



Long-Term Effects of COVID-19: A Guide to Post-Recovery Symptoms in Diyala Governorate, Eastern Iraq

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Abstract

The COVID-19 pandemic is a massive global event with significant health consequences, it appeared for the first time in December 2019, and it was officially called severe acute respiratory syndrome (SARS-Cov-2), it causes important diseases in humans ranging from the common cold to deadly respiratory infections, most infected people recovering within a few weeks, except some of them, have symptoms for a long time and it is called a post-COVID-19 syndrome. This study was conducted in Diyala Governorate, north of Baghdad, from October 2022 to March 2023, to investigate the most important symptoms people still suffer from after recovering from COVID-19. The study was carried out by cross-sectional analysis of a sample of people who had previously been infected with COVID-19, using a questionnaire that was divided into several sections including demographic details for the participants in this study, duration of hospitalization, and the symptoms that still accompany them after gaining full recovery from infection with the virus. The sample size was 300 individuals. The current study concluded that many symptoms are still associated with people who recovered after infection with Covid-19. The following symptoms were most common, fatigue after any slight exertion, headache, Dizziness when standing, coughing, and difficulty breathing with proportions of 70.0%, 69.0%, 64.0%, 60.7%, and 55.7%, respectively, these symptoms were more frequent with age group (10-40) for 85% and these symptoms are more common in male from the female.

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Introduction

Several cases of pneumonia contagious of unknown causes were discovered specifically in the densely populated city of Wuhan, located in central China, called (COVID-19) "by World Health Organization in December 2019 (Farhood et al.,2022). This virus belongs to a large family of RNA viruses that infect some animals such as cats, bats, camels, and others, and are contagious to humans when they come into contact with those animals (Bhatt &Singh,2020; Ajbar et al .,2021)Some coronaviruses reason destructive pestilence, while some cause weak to moderate respiratory infections, such as colds, and their incubation period is from five to six days(Namekar et al.,2013).

COVID-19 is one of the most dangerous pathogens that infect vertebrates, most patients present with fever, dry cough, muscle pain, difficulty breathing, sneezing, and sore



throat (Wang et al.,2020) symptoms are usually initially simple and then turn into shortness of breath and acute respiratory distress syndrome (ARDS) and usually occur within 5 to 8 days of infection (Lai et al.,2020; Khan et al.,2020).

Inflammation of the lungs is the main symptom of COVID-19 patients in hospitals, and about 5% of these patients deteriorate, which requires high care (Mcgonagle,2020) Hypoxia, systemic inflammation, clotting, and difficulty breathing, were identified as severe indicators of infection with the virus (Ruan et al.,2020; Clerkin et al.,2020; Abdulkareem,2023). A percent of patients also had heart muscle damage (Chamola et al.,2002). Heart disorders, liver, and kidney injury, and secondary bacterial infections are among the most common complications in people with COVID-19, as well as the disease develops more in the elderly, as the death rate increases in people over 65 years of age (Lodigiani et al.,2020; Silver et al.,2021).

Most people infected with COVID-19 fully recover, but some individuals suffer from health effects and symptoms after recovering from the first infection, this condition is called COVID-19 syndrome or long COVID-19 (Al-Jahdhami et al.,2021). Long-term COVID-19 refers to long-term symptoms that people experience after they become infected with COVID-19. These symptoms may persist since those people first contracted COVID-19 or develop after they recover. These symptoms can appear and disappear and then reappear over time (Thompson et al.,2022) The most common symptoms associated with post-COVID-19 include fatigue, shortness of breath, persistent cough, muscle pain, loss of smell and taste, sleep disturbances, and cognitive impairment (such as confusion, loss of mental focus, forgetfulness) (Patcai,2022). There are fewer common symptoms, but they affect the social and personal life of patients who have recovered from COVID-19 in different ways, such as some psychological problems, depression and anxiety and the severity of these symptoms varies between adults and children. Symptoms are more common in individuals between the ages of 18 to 49 years, with greater risks of increasing age, body mass index, and sex (Walia et al.,2021). Symptoms must have lasted for at least two months since a person first contracted COVID-19 for the person to be considered to have post-COVID-19. About 50 to 80% of people who catch COVID-19 develop symptoms after about three months after infection (Kingstone et al.,2020)

