

## Post recovery symptoms and complication corresponding COVID-19 infection

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### Abstract

This study was conducted on those recovering from infection with the COVID\_19 virus and aims to assess the pathological complications after recovery. A Google electronic form was used to collect data from male and female participants. The results showed that there was a significant correlation between sex and severity of infection with the complications of the disease after recovery, especially joint pain, fatigue and hair loss. The results did not show significant differences for the correlation coefficient between the variables and other complications of the disease.

**Keywords:** Complication; COVID-9; Symptoms; Infection

### 1. Introduction

Coronavirus disease 2019 (COVID-19) is a contagious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first known case was identified in Wuhan, China, in December 2019. The disease has since spread worldwide, leading to an ongoing pandemic. [1]. Symptoms of COVID-19 are variable, but often include fever, cough, headache, fatigue, breathing difficulties, and loss of smell and taste. Symptoms may begin one to fourteen days after exposure to the virus. At least a third of people who are infected do not develop noticeable symptoms [2, 3, 4].

COVID-19 transmits when people breathe in air contaminated by droplets and small airborne particles containing the virus. The risk of breathing these in is highest when people are in close proximity, but they can be inhaled over longer distances, particularly indoors. Transmission can also occur if splashed or sprayed with contaminated fluids in the eyes, nose or mouth, and, rarely, via contaminated surfaces. People remain contagious for up to 20 days, and can spread the virus even if they do not develop symptoms. [5]. [2] Found that olfactory dysfunction has been observed as one of the clinical manifestations in COVID-19 patients [6, 7]. Handful of studies reported the observation of olfactory dysfunction in COVID-19 patients. Following that the Ear, Nose, and Throat [8]. Limited evidence suggests that ACE 2 expression is attenuated in females compared with the males which could justify the higher number of COVID-19 cases in men [9, 10]. [11] Stated that the mortality rate of COVID-19 increases by up to 49% in patients who develop ARDS. Age, neutrophilia, elevated LDH and D-dimer are the identified risk factors for the development of ARDS. Similar to the MERS, a positive association of neutrophilia and lung damage has been recognized in COVID-19 [12]. A study include 243 patients suggests that AST elevation occurs in 20% of the COVID-19 patients (95% CI: 15.3–25.6%). In addition from six studies including 197 patients indicates that ALT elevation is observed in 14.6% of COVID-19 cases (95% CI: 12.8–16.6%) [13]. other reports indicate that in 14–53% of COVID-19 cases, abnormal levels of aminotransferases (AST and ALT) are observed [14]. Teachers are the main caregivers and the first line of protection for school children. Their role complements that of parents. During school hours, school teachers are actually the first-respondent in cases of disasters or emergencies. They must be able to deal properly with health emergencies both in normal children, and those children with special health care needs [19]. Healthcare professionals have realized that much of their technical and

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administrative activities arrelated to the management and provision of patient information, diagnosis, treatment and medical research. Hence, we can recognize the role of computer and the idea of using it in medicine and its relation to health sciences and the relationship of the latter with computer science and medical engineering [20].

## 2. Material and methods

The current study included forty people who participated in answering the questionnaire prepared in Google format and included demographic information that included age, gender, injury severity and recovery from injury. With or without treatment and information related to the most important complications of the disease after recovery from infection with the COVID-19 virus, including Body pain, Joints pain or headache, High blood sugar (hyperglycemia),Fever, Fatigue, Feeling of tiredness or lack of energy ,Loss of taste or smell, Shortness of breath or difficulty breathing, Coughing or Chest pain, Hair loss and Inability to focus or difficulty thinking or a lack of mental clarity ,Difficulty in sleeping, Rapid or fast heartbeat ,Insomnia, anxiety disorder or depression ,Dizziness or lightheaded when you stand up from sitting or lying down Red bumps or rash on a flat, red patch of skin , and symptoms that get worse after mental or physical activities. The data were analyzed using the Statistical Package for Social Sciences (SPSS), version 26. Include Percentage (%) and Chi square ( $X^2$ ).

## 3. Results and discussion

Symptoms, signs, or abnormal clinical parameters persisting two or more weeks after COVID-19 onset that do not return to a healthy baseline can potentially be considered long-term effects of the disease (15).

**Table 1** Distribution of the Variables Related Demographic Characteristics N=40 patients

Descriptive statistics of Demographic Variables			
Demographic Variables	Variables Classes	F	Percent
Sex	Male	21	52.5 %
	Female	19	47.5 %
	Total	40	100 %
Age	18-35	18	45 %
	36-60	22	55 %
	Total	40	100 %
Severity of infection	10-30 %	28	70 %
	40-60 %	8	20 %
	More 60 %	4	10 %
	Total	40	100 %
Recovery	Without treatment	18	45 %
	With treatment	22	55 %
	Total	40	100.0

Table (1) showed that there were no differences in percentage regarding gender or age but the severity of infection were more between 10-30%.on other hand there were no differences corresponding with or without treatment.

