

A STUDY ON POST-COVID ALLERGIC AIRWAY DISEASE

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ABSTRACT

Aim: To research the onset or progression of post-covid allergic airway illness in a tertiary care facility. **Method:** To gain a better knowledge of the condition, 90 patients were included in the research, including inpatients and outpatients diagnosed with post-COVID allergic airway disease. It was done to collect patient data. Every piece of information necessary for the study was gathered at the time of enrollment. After putting the data into a Microsoft Excel sheet, it was analyzed, and frequency tables were created using an appropriate statistical analysis technique. The references for this study were found via searches for similar articles, which were done in a hospital where patients were receiving care. **Results:** Post-covid allergic airway illness, or worsening or development of upper airway allergies, as shown by our study's findings. Among the 90 instances, the average age of individuals impacted was between 30 and 40 years old, with men being more at risk. Symptoms were used to divide the patients into groups. 21% of patients had a cough, 19% had a cough and sob, 18% had cough and throat discomfort. According to our research, 54(60%) patients developed the symptoms after COVID, and 36(40%) patients had worsening symptoms after COVID. We learned that in (17) 26% of cases patients having hypertension was the most prevalent comorbid condition, Diabetes is the next condition in (15) 23%, asthma in (10) 15% of patients, and allergic rhinosinusitis in (4) 6% and COPD, ILD (1) 2%. **Conclusion:** Men were more vulnerable than women which could result from increased exposure to pollution and allergens. All 90 patients' primary complaints were taken into account, and among them, the cough was reported by 21% of patients, A total of 19% of patients arrived with cough and SOB, and 18% of the population with cough and throat discomfort. When medication history was taken into account, it was shown that the majority of individuals have hypertension, followed by diabetes mellitus and asthma.

1. INTRODUCTION

SARS-CoV-2 has caused an unparalleled public health disaster and a worldwide pandemic. Recent research points to the formation of a unique illness called "long COVID," which refers to a variety of symptoms that continue for at least 4 weeks beyond the commencement of a documented COVID-19 infection. Common signs include chronic dyspnea, exhaustion, and coughing.^[1]

The virus responsible for COVID-19 can have long-lasting effects on some individuals affected. Similar outcomes have frequently been known post-COVID conditions (PCC) or extended COVID-19. There appear to be various terms that describe post-COVID conditions, such as long-term COVID-19, persistent COVID-19, post-acute COVID-19, and post-acute sequelae of SARS-CoV-2 infection (PASC).^[2]



Post-COVID-19



Symptoms that have persisted after more than 12 weeks without being explained by another diagnosis.

COVID-19 and Allergies

The symptoms of COVID-19, a respiratory illness, may somewhat resemble those of certain allergies (including asthma or eczema). Many precautions are taken to stop the COVID-19 virus from spreading, such as handwashing and facial coverings, which might worsen allergy symptoms. During the COVID-19 lockdown, allergic rhinitis symptoms grew worse. Some patients' allergic rhinitis (AR) symptoms worsened during the COVID-19 lockdown, and this was probably caused by more exposure to indoor allergens.^[3]

SIGNS AND SYMPTOMS

- Post-COVID symptoms can affect anyone who contracted the infection. However, some persons who later developed post-COVID illnesses have no idea when they became infected. For the most part patients with post-COVID disorders showed symptoms days after discovering they had COVID-19.^[4]
 - Numerous symptoms may appear in those with post-COVID disorders. It might endure for a few days, weeks, months, or even years. The following infection. Sometimes the symptoms may either disappear or reappear.
 - Everyone may not be affected equally by post-COVID symptoms. When different types and combinations of symptoms occur over varying periods, people with post-COVID illnesses may encounter health issues.
 - In post-COVID syndrome, coughing and shortness of breath are the most prevalent pulmonary symptoms.^[5]
- **General symptoms**
 1. tiredness or fatigue that interferes with day-to-day activities.
 2. "Post-exertional malaise" is the term for symptoms that worsen after exerting one's body or mind.
 3. Throat discomfort.
 4. Throat irritation.
 5. Shortness of breath.
 6. Breathing difficulty.
 7. Allergies.
 8. Worsening of previous allergies.
 9. Developing new allergies.
 10. Cough (persistent or severe).