A meta-analysis of 28 studies revealed that there is a deficiency in the performance of the respiratory system in 11- 45% of survivors from COVID-19 after 12 months from infection, using the metric scale (walking for 6 minutes) and a third of the survivors suffered from psychological problems ranging from depression to Anxiety that lasted for a long time, and about 17% of survivors did not return to their previous level of work even a year after the infection (Ahmed et al.,2020).It was observed that an increasing number of people complained of heaviness in the chest, shortness of breath, muscle pain, palpitations, and fatigue, weeks and sometimes months after the onset of the disease. Especially healthcare workers, because they were the most exposed to the disease during the first epidemic wave when the equipment and was Personal protection not enough (Brüssow& Timmis).

A Swedish hospital surveyed healthcare workers (HCW). 26% of them reported that the symptoms of COVID-19 lasted for two months, and 15% of them reported that the symptoms lasted for 8 months after infection, and the most common of these symptoms were loss of smell, fatigue, and shortness of breath. And that these long-term symptoms have hampered their work and social or home life (Havervall et al.,2021).

The study aimed to identify these symptoms, and their duration among gender with demographic variables in Diyala Governorate, north of Baghdad to classify post-recovery long-term symptoms of COVID-19.

Materials and Methods

Study Design and Setting

This retrospective cross-sectional study was conducted in Baquba General Hospital in Baquba City during the period from October 2022 to March 2023, it included COVID-19 patients who were lying in a quarantine center during the epidemic period. The study was approved by the Scientific division of the Technical Institute Baquba, patients who wish to participate in the study of both sexes and from different age groups were registered, and some other groups were excluded as patients who suffer from old chronic diseases and people who do not wish to participate in the study.

A questionnaire was filled out for the participants, which included the duration of hospitalization, stay in intensive care, the need for oxygen during infection, and the most important symptoms that they still suffer from after full recovery from infection with the virus.

Statistical Analysis

T Data collected using SPSS version 25 were entered into tables and simple figures, and the data were analyzed using the Chi-square (χ^2) test to compare with percentages. A significance $\alpha = 0.05$ was applied using the program (SPSS v.26), P-value was calculated and considered a significant difference if less than 0.05.

Ethical Approve

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. before collecting any data, all study participants gave their informed consent participants were made aware of the study's objectives, their freedom to decline or discontinue participation at any time, and the confidentiality of their answers. the data were kept private, and the names of the participants were replaced with identification codes.

Limitations of The Study

- The sample size may affect the results of the study and therefore it cannot be generalized.
- The age group may have an impact on the results of the study because it was taken randomly, and the proportion of one age group may be more than the other.

Results

Frequency and Proportion of COVID-19 Recovered Patients According to Demographic Characteristics

There were very high statistically significant differences with respect to the job variable, as 251 individuals, or 83.7% of the sample, were not employed, as well as for their hospitalization during infection, 248 individuals, 82.7% of the sample, did not need admission to intensive care unit admission. There were highly significant differences in the age of the sample, with the highest age group (10-40) accounting for 85%, while the lowest age group (>60). There were also statistically significant differences in oxygen requirements, which stood at 202, and 67.3% of respondents did not require oxygen during the time they were infected with COVID-19.

Table 1. frequency and percentage of patients recovered from COVID-19 according to demographic variables using chi-square test

Items of demographic variables	Count	Percentage	P- value
Age groups (years)	10-40	254	85.3%
	41-60	37	12.3%
	>60	7	2.3%
Gender	Male	174	58.0%
	Female	126	42.0%
Living	Urban	179	59.7%
	Rural	121	40.3%
Occupation	Employer	49	16.3%
	Un employer	251	83.7%
Intensive care unit admission	Yes	52	17.3%
	No	248	82.7%
Stay time (days)	<7	115	38.3%
	7_14	98	32.7%
	>14	87	29.0%
Oxygen	Yes	98	32.7%
	No	202	67.3%

Frequency Rate and Percentage of Respondent Data for Patients who Have Recovered from COVID-19 Disease in Terms of The Symptoms that Continue to Accompany Them After Recovery

The following symptoms after recovery from COVID-19 were most common, fatigue after any slight exertion, headache, Dizziness when standing, coughing and difficulty breathing with proportions of 70.0%, 69.0%, 64.0%, 60.7% and ,55.7%, respectively.

