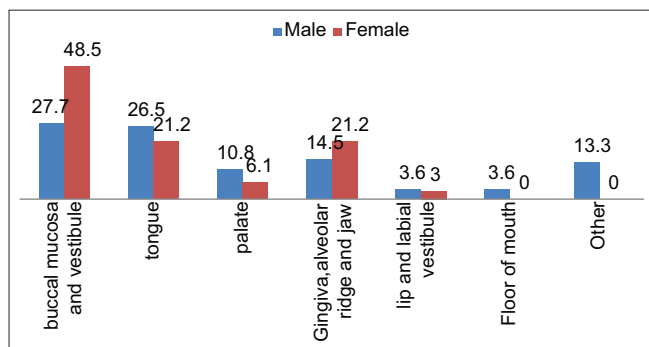


Figure 6: Site distribution of oral cancer based on gender

Men as well as women, who had chewing habits for them buccal mucosa and vestibule was the most common oral cancer site. No women oral cancer patients had drinking habits. Oral cancer patients who had drinking habits, among them buccal mucosa and vestibule was the most predominant site for oral cancer.

Oral cancer patients (men and women both), who had combined smoking and chewing habit, among them; buccal mucosa and vestibule was the most common site for oral cancer.

In the study, we could not found any female who had combined, smoking and drinking, chewing and drinking or all three habits.

Table 1: Gender wise distribution of education and occupation

Subgroups	Gender, count (%)		Total, count (%)	P
	Male	Female		
<b>Education</b>				
Uneducated	24 (28.9)	18 (54.5)	42 (36.2)	0.103
Primary	32 (38.5)	8 (24.2)	40 (34.5)	
Secondary	18 (21.7)	6 (18.2)	24 (20.7)	
Higher secondary	3 (3.6)	0	3 (25.8)	
Graduate	6 (7.2)	1 (3.0)	7 (6.0)	
Total	83 (100.0)	33 (100.0)	116 (100.0)	
<b>Occupation</b>				
House wife	0	27 (81.8)	27 (28.4)	<0.001
Manual labour	59 (71.1)	5 (15.2)	64 (55.2)	
Service	6 (7.2)	0	6 (5.2)	
Self employed	18 (21.7)	1 (3.0)	19 (16.4)	
Total	83 (100.0)	33 (100.0)	116 (100.0)	

Table 2: Gender based distribution of different habits among oral cancer patients

	Gender, count (%)		Total, count (%)
	Male	Female	
<b>Smoking habit</b>			
Absent	32 (38.55)	32 (96.97)	64 (55.17)
Present	51 (61.45)	1 (3.03)	52 (44.83)
Total	83 (100.0)	33 (100.0)	116 (100.0)
<b>Chewing habit</b>			
Absent	43 (51.80)	11 (33.33)	54 (46.55)
Present	40 (48.20)	22 (66.67)	62 (53.45)
Total	83 (100.0)	33 (100.0)	116 (100.0)
<b>Drinking habit</b>			
Absent	65 (78.31)	33 (100.0)	98 (84.48)
Present	18 (21.69)	0	18 (15.52)
Total	83 (100.0)	33 (100.0)	116 (100.0)
<b>Smoking + drinking</b>			
Absent	68 (81.93)	33 (100.0)	101 (87.07)
Present	15 (18.07)	0	15 (12.93)
Total	83 (100.0)	33 (100.0)	116 (100.0)
<b>Smoking + chewing</b>			
Absent	71 (85.54)	32 (96.97)	103 (88.79)
Present	12 (14.46)	1 (3.03)	13 (11.21)
Total	83 (100.0)	33 (100.0)	116 (100.0)
<b>Chewing + drinking</b>			
Absent	73 (87.95)	33 (100.0)	106 (91.38)
Present	10 (12.05)	0	10 (8.62)
Total	83 (100.0)	33 (100.0)	116 (100.0)
<b>Smoking + drinking + chewing</b>			
Absent	76 (91.57)	33 (100.0)	109 (93.97)
Present	7 (8.43)	0	7 (6.03)
Total	83 (100.0)	33 (100.0)	116 (100.0)
<b>Other habit</b>			
Absent	83 (100.0)	31 (93.94)	114 (98.27)
Present	0	2 (6.06)	2 (1.73)
Total	83 (100.0)	33 (100.0)	116 (100.0)
<b>No habits</b>			
Absent	79 (95.18)	22 (66.67)	101 (87.07)
Present	4 (4.82)	11 (33.33)	15 (12.93)
Total	83 (100.0)	33 (100.0)	116 (100.0)

Buccal mucosa and vestibule was the most common site for men who had all three habits as well as combined chewing and drinking habits.

**Table 3: Gender based distribution of different habit products among oral cancer patients**

	Gender, count (%)		Total, count (%)	P
	Male	Female		
<b>Bidi habit</b>				
Absent	34 (41.0)	32 (97.0)	66 (56.9)	<0.001
Present	49 (59.0)	1 (3.0)	50 (43.1)	
Total	83 (100.0)	33 (100.0)	116 (100.0)	
<b>Cigarette habit</b>				
Absent	72 (86.7)	33 (100.0)	105 (90.5)	0.032
Present	11 (13.3)	0	11 (9.5)	
Total	83 (100.0)	33 (100.0)	116 (100.0)	
<b>Ganja habit</b>				
Absent	81 (97.6)	33 (100.0)	114 (98.3)	0.999
Present	2 (2.4)	0	2 (1.7)	
Total	83 (100.0)	33 (100.0)	116 (100.0)	
<b>Khaini habit</b>				
Absent	64 (77.1)	31 (93.9)	95 (81.9)	0.035
Present	19 (22.9)	2 (6.1)	21 (18.1)	
Total	83 (100.0)	33 (100.0)	116 (100.0)	
<b>Gutkha habit</b>				
Absent	78 (94.0)	29 (87.9)	107 (92.2)	0.272
Present	5 (6.0)	4 (12.1)	9 (7.8)	
Total	83 (100.0)	33 (100.0)	116 (100.0)	
<b>Pan + arecanut + tobacco</b>				
Absent	69 (83.1)	23 (69.7)	92 (79.3)	0.130
Present	14 (16.9)	10 (30.3)	24 (20.7)	
Total	83 (100.0)	33 (100.0)	116 (100.0)	
<b>Tobacco chewing habit</b>				
Absent	78 (94.0)	26 (78.8)	104 (89.7)	0.036
Present	5 (6.0)	7 (21.2)	12 (10.3)	
Total	83 (100.0)	33 (100.0)	116 (100.0)	
<b>Gudaku habit</b>				
Absent	82 (98.8)	31 (93.9)	113 (97.4)	0.194
Present	1 (1.2)	2 (6.1)	3 (2.6)	
Total	83 (100.0)	33 (100.0)	116 (100.0)	
<b>Pan+betelnut</b>				
Absent	80 (96.4)	30 (90.9)	110 (94.8)	0.350
Present	3 (3.6)	3 (9.1)	6 (5.2)	
Total	83 (100.0)	33 (100.0)	116 (100.0)	

