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Oral Manifestation of COVID – 19 Patients: Online Survey.

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Introduction:

The Novel coronavirus Disease (2019) is a fatal disease which Transmitted by Human – to- human & Cause by one of Coronaviruses. Coronavirus Cause life –threatening disorders such as severe Acute Respiratory Syndrome (SARS) & The World Health Organization (WHO) declared COVID -19 as a Pandemic Disease ,with most countries reporting Large number of infected people and deaths as December 2019.[1] The typical manifestation of COVID-19 were Fever, Cough, Myalgia, Headache, Cold, dry cough, weakness , with abnormal chest CT scan while less prevalent Symptoms were Sputum Formation, Diarrhea & hemoptysis, oral manifestation include Alteration loss of taste sensation, burning mouth ,bleeding gums , loss of smell sensation, oral ulcer, vesiculobullous macular lesion etc.[2] It was also noted that patients with comorbities had severe symptoms compare to the rest.

The reported manifestations include taste impairment, oral mucosal changes (petechiae, ulcers, plaque-like lesions, reactivation of herpes simplex virus 1(HSV1), geographical tongue and desquamative gingivitis) and dry mouth. The prominent location for mucosal lesions are tongue, palate and labial mucosa. The exact pathogenesis of these oral symptoms is not known. Angiotensin-converting enzyme 2 (ACE2) cell receptors are expressed in abundance on oral mucosa allowing severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) to infect them..[3] Coronavirus attacks human cells by angiotensin Converting enzyme 2 (ACE) receptors. Current indicated that receptors current evidence indicated that ACE 2 acts as the primary host cell receptors for severe acute receptors for severe acute respiratory syndrome coronavirus 2 (SARS) .The Corona Virus will bind to ACE 2 by the spike like protein on its surface &ACE2 will serve as cellular portal for viral entry into the

cell to cause COVID -19 infection .hence lungs will become target cells during SARS COV -2 Infection because it is organ with high ACE-2 expression that cause inflammatory reactions and it detects on cell membrane of organs and tissues like Kidneys, liver , epithelial cells of tongue and Salivary glands , upper respiratory tract , nervous system and skeletal muscle.[4] According to this one may explain the occurance of both oral ulcerations and loss or altered taste sensation because of destruction of oral fibroblasts and keretinocytes. Otherwise , high viral load in saliva and nasal secretion can be a pathogenic factor due to which oral manifestations of COVID-19 are developed which indicates the direct effect of COVID-19 virus on oral tissues. Saliva can have a central role in human to human transmission this can be more dangerous to dentists and healthcare professionals.

As the oral cavity is the mirror of general health, many times it becomes the site for the appearance of inaugural symptoms. Prevailing knowledge and acquaintance of these oral symptoms can help primary and general care physicians to diagnose asymptomatic, symptomatic, and post-COVID-19 patients with deteriorating immune status. Early diagnosis in these cases can alarm healthcare providers to strictly adhere to preventive protocols and make them explore patients' existing health conditions, which will avoid further worsening of their systemic diseases, the incidence of opportunistic infections such as mucormycosis, and many other post-COVID complications.[5] some oral manifestations have been observed in patients with coronavirus disease 2019 (COVID-19). However, there is still a question about whether these lesions are due to coronavirus infection or secondary manifestations resulting from the patient's systemic condition.[6] Thus, this article aims to report an additional case of an oral condition in a patient diagnosed with COVID-19.Moreover there are very few studies present which were tried to find oral manifestation of corana patients with comorbidities. Thus, this study would add in to present literature.

Aim and Objectives

AIM:

This Survey Aims to Study Oral manifestation of COVID -19 Patients.

Objective:

To assess relationship between demographic factor and co-morbidities with oral manifestation of covid-19 Patients.

Materials and Method

A cross sectional online survey was carried out to Study Oral manifestation of COVID -19 Patients. As It is not feasible to examine/interview the patients clinically due to corona guidelines and to avoid selection biases due to convenience sampling , it was decided to conduct online survey.

PLACE OF STUDY

A cross sectional Online Survey (Gujarat, India)

SOURCE OF DATA

Convenient Sampling

1. INCLUSION CRITERIA

Participant who were willing to participate and to provide consent were included in study. (Only participants who were diagnosed COVID-19 positive, confirmed with Reverse Transcriptase-Polymerized Chain Reaction(RT-PCR) and were isolated in various hospitals in Gujarat, India.)

1) Recovered corona patients who were admitted to hospital within last 3 months

2) Age Group: above 18 years

3) Male & Female both are included

EXCLUSION CRITERIA :

1.The people who have taken treatment at home.

2.Self- diagnosed and Self -treated patients.