PATHOPHYSIOLOGY

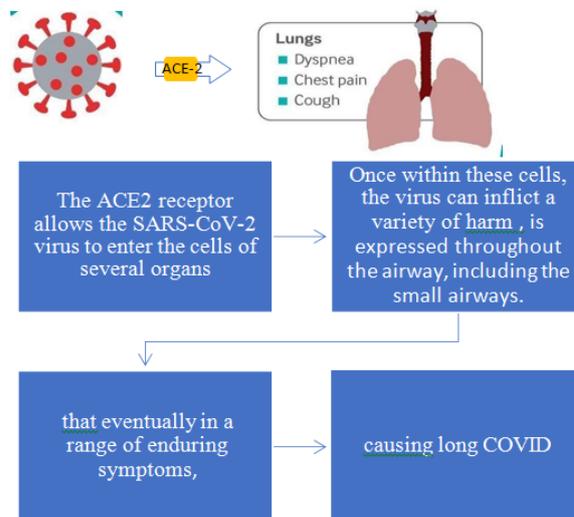
A continuous damage-repair process, cellular debris, and/or aberrant mucus production are possible causes of post-COVID Small Airway Disease.

As opposed to that, notwithstanding the lack of infection, the immunological response brought on by SARS-CoV-2 can directly bring post-COVID Small Airway Disease.

The first COVID-19 patients discovered that mononuclear cells, which likely contained oocysts and T cells, gathered in the lungs, while modest concentrations

of hyperactive T cells were seen in the peripheral blood.

T cells are present in the circulation to the point that they likely do not stay in the bloodstream but rather enter the infected organs to suppress the immune response.^[6]



DIAGNOSIS

Post-COVID illnesses are not all the same.

- Medical history is reviewed, including whether a person has ever been diagnosed with COVID-19 because of a positive test result, symptoms, or exposure. In addition, a physical exam is done. Different lung function assessments are available.^[7]

- **Spirometry**

The most used LFT is spirometry. It gauges how quickly and the quantity of air can fit inside and exit your lungs.^[8]

- **Pulmonary function test**

Also known as the plethysmography of the body. This exam reveals how much air you can keep in your lungs in addition to how much air is left behind after you exhale to the extent you can.^[9]

- **Lung volume test**

This examination gauges the rate at which oxygen and other gases leave the lungs and enter the blood.^[10]

- **ABGs Test**

Measurements of oxygen and CO₂ in your blood are made during an ABG test. The pH level of your body, which is typically balanced when you're healthy, is another thing that it monitors. Examine your lungs and breathing for any serious respiratory or lung conditions. The outcomes of your ABG exam may reveal whether or not your body is receiving adequate oxygen. Enough CO₂ is being exhaled by your lungs.^[11]

- **CT-scan**

A computed tomography scan, often known as a CT scan,

is a non-invasive imaging procedure that uses X-rays and a computer to produce visually accurate pictures of your chest's inside. Compared to conventional X-ray scans, a CT scan provides more accurate pictures of interior organs and soft tissues, particularly blood vessels and soft tissues.^[12]

- **Chest X-ray**

An X-ray is a sort of screening examination that produces a photographic or digital picture of the internal organ structures. It's a rapid, painless test that sends X-ray beams (a small dosage of radiation) into the body to observe their responses to various substances.

Pictures of the heart, lungs, blood arteries, airways, and the bones in your spine and chest are created by chest X-rays. X-rays of the chest can also show air around a lung or fluid in or around the lungs.^[13]

TREATMENT

Lifestyle Modifications

An anti-inflammatory diet can be very helpful in managing asthma and allergies. It calls for consuming fresh produce, lean meats, and a minimal amount of alcohol and carbs. Aim for a pure, wholesome diet that does not encourage inflammation.

A greater chance of post-COVID symptoms emerging is linked to a poor lifestyle. Not just physical health is negatively impacted, but also psychological wellness. The healthcare system is also challenged by this. A medication of lifestyle is one of the cheap and simple solutions to handle this condition.^[14]

Moreover, getting adequate sleep maintains and moving or exercising lowers the inflammation and strengthens the

immune system.