The percentage of period of complication in table (2) sowed that most participants suffer some time from post recovery complication Body pain, Joints pain or headache and Insomnia, anxiety disorder or depression 57.5, Shortness of breath or difficulty breathing, Inability to focus or difficulty thinking or a lack of mental clarity42%, Difficulty in sleeping and Rapid or fast heartbeat 45%,, Dizziness or lightheaded when you stand up from sitting or lying down and Symptoms that get worse after mental or physical activities 47.5% .

The authors (16) performed a survey in a Facebook group of patients who previously had COVID-19 and compared the symptoms of those hospitalized with mild to moderate symptoms. They concluded that both groups had symptoms after 3 months of having COVID-19. (17) Found that Dyspnea and cough were found in 24% and 19% of patients, respectively. In addition, abnormalities in CT lung scans persisted in 35% of patients even after 60–100 days from the initial presentation. Gandhi (18) Stated that Later in the disease, a hyper inflammatory state and coagulopathy are thought to lead to clinical complications; in this stage, anti-inflammatory medications.

**Table 2** Results of symptoms for post complication of COVID-19 infection

Frequencies and percentage for post complication of COVID-19 infection							
No	Questions	No symptoms		Some Time		Always	
		F	%	F	%	F	%
1	Body pain, Joints pain or headache	8	20 %	23	57.5 %	9	22.5 %
2	High blood sugar (hyperglycemia)	36	90 %	3	7.5 %	1	2.5 %
3	Fever	14	35 %	18	45 %	8	20 %
4	Fatigue, Feeling of tiredness or lack of energy	5	12.5 %	14	35 %	21	52.5 %
5	Loss of taste or smell	15	37.5 %	11	27.5 %	14	35 %
6	Shortness of breath or difficulty breathing	18	45 %	17	42.5 %	5	12.5 %
7	Coughing or Chest pain	17	42.5 %	15	37.5 %	8	20 %
8	Hair loss	17	42.5 %	13	32.5 %	10	25 %
9	Inability to focus or difficulty thinking or a lack of mental clarity	12	30 %	17	42.5 %	11	27.5 %
10	Difficulty in sleeping	15	37.5 %	18	45 %	7	17.5 %
11	Rapid or fast heartbeat	16	40 %	18	45 %	6	15 %
12	Insomnia, anxiety disorder or depression	10	25 %	23	57.5 %	7	17.5 %
13	Dizziness or lightheaded when you stand up from sitting or lying down	13	32.5 %	19	47.5 %	8	20 %
14	Red bumps or rash on a flat, red patch of skin	34	85 %	4	10 %	2	5 %
15	Symptoms that get worse after mental or physical activities	21	52.5 %	19	47.5 %	0	0 %

**Table 3** Comparison of symptoms (post complication of COVID-19 infection) according to gender

Comparison of symptoms between male and female by chi square								
no	Questions	Symptoms	Sex			Significant		
			Male	Female	Total	X2	P - value	Sig
			N	N	N	7.58	0.023	S
1	Body pain, Joints pain or headache	No Symptoms	1	7	8	7.58	0.023	S
		Some Time	13	10	23			
		Always	7	2	9			
		Total	21	19	40			
		No Symptoms	20	16	36	1.68	0.355	Ns

2	High blood sugar (hyperglycemia)	Some Time	1	2	3			
		Always	0	1	1			
		Total	21	19	40			
3	Fever	No Symptoms	5	9	14	3.27	0.185	Ns
		Some Time	10	8	18			
		Always	6	2	8			
		Total	21	19	40			
4	Fatigue, Feeling of tiredness or lack of energy	No Symptoms	1	4	5	2.89	0.220	Ns
		Some Time	7	7	14			
		Always	13	8	21			
		Total	21	19	40			
5	Loss of taste or smell	No Symptoms	7	8	15	0.78	0.672	Ns
		Some Time	7	4	11			
		Always	7	7	14			
		Total	21	19	40			
6	Shortness of breath or difficulty breathing	No Symptoms	8	10	18	1.79	0.407	Ns
		Some Time	11	6	17			
		Always	2	3	5			
		Total	21	19	40			
7	Coughing or Chest pain	No Symptoms	8	9	17	0.56	0.756	Ns
		Some Time	9	6	15			
		Always	4	4	8			
		Total	21	19	40			
8	Hair loss	No Symptoms	3	14	17	17.7	0.00	S
		Some Time	8	5	13			
		Always	10	0	10			
		Total	21	19	40			
9	Inability to focus or difficulty thinking or a lack of mental clarity	No Symptoms	3	9	12	7.43	0.024	S
		Some Time	9	8	17			
		Always	9	2	11			
		Total	21	19	40			
10	Difficulty in sleeping	No Symptoms	5	10	15	3.75	0.153	Ns
		Some Time	11	7	18			
		Always	5	2	7			
		Total	21	19	40			
11	Rapid or fast heartbeat	No Symptoms	5	11	16	4.82	0.890	Ns
		Some Time	12	6	18			
		Always	4	2	6			

