

## Original Research Article

# A CROSS-SECTIONAL STUDY ON POST- COVID COMPLICATIONS IN A TERTIARY CARE HOSPITAL

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**ABSTRACT**

**Background:** COVID-19 has been associated with significant morbidity. Post-COVID syndrome is a pathologic entity, in which physical, medical, and cognitive symptoms persist following COVID-19. This study was done to assess such symptoms in patients recovered from COVID-19 infection.

**Materials and Methods:** A total of 100 patients with recent history of COVID-19 infection who presented to Medicine OPD of Government General Hospital, Kakinada, from June 2021 to May 2022 were included in this study.

**Results:** Out of the 100 patients, 65% had post-COVID syndrome. Fatigue was most common complaint (75%), followed by disturbed sleep (60%) and dyspnea (40%). No deaths were observed during the study period.

**Conclusion:** The purpose of this study is to raise awareness regarding the post-COVID syndrome which includes a constellation of unexplained symptoms for which no confirmatory laboratory test exists, thus making it easy to overlook or ignore.

**Keywords:** COVID-19, post covid sequelae.

**INTRODUCTION**

SARS infection was documented during the 2002–2003 outbreak in 29 nations across North America, South America, Europe, and Asia. The severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) outbreak was identified at the beginning of December 2019 as the result of several idiopathic cases of severe pneumonia. The first report was submitted to the regional office of the World Health Organization on December 30. The epidemiological curve of those affected people rose sharply globally, and on January 30, 2020, the outbreak was categorised as an international public health emergency. On March 11, 2020, the outbreak was categorised as a pandemic.<sup>[1,2]</sup>

SARS- CoV-2 has caused significant morbidity and mortality throughout the world. Although the majority of COVID-19-19 patients were asymptomatic, 5- 8% of infected patients experienced hypoxia, bilateral lung infiltrates, or decreased lung compliance that necessitated non-invasive ventilation (NIV) or mechanical ventilatory support.<sup>[3]</sup>

Despite of biochemical evidence that the SARS-CoV 2 replication stops four weeks after the initial infection, a constellation of different clinical symptoms known as post-acute COVID-19 syndrome has been described in a small percentage of patients who recovered from COVID-19 caused by SARS-CoV-2. It is characterized by the persistence of clinical symptoms beyond 4 weeks after onset.

Based on the chronicity of symptoms post-19 infections, Nalbandian et al. classified post COVID-19 syndrome into Sub-acute or persistent symptomatic COVID-19 (symptoms up to 12 weeks from the initial acute episode) and Chronic or post-COVID-19 syndrome (symptoms present beyond 12 weeks).<sup>[4]</sup>

The purpose of this study is to assess the various complications, morbidity and mortality after COVID-19 19 infection and to evaluate the response to treatment.

**MATERIAL AND METHODS**

This hospital based cross-sectional study was done in the Department of General Medicine,

Government General Hospital, Kakinada over 1-year period, i.e., from June 2021 to May 2022 among Post COVID-19 syndrome patients attending the OPD.

All patients above 18 years of age who were affected by Covid-19 previously who presented with complaints of post COVID-19 symptoms were included in this study after taking an informed consent from them. A total of 100 patients were included in the study.

A detailed history, general physical examination and relevant systemic examination was done. Baseline investigations like complete blood picture, renal function parameters, liver function parameters, chest x-ray, 12-lead ECG was taken for all patients. To assess the long term effects of Covid-19 on functional status, the Post-COVID-19 Functional Status (PCFS) Scale was used.

This ordinal scale covers the entire range of functional outcomes by focusing on limitations in routine tasks and activities, whether at home or at work or school, as well as lifestyle changes. The score ranges from 0 (no symptoms) to 5 (death, D). Both clinicians and patients can easily understand the scale grades because they are simple and intuitive.

**Table 1: General description of each scale grade**

Grade 0	Absence of any functional limitation
Grade 1	Exhibit some symptoms, but not those that prevent or restrict them from engaging in regular activities.
Grade 2	Are capable of performing all routine tasks independently but at a reduced level of intensity, occasionally in conjunction with minor restrictions on engaging in routine social roles
Grade 3	Mild functional limitations that require patients to structurally modify their daily activities, reflecting the inability to perform some activities that, as a result, require others to perform them for them
Grade 4	Require assistance with activities of daily living (ADL), not always provided by a certified nurse, but who have severe functional limitations
Grade 5 / Grade D	Records a patient's death

Ethical committee approval was taken before commencement of study.