Online questionnaire in English and Gujarati language was used for the study. After reviewing about the pathogenesis of COVID-19 and its related manifestations, we developed an online survey using GOOGLE form to target adults (over 18 years old) who live in Gujarat-India, via GOOGLE form. Medical terminology were avoided to increase comprehension of participants. A pilot study was conducted for reporting results of internet E-survey and to validate questionnaire. The internal consistency "Cronbach's alpha value" for the questionnaire obtained was 0.86 which showed good internal consistency. Validity of questionnaire was assessed. Face validity was checked by asking experts to scrutinize the questions, while content validity was checked by ensuring that the questions covered all the areas of knowledge mapped out by initial objectives. The translated questionnaire was also pilot tested. Contain of the questionnaire:

Part:1

Demographic details and Consent form
Part:2 Height and Weight (forBMI)
Dietary habit
Adverse habit
Pregnancy
Co-morbidity
Part:3
Open and close ended questions regarding the study

oral manifestation include:

1. Alteration/ loss of taste sensation (dysgeusia/ageusia)
2. burning mouth
3. bleeding gums
4. pain in jaw/ salivary gland
5. oral ulcer
6. vesiculobullous/ macular lesion etc.
7. any other unusual symptoms experienced during the disease course.

The questionnaire was directly mailed/messaged using digital media. Details of the investigator was provided for correspond. An examiner himself was trained and calibrated to record the study proforma.

Statistical analysis:

The Statistical software namely SPSS 20.0 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc. Descriptive and inferential analysis were done for the data. The results were statistically analyzed using chi-square test.

Results

A total of 100 covid-19 treated patients were included in study. The study was comprised of 59 male and 41 female. Around 56 participants were above 30. There were around 18 participants of diabetes, 22 had hypertension and 12 participants had both of the comorbidities. Around 43 participants were in higher BMI (>25 obese) category.(Table 1) Most common oral finding of the participants were alteration of taste 62%, and xerostomia 58%.(Table 2) chi square test was applied to know the statistical significance between age group and gender (Table 3,4). It was noted that at least one of the oral manifestation were present in 71% of the participants. But they were statistically insignificant.(Table 3,4) The comorbidities and some of oral manifestation were found to be significant. (table 5,6)The descriptive and inferential results are:

TABLE 1: DESCRIPTIVE DETAILS OF PARTICIPANTS

Demographic details	VARIABLES	NO
Age	>30	56
	<30	44
Gender	MALE	59
	FEMALE	41
Smoking	YES	24
	NO	76
Tobacco/ Mawa	YES	38
	NO	62
Alcoholism	YES	12
	NO	88
Diabetes	YES	18
	NO	82
Hypertension	YES	22
	NO	78
Diabetes + Hypertension	YES	12
	NO	88
Systemic disease	YES	03
	NO	97
BMI	<18	21
	18-25	36
	>25	43

TABLE 2: DESCRIPTIVE STATUS OF VARIABLES (ORAL MANIFESTATION)

VARIABLES	YES	NO
DRY MOUTH	58	42
LOSS OF TASTE	35	65
ALTERED TASTE	62	38
BURNING SENSATION	31	69
DIFFICULTY IN SWALLOWING	23	77
ORAL ULCER	12	88
PAIN IN CHEEK/SALIVARY GLAND	09	91
TONGUE REDNESS	27	73
GINGIVAL BLEEDING	17	83
HALITOSIS	11	89
ANY MEDICATION FOR ORAL SYMPTOMS	8	92

TABLE 3: AGE WISE COMPARISION OF VARIABLES

VARIABLES (ORAL MANIFESTATIONS)		AGE >30 (56)	AGE <30 (44)	P value
DRY MOUTH	Yes	33	25	0.112
	No	23	29	
LOSS OF TASTE	Yes	21	14	0.152
	No	35	30	
ALTERED TASTE	Yes	39	33	0.123
	No	17	11	
BURNING SENSATION	Yes	17	14	0.209
	No	39	40	
DIFFICULTY IN SWALLOWING	Yes	13	10	0.116
	No	43	34	
ORAL ULCER	Yes	08	04	0.213
	No	48	40	
PAIN IN CHEEK/ SALIVARY GLAND	Yes	06	03	0.562
	No	50	41	
TONGUE REDNESS	Yes	16	13	0.522
	No	40	31	
GINGIVAL BLEEDING	Yes	11	06	0.306
	No	45	38	
HALITOSIS	Yes	08	03	0.425
	No	48	41	