Along with buccal mucosa and vestibule; gingiva-alveolar ridge and jaw was the most common site for oral cancer patients who had combined habit of smoking and drinking.

Oral cancer patients, who had smoking habits (men and women both) for them most prominent age group was 50–59 years. Women oral cancer patients, who had chewing habits for them most predominant age group was 40–49 years; where for men chewer, it was 60–69.

Oral cancer patients, who had drinking habits; all of them were men. The most prevalent age group was 50–59.

Men oral cancer patients who had combined smoking and chewing habits, for them most prevalent age group was 40–49; for women it was 50–59.

No women oral cancer patients had combined smoking and drinking, chewing and drinking or all kinds of habits.

Men oral cancer patients who had all kind of habits for them most prevalent age group was 60–69; followed by age group of people <40 years. People who had combined smoking and drinking habits; most prevalent age group for them was 50–59. For group of cancer patients who had combined chewing and drinking habits, for them most of the people belonged to 60–69 years of age groups.

Women patients who never had any habit products but suffered from oral cancer; majority of them belonged to 50–59 age groups; followed by 60–69 years of age groups. 13.33% women oral cancer patients, who never used any habit products belonged to age groups <40 years.

Men oral cancer patients who never used any habit products, majority belonged to age groups 40–49 years.

Among all oral cancer patients only 1 male patient had sharp teeth associated with cancer site and 6.4% patients had systemic diseases among which 5.3% patents had diabetes.

Table 5 describes gender-wise distribution of different smoking products based on site of cancer, age groups, frequency and duration of habit products.

In this study, we found that smoking products was mainly used by men oral cancer patients. As per data, no women oral cancer patients had habits of cigarette or any other smoking products.

Oral cancer patients who ever took other smoking products as habit, among them; 50% lesions of oral cancer were seen in palate and another 50% lesions were seen in gingiva and alveolus.

Oral cancer patients who used cigarette; among them, tongue was the most predominant site for oral cancer. For these patients, the most common age group was 50–59 years.

Most frequent duration of their smoking habit was for 21–30 years and common frequency of cigarette smoking were <5 times/day and 5–10 cigarette/day.

Women patients with oral cancer, who smoked bidi; among them the most prevalent site was tongue and most common age groups were 50–59 years. These patients used to smoke bidi 5–10 times/day for 10–20 years.

Men oral cancer patients who used bidi, among them tongue was the most common site for oral cancer followed by buccal mucosa and vestibule. 50–59 and 60–69 age

**Table 4: Site of oral cancer and age group of patients based on different habits**

	Nil			All 3 habits			Smoking			Chewing		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Site of oral cancer												
Buccal mucosa and vestibule	0.00	13.33	13.33	42.86	0	42.86	23.08	0.00	23.08	26.98	20.63	47.61
Tongue	13.33	26.67	40	28.57	0	28.57	28.85	1.92	30.77	12.70	3.17	15.87
Palate	0.00	6.67	6.67	14.29	0	14.29	17.31	0.00	17.31	3.17	1.59	4.76
Gingiva, alveolar ridge and jaw	0.00	20.00	20	14.29	0	14.29	7.69	0.00	7.69	14.29	6.35	20.64
Lip and labial vestibule	0.00	6.67	6.67	0.00	0	0.00	1.92	0.00	1.92	3.17	0.00	3.17
Floor of mouth	0.00	0.00	0	0.00	0	0.00	5.77	0.00	5.77	1.59	0.00	1.59
Other	13.33	0.00	13.33	0.00	0	0.00	13.46	0.00	13.46	6.35	0.00	6.35
Total	26.67	73.33	100	100.00	0	100.00	98.08	1.92	100	68.25	31.75	100
Age group												
<40	0.00	13.33	13.33	28.57	0	28.57	9.62	0.00	9.62	12.70	0.00	12.7
40-49	13.33	13.33	26.66	14.29	0	14.29	19.23	0.00	19.23	17.46	11.11	28.57
50-59	0.00	26.67	26.67	14.29	0	14.29	30.77	1.92	32.69	7.94	9.52	17.46
60-69	6.67	20.00	26.67	42.86	0	42.86	28.85	0.00	28.85	23.81	9.52	33.33
70-80	6.67	0.00	6.67	0.00	0	0.00	9.62	0.00	9.62	6.35	0.00	6.35
>80	0	0.00	0	0.00	0	0.00	0.00	0.00	0	0.00	1.59	1.59
Total	26.67	73.33	100	100.00	0	100.00	98.08	1.92	100	68.25	31.75	100
	Drinking			Smoking + chewing			Smoking + drinking			Chewing + drinking		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Site of oral cancer												
Buccal mucosa and vestibule	33.33	0	33.33	38.46	7.69	46.15	25	0	25	50	0	50
Tongue	16.67	0	16.67	15.38	0.00	15.38	18.75	0	18.75	20	0	20
Palate	16.67	0	16.67	15.38	0.00	15.38	18.75	0	18.75	10	0	10
Gingiva, alveolar ridge and jaw	16.67	0	16.67	7.69	0.00	7.69	25	0	25	10	0	10
Lip and labial vestibule	5.56	0	5.56	0.00	0.00	0	0	0	0	10	0	10
Floor of mouth	5.56	0	5.56	7.69	0.00	7.69	6.25	0	6.25	0	0	0
Other	5.56	0	5.56	7.69	0.00	7.69	6.25	0	6.25	0	0	0
Total	100.00	0	100.00	92.31	7.69	100	100	0	100	100	0	100
Age group												
<40	11.11	0	11.11	15.38	0.00	15.38	12.5	0	12.5	20	0	20
40-49	27.78	0	27.78	30.77	0.00	30.77	18.75	0	18.75	30	0	30
50-59	33.33	0	33.33	15.38	7.69	23.07	43.75	0	43.75	10	0	10
60-69	22.22	0	22.22	23.08	0.00	23.08	18.75	0	18.75	40	0	40
70-80	5.56	0	5.56	7.69	0.00	7.69	6.25	0	6.25	0	0	0
>80	0.00	0	0.00	0.00	0.00	0	0	0	0	0	0	0
Total	100.00	0	100.00	92.31	7.69	100	100	0	100	100	0	100

