



IMPACT OF COVID-19: A STUDY ON THE POPULATION OF DELHI -NCR

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Abstract

Long-term impact of COVID-19 post-acute sequelae in patients vary according to the period since infection, organ systems and tissues affected. The objective of this study is to emphasize the long-term impact on the recovered COVID-19 patients and understand the post- COVID-19 sequelae. The analysis was done through a cross-sectional study in COVID-19 recovered patients during the first and second SARS-CoV-2 pandemic waves. It was found that majority of the survey population was infected during the second surge, April 2021 onwards. The sample survey endured all these symptoms infrequently. Psychological side effects including depression, fear and anxiety might continue for a longer time frame. There were people who reported heart and lung ailments even after recovering from COVID-19. The findings of this study will help researchers better understand the consequences of post-COVID symptoms.

Furthermore, the mental health difficulties that have evolved as a result of the COVID-19 epidemic are expected to have global ramifications. During the second wave of infection, the majority of the sample population became infected, with severe symptoms.

Keywords: SARS-CoV-2, Pandemic, COVID-19, mental health, second wave.

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1. INTRODUCTION

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was detected in China in December 2019.^[1] Up till June 11, 2021, India had reported 29.27 million cases during the pandemic, with a case fatality rate of 1.24 percent (363,079 fatalities)⁽²⁾.

Since the emergence of the 2019 new coronavirus (2019-nCoV) infection, it has spread across China and lots of other countries [3, 4, 5, 6, 7, 8]. So far, 2019-nCoV has affected 43,000 cases in 28 countries and regions and has become a major global health concern. On February 11, 2020, the World Health Organization (WHO) blazoned a relief name for the contagious complaint caused by the 2019-nCoV coronavirus complaint (COVID-19). The COVID-19 contagion created an annihilation in a short span of time all over the world. We're in this for the long haul and are still fighting against it. Major parts of the population infected with the coronavirus 2019 (COVID-19) recover within a 15-day span. However, some people, even those with mild symptoms, continue to experience long-term or short-term symptoms after being infected with the COVID-19 virus^[9].

Indeed, as acute COVID-19 has been shown to affect every part of the body, there can be a range of symptoms endured by patients post-COVID. Some might witness symptoms that last weeks or months after first being infected with the COVID-19 contagion. Unlike some of the other types of post-COVID conditions that tend only to affect people that have had severe illnesses, these symptoms can affect anyone who has had COVID-19, albeit the illness was mild, or if they had no original symptoms.^[10] The COVID-19 symptoms' inflexibility ranges from extremely mild to severe. Some people

may be symptomatic, some may have no symptoms or mild symptoms, but they can still spread it (asymptomatic transmission). Some might have the primary symptoms only, such as fever, dizziness, breathlessness, headache or dry cough.^[11,12]

Symptoms endured for more than four weeks after being diagnosed with COVID-19 are called post-COVID-19 conditions or post-COVID symptoms. Aged people and others with a variety of serious medical conditions are more likely to experience moping COVID-19 symptoms, but even young, otherwise healthy people can feel ill for weeks to months after infection.^[13] People generally report different combinations of symptoms such as difficulty in breathing, frazzle or fatigue^[14], symptoms that get worse after physical or internal conditioning (also referred to as "post-exertional malaise"), headache, tachycardia, joint or muscle pain, legs-and-needles feeling, diarrhea, insomnia, fever, dizziness on standing, rash, mood changes, change in smell or taste or changes in menstrual cycles in ladies.^[15, 16,17,18,19] Some people suffering from severe illness with COVID-19 may succumb to multiorgan diseases or autoimmune conditions over an extended period of time, with symptoms lasting weeks or months after the illness with COVID-19 illness^[20]. Multiorgan diseases can affect numerous, if not all, body systems, including heart, lungs and brain functions, and are the most common organs affected post-COVID^[21]. Follow-up examinations of infected people can assist medical professionals to remain alert. Early medical action can help to either avoid complications or improve the prognosis. The risk of organ damage is linked to COVID-19, as well as the long-term consequences that may result. Table 1 shows all of the characteristics of SARS-CoV-2 in multi-organ systems.^[22]

