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Research Article

COVID-19 Complications in Patients Aged 20-80 with Pulmonary Involvement: A Study on the 1-Month and 3-Month Post-Infection and Recovery Periods, from August 2021 to November 2021

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ABSTRACT

Background: In this study, our aim is to investigate the complications caused by COVID-19 disease in the period of 1 month and 3 months after infection and recovery in patients aged 20 to 80 admitted to the special care department of Shariati Hospital in Tehran.

Methods: The information of the patients in this research was collected between 1 and 3 months after discharge non-randomly and from among the samples that are available (consecutive), through phone calls and a prospective questionnaire including questions about complications such as fatigue, body pain, joint pain, anorexia, disorders, sleep, headache, depression, dizziness, palpitations, chest pain, cough, diabetes, skin disease, obesity, imbalance, neuropathy, neurological and mental problems, and other cases are collected.

Results: In this study, what was observed was those 4 complications of nausea and vomiting, diabetes, depression, and hypothyroidism were significantly related to hospitalization of COVID-19 patients in the hospital's special care department. The frequency of other complications was also investigated in this study.

Conclusions: According to the conducted study as well as previous studies, what is clear is that the frequency of complications caused by COVID-19 in patients admitted to the intensive care unit after discharge is high, and more studies should be done in order to reduce these complications.

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has infected millions of people worldwide and caused a pandemic that is still ongoing. The virus can cause a disease named COVID-19, which is composed of multi-systemic manifestations with a pulmonary system predominance. As time passes, we are dealing more and more with a wide variety of effects and complications of the disease in survivors as far as concerns about the clinical outcome and the timeline of symptoms in different patients. Since the lungs are the most involved organs and the post-COVID prolonged and persistent effects are mainly related to the pulmonary system, it is crucial to define and predict the outcome and to determine the individuals that can progress to fibrosis and loss of function of the lungs. This

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review summarizes the current literature regarding the pulmonary complications in post-COVID syndrome and the management of these conditions [1].

Post-COVID-19 pulmonary fibrosis is a recognized complication observed in a significant number of survivors. in the study, it was found that approximately half of the patients experienced lung fibrosis following COVID-19 infection. Furthermore, patients who had severe COVID-19 pneumonia were at a higher risk of developing pulmonary fibrosis. The initial chest CT scans revealed that consolidation and higher CSS (Chest Severity Score) were associated with an increased likelihood of post-COVID-19 lung fibrosis. Interestingly, the follow-up CT scans conducted after 6 months indicated that some patients showed a reduction in fibrotic abnormalities, while others did not exhibit such improvements. These findings highlight the importance of identifying and controlling predictive factors for lung fibrosis development and exploring the potential therapeutic role of anti-fibrotic drugs in clinical practice, to prevent and mitigate the adverse outcomes of COVID-19 pneumonia [2].

The analysis of the UKILD Post-COVID-19 Study suggests that thresholds of ppDlCO (diffusing capacity for carbon monoxide), CXR (chest X-ray), and severity of admission can be used to stratify the risk of residual abnormalities on CT scans involving more than 10% of the lung. This information can be valuable for clinical management, particularly for individuals falling into the moderate- to very-high-risk strata. Longitudinal analysis of CT scans revealed the persistence of these abnormalities over the study period, although the long-term functional consequences remain unknown and may be limited by clinical indication. These findings underscore the importance of both radiological and physiological monitoring during early and later follow-ups, indicating that up to 11% of individuals discharged from acute COVID-19 hospitalization may be at risk of residual lung abnormalities. Further research is required to understand the progressive development of radiological patterns or resolutions over time [3].

Patients with COVID-19 or influenza had a high incidence of coinfections and ICU-acquired superinfections. The represent agents of coinfection in ICU patients were different from those in the general ward. These high-risk patients should be closely monitored and empirically treated with effective antibiotics according to the pathogen [4].

Most patients showed persistent radiological abnormalities on CT and reduced lung volumes, impaired diffusion capacity, and patterns of restrictive lung function at 6 months post-discharge from the ICU. The correlations between abnormalities on CT and lung function tests were weak. Further, studies with a long-term follow-up of lung function in this group of patients are needed [5].

A prospective single-center cohort study conducted by Darlington et al., it was found that there were minimal differences in long-term health-related quality of life (HRQL) and respiratory health outcomes between patients who survived critical COVID-19 during the first wave compared to those in the second/third waves of the pandemic. The study aimed to compare the severe outcomes of COVID-19 and assessed HRQL and pulmonary outcomes six months after infection. Despite changes in intensive care treatment strategies over time, the study observed that respiratory health remained relatively consistent between the two groups. These findings suggest that the long-term impact of critical COVID-19 on HRQL and respiratory function may not significantly vary across different waves of the pandemic [6].