groups were commonly affected. These patients used to smoke bidi predominantly 5–10 times/day and smoked them for 10–20 years.

Table 6 describes gender-wise percentage distribution of different chewing products among oral cancer patients, based on site of cancer, age groups, frequency and duration of habits.

People who used pan with betel nut most, among them 50% had oral cancer in buccal mucosa and vestibule. Tongue was the most cancer affected site of women who had the same habit; whereas for men, who used pan with betelnut; for them the most common cancer site was buccal mucosa and vestibule.

The age of 60–69 years was the most prevalent age group for women oral cancer patients who used pan with betelnut most as habit product.

Oral cancer patients, who used pan with betelnut <10 years; among them none was men and 16.17% was women.

There was no difference in frequency of pan with tobacco chewing, based on gender of oral cancer patients.

Among oral cancer patients with gutkha chewing habits, the most prevalent site was buccal mucosa and vestibule (62.50%). Tongue was the most prevalent site and below 40 years was the most prevalent age group for men oral cancer patients who used gutkha most. 12.5% of oral cancer patients who used gutkha <5 times/day was male, whereas 25% of oral cancer patients who used gutkha <5 times/day was female. 87.5% oral cancer patients who had gutkha chewing habit; used it for 10–20 years.

Among oral cancer patients with khaini chewing habits, the most prevalent site was buccal mucosa and vestibule. For men, the most prevalent age group was 40–49 years whereas for women the age group 50–59 and 60–69 was equally prevalent. Women oral cancer patients had the khaini chewing habits 21–30 years, whereas 45.45% of men oral cancer patients who had khaini chewing habit,

**Table 5: Gender wise distribution of different smoking products based on site of cancer, age groups, frequency and duration of habit products**

	Bidi			Cigarette			Ganja		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Site of oral cancer									
Buccal mucosa and vestibule	26.00	0.00	26.00	9.09	0	9.09	0.00	0	0.00
Tongue	28.00	2.00	30.00	54.55	0	54.55	0.00	0	0.00
Palate	18.00	0.00	18.00	9.09	0	9.09	50.00	0	50.00
Gingiva, alveolar ridge and jaw	4.00	0.00	4.00	18.18	0	18.18	50.00	0	50.00
Lip and labial vestibule	4.00	0.00	4.00	0.00	0	0.00	0.00	0	0.00
Floor of mouth	4.00	0.00	4.00	0.00	0	0.00	0.00	0	0.00
Other	14.00	0.00	14.00	9.09	0	9.09	0.00	0	0.00
Total	98.00	2.00	100.00	100.00	0	100.00	100.00	0	100.00
Age group									
<40	10.00	0.00	10.00	18.18	0	18.18	0.00	0	0.00
40-49	18.00	0.00	18.00	27.27	0	27.27	50.00	0	50.00
50-59	32.00	2.00	34.00	36.36	0	36.36	50.00	0	50.00
60-69	28.00	0.00	28.00	18.18	0	18.18	0.00	0	0.00
70-80	10.00	0.00	10.00	0.00	0	0.00	0.00	0	0.00
>80	0.00	0.00	0.00	0.00	0	0.00	0.00	0	0.00
Total	98.00	2.00	100.00	100.00	0	100.00	100.00	0	100.00
Duration									
<10	8.00	0.00	8.00	18.18	0	18.18	0.00	0	0.00
10-20	52.00	2.00	54.00	18.18	0	18.18	50.00	0	50.00
21-30	22.00	0.00	22.00	45.45	0	45.45	50.00	0	50.00
31-40	12.00	0.00	12.00	18.18	0	18.18	0.00	0	0.00
>40	4.00	0.00	4.00	0.00	0	0.00	0.00	0	0.00
Total	98.00	2.00	100.00	100.00	0	100.00	100.00	0	100.00
Frequency									
<5	2.00	0.00	2.00	36.36	0	36.36	50.00	0	50.00
5-10	48.00	2.00	50.00	36.36	0	36.36	50.00	0	50.00
11-15	18.00	0.00	18.00	9.09	0	9.09	0.00	0	0.00
16-20	20.00	0.00	20.00	9.09	0	9.09	0.00	0	0.00
>20	10.00	0.00	10.00	9.09	0	9.09	0.00	0	0.00
Total	98.00	2.00	100.00	100.00	0	100.00	100.00	0	100.00

used the product only 10–20 years and 13.63% of men oral cancer patients who had this particular habit, used the product only <10 years.

Oral cancer patients those who used gudaku, chewing tobacco and pan with betelnut and tobacco as habit products, among them women were more than men.

It was found that all women oral cancer patients, who used Gudaku; had lesions on buccal mucosa and vestibule as well as all men patients with same habit had lesions in lip and labial vestibule. For women cancer patients who used these habits, the most predominant age group was below 40 and 40–49; whereas for men, it was 60–69. Predominant duration for this habit of both men and women was 10–20 years and most common frequency was 5–10 times/day.