Table 1: Organs affected post COVID-19

Organ	Site of symptom	Manifestation	Confirmative test	Presence of viral nucleic acid	Presence of ACE-2 receptor	Remarks	References
Brain	Olfactory Bulb	Hyposmia, hypogeusia, hypopsia, encephalitis and headache	CT Scan, MRI Scan, UPSIT (University of	Nasopharyngeal swab	—	- SARS-CoV-2 enroute to the olfactory bulb	Matthew, 2020; Poyiadji et al., 2020;

			Pennsylvania Smell			leading to smell dysfunction and	Puja et al., 2020
Eye	Conjunctiva	Conjunctivitis,	Identification Test) Slit Lamp	–	Retina and	cytokine storm in the thalamus. -SARS-CoV-2 could enters	Sommer, 2020; Qing
Lung	Pulmonary lobe	chemosis, swelling of conjunctiva, epiphora or overflow of tears onto the face Bilateral pneumonia,	diagnostic CT Scan	Lung sputum	Retinal pigment epithelium Transient	the tears in the droplet form and could transmit the disease to various organs. -Damage of walls and lining	et al., 2020; Wu et al., 2020 Cao et al., 2020; Han
	Pulmonary	unilateral pneumonia, ground glass opacities,			secretory cells	cells by SARS-CoV-2 - Inflammation pathway	et al., 2020
Heart	nodules Bronchovascular bundles Alveolus Myocardium and	Irregular lesions Thickening Shortness of breath ARDS Cardiac failure or	Physical symptom Increased levels of	–	Viable	mediated lung injury and damage - Inflammation and cytokine	Markian, 2020;
Gastrointestinal	Cardiac muscle cell Stomach and	Myocarditis, Myocardial infraction. Anorexia, vomiting,	Troponin protein Physical symptoms	Nasopharynx	myocardium Oesophagus,	storm mediated myocardial infraction or myocarditis. - GI symptoms may occur at	Huang et al., 2020; Bansal, 2020; Wang et al., 2020 Zhu et al., 2020;

system	digestive organs GI tract	nausea, abdominal pain Gastrointes tinal	Endoscop y,	Throat Stool	ileum and colon	the initial stage of COVID- 19	Zhang et al., 2020; Cui et al., 2020;
		bleeding	colonosc opy				Risman baf and Zarei,
Kidney	Liver	Liver injury Acute Kidney Injury	AST, ALT Creatinine blood test	Urine	Cholangioc ytes Proximal	-Possible drug induced liver injury - Liver fibrosis through AP-1 or inflammas ome pathway - Inflammas ome pathway	2020. Yang et al., 2020;
				(Uncommo n)	convoluted tubules Podocytes	-Multi- organ mediated damage	Perico et al., 2020; Pan et al., 2020

2. METHODS

A cross-sectional study was carried out in the Delhi-NCR region to know regarding the long-term effects of patients who recovered from COVID-19 during the first and second pandemic waves.

The sample population size was 481 participants who gave their consent to be a part of our study. The form was distributed to the age groups of 18–25 years, 25–40 years and 40–60 years. To follow appropriate COVID-19 precaution guidelines, the questionnaire was prepared using Google Forms and was distributed via social media platforms like WhatsApp and other social media apps. The survey targeted patients who recovered from COVID-19.

The form consisted of 14 questions that analyzed their post-COVID effects. The common post-COVID effects were searched

through various online research papers and included in the questionnaire. Survey data was organized into an excel sheet using Microsoft Excel software, and thereafter the results of the study were analyzed and summarized in a table.

The validation of form was done via pilot study. This study was formally approved by the Manav Rachna Dental College, Faridabad.

3. RESULTS

A survey was conducted on the population of Delhi-NCR which consisted of a sample survey of 481 people out of which 278 were COVID-19 positive and 203 were COVID-19 negative patients. The study included both male and females between 18-25 years, 25-40 years and 40-60 years.

