

## **Management of Secondary Infections among Patients with COVID-19 in Health Settings**

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**Received:** December 29, 2021; **Published:** December 31, 2021

### **Abstract**

COVID-19 has impacted millions of people since its emergence. The main objectives of the present study were to review the existing literature on how to manage secondary infections associated with COVID-19. The most recent studies were reviewed. The results showed that several considerations to be taken into account such as protecting the working staff since working staff are in first contact points with patients with COVID-19. The other important point is the existence of secondary infections that worsen the clinical status of the infection with coronavirus. Since patients with COVID-19 are more likely to be seen in emergency and intense care units, appropriate and early management of patients in these units make medical process including diagnosis and treatment more efficient. Taken together, secondary infections among patients with COVID-19 should not be forgotten and should be taken seriously to improve the outcome of therapeutic process.

**Keywords:** *COVID-19; Secondary Infections; Emergency Unit; Intense Care Unit; Working Staff*

### **Introduction**

#### **Overview of emerging COVID-19**

As of September 27, 2020, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic had afflicted more than 32 million victims worldwide [1]. The clinical signs of this disease [2] vary from asymptomatic infection to severe viral pneumonia requiring ICU treatment [3-5]. SARS-CoV-2 can cause direct lung epithelial destruction as well as an abnormal cytokine storm, which can lead to multi-organ failure [6,7]. Immunosuppressive medications are commonly used to reverse this dysregulated immune system activity [6,8]. The vulnerability to secondary infections is expected to be increased by a combination of virus- and drug-induced immunosuppression. Despite this, there are only a few instances of infectious problems in COVID-19 [9-11].

#### **Secondary infections associated with COVID-19**

Ripa., *et al.* [1] found that secondary infections were common in COVID-19 patients who were hospitalized. Early ICU admission, respiratory failure, and significant lymphopenia were found as risk factors for subsequent infections in multivariable analysis.

Bacterial co-infections and secondary illnesses are common in severe influenza [12] and other severe respiratory viral infections, and they're linked to higher morbidity and mortality rates [13]. The recommendations for empirical antimicrobial therapy in severe disease vary between national and international COVID-19 guidelines; some suggest empirical antimicrobial therapy in severe disease [2,14], while others do not [15]. When a lower respiratory tract infection is assumed to be caused by COVID-19, but there is no evidence of bacterial infection, UK guidelines advise against empirical therapy [16].

### Management of secondary infections in patients with COVID-19

Fluvoxamine may have a therapeutic role for COVID-19, according to new research. The goal of the TOGETHER study for COVID-19 patients with acute symptoms was to compare the efficacy of fluvoxamine against placebo in preventing hospitalization, which was defined as either staying in a COVID-19 emergency room or being transferred to a tertiary hospital due to COVID-19. In high-risk outpatients with early diagnosed COVID-19, treatment with fluvoxamine (100 mg twice daily for 10 days) reduced the requirement for hospitalization, defined as retention in a COVID-19 emergency setting or transfer to a tertiary hospital [17].

Although safe and effective COVID-19 vaccines have been created and administered, there are still significant obstacles in terms of production, distribution, and pricing, particularly in low-resource settings [18]. It's critical to find low-cost, widely available, and effective COVID-19 treatments. Repurposing current drugs that are widely available and have well-known safety profiles has a lot of appeal [19].

Fluvoxamine is a selective serotonin reuptake inhibitor (SSRI) and agonist of the serotonin-1 receptor (5HT<sub>1A</sub>) [20]. Fluvoxamine has several potential pathways for treating COVID-19 disease, including anti-inflammatory and antiviral properties [21]. Fluvoxamine may minimize the risk of clinical deterioration in COVID-19 outpatients, according to a small placebo-controlled, randomised experiment, indicating the need for larger randomised, placebo-controlled research [22,23].