PHARMACOLOGICAL TREATMENT

The following medications are accustomed to treat post-COVID allergic airway disease:

- **ANTI-HISTAMINES:** Antihistamines are used most often for symptomatic relief in allergic rhinitis care.^[15]
- **DECONGESTANTS** - reduce swelling and edema by localizing blood vessel constriction. In cases of viral or allergic rhinitis, they are perhaps utilized topically as nasal decongestants. As respiratory tract decongestants, they are furthermore administered systemically together with antihistamines.^[16]
- **NASAL SPRAY:** Treatment for allergies-related sneezing and runny nose using NASALSPRAY.^[17]
- **IMMUNOTHERAPY** - Allergen immunotherapy (AIT) aims to be an excellent remedy for allergic rhinitis and other respiratory allergies (AR) and asthma, and it may change the course of the condition's natural course.^[18]
- **SUBLINGUAL IMMUNOTHERAPY** - Sublingual immunotherapy (SLIT) is a kind of allergen immunotherapy (AIT) that uses the tolerogenic qualities of the oral mucosa to administer the allergen under the tongue.^[19]
- **CORTICOSTEROIDS** - because of the immunological system suppression caused by corticosteroids, the body might experience significant repercussions. Corticosteroids are frequently prescribed by doctors when alternative treatments fail or a quick recovery is needed.^[20]

DRUG	BRAND NAME	INITIAL DOSE	MAX DOSE
ANTI-HISTAMINES	i. CETIRIZINE ii. FEXOFENADINE	Once daily oral dose of 5-10mg. ^[21] Adults: 120 mg once a day. ^[22]	10mg (daily) 180mg (daily)
DECONGESTANTS	i. OXYMETAZOLINE ii. PSEUDOEPHEDRINE	2-3 drops of 0.05% solution in each nostril every ten to twelve hours. ^[23] Every 4 to 6 hours, if needed, take 30 to 60 mg by mouth for immediate release. ^[24]	Use no more than twice every 24 hours. 120 mg is used orally every 12 hours as necessary for sustained release
NASAL SPRAY	i. AZELASTINE WITH FLUTICASONE PROPIONATE ii. XYLOMETAZOLINE WITH CROMOGLICIC ACID	i. 0.1% spray: 1-2 sprays twice daily in each nostril. ii. 0.15% spray: 1 or 2 nasal sprays, one each once or twice daily. ^[25] 0.1% spray ^[26]	Use no more than twice every 24 hours. Use no more than twice every 24 hours. Do not exceed 2 applications daily into each nostril, It should not be used for more than 10 consecutive days.

IMMUNOTHERAPY	i. ALLERGY INJECTIONS (shots)	given over time, often three to five years. ^[27]	
CORTICOSTEROIDS	i. PREDNISOLONE ii. BETAMETHASONE	5 to 60 milligrams (mg) initially each day orally. ^[28] Oral Solution, 6mg 0.6 mg/5 ml. ^[29]	Adjust or maintain the initial dose then gradually decrease to the lowest dose that maintains an adequate clinical response
SUBLINGUAL IMMUNOTHERAPY	i. ALLERGY DROPS ii. ALLERGY PUMPS	Starting with the lowest concentration. ^[30]	The patient must progressively raise it while utilizing the various dosage formulations until the maintenance dose is attained.

METHODOLOGY

The study is prospective and observational.

Source of data and material

Patient data collection form. Patient case note/prescription

Inclusion criteria

- Age- 15-80 years.
- Patients recovered from COVID-19.
- All Inpatients and Outpatients tested positive for COVID-19
- Patients who are willing to give consent.

Exclusion criteria

- Patients with ages below 18 years.
- Patients who don't have allergies.
- Patients who do not give consent.

Method of data collection

- Patient data collection form
- Patient medication notes/prescription

Study procedure

This is an observational study for a better understanding of disease where patient eligible were enrolled into the study after getting their consent. The data collection form was used, which included the demographic details of the patient and their medication chart.

Patient

Patient counseling was done by using leaflets. The study is conducted at a care hospital. All information relevant to the study was collected from the time of admission till the date of review follow up and the data was analyzed after entering into a Microsoft excel sheet and frequency tables were calculated using a suitable method for statistical analysis.

Does the study require any Investigation or Intervention to be conducted on patients?

NO.

