Asthma and COVID-19 - A systematic review

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Letter to de Editor

Asthma and COVID-19 - *A systematic review*

Dear Editor,

COVID-19 was first reported in December, 2019 in Wuhan, China, and rapidly spread across the globe [1]. It has affected more than 6.4 million people and has led to the death of over 370 thousand as of June 2, 2020 (www.who.org). Severely affected patients present fever, dry cough, dyspnea, and fatigue, which are commonly associated with the development of pneumonia and acute respiratory distress syndrome (ARDS) [2]. Advanced age, ischemic and congestive heart disease, hypertension, diabetes, and chronic obstructive pulmonary disease (COPD) are the most important independent predictors of death [2,3]. As with other infectious diseases affecting the respiratory tract, asthma has been cited as a potential risk factor for severe COVID-19[4-6]; however, no previous study has addressed this specific question.

Here, we systematically reviewed all papers published on COVID-19 since its emergence in December 2019 to May 18, 2020, looking into the description of asthma as a premorbid condition and its putative association with severe progression of the disease.

Two authors, NFM and CPJ, independently identified cross-sectional and longitudinal studies published before May 18, 2020, that reported on the prevalence of asthma as a premorbid condition of severe COVID-19 by systematically searching PubMed-NCBI database. We restricted the search for PubMed-NCBI because COVID-19 is a new medical condition and, currently, PubMed-NCBI covers more than 90% of MEDLINE providing a widely accessible biomedical resource [7]. For database searches, language of the article was restricted to English. Search terms included the following: *COVID-19 (COVID, COVID 19)* or*nCov* or *novel coronavirus* or *Sars-Cov-2* in the title and *clinical characteristics* or *asthma* anywhere in the text. Three authors, EM, EPA, and LAV, resolved eventual discrepancies by discussion and adjudication.

We found 458 articles that met the initial inclusion search criteria (Supplementary Figure 1). All articles were assessed by authors and 290 were excluded (Supplementary Table 1) due to one or more of the following criteria: editorials; metanalyses; systematic reviews; commentaries; letters to the Editor; no description of patient's clinical characteristics or premorbid conditions; and main text in a language other than English.

The remaining 150 articles were included in the study. Supplementary Table 2 depicts the details of all articles analyzed. As a whole, the articles described the clinical aspects of 36,072 COVID-19 patients. One hundred and seven studies mentioned the existence of other respiratory premorbidities except for asthma. Asthma was mentioned as a premorbid condition in only eighteen studies (Table 1). There was a total of 8,690 patients included in the studies mentioning asthma, and 655 patients were previously diagnosed with asthma. In most of the studies describing other respiratory illnesses, COPD was the leading diagnosis.

Based on the current medical records, we conclude that 7.5% of patients included in articles describing the clinical characteristics of COVID-19 patients and citing asthma were previously diagnosed with asthma. If

all studies providing any clinical description of COVID-19 comorbidities are taken into consideration, asthma was present in only 1.8% of patients. These numbers are far less than expected considering the prevalence of asthma in the world. According to the World Asthma Report (http://www.globalasthmareport.org), there were as many as 339 million people living with asthma in the world in 2018, which corresponds to 4.4% of the world's population.

In conclusion, asthma does not seem to be an important premorbid condition in COVID-19 patients; or, conversely, it could be a protective factor, as previously proposed [8]. The findings herein reported could be an epidemiological truth that should be further explored in mechanistic studies or could be due to the fact that researchers are not properly investigating and describing the premorbidities in COVID-19 patients. Whatever the reasons, the medical community should be aware of the implications of missing the diagnosis of a potentially severe respiratory disease such as asthma that could worsen the prognosis of COVID-19 patients.

Ethics. The study does not require ethical approval because the systematic review is based on published research and the original data are anonymous.

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Table 1. Details of the articles that mention asthma.

Citation	Title
Aretz M, et al. 2020	Characteristics and Outcomes of 21 Critically Ill Patients With **COVID-19** in Washington Sta
Bhatraju PK, et al. 2020	**Covid-19** in Critically Ill Patients in the Seattle Region — Case Series
Chao JY, et al. 2020	Clinical Characteristics and Outcomes of Hospitalized and Critically Ill Children and Adolescen
Duanmu Y, et al. 2020	Characteristics of Emergency Department Patients With **COVID-19** at a Single Site in Northe
Fan J, et al. 2020	The epidemiology of reverse transmission of **COVID-19** in Gansu Province, China.
Ferguson J, et al. 2020	Characteristics and Outcomes of Coronavirus Disease Patients under Nonsurge Conditions, Nor
Fernandéz R, et al. 2020	**COVID-19** in Solid Organ Transplant Recipients: A Single-Center Case Series From Spain
Gold JAW, et al. 2020	Characteristics and Clinical Outcomes of Adult Patients Hospitalized With **COVID-19** - Georg
Lechien JR, et al. 2020	Clinical and Epidemiological Characteristics of 1,420 European Patients With Mild-To-Moderat
Li X, et al. 2020	Risk factors for severity and mortality in adult **COVID-19** inpatients in Wuhan
Merza MA, et al. 2020	**COVID-19** outbreak in Iraqi Kurdistan: The first report characterizing epidemiological, clinica
Richardson S, et al. 2020	Presenting Characteristics, Comorbidities, and Outcomes Among 5700 Patients Hospitalized Wi
Sultan I, et al. 2020	The Role of Extracorporeal Life Support for Patients With COVID-19: Preliminary Results Fro
Wang X, et al. 2020	Nosocomial Outbreak of **2019 Novel Coronavirus** Pneumonia in Wuhan, China
Yao Q, et al. 2020	Retrospective Study of Risk Factors for Severe **SARS-Cov-2** Infections in Hospitalized Adult
Zhang JJ, et al. 2020	Clinical characteristics of 140 patients infected with **SARS-CoV-2** in Wuhan, China
Zhang L, et al. 2020	Clinical Characteristics of **COVID-19**-infected Cancer Patients: A Retrospective Case Study i
Zhou X, et al. 2020	Clinical Characteristics of **Coronavirus Disease 2019 (COVID-19)** Patients With Hyperten