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## Post-COVID-19 syndrome: A narrative review

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### Abstract

**Background:** COVID-19 Pandemic recoveries have increased but it has been found that many patients have been experiencing short to long term sequel of the disease that needs attention. Since there is no universally accepted definition of Post COVID-19 syndrome by consensus it is defined as signs and symptoms which even continue for more than 12 weeks and are not explained by alternative diagnosis.

**Aim:** This review aims to acknowledge all the recent studies on Post-COVID-19 syndrome and get in depth knowledge regarding Post-COVID-19 sequel and its effect on quality of life.

**Discussion and Conclusion:** SARS-COV-2 has immensely raised global morbidity & mortality rate as it leads to severe damage to multiple organs even after the recovery but there is limited literature on the potential pathophysiological mechanism of post COVID-19 syndrome, thus there is need for further research studies on Post-COVID-19 syndrome.

**Keywords:** Post-COVID-19 syndrome, sequel of COVID-19

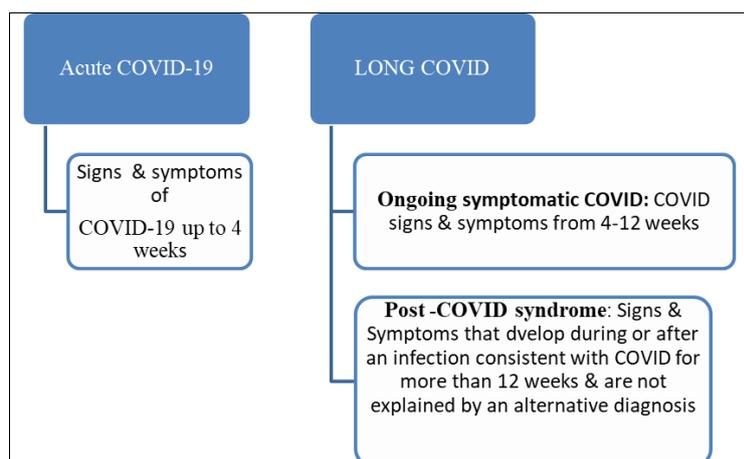
### Introduction

As we enter in the 4<sup>th</sup> year of COVID-19 Pandemic recoveries have increased but it has been found that many patients have been experiencing short to long term sequel of the disease that needs attention. Since there is no universally accepted definition of Post COVID-19 syndrome by consensus it is defined as signs and symptoms which continue for more than 12 weeks and are not explained by alternative diagnosis. As literature regarding the manifestation of COVID-19 has increased there has been growing recognition of Post-COVID-19 syndrome<sup>[1]</sup>.

Post COVID-19 syndrome which might emerge as the new pandemic, has adverse impact on physical, mental & social well-being and influences the various domains of life. So the study regarding Post-COVID-19 syndrome is the need of hour<sup>[3]</sup>.

### Background of the study

Millions of COVID-19 recovered patients have been affected by COVID-19 syndrome. National Institute for Health and Care Excellence has used the term 'Long Covid' and has defined it as symptoms that continue or develop after acute COVID-19. The timeline of COVID-19 phases are illustrated in Fig.1.



**Fig 1:** COVID-19 phases

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The COVID-19 infectious agent, SARS-CoV-2 has a high affinity for human angiotensin –converting enzyme (ACE2) receptor which is also expressed in neurons and glial cells Which could explain the reported neurologic al manifestations such as Peripheral neuropathy, olfactory neuropathy, etc.

It was found in post –mortem studies that viral particle are present in the cytoplasm of neocortex, cerebrospinal fluid and hypothalamus neurons .it has been inferred that in cured patients SARSCOV-2 remains latent in the central nervous system for a long time, and is able to re-activate and trigger neurological complications.

**Significance of this Review**

Prior to 2020 most of the literature related to COVID-19 did not address Post COVID-19 syndrome but recent studies and reports suggests higher incidence of Post COVID-19 syndrome among healthcare workers who have recovered from COVID-19. So further studies need to be done to explore the impact of Post-COVID-19 sequel on health, social, psychological well-being among patients who

recovered from COVID-19 and among health care workers who recovered from COVID-19.