Table 2: Frequency and Percentage of Clinical Symptoms of Patients Recovered from COVID-19

Items of questioner data	Results	Count	Percentage	P value
Shortness of breath	Yes	167	55.7%	P>0.05
	No	133	44.3%	
Cough	Yes	192	64.0%	P<0.05*
	No	108	36.0%	
Arthritis	Yes	158	52.7%	P>0.05
	No	142	47.3%	
Loss of sense of smell or taste	Yes	140	46.7%	P>0.05
	No	160	53.3%	
Dizziness	Yes	182	60.7%	P<0.05*
	No	118	39.3%	
Depression or anxiety	Yes	143	47.7%	P>0.05
	No	157	52.3%	
Blood clots in the lungs	Yes	21	7.0%	P<0.001***
	No	279	93.0%	
Fatigue	Yes	210	70.0%	P<0.001***
	No	90	30.0%	
Difficulty concentrating	Yes	147	49.0%	P>0.05
	No	153	51.0%	
Difficulty sleeping	Yes	144	48.0%	P>0.05
	No	156	52.0%	
Headache	Yes	207	69.0%	P<0.05*
	No	92	30.7%	
Rapid heartbeat	Yes	110	36.7%	P<0.05*
	No	190	63.3%	
Renal function disorders	Yes	37	12.3%	P<0.001***
	No	263	87.7%	
Myocarditis	Yes	15	5.0%	P<0.001***
	No	285	95.0%	

Table 3 Relationship Between Personal Characteristics and Gender of Recovered COVID-19 Patients

Features	The age group		Gender		Total	P- value
			Male	Female		
Age group	1 - 20	n	68	61	129	p<0.05*
		%	39.1%	48.4%	43.0%	
	21 - 40	n	83	44	127	
		%	47.7%	34.9%	42.3%	
	41- 60	n	22	15	37	
		%	12.6%	11.9%	12.3%	
	>60	n	1	6	7	
		%	.6%	4.8%	2.3%	
Living	Urban	n	97	82	179	p>0.05
		%	55.7%	65.1%	59.7%	
	Rural	n	77	44	121	
		%	44.3%	34.9%	40.3%	
Need for Oxygen	Yes	n	54	44	98	p>0.05
		%	31.0%	34.9%	32.7%	
	No	n	120	82	202	
		%	69.0%	65.1%	67.3%	

Discussion

Many people worldwide have been infected with this virus, and even more of them have died. Most patients will see short-term improvement if evidence-based treatments are continued and new therapies are introduced as needed. The number of patients at risk of poor long-term outcomes is referred to as persistent COVID-19 (Mohammed et al.,2023).

For a large percentage of the patients included in the study, the symptoms of COVID-19 continued with them for long periods after recovery, perhaps their immunity was not sufficient, or they suffered from malnutrition, or they did not take enough time to rest due to the pressures of life and their preoccupation with their important work.

The results of a study conducted in Paris that included 279 individuals with COVID-19, due that symptoms persisted after 4 months, the most frequent symptoms were fatigue (55%), shortness of breath (42%), poor concentration (28%), sleep disturbances (31%), memory loss (34%), and hair loss (20% mainly in women) (Garrigues et al.,2020).

In a Chinese study that included 1733 patients who were treated between January and May 2020 in a hospital in Wuhan, and after 6 months of the infection, during a physical examination, 6-minute walking test, blood analysis, and lung function tests, 76% of them reported the presence of at least one disease, and women were affected more than men (Huang et al.,2021).