## RESULTS

The study was conducted in Government General Hospital, Kakinada among the post COVID-19 patients who attended General Medicine OPD. A total of 100 patients were included in the study.

In present study, majority (28%) of the study subjects belong to of the study subjects belong to the

21-30 years age group followed by 41-50 years (25%) and 51-60 years (24%). 18% belonged to 31-40 years and 5% were above 61 years of age. The mean age of present study is 46.25 Years with SD  $\pm$  14.8 Years. Youngest patient was 24 years old and the oldest was 73 years. 59% of the study population were males and 41% were females. Male to female ratio was 1.4:1.

Most of them (36%) had completed their secondary school education, 26% completed Inter or above education, 23% completed primary education and 15% were illiterates. The majority of them were residents of urban areas (67%) and 33% of rural areas.

34% of the study subjects were having normal range of body mass index while, 31% were in pre-obese condition, 21% were overweight, 12% were obese and 2% were underweight.

64% got the previous COVID-19 infection within the last 6 months while 36% got their previous COVID-19 infection more than 6 months ago.

85% had only one COVID-19 infection while 15% had more than one episode of nasopharyngeal confirmation of COVID-19.

37% were having mild symptoms, 41% had moderate symptoms, and 22% had severe COVID-19 symptoms.

39% had comorbidities and 61% were normal. Out of 39% cases, 28% of patients had a history of Diabetes, 23% had hypertension, 6% each had Hypothyroidism and COPD/Asthma, 2% each had Hyperthyroidism, coronary artery disease, chronic kidney disease and 1% each had Chronic liver disease, Pulmonary tuberculosis and HIV.

98% of patients got Doxycycline/Ivermectin as treatment, 60% of patients got steroids as a treatment, 33% of patients received Remdesivir, 10% of patients received LMWH and 4% of patients got pulse Steroid therapy.

Only 53% of patients received supplementary oxygen therapy. Out of 53% of patients who received oxygen therapy, 37.7% received oxygen through a face mask, 28.3% through nasal cannula, 22.6% through HFNC/NIV and 6% through NRM (Non-rebreathing mask)

65% of patients had post COVID-19 complications/symptoms even after 4 weeks of acute COVID-19 attack i.e., Ongoing Symptomatic COVID-19. This will last for 4 weeks to 12 weeks. In 35% these symptoms were persisted even after 12 weeks this was called Post COVID-19 syndrome.

Out of the 100 patients, 75% had fatigue while the rest 25% had no fatigue. Amongst these and 20% complained of fatigue even to do their routine work.

**Table 2: System wise distribution of symptoms**

System	Symptoms	Prevalence
Respiratory	Dyspnoea	40%
	Cough	18%
	Oxygen dependency	4%

	Lowered 6minutes walk test	10%
<b>Cardiovascular</b>	Chest pain	4%
	Palpitations	3%
	Pedal edema	1%
	Orthopnoea / PND	5%
<b>Neurological</b>	Headache	6%
	Amnesia	6%
	Limb weakness	5%
	Concentration deficit	5%
	Anosmia	4%
<b>Psychiatric</b>	Ageusia	4%
	Disturbed sleep	60%
	Anxiety	7%
	Headache	6%
	Excess consumption of alcohol	2%
<b>GIT/ Nephro</b>	Depression	16%
	Nausea/Vomiting	1%
	Loss of appetite	8%
	Decreased urine output	1%
<b>Endocrine disorders</b>	Newly diagnosed Diabetes	2%
	Vitamin D deficiency	3%
	Diabetes Keto acidosis	1%

**Table 3: Post COVID-19 functional assessment scale scores**

Grade	Prevalence
Grade 0	9%
Grade 1	26%
Grade 2	44%
Grade 3	19%
Grade 4	2%
Grade 5 / Grade D	0

Out of 100 patients with post COVID-19 symptoms, 73% responded positively to treatment and improvement in symptoms and improved quality of life was observed. 27% had no improvement in symptoms. No deaths were observed in the study.

## DISCUSSION

The study was conducted in Government General Hospital, Kakinada among the post covid patients who attended General Medicine OPD. A total of 100 patients were included in the study.