Women oral cancer patients who used mostly chewing tobacco, among them most predominant site of oral cancer was buccal mucosa-buccal vestibule as well as gingiva and alveolus, followed by tongue. For men, it was buccal mucosa-buccal vestibule followed by tongue. 16.67% men oral cancer patients had duration of habit <10 years. No cases of women patients were

observed, who had <10 years' duration of tobacco chewing habit.

Among oral cancer patients, 41.67% patients, who were men, had chewing frequency of tobacco <5 times/day; whereas only 25% of oral cancers patients who were women had chewing frequency <5 times/day.

56.52% oral cancer patients among whom 30.43% was women and 26.09% were men; who used pan with betel nut and tobacco as chewing product had lesions on buccal mucosa and vestibule. Detailed gender-wise distribution of lesional sites is described in Table 4. 4.35% men oral cancer patients, who used pan with tobacco and betel nut had lesions before 40 years of age. No women oral cancer patients who used same habit products had lesions before 40 years of age.

## DISCUSSION

Despite recent advances in diagnosis and treatment the 5-year survival rate for oral cancer does not improved much. The present world is very much concern about oral cancer in South east Asia, due to the prevalence of tobacco

**Table 6: Gender wise percentage distribution of different chewing products among oral cancer patients based on cancer site, age groups, frequency and duration of habits**

	Pan with betelnut			Gutkha			Khaini			Gudaku			Tobacco chewing			Pan with betelnut and tobacco		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Site of oral cancer																		
Buccal mucosa and vestibule	33.33	16.17	50.00	25.00	37.50	62.50	31.82	9.09	40.90	0	66.67	66.67	25.00	25.00	50.00	26.09	30.43	56.52
Tongue	0	33.33	33.33	37.50	0	37.50	13.63	0	13.63	0	0	0	16.67	8.33	25.00	0.00	0.00	0
Palate	0	0	00.00	0	0	0	4.54	0	4.55	0	0	0	0.00	0.00	0.00	4.35	13.04	17.39
Gingiva, alveolar ridge and jaw	0	0	00.00	0	0	0	27.27	0	27.27	0	0	0	0.00	25.00	25.00	13.04	8.70	21.74
Lip and labial vestibule	0	0	00.00	0	0	0	4.55	0	4.55	33.33	0	33.33	0.00	0.00	0.00	0.00	0.00	0
Floor of mouth	0	0	00.00	0	0	0	4.55	0	4.55	0	0	0	0.00	0.00	0.00	0.00	0.00	0
Other	16.17	0	16.17	0	0	0	4.55	0	4.55	0	0	0	0.00	0.00	0.00	0.00	4.35	4.35
Total	49.5	49.5	100	62.50	37.50	100	90.90	9.09	100	33.33	66.67	100	41.67	58.33	100.00	43.48	56.52	100
Age group																		
<40	0	0	0	50.00	0	50.00	9.09	0	9.09	0	33.33	33.33	8.33	0.00	8.33	4.35	0.00	4.35
40-49	16.17	16.17	33.33	0	12.5	12.5	36.36	0	36.36	0	33.33	33.33	16.67	25.00	41.67	8.70	13.04	21.74
50-59	16.17	0	16.17	12.5	12.5	2	4.55	4.55	9.09	0	0	0	8.33	16.67	25.00	8.70	17.39	26.09
60-69	0	33.33	33.33	0	12.5	12.5	31.81	4.55	36.36	33.33	0	33.33	8.33	16.67	25.00	21.74	13.04	34.78
70-80	16.17	0	16.17	0	0	0	9.09	0	9.09	0	0	0	0.00	0.00	0.00	8.70	0.00	8.7
>80	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	4.35	4.35
Total	50.00	50.00	100	62.5	37.5	100	90.90	9.09	100	33.33	66.67	100	41.67	58.33	100.00	52.17	47.83	100
Duration																		
<10	0	16.17	16.17	0	0	0	13.63	0	13.64	0	0	0	16.67	0.00	16.67	13.04	4.35	17.39
10-20	33.33	16.17	50.00	62.5	25.00	87.5	45.45	0	45.45	33.33	33.33	66.67	16.67	33.33	50.00	21.74	17.39	39.13
21-30	16.17	16.17	33.33	0	0	0	13.64	9.09	22.72	0	33.33	33.33	0.00	25.00	25.00	4.35	13.04	17.39
31-40	0	0	0	0	12.5	12.5	13.64	0	13.64	0	0	0	8.33	0.00	8.33	17.39	4.35	21.74
>40	0	0	0	0	0	0	4.55	0	4.55	0	0	0	0.00	0.00	0.00	0.00	4.35	4.35
Total	50.00	50.00	100	62.5	37.5	100	90.90	9.09	100	33.33	66.67	100	41.67	58.33	100.00	56.52	43.48	100
Frequency																		
<5	33.33	33.33	66.67	12.5	25.00	37.5	31.81	4.55	36.36	0	0	0	41.67	25.00	66.67	17.39	13.04	30.43
5-10	16.17	16.17	33.33	37.5	0	37.5	59.09	4.55	63.63	33.33	33.33	66.67	0.00	25.00	25.00	30.43	13.04	43.47
11-15	0	0	0	0	12.5	12.5	0	0	0	0	33.33	33.33	0.00	8.33	8.33	8.70	17.39	26.09
16-20	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0
>20	0	0	0	0	12.5	12.5	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0
Total	50.00	50.00	100	50.00	50.00	100	90.90	9.09	100	33.33	66.67	100	41.67	58.33	100.00	56.52	43.48	100

habits either in smoked form or smokeless. Along with tobacco; betel quid chewing and alcohol consumption is also cause of concern in respect to oral cancer.<sup>[8]</sup>

Most of the study says that the mean age of oral cancer is more than 60 years,<sup>[9]</sup> but recent Indian studies have shown an increase in incidence of oral cancer in younger population with mean age of 51 years.<sup>[10]</sup> Aruna *et al.* in 2011 reported mean age of 55 years based on their studies.<sup>[11]</sup> This change in mean age in recent studies could be due to either early detection of lesions or early exposure of risk habits.<sup>[11]</sup>

Lin *et al.* in 2020<sup>[12]</sup> studied differences of men patients and women patients suffering from oral squamous cell carcinoma (SCC) and found mean age for diagnosis of oral cancer among women was 61.7 years and for men was 56.9 years. As per them, men get diagnosed for oral cancer earlier than women.