DURATION OF THE STUDY

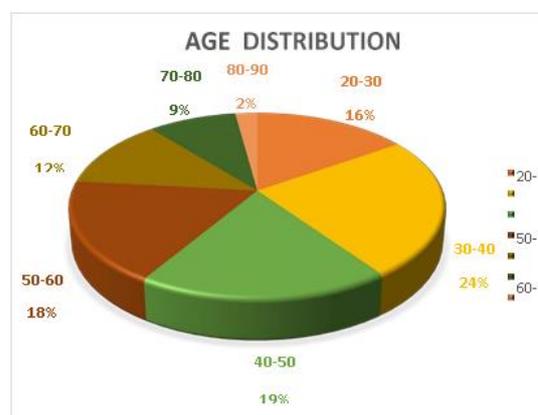
The study was conducted for a period of 6 months.

PLACE OF STUDY

The study was conducted at a tertiary Care hospital.

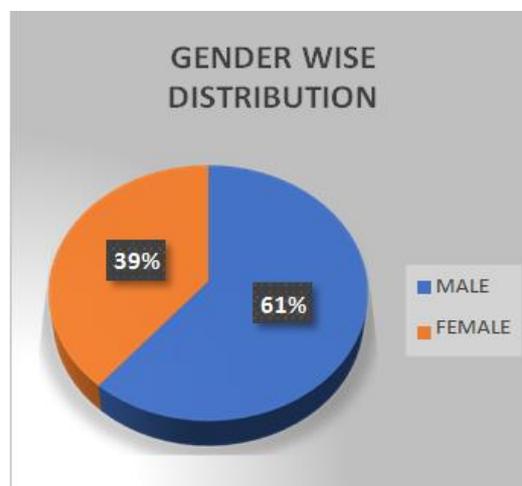
RESULTS

There were 90 patients in the current study, The average age group of affected individuals was found to be 30-40 years of age.



GENDER WISE DISTRIBUTION

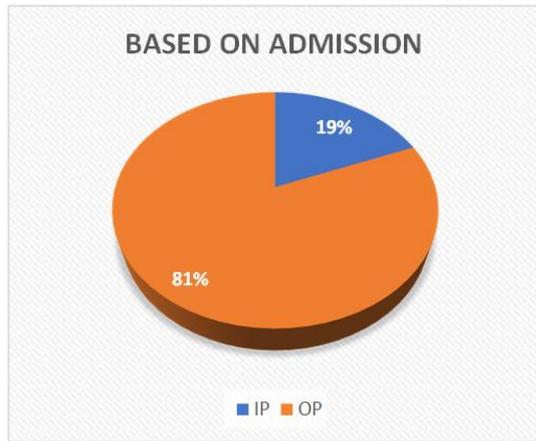
Out of a total of 90 cases studied, 69% were male and 39% were female patients.



DISTRIBUTION OF PATIENTS BASED ON ADMISSION

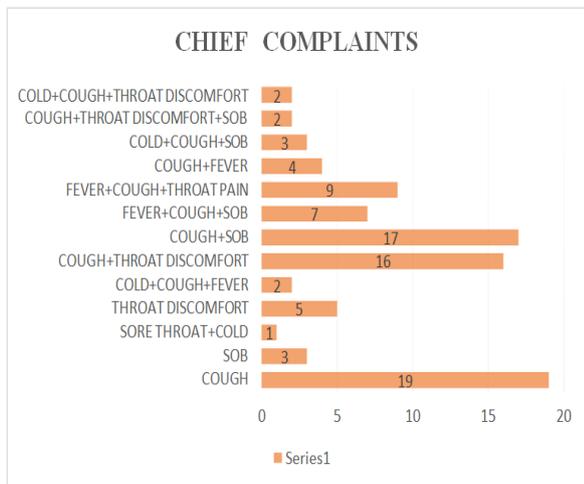
About 90 patients were included in the study of which 17

were Inpatients and 73 were Outpatients.



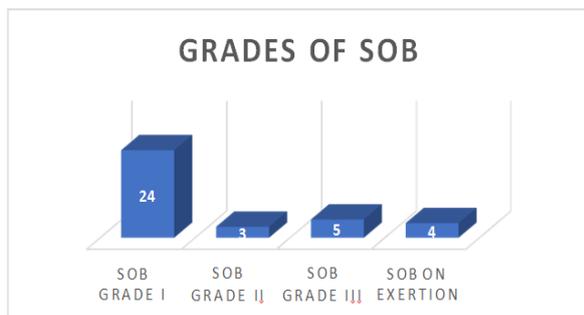
DISTRIBUTION OF PATIENTS BASED ON CHIEF COMPLAINTS

21% of the patients came with a cough, 19% of all the patients came with cough and SOB, and 18% of the population with cough and throat discomfort.



