

## Poor oral hygiene in COVID-19 patients is a leading cause of prevalence of oral candidiasis in inpatients

Noor-Ul-Ain<sup>1\*</sup>, Talha Bin Saeed<sup>2</sup>

<sup>1\*</sup> Department of Pharmacy, The University of Faisalabad

<sup>2</sup> Allied Hospital Faisalabad, Pakistan

Corresponding author at: Department of Pharmacy, The University of Faisalabad, Pakistan

Contact: +923367744654, **Email:** [ananorkhan105@gmail.com](mailto:ananorkhan105@gmail.com)

### Abstract

The world is under the threat of COVID-19 pandemic caused by SARS-COV2 since January 2020. And this pandemic has caused millions of deaths still it is affecting the lives of many people affected by this viral disease. The unavailability of definite treatment is a main focus to ponder because symptomatic treatment like use of antibiotics, steroids and oxygen therapy is also a cause of many opportunistic infections like oral candidiasis caused by *Candida Albicans* and the main reasons of this infection are the excessive use of medications which may cause drug reaction, the continuous use of oxygen therapy and co-morbidities and poor oral hygiene etc. which increase the length of hospital stay of patient and also affect the quality of life of patient as patients become dysphagic as unable to take orally due to the severity of this opportunistic infection. This case study was done to check the prevalence of oral candidiasis in inpatients of COVID-19 and their possible management was done with the use of both topical as well as systemic antifungals and this condition resolved in 5 to 7 days with the proper management and proper maintenance of oral hygiene.

**Keywords:** Pandemic, opportunistic, infection, topical, systemic, hygiene

## Introduction:

The pandemic of COVID-19 has affected the people globally since January 2020 and instigated so far more than 90 million people in addition to more than a million deaths occurred globally. The pandemic of COVID-19 was in the beginning deliberated an ailment triggered through a unwavering virus that may possibly be responsible for immunity, like in case of other respiratory viruses and for those this immunity produced by the virus is enduring a year or supplementary. Likewise childhood viral diseases like, naturally assimilated contagion with those as chickenpox, measles, or mumps be responsible for shield for the entireness of life. The COVID-19 disease caused by virus from Coronaviridae family and Pisoniviricetes class the viruses from this family were also cause of previous pandemics like SARS-COV1 ( Severe acute respiratory syndrome coronavirus) and MERS-COV ( Middle East respiratory syndrome coronavirus) [1]. The virus that causes COVID-19 disease is considered to be zoonotic in origin and it is also believed that there is close genetic similarity of this virus to those with virus from bat origin. It is still under consideration to know whether this virus directly came from bat origin or there is another intermediate host involve in this transmission.

There is no definite treatment available for this COVID-19 disease and the people affected by this virus are only treated on the basis of their symptoms. And the most common symptom is the occurrence of shortness of breath (SOB) and decrease in oxygen saturation due to the effect of virus on lungs so the patient affected with virus is given with the oxygen therapy to avoid the symptoms that affect quality of life. Most of the patients affected with this virus are on oxygen therapy and this oxygen is given to them by simple face mask, non-re-breather face mask, CPAP (Continuous positive airway pressure) and HFNC (high flow nasal cannula) all these are used to compensate the oxygen demand of patient. But the inpatients who are continuously on oxygen therapy they also have poor oral hygiene which is a leading cause of oral thrush and oral candidiasis and this leads to prolong their hospital stay with the chance of getting other nosocomial infection and also cause increase in mortality rate. And if the diagnosis of this oral candidiasis is delayed it may leads to Mucormycosis (Black fungus disease) which ultimately increase death rate [2] [6] [7].

## Methods:

The case study performed on 30 patients with age group of 35 to 65 years who were admitted to the hospital and their SARS-CoV-2 qRT-PCR on nasopharyngeal was positive and on HR-CT

examination the lungs involvement was in the range of 30 to 60 percent. And all of these patients had spO<sub>2</sub> (Oxygen saturation) at the time of admission was in range of 65 to 85 percent and these patients were on Oxygen therapy as 15L/min with non-re-breather face mask and 60L/min with CPAP. And the treatment regimen for COVID-19 infection was Azithromycin 250mg twice a day, Moxifloxacin 400mg once a day, Ivermectin 6mg once a day, Dexamethasone 0.5mg thrice a day. And all of these patients developed oral candidiasis after 2 to 3 days of hospital stay due to dryness developed with continuous oxygen delivery and due to the treatment related drug reactions and the co-morbidities of patients and the ultimate cause as that poor oral hygiene. And xerostomia (dry mouth) is considered to be the leading cause of this opportunistic infection pseudomembranous candidiasis caused by *Candida albicans*. On examining of the patients developed white membranous patches that spread over the tongue dorsum, mouth floor, soft palate, oropharynx region, and to a lesser extent the buccal mucosa. The patients were treated with a treatment protocol as with the systemic as well as local agents as systemic agents like Fluconazole was given three times a day and a mouth wash containing glycerin, Lignocaine 2% and Cetylpyridinium chloride 0.1% Benzylamine 1% to wash the inside of oral cavity and then applying of Miconazole (Daktarin oral gel) three times a day. And the oral symptoms of patients were resolved within 5 to 7 days with proper maintenance of oral hygiene.

