

AGE AND SEX RELATED RISK FACTORS OF ORAL COMPLICATION AMONG COVID-19 PATIENTS**Mohammad Arifur Rahman^{1*}, Mohammad Zahidur Rahman Mazumder², Mohammad Mahiuddin Fazle Rabbi³, Mohammed Abdur Rahim Bhuiyan⁴, Mohammad Anayet Hossain⁵ and Ummay Salma⁶**¹Assistant Professor (Dentistry), Comilla Medical College & Hospital, Cumilla, Bangladesh.²Assistant Professor (Anesthesiology) and in charge COVID ICU, Comilla Medical College and Hospital, Cumilla, Bangladesh.³Junior Consultant, (Dentistry), Comilla Medical College Hospital, Cumilla, Bangladesh.⁴Assistant Registrar (Dental), Comilla Medical College Hospital, Cumilla, Bangladesh.⁵Assistant Professor, Periodontology and Oral pathology, Shaheed Suhrawardi Medical College, Dhaka.⁶Registrar (Dental), Comilla Medical College Hospital, Cumilla, Bangladesh.***Corresponding Author: Mohammad Arifur Rahman**

Assistant Professor (Dentistry), Comilla Medical College & Hospital, Cumilla, Bangladesh.

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ABSTRACT

Background: Corona Virus Disease 2019 causes SARS-2019 (COVID-19). Coronavirus 2 (SARS-CoV-2) produces a deadly respiratory illness. According to the WHO, the overall number of confirmed cases by October 19, 2021 will reach 240 million, and the cumulative number of deaths would approach 4.8 million. Oral diseases are a global concern that may cause pain, tooth loss, deformity, progressive and persistent oral problems including death. Tooth decay affects young children but continues into adolescence, adulthood, and old life. Poor and underprivileged people suffer disproportionately from oral illnesses. Socioeconomic status affects the occurrence and severity of oral diseases. Oral issues may be a sensitive clinical marker of socioeconomic disadvantage, signaling deprivation-related health concerns. Oral diseases are a neglected health concern. Oral complications are induced by modifiable risk factors such as sugar consumption, cigarette use, alcohol usage, and poor cleanliness, as well as societal and economic forces. COVID-19 has been linked to oral issues such as lesion, taste loss, and tooth loss. As of now, the confirmed case of COVID-19 in Bangladesh is 2000282 and death 29312. Various studies have been done in association with Covid 19 but there is not a single study of Covid-19 in relation to oral complication risk factors. The purpose of the study is to find the oral complication associated with risk factors of age and sex among Bangladesh population. **Methods:** This study was a Comparative study. This study comprised 25–90-year-olds diagnosed with mild COVID-19 and hospitalized Covid ICU at Comilla Medical College Hospital in Bangladesh. The assessment followed inclusion/exclusion criteria. Sample size of 132 was obtained using a calculator with a 0.05 standard error and 95% confidence. Chest x-ray and RT-PCR confirmed COVID-19. Comparing 100 patients with oral thrush and associated oral issues. Data entry will utilize SPSS and Excel. SPSS 23 will be used for data analysis. Excel and JASP will be available for any complications. **Result:** Oral thrush is the most prevalent, 98 (74.2%) and is mostly among the age group of 65-74 (20.5%) years of age. Most of the patient with oral thrush complication are found among male (57.6%). However, there was no significant association between oral thrush and age and gender. There was significant association between dental pain and foul smell and age group, $p=0.000$. There is significant association between dental pain gender, $p=0.014$ where the prevalence of both genders is 4.5%. **Conclusion:** The most often reported concerns among COVID-19 patients with severe illness were oral thrush, dental movement, and irritated gums and male are mostly affected. In the ICU environment prolonged static posture, poor oral care, mechanical artificial breathing and immunosuppressive status may lead to these oral issues. Therefore, it is strongly suggested that a multidisciplinary strategy be used for the monitoring and treatment of COVID-19, which necessitates the inclusion of nurses and oral health specialists on ICU teams.

KEYWORDS: Oral complications, Age, Gender, COVID-19.**INTRODUCTION**

Severe Acute Respiratory Syndrome (COVID-19) caused by a Corona Virus (SARS CoV2)D. SARS-CoV-2

causes an acute respiratory infection with a high incidence of infectivity and mortality. According to figures from the World Health Organization (WHO), the

total number of confirmed cases recorded worldwide by October 19, 2021 would exceed 240 million, and the cumulative number of fatalities will exceed 4.8 million.^[1] The main clinical signs of COVID-19 infection include acute respiratory infection, shown by fever, tiredness, cough, myalgia, exhaustion, and other symptoms; unusual symptoms include expectoration, headache, hemoptysis, and diarrhea.^[2] In clinical therapy, all patients develop pneumonia, with about half also suffering from dyspnea and lymphocytopenia. Severe COVID-19 pneumonia has presented significant hurdles to the medical and scientific community. Age, gender, and comorbidities raise the likelihood of developing a severe condition. 15-30% of COVID 19 hospitalized patients will develop COVID 19 associated acute respiratory distress syndrome (ARDS).^[3]

