



Review article

**A systematic review on SARS-COVID-2: Risk and its comorbidities**

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**ABSTRACT**

Since 2019 November, an outbreak of COVID-19 arose and became a major public health emergency of international concern. A comprehensive case series from China was published by the New Coronavirus Pneumonia Emergency Response Epidemiology Team, which indicated an overall fatality rate of 2.3 percent, which climbed to 6.0 percent in persons with high blood pressure. The elderly and people with underlying medical problems, such as cardiovascular disease, diabetes, chronic respiratory diseases and cancer are more likely to develop serious illnesses. An electronic literature search was carried out by the search engines like PUBMED, Google scholar, etc. Comorbidities included in this study such as diabetes, hypertension, asthma, cardiovascular risk factors, cerebrovascular conditions. The result was the most of the comorbid caused was hypertension. By the above systemic review, it was concluded that the most comorbid condition hypertension followed by diabetes mellitus, hence the mortality rate also seems to be higher in these two cases.

**Keywords:** COVID-19, Comorbidities, Clinical investigations, Morbidity and mortality, Hypertension and diabetes mellitus.

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**INTRODUCTION**

Since 2019 November, an outbreak of COVID-19 arose and became a major public health emergency of international concern. This has been developed from the severe acute respiratory syndrome, known as SARS-COVID-2. This has been initially started in Wuhan, China, and spread quickly to over 180 countries [1]. Coronaviruses are single-stranded RNA viruses with a high capacity for rapid mutations and recombination's that cause respiratory or intestinal infections in humans and animals. COVID-19 virus infection occurs by coupling the protein S in the virus with the angiotensin converting enzyme 2 (ACE2), which is located in the lungs and acts as a receptor for the virus [2]. The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team published a large case series from China; they found an overall case fatality rate of 2.3% (1023 of 44,672 confirmed cases), which increased to 6.0% for people with hypertension [3].

According to the World Health Organization (WHO), the majority of people infected with the COVID-19 virus had suffered from mild to moderate respiratory illnesses and recovered without special treatment. The Orderly and people with underlying medical problems like disorder, diabetes, chronic respiratory illness, and cancer are more likely to develop serious illnesses. The most common symptoms of the SARS-COVID-2 are fever, dry cough, tiredness, the less common include sore throat, diarrhoea,

conjunctivitis, and serious include difficulty in breathing or shortness of breath, chest pain and loss of speech or movement. These clinical manifestations may give rise to many conditions which may worsen the health condition i.e., morbidity and mortality of the individuals who have been affected by the COVID-19. These data were reported without adjustment for age. Both the mortality rates from COVID-19 and the prevalence of hypertension increase with age, reaching 8.0% and more than 50% in the age group 70 to 79 years, respectively [3]. The morbidity caused by the COVID-19 is more than 80% of deaths occur in people over age 65, and more than 95% of deaths occur in people older than 45. This study may give a comprehensive review of the risk of the COVID-19 virus-affected patients by their previous comorbid conditions.

**METHODOLOGY**

An electronic literature search was carried out by the search engines like PUBMED, Google scholar, etc., The articles were selected based on the criteria which belong to the topic like COVID-19, comorbidities, clinical features, diabetes, and hypertension-induced COVID-19. From these criteria, the articles were selected and reviewed for the topic from the years 2020, 2021. Several articles were reviewed and preprints were taken. Comorbidities included in this study were diabetes, hypertension, asthma, cardiovascular risk

factors, and cerebrovascular conditions, the less common are HIV, Hepatitis-B, malignancy, respiratory distress, and immunodeficiency.