Age is considered an important independent indicator of mortality in any epidemic, especially COVID-19, and this is due to many reasons, including chronic diseases, as well as a person's level of immunity. In our study, the difference in sample size probably increased in the sample under 40 years of age. In a recent study of 41 patients admitted to a hospital in China, it was reported that 49% of them were aged 25 to 49 years, and 34% of them were over 50 years old (Chamola et al.,2020) In another Chinese study, it was performed on 191 people infected with COVID-19 during the first month of the epidemic outbreak and follow-up until recovery. They were between 18 to 87 years old, 62% of them were male and 70% of them did not survive, so the mortality rate is related to age (Ruan et al.,2020).

A study was conducted in France, including 150 patients with COVID-19 were followed up, and it was noted that 66% of them still suffer from weakness and shortness of breath after the eighth week of recovery, and the symptoms were more frequent with the age of the patients (Carvalho-Schneider et al.,2021). In a Spanish study conducted on 277 patients who recovered from COVID-19, the symptoms they still suffer from after several months of recovery are shortness of breath and fatigue, and symptoms related to taste and smell were associated with younger age groups (Moreno-Pérez et al.,2021).

Males are often more susceptible to infection than females, perhaps because women have a better immune system due to genetic and hormonal factors, which makes the immune response stronger to viral infections. Also, because of the poor diet in men because they spend more time outside the home, as well as their frequent smoking.

Most of the individuals in the sample were males, and they did not need to be admitted to the intensive care units during their COVID-19 infection, perhaps their infection was slight or they had received the COVID-19 vaccine before, and in a similar study conducted at Wuhan University for 138 people suffering from pneumonia associated with covid -19 and their average age was 56 years, and the largest proportion of them were men, and most of them did not need to be admitted to the intensive care units (Lodigiani et al.,2020; Bikdeli et al.,2020).

According to a study conducted in the United Kingdom on 100 patients after discharge from the hospital, the most common symptoms were fatigue and shortness of breath, with an increase in the severity of symptoms in people who entered intensive care units during infection with COVID-19 (Carvalho-Schneider et al.,2021) The risk of hypoxia and long-term symptoms is 5 times increase in COVID-19 patients treated in the acute intensive care unit compared to patients treated in the general ward(Davis et al.,2021).

The current study found some patients studied were exposed to blood clots at a rate of 7%, that SARS-CoV-2 could be a cause of increased blood clot formation in the venous and arterial circulation and this confirms that COVID-19 is one of the causes of thrombosis (Wang et al.,2020B).

The increased cardiac vital signs, as well as the rate of clotting when infected with the virus, cause the patient's inflammatory condition to be a clot with inner layer loss of function, and it ends in perishing if it persists. Despite the prophylactic drug therapy, the risk of

thrombosis was significantly increased for hospitalized patients) Ramanathan et al.,2020; Chamola et al.,2020).

COVID-19 infection has direct and indirect effects on the kidneys. Possible direct effects include endothelial damage from viral entry and indirect mechanisms such as sepsis and drug-induced nephrotoxicity leading to illness of the urinary system and accessories, particularly in individuals of social and economic decline and helpless entry into healthy sponsorship units. SARS-CoV-2 can penetrate the kidneys. A study on kidney function was conducted on 59 people infected with the virus; (63) % of them had proteinuria. (19) percent had elevated plasma creatinine levels and (27) percent had high urea nitrogen levels. There is a close link between kidney failure and infection with COVID-19(Marco et al.,2021).

A high percentage of about 70% of the sample suffered from fatigue and stress as well as headaches after any exertion, even if it was just a simple one. This is due to the effects that COVID-19 infection causes on different organs of the body, including the heart and lungs

Conclusion

Even after a full recovery, COVID-19 continues to cause serious complications. The most common symptoms are fatigue after minor exertion, headache, dizziness on standing up, cough, and difficulty breathing, at rates of 70.0%, 69.0%, 64.0%, 60.7%, and 55.7%, respectively. The incidence of males was higher than females. Prevalence was higher in men than in women. The highest incidence of symptoms occurred in the age group (1-20) and (21-40) years.

Competing interests

The authors wish to declare that there are no competing interests.

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