TABLE 4: GENDERWISE COMPARISION OF VARIABLES

VARIABLES (ORAL MANIFESTATIONS)		MALE 59	FEMALE 41	P value
DRY MOUTH	Yes	38	20	0.119
	No	21	21	
LOSS OF TASTE	Yes	23	12	0.316
	No	36	29	
ALTERED TASTE	Yes	42	27	0.570
	No	17	14	
BURNING SENSATION	Yes	17	14	0.265
	No	32	27	
DIFFICULTY IN SWALLOWING	Yes	15	08	0.325
	No	44	33	
ORAL ULCER	Yes	05	07	0.645
	No	54	34	
PAIN IN CHEEK/ SALIVARY GLAND	Yes	06	03	0.526
	No	53	38	
TONGUE REDNESS	Yes	15	14	0.265
	No	44	27	
GINGIVAL BLEEDING	Yes	13	04	0.254
	No	46	37	
HALITOSIS	Yes	06	05	0.235
	No	53	36	

TABLE 5: RELATION SHIP BETWEEN COMORBIDITIES AND SYMPTOMS

VARIABLES	DAIBETES (18)	P VALUE	HYPERTENSION (22)	P VALUE	BOTH (12)	P VALUE
DRY MOUTH Y N	15 43 03 39	0.016*	13 55 09 23	0.310	07 57 04 31	0.940
LOSS OF TASTE	12 23 06 59	0.001*	12 23 10 55	0.029*	10 23 02 65	0.000*
ALTERED TASTE	16 46 02 36	0.009*	15 47 07 32	0.459	12 50 00 38	0.003*
BURNING SENSATION	12 19 06 63	0.000*	06 25 16 50	0.591	06 13 06 75	0.003*
DIFFICULTY IN SWALLOWING	04 18 14 64	0.979	08 10 14 68	0.011*	04 18 08 70	0.312
ORAL ULCER	00 12 18 70	0.0836	04 08 18 70	0.312	03 09 09 79	0.102
PAIN IN CHEEK/SALIVARY GLAND	00 09 18 73	0.140	03 06 19 72	0.389	01 08 11 80	0.931
TONGUE REDNESS	02 29 16 53	0.516	01 30 21 49	0.002*	05 26 07 62	0.394
GINGIVAL BLEEDING	05 17 13 65	0.434	07 15 15 63	0.208	06 16 06 72	0.012*
HALITOSIS	00 11 18 71	0.995	02 09 20 69	0.745	00 11 12 77	0.194

TABLE 6: RELATIONSHIP BETWEEN COMORBIDITIES AND SYMPTOMS

VARIABLES (ORAL MANIFESTATIONS)		BMI<18 (21)	BMI 18-25 (36)	BMI>25 (43)	P VALUE
DRY MOUTH	Yes No	06 15	16 20	32 11	0.000*
LOSS OF TASTE	Yes No	04 17	09 27	22 21	0.011*
ALTERED TASTE	Yes No	08 13	22 14	35 08	0.002*
BURNING SENSATION	Yes No	03 18	11 25	17 26	0.121
DIFFICULTY IN SWALLOWING	Yes No	02 19	05 29	14 29	0.538
ORAL ULCER	Yes No	04 17	03 33	05 39	0.478
PAIN IN CHEEK/ SALIVARY GLAND	Yes No	04 17	02 34	03 40	0.189
TONGUE REDNESS	Yes No	07 14	10 26	10 33	0.689
GINGIVAL BLEEDING	Yes No	08 12	04 32	05 38	0.101
HALITOSIS	Yes No	03 18	04 32	03 40	0.632

Discussion

Evidence suggests that the oral cavity is affected by this virus either directly or indirectly, but it is still a doubt whether these symptoms are due to direct effects from the virus, impaired immune system, systemic deterioration in this multiorgan disease, or as a response to intense multidrug treatment. Due to the vicious nature of the disease and its varied symptomatology. The present study was aimed to investigate the prevalence of oral manifestations among COVID-19 patients and to find relationship between oral manifestations and comorbidities.

In the present study it was noted that at least one symptom was present in 71% of the population irrespective of their age and gender. Most of the patients were finding it difficult taste (around 62%). Only 35% of the participants were found to lost their taste sensation. (table 2). This finding were in accordance with the previous study done on Egyptian population. They found out that around 67.2% of the patients had atleast one of the manifestations related to oral cavity.[1]

In the present study, there was no specific gender wise distribution of any lesions. The symptoms were more severe and high in participant above 30 years. Though these results were stastically insignificant.(table 3 and 4) . A previous study done by Behzad I, also suggest same result that Oral lesions were nearly equal in both genders (49% female and 51% male). Patients with older age and higher severity of COVID-19 disease had more widespread and sever oral lesions. Lack of oral hygiene, opportunistic infections, stress, immunosuppression, vasculitis, and hyper-inflammatory response secondary to COVID-19 are the most important predisposing factors for onset of oral lesions in COVID-19 patients.[7]