Kruse *et al.* also found, the median age of men oral cancer patients were 61.04 and women oral cancer patients were 65.36.<sup>[5]</sup>

In contrast to these studies, we have found the opposite results. As per our study, women get diagnosed for oral cancer earlier than men. The mean age of oral cancer patients in our study was 54.33; the mean age of men patients was 57.5 and the mean age of women patients were 46.33.

Satgunaseelan *et al.* in 2020 suggested that, there were two discrete groups of SCC in women. These were older women with nontongue oral SCC and young women with tongue SCC.<sup>[13]</sup> As per them, increased oral SCC among older women could be due to traditional risk factors of habits, but minority of oral cancer affected younger women had habits or the exposure time was insufficient to cause oral cancer.<sup>[13]</sup>



Data from Head and Neck Cancer Epidemiology Consortium also support that tongue cancer in women below 45 is increasing.<sup>[14]</sup>

Although a study by Lin *et al.* showed that mean age of diagnosis of oral cancer was early for men than women; it was also noticed that percentage of oral cancer diagnosis among women was more in age groups of very high (>71 years) and very low (<40 years) than men. As per them, the percentage of oral cancer diagnosis among men was more in age groups of 51–60.<sup>[12]</sup>

In our study, oral cancer among women was not diagnosed much from aged population. The percentage of oral cancer diagnosis among women was more from age groups of 40–59 years and 50–59 whereas oral cancer was diagnosed more among men from age group of 60–69 years. This could be the reason behind the decreased mean age of diagnosis of oral cancer among women in our study.

Various literature described gender-based differences in oral cancer with men predominance. This gender disparity can be explained by lower prevalence of carcinogenic life style factors such as tobacco use, alcohol consumption in women.

Chen *et al.*<sup>[15]</sup> in their studies found men: women oral cancer patients was 51:1; Lin *et al.*<sup>[12]</sup> in their studies also found men-women ratio for oral cancer was 20:1, but Aruna *et al.*<sup>[11]</sup> found less gender discrepancy (2:1) among oral cancer patients. In our study, the men: women ratio for oral cancer patients was 2.5:1.

Various researchers have opined that, in India, the disproportionately higher prevalence of oral cancer in either sex is related to use of tobacco in various forms.

Aruna *et al.* in their study found that among their study population, 51% was individual risk habituate (men 47% and women 59%); among them 40% were chewers (men 32% and women 57%), 10% were smokers (men 14% and women 3%) and rest were snuff and alcohol user. No women patients had drinking habit.<sup>[11]</sup> They also mentioned that, in their study 359 patients (24%) had combination of risk habits; among them 10% was chewers and smokers (men 14% and women 0.4%), 5% was smokers and alcohol users (8% men and 0.4% women), chewing + alcohol user was 4% (among men 6% and among women 0.2%); 5% was chewers + smokers + alcohol users (7% men and 0.4% women) and rest were negligible.<sup>[11]</sup>

In our study, 65.52% patients had individual habit; among them 39.47% had smoking habits and 60.53% had chewing habits. No patient was found who had drinking habits as individual habits. Among all our patients, 20.69% had a history of using combinations of habits. In our study, only 0.86% women patients had combined habit of smoking and chewing together. Among men oral cancer patients, smoking (61.45%) was the most predominant cancer causing habit and among women oral cancer patients, chewing (66.67%) was the most predominant habit.

We have found increased percentage of individual habituate patients than the study done by Aruna *et al.* The exact similar finding in both the study was that, no women oral cancer patients had drinking habits.

This report contradicts the findings by Kruse *et al.*, who found that among women oral cancer patients 42% were regular smoker and 36% were regular drinkers whereas among men oral cancer patients 63% were regular smoker and 64% were drinker.<sup>[5]</sup>

In contrast to our study, Lin *et al.* found that, among their patients 74.3% was smoker (77.5% men and 21.3% women), 57.0% was betel nut chewer (59.9% men and 9.0% women) and 49.4% was alcohol consumer (52.5% men and 4.9% women).<sup>[12]</sup>

Aruna *et al.* found that among individual habit products, smoking bidi habit was 8% (men 12% and women 0.6%) and smoking cigarette habit was 1.5% (men 2% and women 0%). In their study, among chewing habit products betel quid habit was 15% (4% men and 38% women), as well as betel quid with tobacco was 1% (among men 0.7% and among women 3%). As per them, among multiple risk habits, Gutkha/khaini/panmasala was the most common; followed by betel + tobacco quid.

In our study, we have found that smoking bidi habit was 43.1% (men 59% and women 3%) and smoking cigarette habit was 9.5% (men 13.3% and women 0%). Among chewing habit products, betel quid habit was 5.2% (3.6% men and 9.1% women), betel quid with tobacco habit was 20.7% (men 16.9% and women 30.3%); Khaini habit was 18.1% (22.9% men and 6.1% women), Gutkha was 7.8% (men 6% and women 12.1%); and Gudaku habit was 2.6% (men 1.2% and women 6.1%).

Based on data from both these study, it was clear that men patients had more smoking habits and women patients had more Chewing habits. Among smoking products, Bidi was commonly used than any other smoking products.

As per various studies, bidi is much more associated with cancer than cigarette; as the main stream of smoke of bidi contains nicotine and toxic agents in higher concentration than cigarette.<sup>[16]</sup>

In our study, women used mainly betel quid with tobacco as main chewing products but Aruna *et al.* found betel quid chewing is most among their women patients.