		Total	21	19	40			
12	Insomnia, anxiety disorder or depression	No Symptoms	1	9	10	9.74	0.008	S
		Some Time	15	8	23			
		Always	5	2	7			
		Total	21	19	40			
13	Dizziness or lightheaded when you stand up from sitting or lying down	No Symptoms	4	9	13	6.39	0.041	S
		Some Time	10	9	19			
		Always	7	1	8			
		Total	21	19	40			
14	Red bumps or rash on a flat, red patch of skin	No Symptoms	16	18	34	4.02	0.133	Ns
		Some Time	4	0	4			
		Always	1	1	2			
		Total	21	19	40			
15	Symptoms that get worse after mental or physical activities	No Symptoms	9	12	21	1.54	0.199	Ns
		Some Time	12	7	19			
		Always	0	0	0			
		Total	21	19	40			

\*Ns = Non significant, X<sup>2</sup> = chi square, degree of freedom = (columns - 1)\*(rows - 1), P - value < 0.05 = significant(S) accept that non-significant (Ns).

**Table 4** Comparison of symptoms (post complication of COVID-19 infection) according to Injury level

Comparison of symptoms between 10-30 %, 40-60 %and 60-80% Injury level s by chi square									
no	Questions	Symptoms	Injury level				Significant		
			10-30 %	40-60 %	60-80 %	Total	X2	P - value	Sig
			N	N	N	N			
1	Body pain, Joints pain or headache	No Symptoms	6	1	1	8	0.42	0.98	Ns
		Some Time	16	5	2	23			
		Always	6	2	1	9			
		Total	28	8	4	40			
2	High blood sugar (hyperglycemia)	No Symptoms	26	7	3	36	9.70	0.04	S
		Some Time	2	1	0	3			
		Always	0	0	1	1			
		Total	28	8	4	40			
3	Fever	No Symptoms	8	4	2	14	5.98	0.20	Ns
		Some Time	16	1	1	18			
		Always	4	3	1	8			
		Total	28	8	4	40			
		No Symptoms	4	0	1	5			

4	Fatigue, Feeling of tiredness or lack of energy	Some Time	9	5	0	14	5.50	0.24	Ns
		Always	15	3	3	21			
		Total	28	8	4	40			
5	Loss of taste or smell	No Symptoms	11	2	2	15	2.26	0.68	Ns
		Some Time	8	3	0	11			
		Always	9	3	2	14			
		Total	28	8	4	40			
6	Shortness of breath or difficulty breathing	No Symptoms	12	3	3	18	5.18	0.28	Ns
		Some Time	14	3	0	17			
		Always	2	2	1	5			
		Total	28	8	4	40			
7	Coughing or Chest pain	No Symptoms	13	2	2	17	2.65	0.61	Ns
		Some Time	11	3	1	15			
		Always	4	3	1	8			
		Total	28	8	4	40			
8	Hair loss	No Symptoms	12	2	3	17	10.3	0.03	S
		Some Time	7	6	0	13			
		Always	9	0	1	10			
		Total	28	8	4	40			
9	Inability to focus or difficulty thinking or a lack of mental clarity	No Symptoms	9	2	1	12	2.13	0.71	Ns
		Some Time	10	5	2	17			
		Always	9	1	1	11			
		Total	28	8	4	40			
10	Difficulty in sleeping	No Symptoms	11	3	1	15	0.53	0.97	Ns
		Some Time	12	4	2	18			
		Always	5	1	1	7			
		Total	28	8	4	40			
11	Rapid or fast heartbeat	No Symptoms	10	3	3	16	3.12	0.53	Ns
		Some Time	14	3	1	18			
		Always	4	2	0	6			
		Total	28	8	4	40			
12	Insomnia, anxiety disorder or depression	No Symptoms	9	1	0	10	3.22	0.52	Ns
		Some Time	14	6	3	23			
		Always	5	1	1	7			
		Total	28	8	4	40			
13	Dizziness or lightheaded when you stand up from sitting or lying down	No Symptoms	9	3	1	13	4.97	0.29	Ns
		Some Time	11	5	3	19			
		Always	8	0	0	8			