Drymouth/ xerostomia was found to be 2nd most frequent symptoms in the present study. It was found to be 58% of the participants followed by burning mouth 31%. These both finding were found to be statistically insignificant between age and gender.(table 3 and 4) A review study suggested that overall prevalence of taste disorders weight 38% and xerostomia up to 43% regarding oral mucous lesion. The most common clinical pattern was apthous ulcer like oral mucosal lesion and burning mouth syndrome.[4] These finding has showed same pattern of severity and occurrence in the present study. (table 2)

In this study most of the patient had 1 major symptoms(71%) with 1 or 2 minor oral manifestation. A retrospective study done by Fantozzy PJ also shows that the majority of patients reported one symptom only (45.9%)reported the association of two symptoms, and 23 (20.7%) patients reported the association of three symptoms at the same time.[8]

The apthous ulcer,halitosis, red tongue, gingival bleeding were found to be very few in the present study. The reason may be prescribed medication (8%), self hygiene motivaton or lack of knowledge or unability to diagnose these symptoms. To date, very few studies have been published that directly address the question of the prevalence of oral manifestations in patients with COVID-19 using adequate detection methods. Much of the data available on the subject is still evidence from studies on mucocutaneous involvement or data gathered through patient questionnaires. Nonetheless, the prevalence data on oral manifestations in COVID-19 at this stage, can identify and define important gaps in evidence and set the stage for further research, and even provide preliminary results of great interest.[9]

Most of the patients were advised to stop their habits during their isolation or hospitalization. They were strictly following diet plan during these period. So it become limitation for the study to record their status with these variables e.g. diet, smoking, tobacco, alcoholism.

One of the major concern for covid 19 patients were presence of comorbidities. individuals with associated comorbidities are more susceptible to severe COVID-19 infection. Those at the highest risk for severe disease include people with underlying conditions such as cerebro-cardiovascular disease, chronic respiratory disease, cancer, diabetes, and hypertension. The presence of associated comorbidities is associated with worse outcome in COVID-19 infection. [10]

A meta-analysis, found that diabetes and hypertension also increase the risk of severity in COVID-19. Diabetes was an important risk factor for mortality in patients infected with pandemic influenza A (H1N1), SARS-CoV as well as MERS-CoV. Moreover, diabetes-related complications as the indicators of advanced diabetes may increase the risk of mortality in COVID-19. Globally, hypertension is a prevalent disease reported in 26% of the population worldwide. However, previous studies showed controversial results regarding the association between hypertension and COVID-19 severity.[10] The crude prevalence of diabetes and hypertension was 7.5% and 25.3%, respectively. Notably, hypertension was common even among younger age groups. Diabetes and hypertension prevalence is high in middle and old age across all geographical areas and socio-demographic groups in India, and hypertension prevalence among young adults is higher than previously thought.[11] Because of these high prevelence it is required to highlight the oral manifestation in corona patients with these comorbidities. The present study highlighted about the diabetes, hypertension and bmi above 25(obese). It was found that the symptoms were severe in those participant with comorbidities (table 4). Xerostomia, loss of taste and burning mouth were more prevalent in participant with comorbidities. And these finding were statically significant (<0.05) (table 5). However, there is still a lingering question, whether these lesions are because of coronavirus infection or they are secondary to the patient's systemic condition. As participants with hypertension has less severity of xerostomia than diabetic participants, it can be assumed that systemic condition also played vital role for oral manifestation. The present study has also include BMI parameter to find out further. It was noted that participant with higher BMI >25 had more symptom. And this was found to be statically significant (<0.05)(table 6)

The other parameter for these study e.g. pain, difficulty in swallowing, oral ulcer, gingival bleeding are found to be very low and statistically in significant.(table 2 to 6). These symptoms might have dependent on severity of corona or may have established due to medication or the treatment adverse effects. Though the rest symptoms found to be frequently present in various studies.[5,6,7] Taste disorders, as easily and early detectable symptoms, would allow mild/moderate case identification and self-isolation orientation, directly contributing to contain the quick spreading of the disease, especially in countries with reduced testing capability.[12] Moreover, the study was dependent on patients perception rather that clinical evaluation. There are very few study that mentioned with clinical and laboratory evaluation. Government/ disease guideline, severity of disease and its contagious nature make it very difficult for investigator to find further details.

Conclusion

The oral cavity is a mirror of health and disease. Many systemic diseases are accompanied by oral manifestations. Oral mucosa is generally the first site affected by viral infections, acting as a natural barrier to infection. Initially, it was reported that coronavirus 2019 disease (Covid-19) affects respiratory, gastrointestinal and neurological systems, but Gustatory impairment along with olfactory changes is now listed as a symptom of Covid-19 by the World Health Organization,

but further research is needed to confirm a link between reported additional oral symptoms and Covid-19 and present comorbidities. Dental professionals may encounter individuals with Covid-19 and various oral manifestations of this disease. Identification and diagnosis of same can further help in diagnosis and rehabilitation of the disease.

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