In our study, smoking was highest among patients of both the gender who got diagnosed their oral cancer at age group of 50–59 years, chewing habit was highest among men who got diagnosed their oral cancer at age group of 60–69 years and for and for women who got diagnosed their oral cancer at 40–49. Drinking habits were highest among men who got diagnosed their oral cancer at 50–59 and combination of all kind of habits was highest among men who got diagnosed their oral cancer at 60–69 age groups. Combination of all kinds of habit was also the most prevalent habit of men who got diagnosed oral cancer below age 40. Comparing individual habit product, we have found that bidi smoking was highest among patients of both the gender who got diagnosed their oral cancer at age group of 50–59, followed by age group 60–69. The use of Cigarette and other smoking products was highest among men patients, who got diagnosed their oral cancer at age group of 50–59 years, followed by age group 40–49 years. In our study, no women patients used cigarette and other smoking products or any drinking products. In our study, we have found that pan with betel nut and tobacco chewing was highest among men patients who got diagnosed their oral cancer at age group of 60–69 and highest among women patients who got diagnosed their oral cancer at age group of 50–59. The use of pan with betel nut was also highest among women patients, who got diagnosed their oral cancer at age group of 50–59. Khaini use was highest among men patients who got diagnosed their oral cancer at age group of 40–49 years followed by age group of 60–69 years. Gutkha use was highest among men patients who got diagnosed their oral cancer at age group below 40 and Gudaku use was highest among women patients who got diagnosed their oral cancer at age group of below 40 as well as 40–49.

Hence, we can say that Gutkha use in men and Gudaku use in women was associated with oral cancer in young age.

In contrast to our study Mathur *et al.* in their study found that most of the tobacco consumer oral cancer patients were between age group of 41–50. Although Gutkha use was more prevalent, yet betel quid was most used product among patients below 30 years of age group.<sup>[16]</sup>

Similar to our study, Aruna *et al.* found increased use of alternative chewing products (Except Betel quid and Betel Quid and tobacco) among oral cancer patients below 40 years. As per their study, the use of other smoking and chewing products were more common among oral cancer patients above 40 years. Various Indian studies has shown that the most affected anatomical site for oral cancer is buccal mucosa, followed by tongue and gingivobuccal mucosa.<sup>[11]</sup> This could be attributed to increased prevalence of tobacco and betel quid chewing habit affecting the particular anatomical site where the betel/tobacco quid is habitually kept and act as a contact carcinogen.<sup>[11]</sup>

In our study, for men as well as women, buccal mucosa-vestibule was the most prevalent site for oral cancer, followed by tongue and gingiva-alveolar ridge and jaw.

Luce *et al.* noted that women suffered more from oral cancer than hypopharynx cancer.<sup>[17]</sup> In our work, we only studied about only oral cancer; hence, we had no data to support or not this fact.

Kruse *et al.* found high number of oral maxillary carcinomas (hard palate and maxillary alveolar ridge) in women. They also mentioned that majority of these patients had no habits. In their study, for male patients the majority of oral cancer is on mandibular alveolar ridge.<sup>[5]</sup>

In contrast to these data, our study found that, women had more oral cancer in buccal mucosa-vestibule and gingival-alveolar ridge compared to oral cancer of men in these locations. In our study, cancer of tongue, palate, floor of the mouth, lip and labial vestibule, and other site was more among men than women. In the present study, people who never used any habit product for them most prevalent site for oral cancer was tongue (40%). Among these tongue lesions, women had 26.27% and men had 13.33%. Among smokers (men as well as women), we found tongue was also the most common site for oral cancer (30.77%). Among these tongue lesions, women had 1.92% and men had 28.85%. Men as well as women, who had chewing habits for them buccal mucosa and vestibule was the most common oral cancer site (47.61%). Among these lesions of buccal mucosa and vestibule, women had 20.63% and men had 26.98%. In our study, no women oral cancer patients had drinking habits. Patients who had drinking habits, among them buccal mucosa and vestibule was the most predominant site for oral cancer (33.33%). Oral cancer patients (men and women both), who had combined smoking and chewing habit, among them; buccal mucosa and vestibule was the most common site for oral

cancer (46.15%). Among these lesions of buccal mucosa and vestibule, women had 7.69% and women had 38.46%. Buccal mucosa and vestibule was the most common site for men (42.86%) who had all three habits as well as combined chewing and drinking habits. Along with buccal mucosa and vestibule (25%); gingiva-alveolar ridge and jaw (25%) was the most common site for oral cancer patients who had combined habit of smoking and drinking. In our study, we have found that patients (men and women) who used bidi and cigarette as habit product for them tongue was the most prevalent site for oral Cancer. Men patients who used pan with betel nut, pan with betel nut and tobacco, chewing tobacco and khaini; among them buccal mucosa and buccal vestibule is the most common site for oral cancer. Men patients who used Gudaku as chewing product for them labial vestibule was the most common site for oral cancer. Women patients, who used any chewing product except pan with betel nut; for them buccal mucosa and vestibule was the most common site for oral cancer. Women patients, who used pan with betel nut for them tongue was the most common site for oral cancer.

Smokeless tobacco contains more than 2000 chemical components,<sup>[5]</sup> among which is directly related to cancer. Quids of Gutkha, Khaini are commonly kept in such places from where it is gradually absorbed after dilution with saliva; hence affecting other important site of oral cavity.<sup>[11]</sup>

In support to our data Mathur *et al.* also found tongue as the predominant site for oral cancer for patients who had bidi smoking habits. Patients, who had habit of betel quid chewing, for them buccal mucosa was most common affected site.<sup>[16]</sup>

Aruna *et al.* also found that, patients who used betel quid as well as betel quid with tobacco for them buccal mucosa was the most common site for oral cancer. Those patients commonly used cigarette as smoking products for them tongue was the most prevalent site for oral cancer. In contrast to our study they found that patients who smoked bidi mostly, for them buccal mucosa was the most common site for oral cancer.<sup>[11]</sup>

Various studies has mentioned that the time length of contact with the tar, tobacco and areca nut products in the tobacco smoke and betel quid seems to be the one of most important factors in causation of cancer at particular oral anatomic site. As per them, the highest relative risk had been related to retaining the quid while sleeping.<sup>[16]</sup>