		Total	28	8	4	40			
14	Red bumps or rash on a flat, red patch of skin	No Symptoms	24	7	3	34	2.98	0.56	Ns
		Some Time	3	0	1	4			
		Always	1	1	0	2			
		Total	28	8	4	40			
15	Symptoms that get worse after mental or physical activities	No Symptoms	17	2	2	21	3.19	0.20	Ns
		Some Time	11	6	2	19			
		Always	0	0	0	0			
		Total	28	8	4	40			

\*Ns = Non-significant, X2 = chi square, degree of freedom = (columns - 1)\*(rows - 1), P - value < 0.05 = significant(S) except that non-significant (Ns).

**Table 5** Comparison of symptoms (post complication of COVID-19 infection) according to Recovery

Comparison of symptoms between without treatment and with treatment Recovery by chi square								
no	Questions	Symptoms	Recovery			Significant		
			Without treatment	With treatment	Total	X2	P - value	Sig
			N	N	N			
1	Body pain, Joints pain or headache	No Symptoms	6	2	8	7.16	0.02	S
		Some Time	11	12	23			
		Always	1	8	9			
		Total	18	22	40			
2	High blood sugar (hyperglycemia)	No Symptoms	17	19	36	1.05	0.59	Ns
		Some Time	1	2	3			
		Always	0	1	1			
		Total	18	22	40			
3	Fever	No Symptoms	9	5	14	5.52	0.63	Ns
		Some Time	8	10	18			
		Always	1	7	8			
		Total	18	22	40			
4	Fatigue, Feeling of tiredness or lack of energy	No Symptoms	4	1	5	5.59	0.061	Ns
		Some Time	8	6	14			
		Always	6	15	21			
		Total	18	22	40			
5	Loss of taste or smell	No Symptoms	9	6	15	2.89	0.23	Ns
		Some Time	5	6	11			
		Always	4	10	14			
		Total	18	22	40			
6	Shortness of breath or difficulty breathing	No Symptoms	12	6	18	8.15	0.01	S
		Some Time	6	11	17			
		Always	0	5	5			

		Total	18	22	40			
7	Coughing or Chest pain	No Symptoms	10	7	17	2.75	0.25	Ns
		Some Time	6	9	15			
		Always	2	6	8			
		Total	18	22	40			
8	Hair loss	No Symptoms	10	7	17	2.47	0.29	Ns
		Some Time	4	9	13			
		Always	4	6	10			
		Total	18	22	40			
9	Inability to focus or difficulty thinking or a lack of mental clarity	No Symptoms	7	5	12	4.49	0.10	Ns
		Some Time	9	8	17			
		Always	2	9	11			
		Total	18	22	40			
10	Difficulty in sleeping	No Symptoms	10	5	15	4.5	0.10	Ns
		Some Time	6	12	18			
		Always	2	5	7			
		Total	18	22	40			
11	Rapid or fast heartbeat	No Symptoms	10	6	16	4.19	0.12	Ns
		Some Time	7	11	18			
		Always	1	5	6			
		Total	18	22	40			
12	Insomnia, anxiety disorder or depression	No Symptoms	7	3	10	3.60	0.16	Ns
		Some Time	9	14	23			
		Always	2	5	7			
		Total	18	22	40			
13	Dizziness or lightheaded when you stand up from sitting or lying down	No Symptoms	9	4	13	8.47	0.01	S
		Some Time	4	15	19			
		Always	5	3	8			
		Total	18	22	40			
14	Red bumps or rash on a flat, red patch of skin	No Symptoms	16	18	34	0.72	0.69	Ns
		Some Time	1	3	4			
		Always	1	1	2			
		Total	18	22	40			
15	Symptoms that get worse after mental or physical activities	No Symptoms	12	9	21	2.63	0.09	Ns
		Some Time	6	13	19			
		Always	18	22	40			
		Total	12	9	21			

\*Ns = Non-significant, X2 = chi square, degree of freedom = (columns - 1) \* (rows - 1), P - value < 0.05 = significant(S) except that non-significant (Ns).

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#### 4. Conclusion

The present study concludes that many patients even they recovered COVID-19 infection they suffered from the post complication, especially muscular and joint pain, hair loss shortness of breath or difficulty breathing.

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#### Compliance with ethical standards

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##### *Disclosure of conflict of interest*

There are no conflicts of interest and all researchers are compatible.

##### *Statement of informed consent*

The present research work does not contain any studies performed on animals/humans subjects by any of the authors.

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