### Bloodstream infections (BSI)

Bloodstream infections and their clinical effects in COVID-19-infected hospitalized patients are poorly understood. The goal of this systematic review and meta-analysis was to assess the pooled occurrence of BSIs and mortality among hospitalized patients with COVID-19. Methods: From the beginning to April 19, 2021, a systematic search was conducted on PubMed, EMBASE, and Web of Science. The primary outcome was the occurrence of BSIs in COVID-19-infected hospitalized patients. Mortality at the longest known follow-up was the secondary outcome. Results: A total of 42,694 patients were analyzed in 46 studies that matched the inclusion criteria. In hospitalized COVID-19 patients, the estimated prevalence of BSIs was 7.3 percent (95 percent CI 4.7 - 11.1 percent), with a death rate of 41 percent (95 percent CI 30 percent - 52.8 percent). An estimated frequency of 29.6 percent (95 percent CI 21.7 percent - 38.8 percent) was found in a subgroup study of patients admitted to ICU. In comparison to patients without COVID-19, patients with COVID-19 had a greater occurrence of BSI (OR 2.77; 95 percent CI 1.53 - 5.02; p 0.001). Conclusions: BSIs were anticipated to occur in roughly 7% of COVID-19-infected hospitalized patients in our study. Patients admitted to ICU were found to have a four-fold increased risk [24].

In hospitalized and critically sick patients, bloodstream infections (BSIs) are a common cause of infection, sepsis, or septic shock. BSIs, whether acquired in the community or in the hospital, can prolong a patient's stay in the hospital and have been linked to poor outcomes [25]. Many patients with acute respiratory failure have been hospitalized because of the COVID-19 epidemic. BSIs have previously been reported in cohorts of patients with various viral pneumonias (e.g. influenza) [26,27]. The clinical characteristics of SARS-CoV-2 infection, the use of immunomodulatory medications, and the high probability of ICU admission may put COVID-19 patients at risk for superinfections such as ventilator-associated pneumonia and BSIs [28].

### Mode of the COVID-19 transmission

Coronaviruses are thought to be spread from person to person primarily through respiratory droplets, which are inhaled or deposited on mucosal surfaces, including aerosols produced while coughing and speaking. Aerosol-generating processes are thought to increase the

amount of aerosols produced. Transmission via contact with contaminated fomites is thought to be conceivable, though this has yet to be documented for SARS-CoV-2, and no cultivable virus has been found in real-life conditions [29,30]. SARS-CoV-2 has been found in both respiratory and feces samples. Viral RNA has been found in blood specimens on rare occasions, however there is no evidence of transmission through blood contact [31]. Environmental examinations in hospital rooms where COVID-19 patients were admitted have shown viral RNA in air samples and air outlet fans, implying the presence of aerosols in those regions [32-35].

Low quantities of cultivable SARS-CoV-2 were found in air samples from a hospital room where COVID-19 patients were staying in two trials [36,37]. The relative importance of big droplet, aerosol, and fomite transmission for SARS-CoV-2, the protection offered by different components of PPE, and the virus's transmissibility at different phases of the disease are all unknown. As a result, caution should be given when examining these elements [38,39]. Respirators may have a better protective impact than medical face masks, according to a recent systematic review and meta-analysis [40]. This finding, however, was based on a small number of observational studies, and the authors assigned it a low level of assurance. As a result, it's uncertain if respirators offer superior protection against other coronaviruses and respiratory viruses like influenza than medical face masks [41,42]. As a result, in the event of widespread community transmission resulting in PPE shortages, a sensible approach would require prioritizing the use of respirators for care activities with a higher perceived risk of transmission, such as during aerosol-generating operations or in intensive care units. Gloves and gowns are used to avoid infection of healthcare workers' hands, skin, and clothing, which could lead to the spread of infectious viruses to the nose, mouth, and eyes. It is unknown whether transmission occurs through intact or nonintact skin. After correcting for the effect of wearing a face mask, it was unclear whether wearing gloves or gowns was protective in various investigations of SARS among healthcare professionals [43-45]. Gloves and gowns were found to be useful in univariable analysis, but the effect was only statistically significant in multivariable analysis on one or two occasions, according to a meta-analysis of these trials [46].

Gloves and gowns can make putting on and taking off PPE more difficult and time consuming, as well as contribute to poor hand hygiene, pollution of the environment, and transfer of additional pathogens if gloves and gowns are not changed after each patient interaction [47,48]. Gloves and gowns have a role to play in the prevention of COVID-19, but more research is needed. There is evidence that patients with mild or no symptoms contribute to COVID-19 transmission [49-51]. Although there are still questions concerning the relative importance of symptomatic vs asymptomatic or pauci-symptomatic transmission, the implications of this finding for COVID-19 prevention among healthcare workers and vulnerable patient populations in healthcare are important [42].

## Conclusion

This study showed various considerations to be taken into account including the potential of infecting the working staff in hospitals, a matter that makes the management of COVID-19 in health setting as a crucial step. Another important point is that not to forget the secondary infections when treating the COVID-19 as a viral disease.

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### Volume 6 Issue 1 January 2022

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