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The impact of COVID-19 in the diagnosis of oral cancer-A hospital based survey.

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Abstract:
Background*: The emergence of the disease caused by the novel coronavirus 2019 (COVID-19) has resulted in an unprecedented global public health crisis. To minimize community spread of the disease, countries adopted many preventive strategies like social distancing, lockdowns, and quarantine of suspected cases. Health care centres have shifted their facilities to meet the massive influx of patients with Covid, interrupting all community-based health promotion and disease prevention services. The percentage of patients with advanced oral cancer is alarming in India. Early diagnosis of oral cancer is so critical that if it is delayed, there is high chance of metastasis to regional lymph nodes causing the probability of survival to be decreased by 50 percent. Hence, this study was undertaken to assess the impact of COVID-19 in the diagnosis of oral cancer.*
Materials and Methods*: This record based observational study was performed to assess biopsy data of patients diagnosed with oral cancer reported to the Department of Oral and Maxillofacial Surgery, Government Dental College, Kozhikode during June 2019 to March 2020 and April 2020 to January 2021.*
Results*: A total of 147 (68.6%) oral cancer cases were reported in the pre-Covid period and 67(31.3%) cases during the post -Covid period. There was a reduction of 37.3% in the number of oral cancer cases during post-covid period when compared with the respective counterpart. Statistically significant difference was observed for the parameters age, month of reporting and histopathology. (P value <0.05)*
Conclusion: *The findings of present study ascertained that COVID 19 outbreak had severely hampered the early diagnosis and detection of oral cancer.*
Key words: COVID 19, diagnosis, impact, Oral cancer

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I. Introduction

Cancer of the head and neck is the sixth most common malignancy worldwide. The oral cavity is the most common site for squamous cell cancer of the upper aero digestive tract. The most common aetiological factors are tobacco, alcohol consumption and presence of pre-malignant lesions.[1]Unfortunately, with all the advancement in the understanding of the disease process and recognition of the associated risk factors, the 5-year survival rate is still 50%. Late diagnosis results in more expensive, aggressive and disfiguring treatments, lower survival rates, lower function and lower quality of life among survivors.[2] Social isolation measures during COVID-19 pandemic has caused drastic disruptions in cancer screening services .Health care centres have shifted their services to accommodate the large influx of Covid patients interrupting cancer screening to treatment and care.[3]The proportion of patients presenting with oral cancer at an advanced stage is troubling. Early diagnosis of oral cancer is so important that the chance of survival is reduced to 50% if it is delayed and progresses to involve the regional lymphatics.[4]To the best of our knowledge, this is first study conducted in India to evaluate the impact of COVID-19 in the diagnosis of oral cancer.

II. Materials and Methods

This record based observational study was performed to assess biopsy data of patients diagnosed with oral cancer reported to the Department of Oral and Maxillofacial Surgery, Government Dental College, Kozhikode.

Study design: Record based observational study.

Study setting: Tertiary health care centre- Department of Oral and Maxillofacial Surgery, Government Dental College, Kozhikode.

Subjects and Selection method: Biopsy data of patients diagnosed with oral cancer ten months prior to Covid and same period after Covid outbreak.

Inclusion criteria

All patients who had done biopsy and histopathological examination primarily from our institution from June 2019 to March 2020 and from April 2020 to January 2021.

Exclusion criteria

Follow up cases after any mode of previous treatments are excluded from the study.

Sample Size Estimation $n = \frac{(Z_\alpha + Z_\beta)^2 pq \times 2}{d^2}$

Z_α =1.94, Z_β =0.84, p=40, q= (100-p), d=16%

With 95 % confidence and 80% power sample size was estimated to be 147.[5]

Study procedure

Permission to access register data was obtained from head of the Oral and Maxillofacial Surgery Department, Government Dental College, Kozhikode. Ethical clearance was obtained from the Institutional Ethics Committee bearing a registration number 199/2020/DCC. Biopsy data was collected from the register maintained in the department of oral and maxillofacial surgery before and after Covid outbreak. Patients who had done biopsy and histopathological examination primarily from our institution were included in the study. Histopathology reports were evaluated for diagnosis of the oral cancer. Data variables analysed in this study were, age of the patient, sex of the patient, month of reporting, site of biopsy and histopathology report.

Statistical analysis

Data analysis was carried out using IBM SPSS (Statistical Package for Social Sciences) Version 21.0, Chicago, IL. Descriptive measures and chi-square test was conducted separately for each variable.

III. Results

A total of 147 (68.6%) oral cancer cases were reported in the pre-Covid period and 67(31.3%) cases during the post -Covid period. There was a reduction of 37.3% in the number of oral cancer cases during post-Covid period when compared with the respective counterpart .Analysis of gender revealed a slight male predominance in both groups and was found to be statistically insignificant (p value =0.76) as shown in Table 1.

