
# Mortality rates of COPD in deceased COVID-19 patients, a cross-sectional study, Afghanistan, Kabul, 2022-2023


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ABSTRACT

**Background:** Infections caused by COVID-19 have a high mortality rate in the world and mostly cause weakness in the respiratory system. The existence of several chronic diseases (comorbidities) along with COVID-19 infections causes the development and spread of these infections and increases the mortality rate. COPD is one of the diseases that increase the severity of COVID-19 infections.

**Aim and method:** The aim of this study is to investigate the mortality rates of COPD patients infected with COVID-19. In this study (a cross-sectional study), the data of 68 patients who deceased due to infections caused by COVID-19 from December 2021 to August 2022 in Afghan-Japan Hospital in Kabul city were used.

**Results:** The 68 patients who deceased, 5 patients (7.35%) were also suffering from COPD, and the mortality rates among COPD patients were reported from 63 COVID-19 patients suffering from COPD (7.93%), while the mortality rates among COPD patients (3.1%) were reported.

**Conclusion:** The existence of several chronic diseases increases the severity of infections caused by COVID-19 and increases the mortality rate among patients, therefore, they require caution and effective medical measures.



**Keywords:** COVID-19, COPD, Kabul and Mortality rate


## 1. Introduction

COVID-19 is one of the viral respiratory diseases, the cause of which is Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-COV-2), one of the 5 human corona viruses. This virus has the genome of Beta corona virus. Although its etiology and pathology have not been fully identified yet, according to the reports received, this virus enters host cells through Angiotensin Converting Enzyme 2 (ACE2) receptors *(Xu et al., 2020)*. ACE2 is a transmembrane peptidase that produces angiotensin by hydrolyzing angiotensin 2 (Ang 2). Ang 2 acts directly on vascular smooth muscle cells through angiotensin 1 receptors, which causes an increase in vascular resistance. In the studies, it has been emphasized that by reducing the expression of ACE2, it is possible to prevent the infection of COVID-19, and the level of infection of COVID-19 in epithelial cells is related to the expression level of ACE2. The existence of chronic diseases

plays an important role in the worsening of COVID-19 infections *(Higham et al., 2020)*. The presence of other diseases in COVID-19 patients causes an increase in the incidence of this disease and causes an increase in mortality among patients *(Singh et al., 2020)*. One of these diseases can be known as Chronic Obstructive Pulmonary Diseases (COPD). COPD refers to a group of diseases that cause airflow blockage and breathing- related problems. It includes emphysema and chronic bronchitis. Mechanisms that may increase susceptibility to COVID-19 infection in COPD:

1. Increased pulmonary ACE 2 expression.
2. Reduced anti-viral defense.
3. Dysfunctional endothelial cells and increased coagulopathy may worsen COVID-19 clinical course *(Higham et al., 2020)*.

COVID-19 has created many dangers for human life. The prevalence of this virus in developing countries is reported to be around (0.38%) on average. The mortality rates caused by COVID-19 in developing countries is (67.5), but in developed countries, it is about (972) cases per million people. Also, the prevalence of COPD has been reported in developing countries (1.12%) and in developed countries (2.69%). The number of COPD patients suffering from COVID-19 is also different all over the world, as this rate has been reported in developing countries (1.48%) and in developed countries (2.02%). The mortality rates of COPD patients with COVID-19 in developing and developed countries are almost similar, as (2.69%) and (2.20%) in developing and developing countries, respectively. It was found that COPD patients infected with COVID-19 have died *(Aggarwal et al., 2022).*

In the study conducted on 154 COVID-19 patients, 89 patients died and 65 patients recovered completely. Among these patients, 73 patients had COPD and 11 COPD patients died. The mortality rate in this study was reported in COPD patients with COVID-19 (15.1%) *(Leung, 2020)*. Comorbidities of chronic diseases can develop COVID-19 infections and mortality. The results received from studies conducted on COVID-19 patients, different rates have been recorded in different countries, such as the prevalence of COVID-19 on COPD patients in China (2.4%), USA (9.2%), Italy (4%), UK (17.7%), Spain (3.3%), Mexico (2.2%), Kuwait (0.5%), *(Singh et al., 2020)*, Iran (17.3%), *(Mohammadi et al., 2021)*, France (5.3%), Turkey (1.9%), Belgium (7.7%), Denmark (8.4%), Bangladesh (8.3%), *(Gerayeli et al., 2021)*, Spain (38%), *(Leung et al., 2020)*, Pakistan (4%), *(Rahim et al., 2020)*, and Russia (1.4%) *(Kirllow et al., 2021)*. Also, the mortality rates of COPD patients infected with COVID-19 have been reported in Canada (13%), *(Bajgain et al., 2021)*, China (46.24%), *(Cao et al., 2019)*, and Turkey (13.2%), *(Turan et al., 2021)*.