Mathur *et al.* in their study found that oral cancer patients who smoked bidi as habit product; most of

them smoked 6–8 bidi/day and most of them smoked for 10–15 years.<sup>[16]</sup>

In our study also, patients who smoked bidi as habit product; most of them smoked 5–10 bidi/day and most of them smoked for 10–20 years. In our study, patients who smoked Cigarette and other smoking products as habit product; most of them smoked <5 times or 5–10 times/day and most of them smoked for 21–30 years. The duration of bidi smoking was less compared to cigarette smoking at the time of diagnosis of oral cancer. This could be related to the fact that as per studies bidi smokers are found to take almost five puffs per minute whereas cigarette smokers smoked two puffs per minute.<sup>[16]</sup>

The frequency of bidi smoking was more compared to cigarette smoking at the time of diagnosis of oral cancer. This could be related to the fact that as per studies bidi contains small amount of tobacco dusts rolled in dried leaf of tendu; hence, the frequency of bidi smoking is more among smokers.<sup>[16]</sup>

Mathur *et al.* found that, cancer patients who had habit of chewing Gutkha or Betel quid as habit product; most of them chewed them 6–8 times/day and most of them used them for 10–20 years.<sup>[16]</sup>

Similarly, in our study, we have also found that, cancer patients who had habit of chewing Gutkha, Khaini, betel quid, betel quid with tobacco as habit product; most of them chewed them 5–10 times/day and most of them used them for 10–20 years.

Wey *et al.* in 1987 studied oral cancer in women who were nonusers of tobacco and alcohol and opined that increasing incidence of oral cancer cannot be explained by only lifestyle changes.<sup>[18]</sup> In their study, out of 109 patients, 41% was women and among these women 31% was nonusers of tobacco and alcohol. Total 14% of all cancer patients were nonusers.

In our study, we have found, 12.93% of all oral cancer patients had no history of habits and 33.33% of all women oral cancer patients had no history of cancer causing habits which is near similar to the study done by Wey *et al.*<sup>[18]</sup>

Early studies in 1936 linked nontobacco and nonalcoholic etiologies such as sideropenic anemia and Plummer-Vinson syndrome with oral cancer of women. It has also been reported that syphilitic glossitis carry increased risk for oral cancer.<sup>[18,19]</sup>

In our study, we could not find any patients with sideropenic anemia, Plummer-Vinson syndrome or syphilitic glossitis. Here, we have found 6.4% oral cancer patients with any other systemic diseases among which 5.3% patients had diabetes.

Suba in 2007 studied gender related hormonal risk factors for oral cancer and claimed that though fasting blood glucose level was not a demonstrable risk factor for men, but it was proved to be a strong risk factor for women.<sup>[20]</sup>

In the present study, among men oral cancer patients 6.3% had diabetes and among women oral cancer patients 3.4% had diabetes. This result contradicts the claim of the study done by Suba in 2007.

Chronic mechanical trauma with sharp or isolated tooth, carious tooth remnants or ill-fitting denture may cause cancer. These factors with improper oral hygiene form secondary infections at traumatized site which causes inflammatory mucosal hyperplasia, premalignant changes and eventually carcinoma.<sup>[18]</sup>

In this present study, only two women patients (6.3%) had sharp tooth associated with oral cancer site. Tongue was the most predominant site for women oral cancer patients who never used any habit products in our study.

Various studies have shown that, few occupational exposure increase risk for the development of oral cancer. Carton *et al.* in 2014 studied association between occupations and head and neck cancers of women and found increased risk among women street vendors, bakers and welders as well as flame cutters who had worked 10 years or more.<sup>[21]</sup>

In our study, most of the women cancer patients were housewives followed by manual labor (15.2%).

Wey *et al.* mentioned that oral cancer was more common among leather workers and printers though the specific agents was not recognized.<sup>[18]</sup>

In this study, we found that among oral cancer patients manual labor was the most predominant occupation.

Wey *et al.* also highlighted that, the increased oral cancer frequency in immune compromised patients proves the role of protection of immune system against the disease. The hypothetical mechanism said that, production of humoral antibodies on cancer cell antigen receptor site block anticancer cell chemotaxis and lymphocytic cytotoxicity.<sup>[17]</sup>

In the present study, no immunocompromised patients with oral cancer were included.

In 2014, Sathish *et al.* mentioned that, in the United States though the tobacco usage decreased but head and neck oral cancer increased in high rate; especially oropharyngeal SCC which involved tonsil and base of the tongue. They also noticed that, these people were men age below 50 years and had no history of tobacco or alcohol usage. Those cancers were associated with human papillomavirus infections.<sup>[22]</sup>

In our study, 45.5% men oral cancer patients were below 50 years. The men patients who never used any tobacco, arecanut or alcoholic products but suffered from oral cancers; majority of them belongs to age group 40–49. The site of their lesions was either in tongue or in tonsillar or retromolar area. These findings support the study of Sathish *et al.*

In our study, the women oral cancer patients who never used any habit product; majority of them belonged to age group 50–59 followed by 60–69, whereas majority of women oral cancer patients, who had chewing habits belonged to 40–49 year of age groups. In similar to our study, Wey *et al.* found that, the mean age of their nontobacco and nonalcoholic women patients was 72 years; which was 11 year older than tobacco and alcohol users.<sup>[18]</sup>

Luce *et al.* in 1988 also found that nondrinking and nonsmoking women patients were older than the women who smoke and drink.<sup>[17]</sup>

Bross and Coombs also found that, both alcohol and tobacco exposure can lead to 15 or more years earlier onset of oral cancer than would occur in women who do not either smoke or drink.<sup>[23]</sup>

Various studies have shown that oral cancer is related to a low educational qualifications because low education is directly related to reduced access to information about the disease in general, including the diagnosis and treatment.

Dantas *et al.* in their study observed that illiterate and grade school education was more among women oral cancer patients compared to men oral cancer patients.<sup>[24]</sup> In our study, we have also found that uneducated patients and patients with only primary education were more among women.

There are several limitations to our study. First, the data of our study were collected from only a single medical center of West Bengal, India, and the people in a single

state may have some particular cultural and geographical features.