Not only may the SARS-CoV-2 induce lung disease, but also a number of systemic problems. Numerous people died as a result of respiratory,^[4,5] and cardiac problems.^[4,6] Acute respiratory distress syndrome (ARDS) (113; 100%), type I respiratory failure (18/35; 51%), sepsis (113; 100%), acute cardiac injury (72/94; 77%), heart failure (41/83; 49%), shock (46; 41%), alkali poisoning (14/35; 40%), hyperkalemia (42; 37%), acute kidney injury (28; 25%), and hypoxic encephalopathy (23; 20%) were common causes of death among patients.^[7] These consequences resulted in difficult-to-recover physical damage and had a significant impact on the patients' lives. In addition, the increased stress produced by COVID-19 and its consequences, the loss of friends or family members, the deterioration of financial condition, employment stress, and confinement have a profound effect on patients' mental health.^[8]

Angiotensin converting enzyme II (ACE II), which is targeted by SARS-CoV-2, mostly resides on the surface of human epithelial cells, particularly type II alveolar epithelial cells, influencing anti-inflammatory, anti-proliferation, anti-fibrosis, anti-apoptosis, and vasodilator functions^[9]. Human oral mucosa and tongue epithelium both contain large amounts of ACEII, and SARS-CoV-2 may bind to ACEII receptors in oral tissues to produce oral problems such as macroglossia, taste abnormalities, oral mucosa illness, and more.^[10]

The mouth cavity links to the respiratory tract to help the respiratory system and serves as the entryway to the digestive tract, which has a tight association with how much food people eat. Oral problems should get additional attention during COVID-19 therapy. In the meanwhile, some oral lesions, such peripheral thrombosis, may potentially serve as COVID-19 warning signs. By paying attention to oral lesions, one may begin anticoagulant medication in time to prevent more severe peripheral thromboembolism-related problems.^[11]

Oral diseases are a huge economic burden, a worldwide problem, and a pressing matter that may lead to discomfort, tooth loss, deformity, and death.^[12-14] Oral

complications are progressive and chronic in nature. For instance, dental caries (tooth decay) affects very young children, but is a disease that persists into adolescence, maturity, and old age. Oral diseases disproportionately impact the poor and socially disadvantaged in society. There is a substantial and continuous relationship between socioeconomic position and the incidence and severity of oral illnesses. Oral complications might therefore be seen as a sensitive clinical marker of socioeconomic disadvantage, serving as an early signal of population health problems associated with deprivation.^[15] Oral disease are a neglected problem, rarely considered a health policy priority.^[16]

Oral complication is caused by a variety of modifiable risk factors, such as sugar intake, cigarette use, alcohol use, and poor hygiene, as well as their underlying social and economic drivers.^[13] And various oral complications have been associated with COVID-19; oral lesion, taste loss, teeth loss however, lesion is the most prevalent one.^[17] Oral indications are linked to the onset of COVID19 by a large quantity of accumulating evidence. CarrerasPresas et al. observed the presence of vesiculobullous lesions in the oral cavities of SARSCoV2infected individuals.^[18] In a 45-year-old female patient, ChauxBodard et al. saw an ulcer on the dorsal side of the tongue, followed by skin lesions.^[19] Due to the high expression of angiotensinconverting2 (ACE2) receptors in the salivary glands, the oral cavity has been recognized as a possible reservoir for COVID19 asymptomatic infection, particularly in the salivary glands and the oral mucosa.^[20]

Moreover, clinical instances of COVID19 infection have demonstrated indications of hyposalivation and resultant dry mouth, as well as olfactory and gustatory impairment.^[21,22] Gingival bleeding (gum inflammation) was a preceding symptom of COVID19 infections, occurring before to or concurrently with fever, other clinical symptoms, and positive tests.^[23]

As of now, the confirmed case of COVID-19 in Bangladesh is 2000282 and death 29312. Various studies has been done in association with Covid 19 but there is not a single study of Covid-19 in relation to oral complication risk factors. The purpose of the study is to find the oral complication associated with risk factors of age and sex among Bangladesh population.

METHODS AND MATERIAL

Study design

This study is a cross-sectional study adopting an open-label, study design conducted in Covid ICU at Comilla Medical College Hospital, Bangladesh. This research included adults aged 25–90 years diagnosed with moderate COVID-19 according to the management guideline for COVID-19 in Bangladesh and admitted in Covid ICU. The evaluation was conducted in accordance with the inclusion and exclusion criteria.