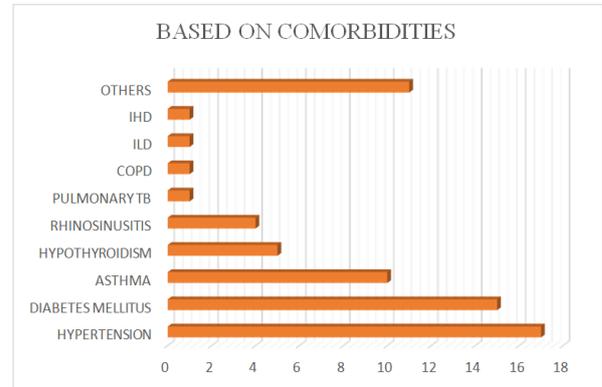
DISTRIBUTION OF PATIENTS BASED GRADES OF SOB

The patients were grouped based on their grades of SOB. Out of 90 patients, 36 patients had SOB grade I, 67% patients had SOB grade I, 14% patients had SOB grade III, 11% patients had SOB ON EXERTION, and 8% patients had SOB grade II.



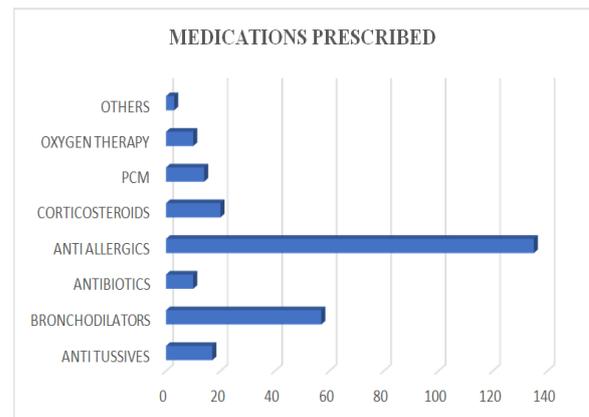
DISTRIBUTION OF PATIENTS BASED ON COMORBIDITIES

Of all the 90 patients 66 patients had comorbid conditions, of which 26% had HYPERTENSION, 23% were suffering from DIABETES MELLITUS, 15% were suffering from ASTHMA, 6% were suffering from RHINOSINUSITIS and 17% were of OTHERS.



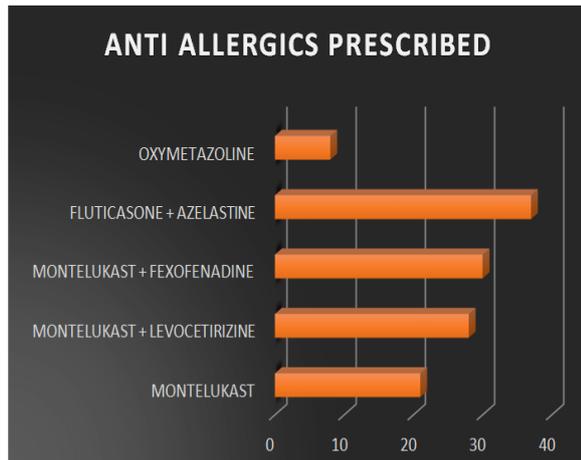
DISTRIBUTION OF PATIENTS BASED ON MEDICATIONS

In our study, of all the 90 patients 51% patients have prescribed ANTI ALLERGIC, 21% patients were prescribed BRONCHODILATORS, 8% patients were prescribed CORTICOSTEROIDS and 6% patients were prescribed ANTI TUSSIVES.