Moreover, a considerable amount of data on lifestyle factors, histological and imaging diagnosis of disease, treatment and follow-up data were not available. Finally, the relatively small sample size of women oral cancer patients limited the capacity for further statistical analysis.

## CONCLUSION

Despite the methodological limitations, this retrospective study is first to report differences on risk habits, anatomical sites and other sociodemographic factors among men and women oral cancer patients of West Bengal, India.

In conclusion, we have found that women get diagnosis of oral cancer earlier than men in our study. Majority of men oral cancer patients had smoking habits and majority of women oral cancer patients had chewing habits. Gutkha use in male and Gudaku use in females were associated with oral cancer in early age. Tongue was the most common site for women oral cancer patients and palate, retromolar area and tonsillar area was the most common site for male oral cancer patients who never used any habit products.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. International Agency for Research on Cancer. Latest Global Cancer Data: Cancer Burden Rises to 18.1 Million New Cases and 9.6 Million Cancer Deaths in 2018, Press Release. World Health Organization; September 12, 2018.
2. India Fact Sheets, Globocan-2018, International Agency for Research on Cancer, World Health Organization. Available from: <https://gco.iarc.fr/today/data/factsheets/populations/356-india-fact-sheets.pdf>. [Last accessed on 2020 Oct 22].
3. Gupta N, Gupta R, Acharya AK, Patthi B, Goud V, Reddy S, *et al.* Changing trends in oral cancer – A global scenario. *Nepal J Epidemiol* 2016;6:613-9.
4. Thompson AB, Tebes JK, McKee SA. Gender differences in age of smoking initiation and its association with health. *Addict Res Theory* 2015;23:413-20.
5. Kruse AL, Bredell M, Grätz KW. Oral cancer in men and women: Are there differences? *Oral Maxillofac Surg* 2011;15:51-5.
6. Muscat JE, Richie JP Jr, Thompson S, Wynder EL. Gender differences in smoking and risk for oral cancer. *Cancer Res* 1996;56:5192-7.
7. Vatanasapt P, Suwanrungruang K, Kamsa-Ard S, Promthet S, Parkin MD. Epidemiology of oral and pharyngeal cancers in Khon Kaen, Thailand: A high incidence in females. *Asian Pac J Cancer Prev* 2011;12:2505-8.
8. Kumar M, Nanavati R, Modi TG, Dobariya C. Oral cancer: Etiology and risk factors: A review. *J Cancer Res Ther* 2016;12:458-63.
9. Arbes SJ Jr., Olshan AF, Caplan DJ, Schoenbach VJ, Slade GD, Symons MJ. Factors contributing to the poorer survival of black Americans diagnosed with oral cancer (United States). *Cancer Causes Control* 1999;10:513-23.
10. Subapriya R, Thangavelu A, Mathavan B, Ramachandran CR, Nagini S. Assessment of risk factors for oral squamous cell carcinoma in Chidambaram, Southern India: A case-control study. *Eur J Cancer Prev* 2007;16:251-6.
11. Aruna DS, Prasad KV, Shavi GR, Ariga J, Rajesh G, Krishna M. Retrospective study on risk habits among oral cancer patients in Karnataka cancer therapy and research institute, Hubli, India. *Asian Pac J Cancer Prev* 2011;12:1561-6.
12. Lin NC, Hsu JT, Tsai KY. Difference between female and male patients with oral squamous cell carcinoma: A single-center retrospective study in Taiwan. *Int J Environ Res Public Health* 2020;17:3978.
13. Satgunaseelan L, Allanson BM, Asher R, Reddy R, Low HT, Veness M, *et al.* The incidence of squamous cell carcinoma of the oral tongue is rising in young non-smoking women: An international multi-institutional analysis. *Oral Oncol* 2020;110:01-05.
14. Toporcov TN, Znaor A, Zhang ZF, Yu GP, Winn DM, Wei Q, *et al.* Risk factors for head and neck cancer in Young adults: A pooled analysis in the INHANCE consortium. *Int J Epidemiol* 2015;44:1-7.
15. Chen YK, Huang HC, Lin LM, Lin CC. Primary oral squamous cell carcinoma: An analysis of 703 cases in southern Taiwan. *Oral Oncol* 1999;35:173-9.
16. Mathur A, Jain M, Shiva M, Navlakha M, Prabu, Kulkarni S. Tobacco habits and risk of oral cancer: A retrospective study in India. *Iran J Blood Cancer* 2009;1:111-6.
17. Luce D, Guenel P, Leclerc A, Brugere J, Point D, Rodriguez J. Alcohol and tobacco consumption in cancer of the mouth, pharynx, and larynx: A study of 316 female patients. *Laryngoscope* 1988;98:313-6.
18. Wey PD, Lotz MJ, Triedman LJ. Oral cancer in women nonusers of tobacco and alcohol. *Cancer* 1987;60:1644-50.
19. Ahlbom HE. Simple achlorhydric anaemia, plummer-vinson syndrome, and carcinoma of the mouth, pharynx, and oesophagus in women: Observations at radiumhemmet, Stockholm. *Br Med J* 1936;2:331-3.
20. Suba Z. Gender-related hormonal risk factors for oral cancer. *Pathol Oncol Res* 2007;13:195-202.
21. Carton M, Guida F, Paget-Bailly S, Cyr D, Radoi L, Sanchez M, *et al.* Occupation and head and neck cancer in women-Results of the ICARE study. *Am J Ind Med* 2014;57:1386-97.
22. Sathish N, Wang X, Yuan Y. Human Papillomavirus (HPV)-associated Oral Cancers and Treatment Strategies. *J Dent Res* 2014;93 Suppl 7:29S-36.
23. Bross ID, Coombs J. Early onset of oral cancer among women who drink and smoke. *Oncology* 1976;33:136-9.
24. Dantas TS, de Barros Silva PG, Sousa EF, da Cunha MD, de Aguiar AS, Costa FW, *et al.* Influence of educational level, stage, and histological type on survival of oral cancer in a Brazilian population: A retrospective study of 10 years observation. *Medicine (Baltimore)* 2016;95:e2314.