Community Based Study about Post COVID-19 Sequelae in Salah Al-Din / Iraq

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ABSTRACT

Undoubtedly, the emergence of coronavirus disease 2019 (COVID-19) has led to critical devastating health effects, with a high rate of sequences and adverse effects that followed the infection for several months. Therefore, this study aims to assess the potential consequences for patients with COVID-19 infection. This community-based study was carried out on 280 participants with assured previous diagnosis of COVID-19, who attended health centers and hospitals in Salah al-Din region (Iraq) from January to April, 2023. Based on results, the main complaints of recovered patients were documented according to the following proportion: asthenia (20%), psychological (17%), respiratory (15%), neurological symptoms (13%), olfactory (10%), musculoskeletal (8%), cardiovascular and thrombotic (7%), gastrointestinal (5%) of the total study population. Most of these sequelae were observed in the period of more than 3 months of infection recovery, except for the olfactory complications, which were more in the period of less than 3 months. It was concluded that this infection has harmful sequencing effects and describes the possible prolonged complications.

Keywords: COVID-19, health impacts, infection sequences

Introduction

It is known that coronavirus disease 2019 (COVID-19) has been considered a global pandemic by WHO since early 2020 [1,2], and the first patient was diagnosed in China in late 2019, and from there it spread to the world as a terrifying pandemic[3]. The patient suffers from troubles in the functions of the respiratory system that may lead to severe progressive pneumonia [4], as well as clinical manifestations of disorders of the cardiovascular system, the digestive system, and the central nervous system [5,6] . This disease may deteriorate due to multiple organ failure, and may lead to death in critical cases [7]. The range of clinical symptoms of this infection ranges from asymptomatic to symptoms with varying levels of severity, depending mainly on the underlying pathological conditions [8]. Common Symptoms include fever, dry cough, and fatigue [9]. In addition to sore throat, nausea, vomiting, pain, diarrhea, conjunctivitis and headache [10]. It should be noted that most patients develop mild to moderate infections and recover without the need for hospitalization [11]. Usually, the symptoms of this infection last for 14 days from first onset, and then the symptoms subside or disappear completely, and the infection decreases[12]. However, the results of some studies indicate the persistence of clinical symptoms following infection and varying durations among some recovered patients [13,14]. Therefore, the present study aimed to appreciate the possibility of the occurrence of some sequelae post COVID-19 infection.

Methods and patients

This community-based study included 280 patients diagnosed with COVID-19 infection from health centers and hospitals in Salah al-Din region (Iraq) from January to April 2023. It was completed after obtaining the ethical approval from the local health directorate, as well as informed consent from each participant. The infections were provably diagnosed through clinical examinations, positive PCR test, and chest CT scan. In contrast, the criteria for recovery from infection were based on the instructions of the World Health Organization as follows: 3 days after the resolution of symptoms and / or two negative RT-PCR results at least 24 hours apart. A comprehensive clinical history and physical assessment was performed for all patients in the outpatient clinics, where information was obtained about the presence or absence of persistent COVID-19 symptoms as sequelae of post infection recovery, and the nature of those symptoms, if any. The results were analyzed by descriptive statistics using the SPSS version (26). The results were presented as figures using the excel program, and were tabulated and presented as frequencies (N) and percentages (%).

Results

Of the 280 participants, 56 (20%) had persistent asthenia. Thus, it was considered the generality consequence in recovered patients with COVID-19 (Figure 1)

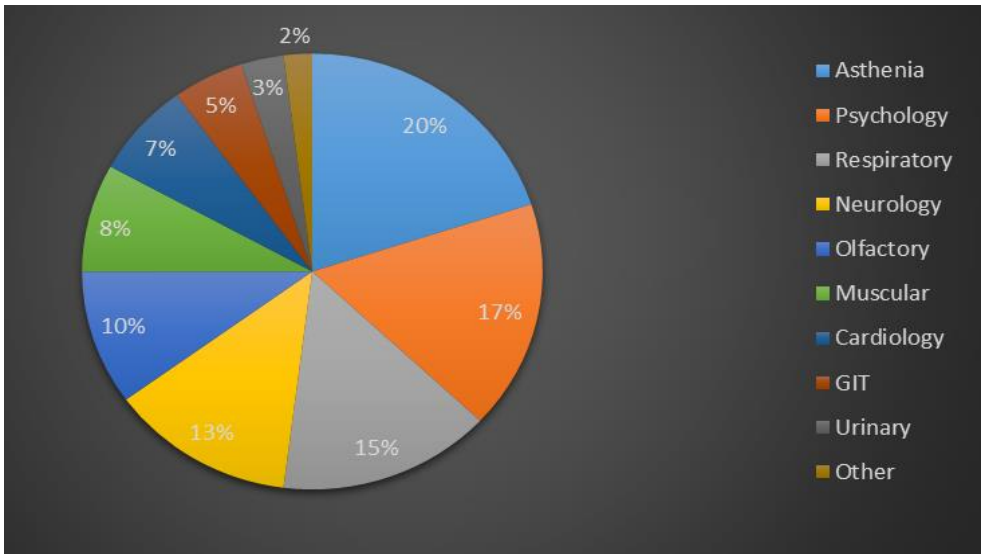

Figure 1: Sequence rates of post- COVID-19 infection among study participants

Table 1 shows the prevalence of long-term some body systems complaints among those recovering from COVID-19 infection during two periods: less than 3 months and more than 3 months. It was found that most of the successive symptoms after recovery from infection are more noticeable in the period of more than 3 months.