Table 1: Distribution of patients among study groups in relation to gender

Gender	Frequency	Pre -Covid	Post-Covid
Male	Count	91	40
	% within group	61.9%	59.7%
Female	Count	56	27
	% within group	38.1%	40.3%
Total	Count	147	67
	Total %	100%	100%

P value =0.764

Analysis in relation to age reported a statistically significant difference (p value =0.03) with large number of participants(37 cases in pre-Covid and 24 cases in post-Covid) belonging to the age group of 60-69 years in both groups as shown in Table 2.

Table 2: Distribution of patients among study groups in relation to age

Age Group	Frequency	Pre -Covid	Post-Covid
20-29 years	Count	1	0
	% within group	.7%	0%
30-39 years	Count	11	1
	% within group	7.5%	1.5%
40-49 years	Count	23	4

	% within group	15.6%	6.0%
50-59 years	Count	36	17
	% within group	24.5%	25.4%
60-69 years	Count	37	24
	% within group	25.2%	35.8%
70-79 years	Count	21	17
	% within group	14.3%	25.4%
80-89 years	Count	12	4
	% within group	8.2%	6.0%
90-99 years	Count	6	0
	% within group	4.1%	0%

P value =0.038 *

Analysis of patients in relation to month of reporting for biopsy revealed that in the pre-Covid period the highest number of cases were reported in the month of July 2019 (14.3%) and the lowest number of cases in March 2020(6.1%).The highest number of cases reported in the post-Covid period was in the month of January 2021(20.8%) and the lowest was in the month of April and July 2020 (3%).The difference were found to be statistically significant with a p value of .000 which is depicted in Table 3,Figure 1 and 2.

Table 3: Distribution of patients among study groups in relation to month of reporting

Month	Frequency	Pre –Covid (June2019-March 2020)	Post -Covid(April 2020-January 2021)
June	Count	10	5
	% within group	6.8%	7.5%
July	Count	21	2
	% within group	14.3%	3.0%
August	Count	15	4
	% within group	10.2%	6.0%
September	Count	14	5
	% within group	9.5%	7.5%
October	Count	14	5
	% within group	9.5%	7.5%
November	Count	18	13
	% within group	12.2%	19.4%
December	Count	12	12
	% within group	8.2%	17.9%
January	Count	18	14
	% within group	12.2%	20.8%
February	Count	16	NA
	% within group	10.9%	NA
March	Count	9	NA
	% within group	6.1%	NA
April	Count	NA	2
	% within group	NA	3.0%
May	Count	NA	5
	% within group	NA	7.5%