Infections caused by COVID-19, regardless of health status, ethnicity, gender, and age, cause the destruction of body tissues, but old age and chronic diseases aggravate these infections *(Baradaran et al., 2020)*. The simultaneous existence of COPD and COVID-19 in patients causes neurological disorders. Since COPD patients are prone to severe shortness of breath during activity, they suffer from lack of oxygen and thus cause hypoxemia and exacerbation of ischemic changes in the brain *(Yohannes, 2021)*. Blood pressure and diabetes are two chronic diseases that increase the mortality rate of COVID-19 patients, but the existence of some respiratory diseases such as COPD also increase the mortality rate of COVID-19 patients *(Olloquequi et al., 2020).* Although the prevalence of COPD in patients with COVID-19 is lower than other chronic diseases in current reports, but the mortality rate of covid-19 with COPD is high *(Alqahtani, et al., 2020)*. COVID-19 patients with a history of COPD have higher in-hospital mortality *(Reyes et al., 2021)*. According to the results received from the studies, having COPD and smoking are among the most important risk factors for mortality in COVID-19 patients *(Zhao et al., 2020)*. By identifying the risk factors of COVID-19 patients, the lives of these patients can be saved *(Dorjee et al., 2020)*.

## 2. Aim Of Study

The purpose of this study is to know the relationship between COPD and COVID-19 on COPD patients, because chronic COPD is one of

the risk factors for the exacerbation of COVID-19 infections.

## 3. Method Of Study

This research is a cross-sectional study, the required data of which was used from the patients in the ICU department of the Afghan-Japan Hospital in Kabul, Afghanistan, from December 2021 to August 2022.

## 4. Data Analysing

Programs such as SPSS, IBM, 27.0.1 have been used for data analysis in this study. In order to better present the results of this study, Excel has been used to draw tables and graphs.

## 5. Results

At this point in time, 1,328 patients visited the Afghan-Japan Hospital in Kabul, and after the PCR (polymerase chain reaction) test, 476 patients (35.8%) were diagnosed with COVID-19. Among these, 68 patients (14.2%) died due by COVID-19. In this study, the gender of 68 deceased patients was investigated. The mortality rates were almost similar considering the gender, so that out of 68 patients who died, 35 were men (51.5%) and 33 were women (48.5%). In this study, the age categories of deceased patients were also investigated.

The highest mortality rate was reported in 44 patients (64.7%) in the age group between 61 and 80 years old. Also, the duration of hospitalization of deceased patients was also investigated, and the majority of deceased patients were hospitalized for more than 9 days. the existence of chronic diseases in this study also differed among deceased patients, such as pneumonia in 62 patients (91.2%), ADRS (acute respiratory distress syndrome) in 14 patients (20.6%), hypertension in 11 patients (16.2%), COPD in 5 patients (7.4 %), CHF (congestive heart failure) 1 patient (1.5%) and other chronic diseases (2.9%) were reported. More details of deceased patients are presented in Table 1.

Mortality rates of COPD patients

In this study, out of 68 patients who died, 5 patients (7.4%) were reported to have COPD. Among them, 2 patients were male (40%) and 3 patients were female (60%). Most of the deceased patients were in the age group of 61-80 years (60%) and the majority were hospitalized for more than 9 days. Also, a significant relationship has been observed between the hospitalization time of deceased patients, gender ($p = 0.094$) and age of deceased patients ($p = 0.237$). More details of COPD patients are presented in Table 2.