## DISCUSSIONS

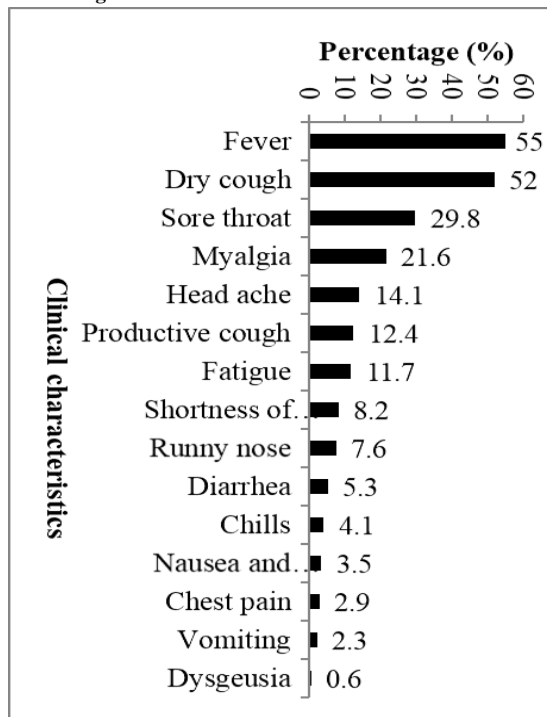
The prevalence rate of COVID-19 patients with diabetes, high blood pressure, and cardiovascular disease (CVD), has varied in different studies, as well as country-specific data [4].

### Clinical evolution of SARS-COVID-2

The confirmed and reported symptoms of the SARS-COVID-2 were cough, fever, chills, shortness of breath, muscle aches, sore throat, loss of taste or smell, diarrhea, and headache [5].

A study conducted for the clinical characteristics of COVID-19 in **Figure 1**, showed fever(55%) as common symptoms followed by dry cough(52%), sore throat(29.8%), myalgia(21.6%), head ache(14.1%), productive cough(12.4%), fatigue(11.7%), shortness of breath(8.2%), runny nose(7.6%), diarrhea(5.3%), chills(4.1%), nausea and abdominal pain(3.5%), chest pain(2.9%), vomiting(2.3%), dysgeusia(0.6%) [6].

**Figure 1:** Clinical characteristics of COVID-19



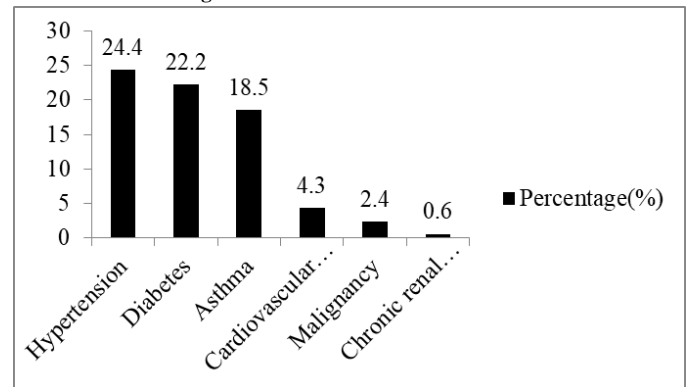
A data obtained from Research square, Alshukry A, Ali H, Ali Y *et al.*, Clinical.

The symptoms which have occurred to the patients will start from mild to moderate, if the pneumonic condition has been improved the symptoms become severe in 5-7 days [5], accordingly in elderly patients 1 out of 6 may cause severe infection and develop difficulty in breathing. In the study given in **Figure1**, most of the symptomatic population occurs in the age group of 51-60 years old (20.5%), followed by 31-40(19.3%) years old and 61-70(18.7%) years old [6].

The comorbidities of the SARS COV-2 have been recorded in the previous study in Fig.1, is hypertension (24.5%), diabetes

(22.2%) followed by asthma (18.5%), malignancy (2.4%), cardiovascular disease (4.3%), and chronic renal disease (0.6%) [6] Given in **Figure 2**.

**Figure 2:** Comorbidities of COVID-19



A data obtained from Research square, Alshukry A, Ali H, Ali Y *et al.*, Clinical characteristics of coronavirus disease 2019 (COVID-19) patients in Kuwait. As on Nov. 20, 2020 [6].

### Treatment and mortality in COVID-19

The study conducted by the confirmatory symptomatic COVID-19 patients results in the treatment given for the patients were Antibiotic 54(31.6%), Antiviral 37(21.6%), Antimalarial 24(14.0%), Corticosteroids 2(1.2%) [5].

In case of mortality rate assessed by some studies included in china was reported as hypertension (9.5%), diabetes (7.4%), COPD (7%), CVD (7.3%) [8,9]. and in Italy were 73.8, 35.5,13.7 and 42.5(%) respectively [10,11].

### COVID-19 in Hypertension

Hypertension is the world's single most important factor in the loss of adequate years of life for people with disabilities [12]. The majority of the population over 60 years of age have high blood pressure [13].