P value =0.000 * NA- Not Applicable

Figure 1: Distribution of patients in pre-Covid time period

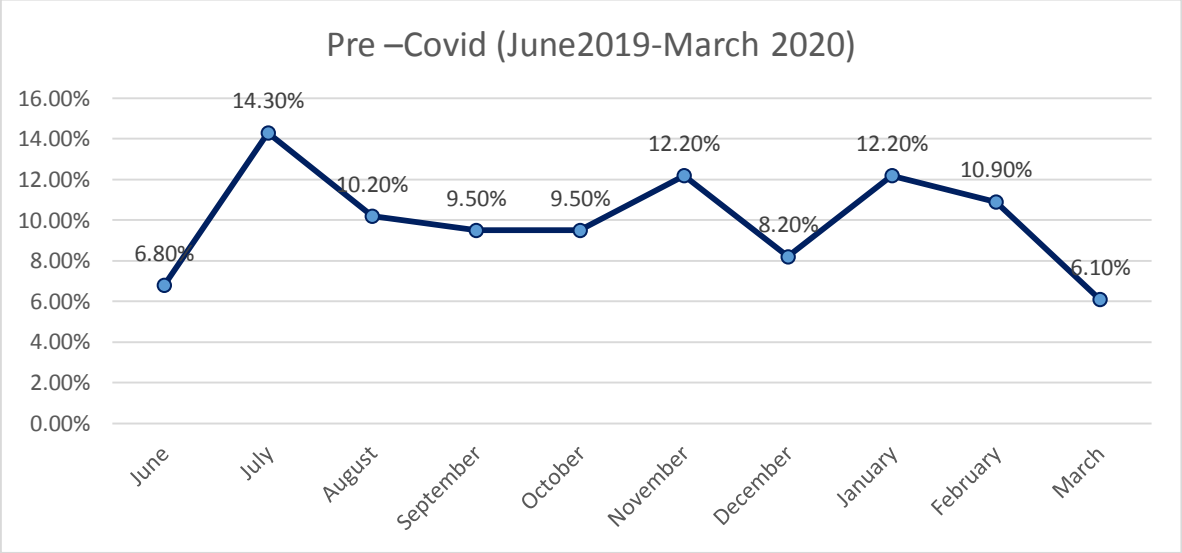
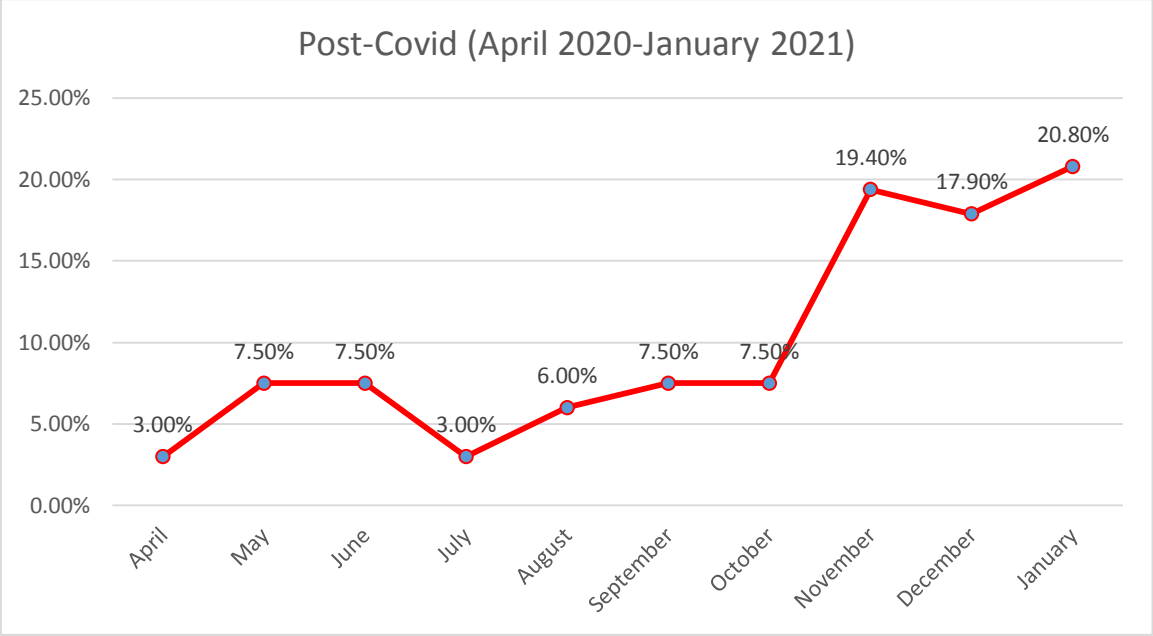


Figure 2: Distribution of patients in post-Covid time period



Statistically significant difference was not observed for the analysis in relation to site of biopsy. The most common reported site for biopsy was buccal mucosa, both in pre-Covid group (46.3%) and in post -Covid group (49.3%) as shown in Table 4.

Table 4: Distribution of patients among study groups in relation to site of biopsy

Site of biopsy	Frequency	Pre -Covid	Post-Covid
Tongue	Count	39	22
	% within group	26.5%	32.8%
Buccal Mucosa	Count	68	33
	% within group	46.3%	49.3%
Gingivobuccal Sulcus	Count	3	1
	% within group	2.0%	1.5%
Alveolus	Count	16	7
	% within group	10.9%	10.4%
Floor of mouth	Count	6	0
	% within group	4.1%	0%
Lip	Count	5	1
	% within group	3.4%	1.5%
Retromolar trigone	Count	4	1

	% within group	2.7%	1.5%
Palate	Count	3	2
	% within group	2.0%	3.0%
Salivary gland	Count	3	0
	% within group	2.0%	0%

P value =0.649

Statistically significant difference was observed for the analysis in relation to histopathological report in which moderately differentiated squamous cell carcinoma was predominately observed in both groups followed by poorly and well differentiated squamous cell carcinomas as shown in Table 5.

Table 5: Distribution of patients among study groups in relation to histopathology report

Histopathology Report	Frequency	Pre -Covid	Post -Covid
Moderately Differentiated Squamous Cell Carcinoma	Count	101	32
	% within group	68.7%	47.8%
Poorly Differentiated Squamous Cell Carcinoma	Count	20	14
	% within group	13.6%	20.9%
Well Differentiated Squamous Cell Carcinoma	Count	15	14
	% within group	10.2%	20.9%
Squamous Cell Carcinoma Microinvasion	Count	5	2
	% within group	3.4%	3.0%
Carcinoma insitu	Count	1	0
	% within group	.7%	0%
Carcinoma Cuniculatum	Count	1	1
	% within group	.7%	1.5%
Papillary cystadenocarcinoma	Count	1	0
	% within group	.7%	0%
Adenoid cystic carcinoma	Count	1	2
	% within group	.7%	3.0%
Mucoepidermoid carcinoma	Count	2	0
	% within group	1.4%	0%
Osteosarcoma	Count	0	1
	% within group	0%	1.5%
Malignant Melanoma	Count	0	1
	% within group	0%	1.5%