In another study, it was demonstrated that certain predisposing factors for the development of severe COVID-19 infection in pregnant patients can be identified. Additionally, specific biochemical parameters can serve as early indicators of severe infection. These findings have significant implications for the management of pregnant women, as close monitoring and prompt initiation of appropriate treatments can help reduce disease-related complications and mortality. By identifying pregnant women at high risk, healthcare providers can implement targeted interventions and ensure timely and effective care. This study highlights the importance of proactive measures in the care of pregnant patients with COVID-19 to improve outcomes for both the mother and the unborn child [7].

Also, the prevalence of invasive pulmonary aspergillosis (IPA) in critically ill patients in the intensive care unit (ICU) is increasing. It is increasingly recognized in immunocompetent hosts and immunocompromised hosts. IPA often complicates both severe influenza and severe coronavirus 2019 (COVID-19) infections. It remains a diagnostic and therapeutic challenge and can be associated with significant morbidity and mortality [8].

According to a prospective cohort study by Ribeiro Carvalho et al, ICU hospitalization due to COVID-19 resulted in respiratory system alterations that persisted six to twelve months after hospital admission. The study aimed to investigate the long-term respiratory outcomes in COVID-19 patients who had been hospitalized in the ICU. The findings indicated that male sex and critical disease during the acute phase were significant risk factors for severe CT (computed tomography) lesions at the six to twelve-month follow-up. Critical disease was characterized by a longer ICU stay, the need for invasive mechanical ventilation (IMV), tracheostomy, and the use of vasoactive drugs. These factors were associated with a higher likelihood of developing persistent respiratory abnormalities. The results highlight the importance of long-term respiratory follow-up for ICU-hospitalized

COVID-19 patients, particularly those with risk factors, to identify and manage potential complications [9].

Methods

This study is a prospective cohort study. In cohort studies, a cohort means a group of people under study who are followed by a common characteristic and the passage of time. In prospective cohort studies, the study starts from the present and continues in the future. In this type of study, the researcher selects or specifies a sample of people. Then, in each person, for example, factors such as food frequency, exercise habits, sleep, and blood lipid levels are measured under the title of "exposure" which may predict the subsequent outcome. The researcher follows up with these people to find the desired outcome(s) with periodic surveys or examinations.

In this type of study, the samples are selected based on the exposure factor, so that the study starts from the exposure factor and ends with the consequences. In this study, a group of people who were exposed to an agent and a cause, and a group who were not exposed to the agent or cause, are followed up for a period of time to determine the occurrence of the disease in two groups. And then the occurrence of the disease in two groups is compared. In this research, the group that is studied are the patients with COVID-19 who were consecutively and non-randomly among the patients who had a positive PCR test or throat culture and in the special care department of Shariati Hospital between August 1400 and They were admitted in November 1400, they are selected. Basic and background information about the patients, including demographic characteristics and clinical records, are collected through the archived files in the database of Shariati Hospital after the approval of the code of ethics. Finally, the selected patients are asked through a questionnaire about defined symptoms such as fatigue, Headache, muscle pain, sleep disorders, joint pain, mental disorders and depression, skin diseases, diabetes, imbalance, obesity, nervous and mental disorders, and dizziness are investigated and questioned. From the beginning, patients are divided into two groups with underlying diseases such as diabetes, blood pressure, and heart disease, and those without the mentioned diseases are studied. In this study, the patients will also be examined in terms of background variables including age, sex, weight, and other variables including the degree of lung involvement, length of hospitalization, and their relationship with these symptoms.

Participants, place, and time: patients between the ages of 18 and 80 who were admitted to the intensive care unit of Shariati Hospital between August 2021 and November 2021.