IEEESEM

|  |  |
|--|--|
|  |  |
|--|--|

**Figure 1: Oral candidiasis of COVID-19 patients White membranous patches spread over the tongue dorsum, mouth floor, and soft palate.**

**Discussion:**

Opportunistic infections are the cause of increase hospital stay and increase in severity of existing disease like oral candidiasis in COVID-19 patients. The state as xerostomia (dry mouth) is a considerable confounding factor for numerous oral contagions, as well as in this study, and about 10 of these patients agonized with striving of swallowing as they had dysphagia issue, therefore demonstrating xerostomia which had been recurrently recounted as an oral demonstration of COVID-19[8]. And it had similarly been recommended that xerostomia might be

| Study location                             | Age group   | Number of patients | Gender           | Confirmation test for COVID-19 | COVID-19 Treatment   | Onset of oral candidiasis       | Management of oral candidiasis  |
|--|-------------|--------------------|------------------|--------------------------------|--|---------------------------------|---|
| Allied hospital Faisalabad, isolation ward | 35-45 years | 8                  | 5 female, 3 male | PCR                            | Azithromycin, moxifloxacin, dexamethasone, vitamin, oxygen therapy with non-re-breather mask | 4 days after hospital admission | Oral Fluconazole, Miconazole gel, Mouth wash (glycerin, Lignocaine 2% and Cetylpyridinium chloride 0.1% Benzylamine 1%) |
| Allied hospital                            | 45-         | 10                 | 6 female,        | PCR                            | Tocilizumab, azithromycin, linezolid,  | 3 days after                    | Oral Fluconazole  |

|   |            |    |                  |     |  |                                 |  |
|---|------------|----|------------------|-----|--|---------------------------------|--|
| <b>al Faisalabad, isolation ward</b>              | 55years    |    | 4 male           |     | Ivermectin, oxygen therapy with non-re-breather mask                                       | hospital admission              | , Miconazole gel, Mouth wash(glycerin, Lignocaine 2% and Cetylpyridinium chloride 0.1% Benzylamine 1%)                 |
| <b>Allied hospital Faisalabad, isolation ward</b> | 55-65years | 12 | 8 female, 4 male | PCR | Tocilizumab, azithromycin, linezolid, Ivermectin, oxygen therapy with non-re-breather mask | 3 days after hospital admission | Oral Fluconazole, Miconazole gel, Mouth wash(glycerin, Lignocaine 2% and Cetylpyridinium chloride 0.1% Benzylamine 1%) |

**Table 1:** findings of patients affected with oral candidiasis, PCR\*: Polymerase chain reaction

the initial indications of COVID-19 or owing to remedial comorbidities as well as due to drug reactions and continuous oxygen therapy. Furthermore, elder patients might have trouble in upholding virtuous oral wellbeing in the practice of somatic infirmities or psychosomatic illnesses. It has been lately described that *Candida* annexation was meaningfully linked by means of cognitive loss, multimorbidity, as well as abridged oral hygiene aptitude [2][3][7].

Oral candidiasis has been unswervingly logged in sternly affected COVID-19 patients, particularly those with prompting comorbidities as well as antibiotics consumption, both defensible and unpardonable. Elder age as well as female patient appeared to be the utmost protuberant risk factors for this opportunistic contagion, which inclines to have late commencement besides necessitates an instantaneous treatment intercession whichever systemically or else topically to halt it from development into disastrous candidemia [4][5][8].

### **Conclusion:**

Opportunistic infection is one of the main reasons for the increase in severity of disease. So, the infections like oral candidiasis which are affecting the quality of life of patients must be avoided by taking all the interventions to avoid the severity of the infection. And the predisposing factors like co-morbidities and drug reactions must be rule out to avoid such instances. And the maintenance of oral hygiene is also a very important factor for the prevention of such infections.

### **Conflict of interest:**

None

### **Acknowledgement:**

None

### **Consent of patients:**

Patient's consent was taken before conducting study.

### **References:**

1. Hocková B, Riad A, Valky J, Šulajová Z, Stebel A, Slávik R, Bečková Z, Pokorná A, Klugarová J, Klugar M. Oral complications of ICU patients with COVID-19: case-series and review of two hundred ten cases. *Journal of clinical medicine*. 2021 Jan;10(4):581.

2. Katz J. Prevalence of candidiasis and oral candidiasis in COVID-19 patients: a cross-sectional pilot study from the patients' registry in a large health center. Quintessence international (Berlin, Germany: 1985). 2021 Jun 2:0-.
3. Jefferson EA. Preventing a Candida Auris Outbreak at an Acute Care Hospital During the COVID-19 Pandemic. American Journal of Infection Control. 2021 Jun 1;49(6):S11.
4. Nargesi S, Bongomin F, Hedayati MT. The impact of COVID-19 pandemic on AIDS-related mycoses and fungal neglected tropical diseases: Why should we worry?. PLoS neglected tropical diseases. 2021 Feb 9;15(2):e0009092.
5. Situmorang JH, Desianti GA. Pneumocystis Pneumonia in Covid-19 Outbreak: A Case Report It's not all about Covid-19. Respiratory Science. 2021 Jun 23;1(3):194-201.
6. Maciel PP, Martelli H, Martelli DR, Machado RA, Andrade PV, Perez DE, Bonan PR. Covid-19 pandemic: Oral repercussions and its possible impact on oral health. Pesquisa Brasileira em Odontopediatria e Clínica Integrada. 2020 Aug 31;20.
7. Hajek A, De Bock F, Huebl L, Kretzler B, König HH. Postponed Dental Visits during the COVID-19 Pandemic and their Correlates. Evidence from the Nationally Representative COVID-19 Snapshot Monitoring in Germany (COSMO). InHealthcare 2021 Jan (Vol. 9, No. 1, p. 50). Multidisciplinary Digital Publishing Institute.
8. Mazur M, Duś-Ilnicka I, Jedliński M, Ndokaj A, Janiszewska-Olszowska J, Ardan R, Radwan-Oczko M, Guerra F, Luzzi V, Voza I, Marasca R. Facial and Oral Manifestations Following COVID-19 Vaccination: A Survey-Based Study and a First Perspective. International Journal of Environmental Research and Public Health. 2021 Jan;18(9):4965.