Table 2 indicates the general information of the COVID-19 positive cases. It shows that the majority of the survey population (59.7%) was

infected during the second surge, after April 2021.

45.7% of them were symptomatic with signs like fever, cough, lack of taste and smell, sore

throat etc. It was also observed that 43.2% of them were reinfected from COVID-19 and 56.8% had no longer been reinfected in our study.

TABLE - 2

RESPONSES OF COVID-19 POSITIVE PATIENTS				
GENERAL INFORMATION				
S.NO	QUESTION	OPTIONS	RESPONSES	PERCENTAGE
1	Period of COVID-19 infection	Between May 2020 & September 2020 (1st wave)	46	16.50%
		Between September 2020 & April 2021 (Intermediate period)	66	23.70%
		After April 2021 (2nd wave)	166	59.70%
2	Symptoms	Highly Symptomatic	127	45.70%
		Very less Symptoms	115	41.40%
		Asymptomatic	36	12.90%
3	Re-infection.	Yes	120	43.20%
		No	158	56.80%

Table 3 and Figure 1 show the chronic health conditions and COVID-19 on the sample population. The survey evaluation confirmed that before getting infected from covid 19.4% of the study population suffered from heart problems, 9.4% suffered from Diabetes Mellitus and 7.2% suffered from Lung Disorders whereas after getting infected from covid 26.6% suffered from heart problems, 4%

suffered from diabetes mellitus, 12.2% suffered from lung disorders. When asked to rate their prevalence of falling sick, headache, breathlessness post covid majority of the sample survey endured all these symptoms infrequently but 69.1% of them had frequent hair fall and 36.7% couldn't see alterations in their weight where 33.5% gained weight and 29.9% lost weight post covid.

TABLE-3

CHRONIC HEALTH CONDITIONS				
S.NO	QUESTION	OPTIONS	RESPONSE	PERCENTAGE
1	Chronic ailments before getting infected by COVID-19	Heart problems	54	19.40%
		Diabetes mellitus	26	9.40%
		Lung disorders	20	7.20%
		None	178	64%
2	Chronic ailments post recovery	Heart problems	74	26.60%
		Diabetes mellitus	11	4%
		Lung disorders	34	12.20%
		None	159	57.20%
3	Frequency of falling sick	Frequently	93	33.50%
		Moderately	84	30.20%
		Rarely	101	36.30%
4	Headaches after recovery	Frequently	97	34.90%
		Moderately	83	29.90%
		Rarely	98	35.30%
5	Breathlessness after recovery	Frequently	97	34.90%
		Moderately	83	29.90%
		Rarely	98	35.30%
6	Frequent hair-fall post COVID-19	Yes	192	69.10%
		No	86	30.90%
7	Weight changes post COVID-19	Gained	93	33.50%
		Lost	83	29.90%
		No Change	102	36.70%