Results

In this study, what was observed was those 4 complications of nausea and vomiting, diabetes, depression and hypothyroidism were significantly related to hospitalization of COVID-19 patients in the hospital's special care department (p value< 0.05). The frequency of other complications was also investigated in this study, which are as follows (Figure 1-16):

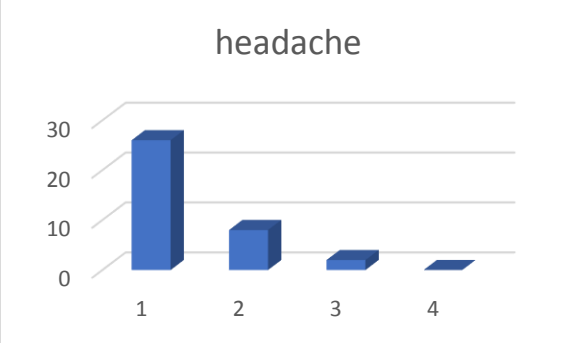

Figure 1- Examining the frequency of headache complications in covid patients hospitalized in the special care department of Shariati Hospital

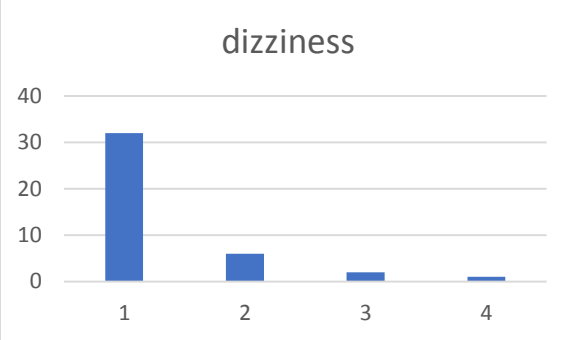

Figure 2- Checking the frequency of dizziness in COVID patients hospitalized in the special care department of Shariati Hospital

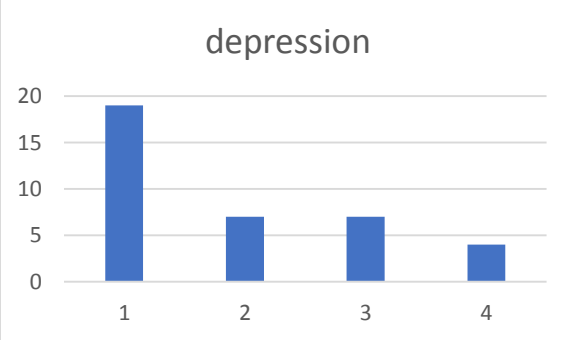

Figure 3- Investigation of the frequency of depression in COVID patients hospitalized in the special care department of Shariati Hospital

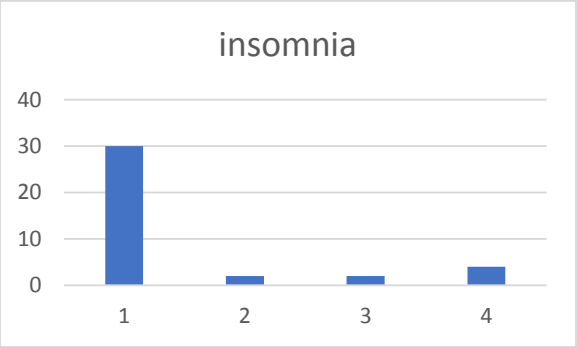

Figure 4- Investigation of the frequency of insomnia in COVID patients hospitalized in the special care department of Shariati Hospital

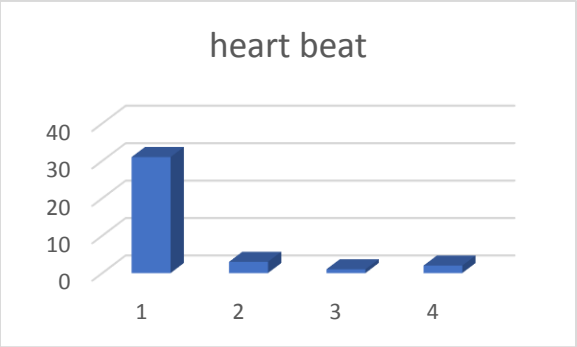

Figure 5- Investigation of the frequency of heart palpitations in covid patients hospitalized in the special care department of Shariati Hospital

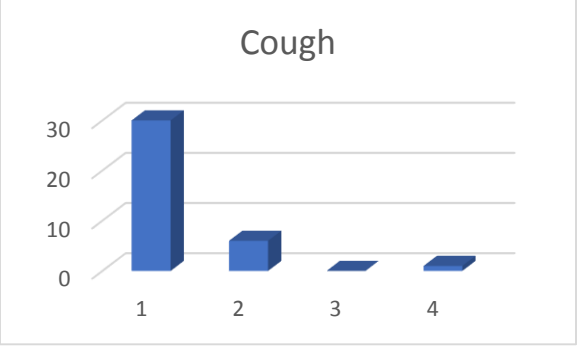

Figure 6- Checking the frequency of cough complications in COVID patients hospitalized in the special care department of Shariati Hospital