In present study, most of the patients were in 21-30 years age group (28%), followed by 25% in 41-50 years and 24% in 51-60 years. The mean age of study is 46.25 Years with SD  $\pm$  14.8 Years. Tolba et al,<sup>[5]</sup> reported that 33.8% of study subjects belong to the 20-30 years age group, 49.1% belonged to the 31-40 years age group and 17.15 belonged to the >40 years age group. The mean age group of the participants was 32.3  $\pm$  8.5 years and ranged between 20-60 years old which is similar to present study. As per the above studies, post covid syndrome started in the 20- 30 years of age group.

In present study, 59% were males and 41% were females with male to female ratio being 1.4:1. Male predominance was also seen in study done by Shivdas N et al,<sup>[6]</sup> who had 69.4% of study population as males and 30.6% were females.

In present study, 34% of the study subjects had normal range of BMI while, 31% were in pre-obese condition, 21% were overweight, 12% were obese and 2% were underweight. Tolba et al,<sup>[5]</sup> reported that 26.5% were having normal BMI while 38% were overweight BMI and 35.5% were obese.

Majority of the study participants in present study were not vaccinated (61%). This is supported by Benjamin et al.,<sup>[46]</sup> who reported 52.7% of unvaccinated individuals.

In present study, 37% were having mild symptoms, 41% had moderate symptoms, and 22% had severe covid symptoms. However, Shivdas N et al,<sup>[6]</sup> reported that 85.8% had mild symptoms, 10.9% were moderate and 3.3% were severely affected, which is discordance with the current study where severe cases were more.

In present study, 39% had comorbidities, of which, 28% of patients had a history of Diabetes, 23% had hypertension, 6% each had Hypothyroidism and COPD/Asthma, 2% each had Hyperthyroidism, coronary artery disease, chronic kidney disease and 1% each had Chronic liver disease, Pulmonary tuberculosis and HIV. Such prevalence of co-morbidities is also seen in study by Shivdas N et al,<sup>[6]</sup> (28.5%).

In present study, a vast majority (98%) of patients received Doxycycline/Ivermectin as treatment, 60% were given steroids, 33% of patients received Remdesivir, 10% of patients received LMWH and 4% of patients got pulse steroid therapy.

53% of patients received supplementary oxygen therapy. Amongst the 53% who received O<sub>2</sub> therapy, 15% receive O<sub>2</sub> through a nasal cannula, 20% through a face mask, 12% on a mechanical ventilator and 6% on a non-rebreathing mask.

Unlike present study, Shivdas N et al,<sup>[6]</sup> reported that Oxygen support was required by 14.2% of whom 1.2% required ventilatory support. Senjam et al,<sup>[7]</sup> reported that 2.9% required oxygen supplementation during the management.

In present study, 65% of patients had ongoing Symptomatic Covid i.e, persistence of symptoms s even after 4 weeks of acute COVID attack. This will last for 4 weeks to 12 weeks. In 35% these symptoms persisted even after 12 weeks this was called Post COVID syndrome.

Shivdas N et al,<sup>[6]</sup> reported that the most common long COVID symptoms included myalgia (10.9%), fatigue (5.5%), shortness of breath (6.1%), dry cough (2.1%) and chest pain (1.2%). Other symptoms included insomnia (1.4%), mood disturbances (0.48%) and anxiety (0.6%). Senjam et al,<sup>[7]</sup> reported that a large proportion 85.6% had unspecific post COVID- 19 symptoms. This included musculoskeletal manifestations (49.8%), symptoms related to ENT (47.5%), neurological (47.0%), cardio-respiratory (42.4%), gastrointestinal (36.2%), ocular symptoms (31.9%), dermatological symptoms (31.5%), and mental health symptoms (23.7%). Other most commonly reported symptoms were fatigue, pain in the joints and muscles, hair loss and headache, cough, breathlessness, sleep disorders, sore throat and decrease of smell and taste. Ambardar et al,<sup>[8]</sup> reported that 33% had fibrosis in their study on pulmonary fibrosis post COVID-19 infection.