This review aim to acknowledge all the recent studies on Post-COVID-19 syndrome and get in depth knowledge regarding Post-COVID-19 sequel and its effect on quality of life.

**Discussion**

Post-Covid conditions are used a an umbrella term for the wide range of health consequences that are present for four or more than four weeks after infection with sARs-Cov-2. Multi-organ effects of COVID-19 have been documented mainly in following body systems cardiovascular, pulmonary, renal, neurological, and psychiatric <sup>[5]</sup>.

Post COVID-19 Syndrome has been classified under 5 categories with criteria based on initial symptoms, delayed onset of symptoms, duration of symptoms and period of quiescence (Amenta *et al.* 2020) as illustrated in Fig. 2 and Post-COVID sequel on Cardio-Vascular system, Gastrointestinal system, Nephrological system, Neurological system are illustrated in FIG.3.

**Table 2:** Five categories of Post COVID-19 Syndrome based on four criteria

Categories by type	Initial symptoms	Duration of symptoms	Delayed onset of symptoms	Period of quiescence
Type 1	Variable	Variable	No	No
Type 2	Mild	>6weeks	No	No
Type 3	Mild	3 - >6 months	No	Yes
Type 4	None	Variable	Yes	No
Type 5	None	None	≥ 3-6 months	No

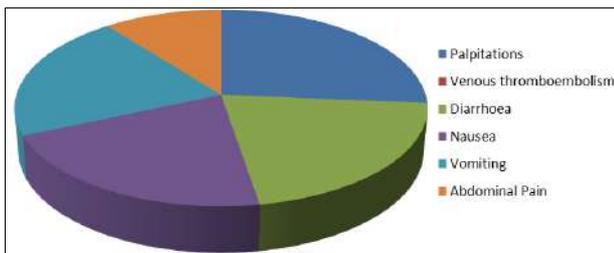
**Table 3:** Post-Covid sequel on cardio-vascular system, gastrointestinal system, nephrological system, neurological system are illustrated in

S. No.	System	Post-COVID sequel
1.	Cardio vascular system	Chest pain (reported in 20% of COVID-19 survivors at 60 days follow up)
		Palpitations (reported in 10% of COVID-19 survivors at 60 days follow up)
		Ongoing chest pain and palpitations have been reported in 5% & 9% COVID-19 survivors at 6 months follow up
		Myocardial inflammation was found in cardiac MRI AMONG 60% of affected people more than 2 months after diagnosis in a study but findings are not replicated further
		Dyspnoea
		Profound Fatigue
		Venous thromboembolism < 5%
2.	Gastrointestinal system	Diarrhoea among 8%
		Nausea among 8%
		Vomiting among 8%
		Abdominal pain among 4%
		Elevated OT/PT among 15%
		Dyspepsia
		Loss of apetite
		Hematemesis
		Malena
		Dysphagia
GERD		
3.	Nephrology	Constipation
		Fatigue with unexplained weakness
		Nocturia
		Increased froth in urine
		Pedal edema
4.	Neurological	Orthopnea
		Facial Puffiness
		Disturbed concentration
		Impaired memory
		Headache
		Sleep Disorders
		Dizziness
		Anosmia

		Fatigue
		Shortness of breath
		Dry cough
		Chest Pain
5.	Respiratory system	Hypotension
		Haemoptysis
		Hyperpyrexia

Although studies on pathophysiology of Post-COVID-19 Syndrome are few, still there is growing evidence of this multi-factorial syndrome involving virus specific pathophysiological variations that influence many mechanisms but specifically immune function, oxidative stress and inflammation. Most common Post-COVID-19 signs and symptoms are illustrated in Fig.4. Future research studies need to be done to get in depth knowledge on Post-COVID-19 sequel [4].

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**Fig 4:** Most common Post-COVID-19 signs and symptoms

**Summary & Conclusion**

SARS-COV-2 has immensely raised global morbidity & mortality rate as it leads to severe damage to multiple organs and even after the recovery a new alarming threat to life has arrived in form of Post-COVID-19 syndrome which is have sequel of Post COVID-19 signs and symptoms and thus there is need for further research studies on Post-COVID-19 syndrome.

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