Procedure

Using a sample size calculator application with a standard error of 0.05 and a confidence level of 95%, the sample size was determined. Chest radiography and a positive real-time reverse transcription-polymerase chain reaction (RT-PCR) confirmed the diagnosis of COVID-19. Total the sample size was 150 but 18 patients were not found with any complication. So the final sample size is 132 with oral complication, were assessed.

A written informed consent was acquired from the patients or their legal guardians after detailing the purpose and benefit of this research.

Inclusion criteria

- Age from 25-90 years
- Confirmed COVID 19 infection using RT-PCR
- ICU admitted patient
- Have oral complication
- Both male and female

Exclusion criteria

- Diagnosed with malignancy
- Not willing to consent

Outcome

This study was conducted from the patients' admission to the hospital until discharge or death. The prevalence of oral complication among age and sex will be determined.

Statistical analysis

For data input, SPSS and Microsoft Excel software will be used. Moreover, for data analysis, SPSS version 23 will be used as principal software. As well as Microsoft excel and JASP will be kept stand by for any kinds of complication.

The collected data were analyzed using IBM SPSS and Microsoft Excel software. All data was recorded systematically in preformed data collection form (questionnaire) and quantitative data was expressed as mean and standard deviation and qualitative data was expressed as frequency distribution and percentage. Data was presented on a categorical scale compared between the groups using Chi-square (X²) or Fisher's Exact Probability test, while the data presented on a quantitative scale was compared between the groups using Student's 't' test or ANOVA. For all analytical tests, a probability (p) value of < 0.05 (p<0.05) was considered statistically significant and p<0.01 was considered highly significant but p>0.05 was taken as non-significant with 95% confidence limit was taken. The summarized data are interpreted accordingly and is then presented in the form of tables.

RESULTS

Table 1 shows the prevalence of age group and gender. Age group between 65-74 with COVID-19 is prevalent in the study, 29.5%, and 55-64 years of age are the second most prevalent, 18.9%. Male patients are found more than the female patients, 78.0% and 22.0%, respectively.

Table 1: Prevalence of age Group and Gender.

Variables	N=150	%
Age		
25-34	9	6.8
35-44	7	5.3
45-54	22	16.7
55-64	25	18.9
65-74	39	29.5
75-84	15	11.4
85<	15	11.4
Gender		
Male	103	78.0
Female	29	22.0

Table 2 shows the prevalence of the complications among the covid-19 patients. Oral thrush is the most prevalent, 98 (74.2%). Second most prevalent is inflamed gum, 42 (31.8%). Teeth mobility is the 3rd most common complication among the COVID-19 patients, 15

(11.4%). Other complication such as dental pain, foul smell, burning sensation, aphthous wean, teeth sensibility; 12 (9.1%), 6 (4.5%), 2 (1.5%), 5 (3.8%) and 2 (1.5%), were also present, respectively.

Table 2: Prevalence of oral complications.

Variables	N=150	%
Inflame gum	42	31.8
Foul smell	6	4.5
Oral thrush	98	74.2
Dental pain	12	9.1
Burning sensation	2	1.5
Aphthous wean	5	3.8

Teeth mobility	15	11.4
Teeth sensibility	2	1.5

In table 3 oral thrush is found to be mostly among the age group of 65-74, 20.5% and second is among 55-65 age group, 15.9%, shown in table 3. However, there is no significant association between oral thrush and age, $p=0.232$. Foul smell is found among the age group, 65-74 and 75-84, 0.8% and 3.8%, respectively. There is a

significant association between foul smell and age, $p=0.000$. There is also significant association between dental pain and age, $p=0.000$. 3.8% of the age group between 35-44 have dental pain. Rest is shown in detail in the table below.

Table 3: Association of oral complications with age group.

Complication	Age n (%)							P-value
	25-34	35-44	45-54	55-64	65-74	75-84	85<	
Inflame gum	2 (1.5)	2 (1.5)	10 (7.6)	5 (3.8)	12 (9.1)	7 (5.3)	4 (3.0)	0.465
Foul smell	-	-	-	-	1 (0.8)	5 (3.8)	-	0.000
Oral thrush	7 (5.3)	3 (2.3)	19 (14.4)	21(15.9)	27(20.5)	10(7.6)	11(8.3)	0.232
Dental pain	-	5 (3.8)	-	2 (1.5)	2 (1.5)	-	3 (2.3)	0.000
Burning sensation	-	-	-	1 (0.8)	-	1 (0.8)	-	0.529
Aphthous wean	-	-	2 (1.5)	-	2 (1.5)	1 (0.8)	-	0.618
Teeth mobility	1 (0.8)	2 (1.5)	2 (1.5)	4 (3.0)	6 (4.5)	-	-	0.305
Teeth sensibility	-	1 (0.8)	-	-	1 (0.8)	-	-	0.159