## 6. Discussion

The rates of being infected with the COVID-19 in this study (35.8%) were observed, which is higher than European and American countries, but lower compared to Asian countries. The rate of COVID-19 infection among COPD patients was also reported in this study (13.2%), which is higher than the statistics of Italy (4.0%), Mexico (2.2%), Kuwait (0.5%) and Spain (7.4%). But it is less than India (16.4%) and England (17.7%) (Singh et al., 2020). The mortality rate of COPD patients due to COVID-19 infections was reported in this study (7.9%). This rate obtained is higher than the mortality rates in China (3.92%) *(Hu et al., 2020)*, but lower than the mortality rates in countries such as Spain (9.33%) *(Graziani et al., 2020)*, Turkey (13.2%) *(Turan et al., 2021)*, South Korea (19.2%) *(Lee et al., 2021)*, Canada (29.6%) *(Ge et al., 2021)* and Saudi Arabia (30%) *(Alkhathami et al., 2021)*. Most of the patients who died in this study were men (40%), which is less than Turkey (79.2%) and Pakistan. The maximum duration of hospitalization of patients in this study is also longer than the duration of hospitalization in Pakistan. The main reasons for the difference in the rates obtained with other countries can be the difference in economic, health, social, cultural and geographical dimensions.

## 7. Conclusion

The existence of several chronic diseases (comorbidities) among COVID-19 patients increases the mortality rate of patients. The existence of COPD in the case of COVID-19 patients also increases the deterioration and even causes the death of the patients.

## 8. Limitation

The lack of a complete database in health centers in Afghanistan and the difference in the diagnostic criteria of patients.

## Author Contributions

Writing- review and editing by Murtaza Jafari, Conceptualization by Abdulbasit Taib, Investigation methodology by Abid Sediqi and Data analysis by Razia Miri.

## Conflict Of Interest

No conflict of interest

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Table 1: Summary of deceased patients' information

| | Frequency/Percent | Mean | Std. Error of Mean | Std. Deviation | Variance | p-value |
|---|---|---|---|---|---|---|
| **Gender** | | 1.49 | .061 | .503 | .254 | < .001 |
| Male | 35 (51.5%) | | | | | |
| Female | 33 (48.5%) | | | | | |
| **Age (years)** | | 2.88 | .080 | .659 | .434 | < .001 |
| <40 | 2 (2.9%) | | | | | |
| 41-60 | 13 (19.1 %) | | | | | |
| 61-80 | 44 (64.7%) | | | | | |
| >80 | 9 (13.2 %) | | | | | |
| **IPD (days)** | | 2.63 | .140 | 1.158 | 1.340 | < .001 |
| 1-3 | 14 (20.6 %) | | | | | |
| 4-6 | 20 (29.4 %) | | | | | |
| 7-9 | 11 (16.2 %) | | | | | |
| >9 | 23 (33.8 %) | | | | | |
| **Comorbidities** | | | | | | |
| Pneumonia | 62 (91.2 %) | .91 | .035 | .286 | .082 | < .001 |
| ADRS | 14 (20.6 %) | .21 | .049 | .407 | .166 | < .001 |
| Hypertension | 11 (16.2 %) | .16 | .045 | .371 | .138 | < .001 |
| COPD | 5 (7.4 %) | .07 | .032 | .263 | .069 | < .001 |
| CHF | 1 (1.5 %) | .01 | .015 | .121 | .015 | < .001 |
| Others | (2.9 %) | .03 | .021 | .170 | .029 | < .001 |
| **Total** | 68 (100 %) | | | | | |

Table 2: Summary of COPD deceased patients' information

| | Frequency/Percent | Mean | Std. Error of Mean | Std. Deviation | Variance | p-value |
|---|---|---|---|---|---|---|
| **Gender** | | 1.60 | .245 | .548 | .300 | .094 |
| Male | 2 (40 %) | | | | | |
| Female | 3 (60 %) | | | | | |
| **Age (years)** | | 2.40 | .400 | .894 | .800 | .237 |
| <40 | 1 (20 %) | | | | | |
| 41-60 | 1 (20 %) | | | | | |
| 61-80 | 3 (60 %) | | | | | |
| >80 | 0 | | | | | |
| **IPD (days)** | | 2.80 | .583 | 1.304 | 1.700 | .016 |
| 1-3 | 1 (20 %) | | | | | |
| 4-6 | 1 (20 %) | | | | | |
| 7-9 | 1 (20 %) | | | | | |
| >9 | 2 (40 %) | | | | | |
| **Total** | 5 (100) | | | | | |