

# Impact of asthma on COVID-19 outcomes ‘remains controversial’

A series of studies that assessed COVID-19-related risks and outcomes among patients with asthma were presented at this year’s virtual American Academy of Allergy, Asthma and Immunology Annual Meeting.

“Numerous studies to date have examined the relationship between [COVID-19 and asthma](#),” **Andrea Sitek, MD**, a first-year allergy fellow at the Mayo Clinic in Rochester, Minnesota, said during her presentation. “However, the impact of asthma on patients with COVID-19 remains controversial and incompletely understood. A series of studies that assessed COVID-19-related risks and outcomes among patients with asthma were presented at this year’s virtual American Academy of Allergy, Asthma and Immunology Annual Meeting.

## Hospitalization, other COVID-19 outcomes

Sitek and colleagues conducted a systematic review and meta-analysis to evaluate patients with COVID-19 who had asthma.

“Our results are somewhat unexpected,” Sitek said during the presentation. “Among patients with COVID-19 infection, the presence of asthma was not associated with a significant increased risk of hospitalization, length of hospitalization, ICU admission or death.”

The researchers completed a comprehensive search of multiple databases for studies on COVID-19 published through October 2, 2020.

Of the 389 studies that were identified, 16 studies involving 92,275 patients were included in the final analysis. Of these studies, 15 were observational and 1 was a prospective cohort study. One study specifically assessed pregnant women, and one only involved pediatric patients.

Among all participants, 48% were female, and the average age was 39.6 years.

Compared with patients who did not have asthma, Sitek and colleagues determined that having asthma was not associated with a significantly increased risk for hospitalization (OR = 1.46; 95% CI, 0.29-7.28), length of hospitalization (1.59 days [-0.55 to 3.74]), being admitted to the ICU (OR = 1.65; 95% CI, 0.56-4.17) or death (OR = 0.73; 95% CI, 0.38-1.40) among patients with COVID-19. They noted that the overall risk for bias was high among the studies.

They also said that while there was a trend toward an increased risk for hospitalization, ICU admission and length of stay among patients with asthma, there was also a trend toward a lower risk for death in [patients with asthma](#) who had COVID-19.

As a potential reason behind these trends, Sitek said that “it has been posited that TH2 inflammation may offer a protective role in the setting of COVID-19 infection, and many studies to date have sought to investigate this theory.”

She added that the current analysis was limited because the included studies were observational and had a large degree of heterogeneity for the assessed outcome. In addition, the method for confirming asthma diagnoses varied between studies, and there was a relatively small number of outcome events in asthmatic groups.

“Further studies are needed in order to better characterize the risk of severe COVID-19 among patients with different subtypes of asthma, as well as among patients with varying degrees of asthma severity,” Sitek said.

## **COVID-19 severity in patients with asthma**

Another analysis that was presented at the meeting also found no significant increased risk for poor COVID-19 outcomes among patients with asthma.

“Early reports did not clearly define the relation between asthma and severe clinical outcomes of COVID-19,” **Lacey Robinson, MD**, an instructor in medicine at Massachusetts General Hospital, told Healio Primary Care. “Many studies were limited by the inclusion of non-asthma chronic pulmonary disease, such as patients with chronic obstructive pulmonary disease (COPD), who may be at higher risk for severe outcomes.”

Robinson and colleagues conducted a matched cohort study with data from the Mass General Brigham Health Care System on adults aged 18 years or older with COVID-19 who did not have COPD, cystic fibrosis or interstitial lung disease from March 3, 2020, through June 2, 2020.

Within the study, patients had at least two asthma diagnosis codes and a prescription for asthma medication in the year leading up to their COVID-19 diagnosis. The researchers matched patients with asthma with up to five non-asthma comparators, who were matched based on age within 5 years, sex and date of positive COVID-19 test within 1 week.

Among 562 patients with asthma who tested positive for COVID-19, 21% were hospitalized, 3% received mechanical ventilation and 1% died.

Of the 2,686 matched comparators, 18% were hospitalized, 4% received mechanical ventilation and 3% died.