In March 2020, a study-level meta-analysis of two, 552 confirmed COVID-19 patients reported a pooled odds ratio (OR) of 2.49; (CI 1.98 to 3.12; 11 studies) for severe disease within the presence of hypertension with little heterogeneity between studies. The OR of death was similar, and weak evidence for meta-regression suggested that high blood pressure could be a clinical predictor of COVID-19 severity in people older than 60 years [3]. Where COVID-19 attacks by upregulating the expression of ACE2 [14]. This increases the signaling of the angiotensin II level by the angiotensin II receptor type 1a (AT1a) and promotes disease pathogenesis, induces pulmonary edema, and impairs respiratory function [15,16]. Several observational studies show that the use of ACE - Inhibitors and ARBs lead to better outcomes in patients with pneumonia [14].

Two large retrospective cohort studies have also been published; In 18,472 people from Ohio and Florida, no association was found between taking ACE inhibitors or ARBs and a positive coronavirus test (weighted OR 0.97, 95% CI 0.81-1.15), while

another A study with 12,594 electronic records of latest York patients found no connection between antihypertensive drugs (ACE inhibitors, ARBs, beta-blockers, calcium channel blockers, or thiazide diuretics) and a better probability of a positive coronavirus test or a better risk of severe illness from COVID-19 [17, 18].

As a treatment in these cases, some experimental studies have reported that the use of ACE inhibitors and ARBs is not clearly identified as beneficial or harmful. These drugs can increase ACE 2, which reduces the inflammatory effects of angiotensin II, with ACE2 being a powerful anti-inflammatory agent that protects against lung damage [19].

#### COVID-19 in Diabetes mellitus

The collision of the two global pandemics of COVID-19 and type 2 diabetes (T2D) has led to the sad reality that T2D is already the second most common comorbidity of COVID-19 [20] and an increase in interleukin6, which can cause symptoms similar to pneumonia [21,22].

Type 2 diabetes patients were also more likely to have a greater severity of COVID-19. A cohort study of 7337 COVID-19 patients with and without type 2 diabetes showed that patients with type 2 diabetes required more interventions for their hospital stay than non-diabetics [23]. New data on COVID-19 suggest that between 11% and 58% of all COVID-19 patients have diabetes, and a COVID-19 death rate of 8% has been reported in diabetics [24,25], significantly higher in patients with Pre-existing DM2 compared to non-diabetic [23].

#### COVID-19 in Asthma

Asthma is a major increasing chronic airway disease and its prevalence has been increasing worldwide since 1950 [26,27]. Asthma is a heterogeneous clinical syndrome that includes bronchial hyperresponsiveness, airway inflammation, and variable expiratory airflow limitation [28]. SARS-COV-2 targets asthma by a delayed innate antiviral immune response and delayed secretion of IFN and causes chronic respiratory diseases along with pneumonia like symptoms [29,30].

However, in the retrospective cohort study of 7272 COVID-19 patients, the proportion of asthma patients among the total COVID-19 patients was 9.4% [31,32], which is relatively higher than the previously known prevalence in Asian Pacific countries and the possibility of developing the severe disease in COVID-19 patients is associated with asthmatic smokers, particularly geriatric individuals [33]. So that asthma is not directly associated with COVID-19 infections.

#### COVID-19 in cardiovascular problems

It is not clear if preexisting cardiovascular disease is a risk factor for acquiring COVID-19, however, some research suggests that preexisting cardiovascular disease and its risk factors such as

smoking, high blood pressure, or diabetes may regulate the boosts the expression of ACE2 [34,35]. Studies reported that COVID-19 patients had the following risk factor incidence rates: smoking 10%, high blood pressure 6% to 31.2%, diabetes 10.1% to 22%, stroke 1.4% to 22% [36,38]. SARSCoV2 targets a weakened immune system and causes myocardial injury, a heart attack [39].

#### CONCLUSION

By the above systemic review, we concluded that the most comorbid condition was hypertension followed by diabetes mellitus, and the symptomatic assessment was found to be dry cold, myalgia, and sore throat and which has been a risk for the treatment of COVID-19, and hence the mortality rate also seems to be higher in these two cases.

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