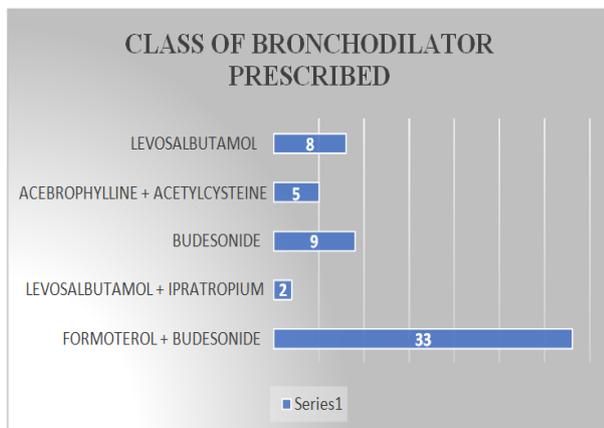
DISTRIBUTION OF PATIENTS BASED ON CLASS OF ANTI-ALLERGICS

In our study conducted on 90 patients, 30 % of patients were prescribed fluticasone + azelastine 24% of patients were prescribed montelukast + fexofenadine, 23% were prescribed montelukast + levocetirizine, 17% patients were prescribed montelukast and 6% patients were prescribed oxymetazoline.



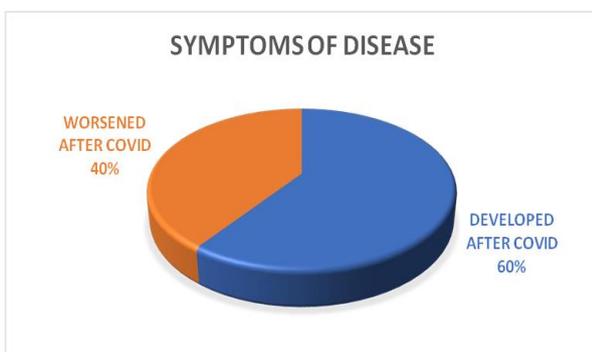
DISTRIBUTION OF PATIENTS BASED ON CLASS OF BRONCHODILATORS PRESCRIBED

In our study conducted on 90 patients, 58 % of patients were prescribed formoterol + budesonide, 16% patients were prescribed budesonide, 14% were prescribed levosalbutamol, 9% patients were prescribed acebrophylline +acetylcysteine and 3% patients were prescribed levosalbutamol + ipratropium.



DISTRIBUTION OF PATIENTS BASED ON THE DEVELOPMENT OR WORSENING OF SYMPTOMS

About 90 patients were included in the study of which 54(60%) patients developed after COVID and 36(40%) patients had worsening of symptoms after COVID.



DISCUSSION

In our 6 months study, 90 patients were observed in Hyderabad's multi-specialty hospital. About 90 patients were included in the study of which 73 were Outpatients and 17 were Inpatients, 55 were males and 35 were females.

In our study majority of the patients were male (55) 61% and female (35) 39%. A similar study conducted by the Division of Pulmonary, Critical Care and Occupational Medicine, Department of Internal Medicine, on 15 March 2022 also shows out of 100 patients 66 were female with a median age of 48 years and were more prone to develop post covid conditions compared to their male counterparts.^[31]

In our study conducted on 90 patients, we found that 54(60%) patients developed the symptoms after COVID, and 36(40%) patients had worsening symptoms after COVID. A similar study conducted by Jennifer Brown on Wednesday, March 23, 2022 states that Imaging the lungs after a patient exhales reveals.^[32]

CONCLUSION

Our research focused on the post-COVID allergic airway illness or the aggravation or development of upperairway allergies.

Men were at higher risk than females, which may be related to their greater exposure to allergens and pollutants.

Age, gender, COVID-19 history, COVID-19 severity, any prior allergies, and concomitant diseases are some of the demographic factors that were taken into account. In our study, COVID-19 was the primary reason for all patients taking into account.

All 90 patients' primary symptoms were taken into consideration, and among them, 21% of people had a cough, 19% of people had a cough and SOB, and 18% of people had a cough and throat pain.

When medication history was taken into account, it was shown that the majority of patients had hypertension, followed by diabetes mellitus and asthma.

The majority of the diagnosis was made based on symptoms and lung function testing. To confirm the illness condition, CT scans were also performed in some circumstances.

A therapy strategy was developed in accordance with how the illness was developing. The majority of patients in our research received antiallergic drugs, followed by bronchodilators, corticosteroids, and antitussives.

When taken into account, the COVID history revealed that the majority of patients developed post- COVID syndrome after recovering from COVID. hidden

physical changes in the small airways of patients affected by long COVID.

These newly observed air-trapping abnormalities may explain some of the persistent breathing problems associated with long COVID.

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