P value =0.02*

IV. Discussion

Globally, oral cancer is the sixth most common type of cancer with India contributing to almost one-third of the total burden and the second country having the highest number of oral cancer cases.[6]Despite great progress in chemotherapy, radiotherapy, and targeted therapy, the prognosis of oral cancer is poor due to aggressive local invasion and metastasis leading to recurrence. Thus oral cancer is still a challenging disease to treat in the field of head and neck cancer.[7]Early diagnosis is the only way to decrease the morbidity and mortality of oral cavity tumours. Healthcare providers should perform oral cancer examinations as part of their patient care regime, and should be knowledgeable about the early signs of oral carcinoma.[8]COVID-19 has significantly hampered the cancer screening infrastructure. The main reason to reduce services was a precautionary measure to minimize patient visits and maintain social distancing.[9, 10]Generally, dentists play a pivotal role in the early detection of oral cancer through opportunistic screening when a patient presents in a dental practice for routine care and by rapid referral of suspicious lesions. In the time of COVID-19, the whole world were in lockdown, and all dental clinics were closed. Therefore, opportunities for screening the oral cavity had significantly disrupted, and consequently diagnosis of malignant and/or potentially malignant lesions got delayed leading to a missed diagnosis of oral cancer or diagnosis at a late stage.[11] Considering the present scenario, this study was undertaken to assess the impact of COVID-19 in the diagnosis of oral cancer.

The present study was a record based observational study done in Department of Oral and Maxillofacial Surgery, Government Dental College, Kozhikode from June 2019 to March 2020 and from April 2020 to January 2021. Findings of our study suggested that people belonging to the old age group(60-69 years) had the highest prevalence of oral cancer during pre-Covid and post-Covid period which was in accordance to the study conducted by Sharma et al.[12] where oral cancer rates increased with increase in age. The increase becomes more rapid after age 50 and peaks between ages 60 and 70.[12] Ageing is accompanied by increased susceptibility to cancer, due to accumulated exposures to environmental and behavioural risk factors.[13] Age is considered as an important prognostic factor in cancers .Improved overall survival for oral cancer is seen in younger patients. So it is very important to detect the presence of oral cancer at an early stage. Elderly people were totally separated from the general public due to reverse quarantine, who were at high risk of contracting

disease during the outbreak of COVID 19 in turn increased the risk of accumulating undiagnosed oral cancers among the elderly population.[14]

In our study, we observed an increased prevalence of oral cancer in males which was in accordance with the study conducted by Dhanuthai et al.[15] where 68.90% of oral cancer were diagnosed in males .This could be due to increased exposure of men to tobacco and alcohol, as both factors have long been implicated as a risk factor for oral cancer. When the month of reporting of oral cancer was assessed, it was clearly observed that the number of cases reported to the department showed a gradual decline from the month of January 2020 to March 2020.The least number of cases were reported in March 2020.The first phase of lockdown was implemented on March 25 ,since then we could clearly see a steep decline in reporting of oral cancer cases till the month of October 2020.From November 2020 onwards, there was tremendous increase in the reporting of oral cancer with its peak reported in January 2021.When Government lifted restrictions in the unlock phase, there was sudden increase in reporting of oral cancer cases. A similar finding was stated by Dinmohamed et al.[5] where there was drastic reduction in the diagnosis of oral cancer after identifying the first confirmed case of COVID 19 in Netherlands. In our study the most common site of occurrence of oral cancer was buccal mucosa and the most of them were moderately differentiated squamous cell carcinomas which was in accordance with the study conducted by Borse et al.[6] who had reported that the occurrence of the tongue and buccal mucosa cancer has been increased in India with a higher prevalence for buccal mucosa cancer cases.[6]

As our nation slowly opens up again, cancer screening and diagnosis need to be considered as an important part in standard health care. Oncology departments should join forces with primary care physicians and health care system to enhance opportunities for cancer screening to reverse this concerning trend. In light of the fact that, this outbreak might continue indefinitely, oral health professionals should come up with some alternative approaches to increase public awareness on early detection and symptoms of oral cancer. Telemedicine for educating, interviewing and examining the patients is one of these approaches. Moreover, proper awareness programs about telemedicine should be conducted among the general population, to train and make them conscious about its fullest potentialities.

V. Conclusion

Cancer screening and diagnosis services were severely hampered due to social isolation measures during COVID-19 pandemic leading to delay in providing effective treatment to the cancer patients. Additional research to assess this impact at the patient level is required.

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