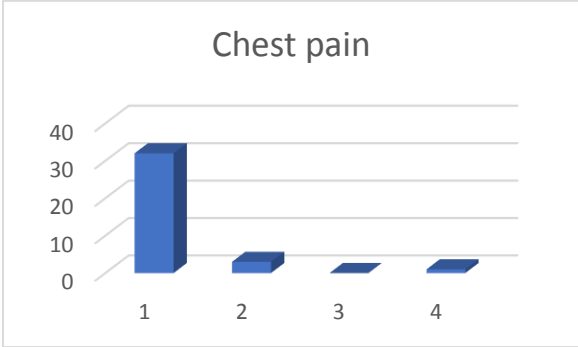

Figure 7- Investigation of the frequency of chest pain in COVID patients hospitalized in the special care department of Shariati Hospital

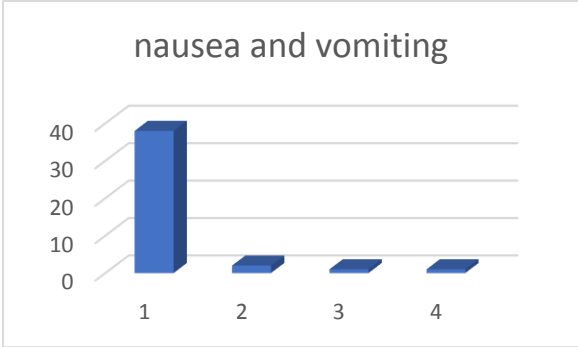

Figure 8- Studying the frequency of nausea and vomiting in COVID patients hospitalized in the special care department of Shariati Hospital

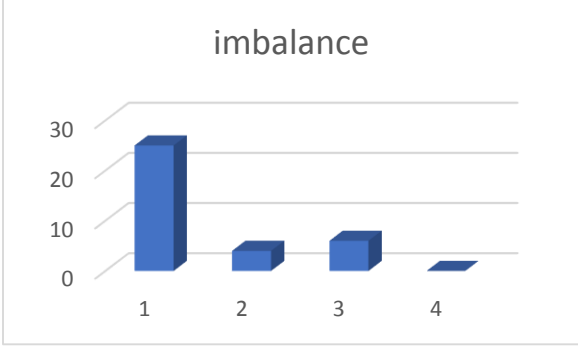

Figure 9- Checking the frequency of imbalance complications in COVID patients hospitalized in the special care department of Shariati Hospital

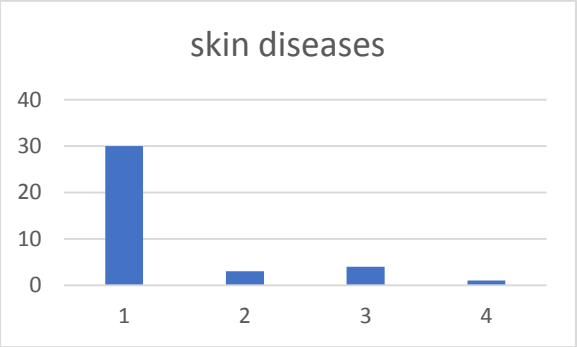

Figure 10- Examining the frequency of skin disease complications in COVID patients hospitalized in the special care department of Shariati Hospital

Figure 11- Studying the frequency of obesity complications in COVID patients hospitalized in the special care department of Shariati Hospital

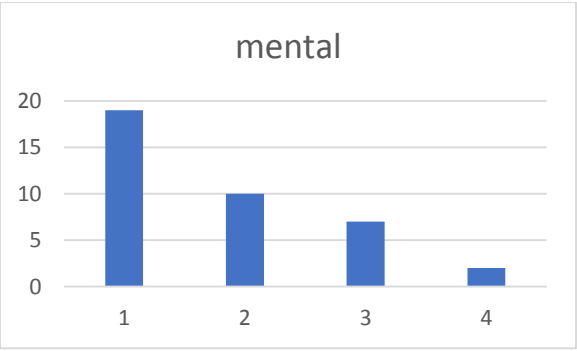

Figure 12- Examining the frequency of mental complications in COVID patients hospitalized in the special care department of Shariati Hospital