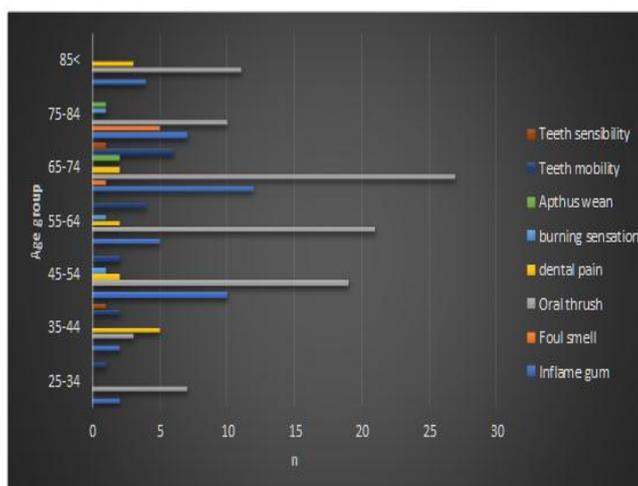


Fig. 1: Association of oral complication with age group.

Table 4 depict the association of oral complication with gender and the result shows that male have the most complication than female. Oral thrush is found most among male, 57.6%) than in female, 16.7%). There is no significant association between oral thrush complication and gender, 0.858. Inflamed gum is the second most oral

complication found in male, 25.8% and in female, 6.1%. Again, there is no association between inflame gum and gender, $p=0.580$. There is significant association between dental pain gender, $p=0.014$ where the prevalence of both genders are 4.5%.

Table 4: Association of oral complication with gender.

Complication	Gender n (%)		P value
	Male	Female	
Inflame gum	34 (25.8)	8 (6.1)	0.580
Foul smell	6 (4.5)	-	0.183
Oral thrush	76 (57.6)	22 (16.7)	0.858
Dental pain	6 (4.5)	6 (4.5)	0.014
Burning sensation	1 (0.8)	1 (0.8)	0.335
Aphthous wean	3 (2.3)	2 (1.5)	0.321
Teeth mobility	14 (10.6)	1 (0.8)	0.128
Teeth sensibility	2 (1.5)	-	0.450

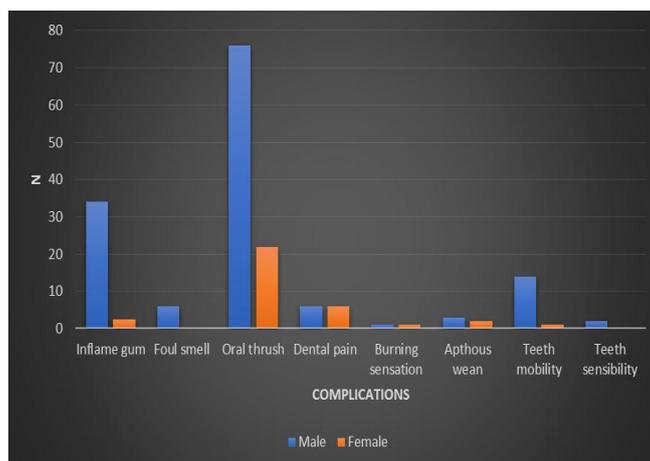


Figure 2: Association of oral complication with gender.

DISCUSSION

The growing body of knowledge on COVID-19-related oral manifestations has led to a significant debate over the pathophysiological nature and epidemiological significance of these mucocutaneous symptoms. This is because the case definition for COVID-19 must be as specific as is practical.^[24] According to the present research, oral candida causes oral thrush, which is more common in COVID positive individuals. Similarly, Amorim dos Santos et al. 2020; Brasilia (Brazil) discovered persistent white plaque on the tongue dorsum on his patients.^[25] Baraboutis et al. 2020 and Athens (Greece) also found unexpected “oral candidiasis.” One of them resembled esophageal candidiasis^[26]. Complications were mostly found in the age group of 65-74 and mostly male in the current study, however other study showed that the patients that had most of the oral complications in both male and female with the age of 53.6.^[27]

CONCLUSION

The most often reported concerns among COVID-19 patients with severe illness were oral thrush, dental movement, and irritated gums and male are mostly affected. The ICU environment's prolonged prone position and mechanical breathing apparatus may have led to these mouth issues. Therefore, it is strongly suggested that a multidisciplinary strategy be used for the monitoring and treatment of COVID-19, which necessitates the inclusion of nurses and oral health specialists on ICU teams.

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