Robinson and colleagues determined that, compared with patients without asthma, patients with asthma had a similar risk for hospitalization (adjusted HR = 0.99; 95% CI, 0.8-1.22) and

mechanical ventilation (adjusted HR = 0.96; 95% CI, 0.36-1.29) and a lower risk for death (adjusted HR = 0.3; 95% CI, 0.11-0.8).

Based on the findings, Robinson said that primary care physicians should tell patients with asthma that “asthma alone does not increase risk of severe COVID-19.”

“Asthma patients should continue their current asthma therapies and follow general public health guidance — masks, physical distancing, hand washing, avoiding crowds, etc.,” she said.

“COVID-19 vaccination should be encouraged for all patients, including asthma patients, when eligible.”

### **Severe COVID-risk with asthma, COPD, medication use**

A third analysis, however, found that patients with asthma and COPD had an increased risk for severe COVID-19 illness and hospitalization.

“Asthma and COPD are listed by the CDC as potential comorbid conditions associated with severe COVID-19,” **Brian Huang, PhD**, a postdoctoral scholar at USC’s Keck School of Medicine, said during the presentation. “However, previous small studies have been inconsistent, detecting both positive and negative associations of asthma and COPD with severe COVID.”

Additionally, he noted that the use of corticosteroids and bronchodilator among these patients may affect COVID-19 disease severity because of their anti-inflammatory and immune suppressing effects.

Huang and colleagues conducted a retrospective cohort study of patients diagnosed with COVID-19 at Kaiser Permanente Southern California from March 2020 through August 2020. They used electronic health record data to collect information on patients’ histories of asthma

and COPD, use of bronchodilators and corticosteroids, demographic characteristics, lifestyle factors, comorbidities and other covariates.

For the study, they considered hospitalization in the 30 days following a COVID-19 diagnosis to represent severe COVID-19.

The study included 72,478 adult patients with COVID-19 (mean age, 43 years). Among these patients, 9.6% were hospitalized within 30 days.

In the entire cohort, 76.3% of patients had no asthma or COPD, 10.7% had asthma only, 8.8% had COPD only, and 4.2% had both asthma and COPD.

The researchers found that the prevalence of bronchodilator and corticosteroid use was 44.8% in those with asthma, 31.4% in those with COPD, and 66.8% of those with asthma and COPD.

Huang and colleagues also reported that the percentage of patients hospitalized with COVID-19 was 8.6% in those with no asthma or COPD, 9.2% in those with asthma only, 15.1% in those with COPD only, and 7.8% in those with both asthma and COPD.

Using those without asthma or COPD as a reference, the researchers determined that there was an increased risk for hospitalization among those with asthma only (OR = 1.06; 95% CI, 0.97-1.16), COPD only (OR = 1.16; 95% CI, 1.06-1.26), and in those with asthma and COPD (OR = 1.22; 95% CI, 1.09-1.37). When assessing hospitalization among patients with asthma and COPD who used medication, compared with those who did not use medications, the odds ratio for hospitalization was 1.01 (95% CI, 0.84-1.21) in those who only used steroids, 1.11 (95% CI, 0.95-1.29) in those who only used bronchodilators, and 1.36 (95% CI, 1.21-1.53) in those who used both medications. According to Huang, the increased odds for hospitalization in all

subgroups was observed only in patients aged 35 to 64 years. He added that when examining these associations by obesity status, they found that the associations were only significant among patients who were obese. “Our study found that patients with both asthma and COPD had the highest risk of hospitalization,” Huang said. “Among asthma and COPD patients, those who used both types of medications were more likely to be hospitalized, suggesting that the severity of asthma and COPD could be a key risk factor for developing severe COVID-19.”

Sitek A, et al. Abstract L28. Presented at: AAAAI Annual Meeting; February 26-March 1, 2021. (Virtual)

Huang B, et al. Abstract L39. Presented at: AAAAI Annual Meeting; February 26-March 1, 2021. (Virtual)

Robinson L, et al. Abstract L22. Presented at: AAAAI Annual Meeting; February 26-March 1, 2021. (Virtual)