#### **PULMONARY SYMPTOMS**

In present study, 40% complained of shortness of breath, 18% were with cough, 4% developed oxygen dependency and 10% failed to do a 6-minute walk test. Similar findings were supported by numerous studies in which survivors were followed for 4 weeks to 3 months.<sup>[9]</sup>

#### **CARDIOVASCULAR SYMPTOMS**

In present study, 4% complained of chest pain, 5% were having orthopnoea /PND, 3% had palpitations and 1% had pedal edema. Myocardial injury occurs in 14.4 -19% of patients with active COVID-19 infection. Numerous mechanisms such as direct myocardial injury, down-regulation of ACE2 receptors, severe inflammation, and hypoxic damage secondary to severe SARS-CoV-2 pneumonia, have been proposed in pathogenesis of myocardial injury in COVID-19 infection.<sup>[10]</sup>

#### **PSYCHIATRY SYMPTOMS:**

In Neuropsychiatric symptoms, 60% complained of disturbed sleep, 6% were worried a lot and 6% complained of headache, 2% were with excess consumption of alcohol and 1 patient complained of hearing abnormal voices.

It was discovered that incident anxiety, depression, and posttraumatic stress disorder were reported by up to 20%–25% of health-care workers, with females and nursing staff having the highest prevalence rates. In a patient-led digital platform survey, many people who had recovered from COVID reported continuing symptoms that were

unrelated to the severity of their illness. Short-term memory loss, hallucinations, delirium, "brain fog," and strange vibration sensations were among the symptoms that were reported. The pathophysiology of these symptoms is still not fully understood. One of the many postulated mechanisms put forth to explain these symptoms was advanced by Yale immunologist Akiko Iwasaki. This hypothesis states that after recovery, a patient might still have a latent virus or genetic fragments in various body tissues. The symptoms could be the result of an immunological reactivation, or a persistent immune activation brought on by these latent particles.<sup>[11,12]</sup>

#### **NEUROLOGY SYMPTOMS**

In present study, 75% have complained of fatigability, 16% had depression and 1 % complained of anxiety. In neurological symptoms, 6% of patients complained of severe headache, 6% of amnesia, 5% with limb weakness, 5% of concentration deficit, and 4% each with ageusia and anosmia.

The term "post-COVID-19 neurological syndrome" refers to all neurological conditions seen during the recovery stage of COVID-19 infection. Numerous studies have previously shown that coronaviruses are neurotropic. Numerous post/para-infectious syndromes, acute ischemic stroke, headaches, anosmia, meningoencephalitis, psychiatric disorder, and other neurotropic symptoms exist independently of the primary respiratory pathophysiology. The olfactory bulb and blood are the two most frequently suggested entry points into the central nervous system during the early stages and during the viremia phase, respectively. One of the most prevalent post-COVID symptoms, persistent anosmia is brought on by damage to the olfactory bulb, which is rich in ACE2 receptors, the virus's binding site.<sup>[13-15]</sup>

#### **GIT/NEPHROLOGY SYMPTOMS**

In our study, 8% complained of loss of appetite, 1 patient with nausea/ vomiting, 1 with decreased urine output.

In studies examining the frequency of GI symptoms in MERS-CoV-infected patients, diarrhoea was reported by 12%– 23% of patients, vomiting by 21%–33% of patients, and abdominal pain by 27%– 40% of patients. The combined prevalence of GI symptoms in a recent meta-analysis of 4243 COVID patients from 60 studies was 17.6%.<sup>[16]</sup>

In COVID patients, hypoxemia and hypercapnia, hypotension, endothelitis, rhabdomyolysis, and direct viral injury are the suggested mechanisms for the development of AKI.<sup>[17]</sup>

#### **TREATMENT**

According to Post covid functional assessment scale (PCFS), 44% had grade 2 symptoms, 26% had grade 1 symptom, 19% had grade 3 symptoms, 9% had grade 0 symptoms and 2% have grade 4 symptoms. There was no death recorded due to post covid complications in our study.

In our study, out of 100 post - COVID complicated patients' treatment was given to patients



symptomatically. 73% responded positively to treatment and improvement in symptoms and improved quality of life were observed. Whereas 27% had no improvement in their symptoms. Fortunately, no death was observed in the cases.

## CONCLUSION

It would be unscientific to recommend a long-term COVID treatment without first understanding the disease's natural history; instead, patients should, whenever possible, be enrolled in clinical trials. Optimizing the recovery process would include testing for (and subsequently treating) underlying cardiac and lung disease, metabolic abnormalities, vitamin deficiencies, electrolyte imbalances, and hormonal dysregulation.

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**Conflicts of Interest:** Nil.

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