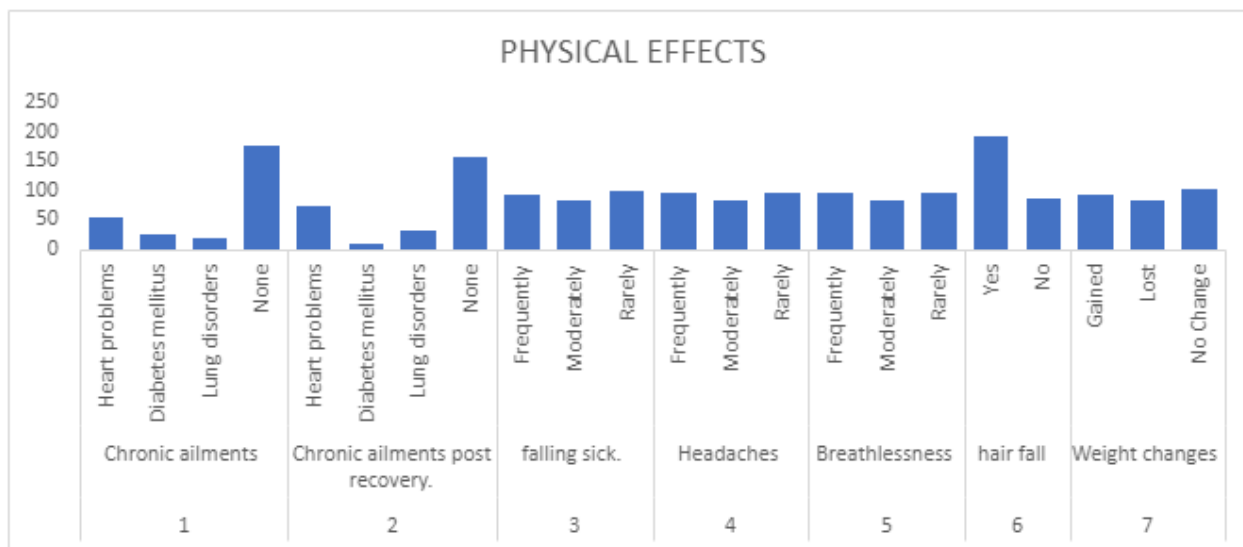


Figure 1: Chronic health conditions in post COVID-19 patients

Table 4 and Figure 2 show the psychological effects faced by the covid positive cases. As we know COVID-19 has had a huge impact on mental health all over the world. The results of our study showed that 61.2% of the total survey sample suffered from insomnia, 58.6% had

memory issues as they complained of forgetfulness post COVID-19, 51.1% had tremors, 59% faced anxiety, 25.5% had stress, 5.8% had panic attacks, 7.6% had fear of isolation.

TABLE-4

MENTAL EFFECTS				
S.NO	QUESTION	OPTIONS	RESPONSE	PERCENTAGE
1	Sleeplessness post covid.	Yes	170	61.20%
		No	108	38.80%
2	Effect on memory.	Yes	163	58.60%
		No	115	41.40%
3	Difficulty in movement post COVID-19	Yes	142	51.10%
		No	136	48.90%
4	Mental health issues post COVID-19	Anxiety	164	59%
		Stress	71	25.50%
		Panic Attacks	16	5.80%
		Fear of Isolation	21	7.60%
		None	87	31.30%

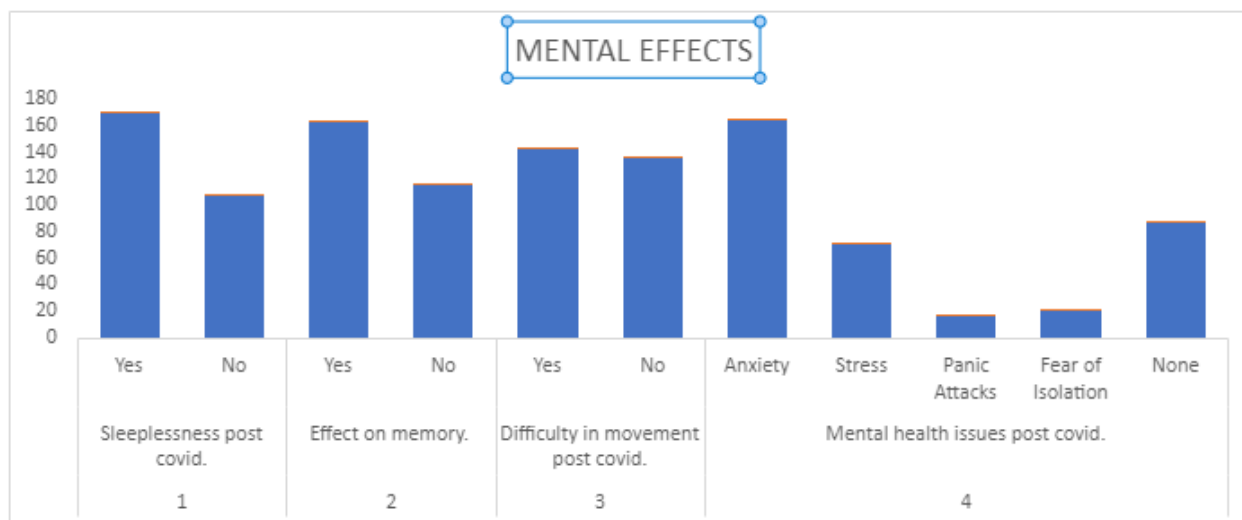


Figure 2: Mental issues post COVID-19

4. DISCUSSION

The aim of the survey was to identify the impact of COVID-19 in recovered patients, to identify long-term effects of the disease, and to determine if the common myths among the general population were actually true or false.