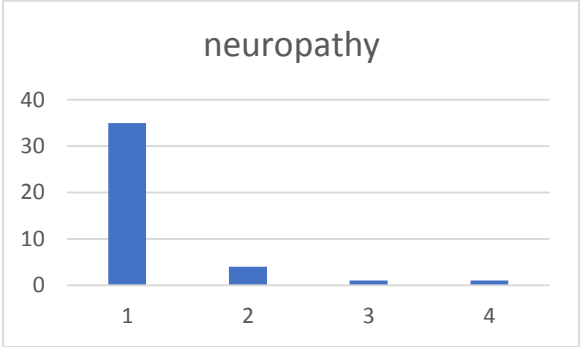

Figure 13- Examining the frequency of neuropathy complications in COVID patients hospitalized in the special care department of Shariati Hospital

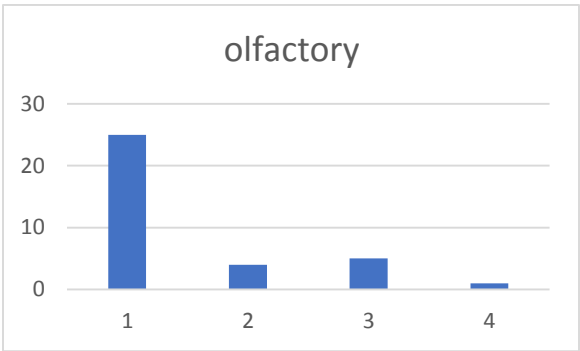

Figure 14- Studying the frequency of olfactory complications in COVID patients hospitalized in the special care department of Shariati Hospital

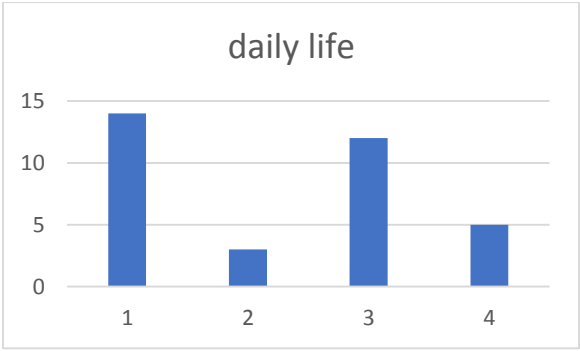

Figure 15- Examining the frequency of complications in daily life in COVID patients hospitalized in the special care department of Shariati Hospital

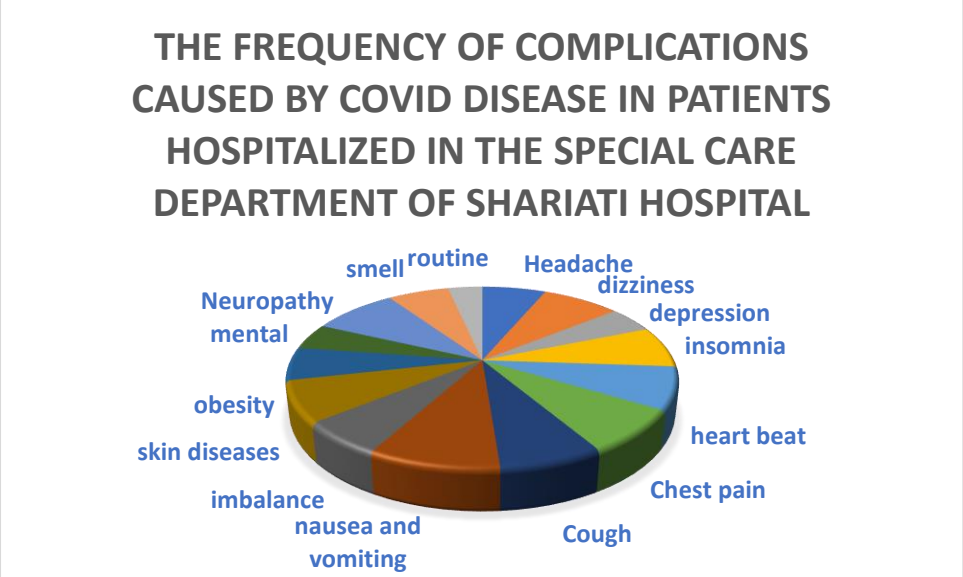

Figure 16- Complication Frequency in COVID-19 Hospitalized Patients

Conclusions

In conclusion, based on the conducted study and previous research, it is evident that patients who have been admitted to the intensive care unit (ICU) due to COVID-19 face a high frequency of complications following discharge. These complications highlight the need for further studies aimed at reducing the occurrence and severity of these complications. The findings emphasize the importance of ongoing research and the implementation of strategies to improve the post-ICU outcomes of COVID-19 patients, ultimately enhancing their overall recovery and quality of life.

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