The results indicated that a large portion of the COVID-19 recovered patients are encountering stress, but the psychological side effects, including depression, fear, and anxiety, might continue for a longer time. There were people who reported heart and lung ailments even after recovering from COVID-19.

This analysis supports the theory that COVID-19 may affect the patients in the long run by having effects on the multiple organ systems of the patients. A recent study reported that the human kidney is a specific target for SARS-CoV-2 infection.^[23] In the follow-up of SARS recovered patients, in addition to the alveolar cells in the lungs, ACE2 expression has been reported in other organs, including the kidney, the heart, and the gut^[26].

Individuals who have recovered from COVID-19 have to be more cautious and keep a check on their health status. They must monitor their health and do blood tests regularly for timely management of any health complication if it occurs after COVID-19 recovery. Henceforth, the recovered patients are recommended to go through a master health check-up to scout for any risks of other diseases. The patients who have recovered should get CT and MRI scans after consultation if required. The University of

Pennsylvania Smell Identification Test (UPSIT) to test smell identification, as loss of smell is one of the underlying symptoms in COVID-19 patients. Lung inflammation^[24], inflammation in the heart^[25], and GI tract inflammation^[27,24] can all be analyzed by various scans and tests. LFT and KFT should be done to rule out any liver or kidney impairment. Regular health check-up of the recovered patients will definitely combat the challenges faced by them after COVID-19 recovery, and help to reduce their stress levels by making them feel psychologically better.

It was found that during the quarantine period, the infected, as well as a few recovered COVID-19 patients, were away from human contact, which could increase the possibility of psychological symptoms. Some strategies that can help overcome loneliness, depression, anxiety and stress by planning a daily routine, performing different activities and hobbies which may help to cope up with anxiety and stress.^[28] COVID-19 recovered patients are prone to develop physical, mental, as well as a few psychological issues, which could likewise be named 'post-intensive care syndrome'. Unaffected people being stressed over getting the infection from somebody who has recovered may attempt to stay away from them, but it is important not to exclude the individuals who have recovered from the illness. They may likewise be stressed over being stigmatized by the community. Henceforth, we propose giving counseling, moral help, as well as a few recommended guidelines to the COVID-19 recovered patients to get back to work as usual.

These should be followed by a COVID-19 recovered patient [22].

COVID-19 is a severe epidemic that has had a worldwide impact. People are affected physically, emotionally, financially as well as psychologically. Since it is still spreading, death rates are increasing day by day, life may come to a halt, and its control time is unpredictable. Many people will be affected by this consequence. Long-term health problems and psychological effects will be more apparent after the COVID-19 outbreak has been contained for a period of time.

This study found that the majority of the sample population was infected during the second wave with high symptoms. A significant number of people suffered from sleeplessness and hair fall post COVID-19. The mental health issues that have arisen as a result of the COVID-19 pandemic are predicted to have worldwide consequences. Certain steps must be taken to reduce the unfavorable psychological impacts. Future research should move beyond the cross-sectional design of the present study to explore the other factors affecting the mental health in a public health emergency. To fight any battle the basic yet one of the most important weapon is self-awareness.[29]



5. CONCLUSION

COVID-19 is a pandemic that has a worldwide impact. This study found that the majority of the sample population was infected during the second wave with severe symptoms. A significant number of people suffered from insomnia and hair fall post-COVID. The mental health issues that have arisen as a result of the COVID-19 pandemic are predicted to have worldwide consequences. Certain steps must be taken to reduce the unfavourable psychological impacts. Future research should move beyond the cross-sectional design of the present study to explore the other factors affecting youth mental health in a public health emergency.

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