Table 1: Post- COVID-19 infection sequence over two time periods .

Complaints	Total N (%)	Periods	
		> 3 months	≤ 3 months
Asthenia ▪ Tiredness ▪ fatigue ▪ Lack of energy	56 (20%)	22	34
Musculoskeletal ▪ Body ache ▪ Backache	22	8	14

▪ Myalgia			
Gastrointestinal ▪ Dyspepsia ▪ Abnormal bowel habit ▪ Colic	14	5	9
Urinary ▪ Abnormal renal function	8	2	6
Other ▪ Dermatitis ▪ Skin itching ▪ Blurred vision	9	1	5

Psychological sequences were recorded among 48 participants, at a rate of 17%, while neurological symptoms were observed in 36 of them (13 %) in the post- COVID-19 period. The psychological consequences included brain fog, depression with low mood, and anxiety. On other hand, the neurological symptoms ranged from stroke, body aches, dizziness, neuropathy, headache, and lower back pain (Table 2).

Table 2: Post-recovery neuropsychological sequences in studied participants .

Sequences	**Incidence**	
	N	%
Psychological sequence • Brain fogs (lack of mental clarity) • Depression & low mood • Anxiety	48	17%
Neurological sequence • Stroke • Pain (body ache) • Dizziness • Neuropathy • Headache • Low back pain	36	13%

Respiratory sequelae were confirmed in 42 participants, with a rate of (15%).Of the total study participants, 20 (7%) recovered patients were found had cardiovascular and thrombotic clinical sequels.

According to Figure 2, the main pulmonary, cardiac and thrombotic consequences were distributed among the recovered participants in the following proportions for each clinical presentation:

Pulmonary complications

- 30% dyspnea
- 30% cough
- 25% wheeze
- 15% others like nocturnal orthopnea and chest pain.

Cardiovascular sequels

- 35% hypertension
- 30% palpitation
- 25% heart attacks
- 10% others like intermittent claudication

Thrombotic complications

- 40% myocardial infarction & stroke
- 30% limb ischemia
- 25% pulmonary embolism

- 5% others like thrombophlebitis

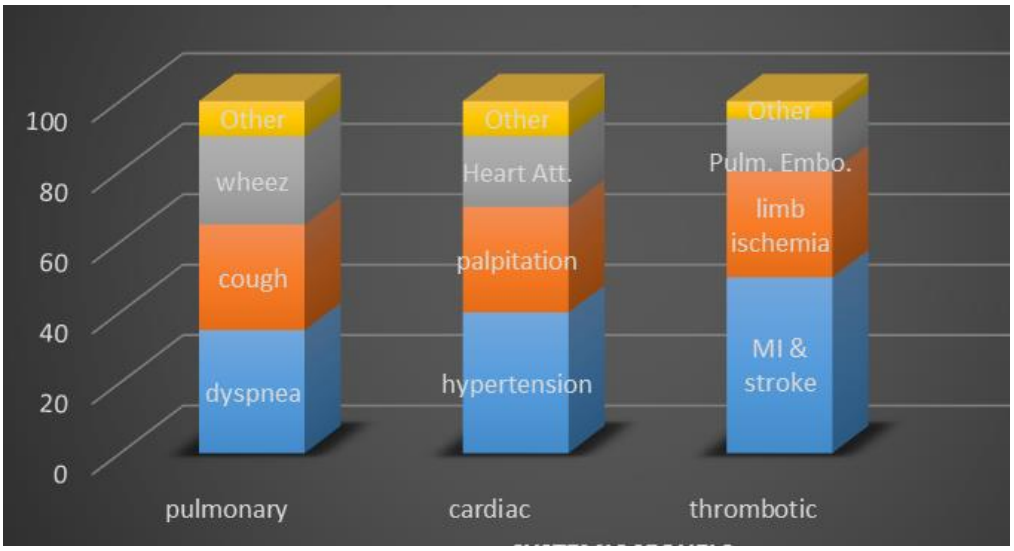

Figure 2: Pulmonary, cardiovascular, and thrombotic sequels in studied patients

As for Table 3, it explain the prevalence of olfactory complaints post infection, as it was found that 28(10%) participants recovering from infection were suffering from olfactory disorders, especially loss of smell (anosmia). Most of these sequels were in a period of less than 3 months.

Table 3: Olfactory sequels post COVID-19 infections over two time periods .

Olfactory sequels	Periods	
	> 3 months	≤ 3 months
Anosmia	10	6
Ageusia	2	2
Hyposmia	1	1
Parosmia	5	1
Total	**18**	**10**

Discussion

According to the results of this study, patients recovering from COVID-19 had multiple sequences of clinical complications during a follow-up period of more than three months after recovery. This is in line with findings from research examining post-recovery complications of COVID-19 and proving the hypothesis that the adverse effects of primary viral infection of COVID-19 are related to excessive activation of the immune system [15,16]. Despite the diversity in the severity of the infection and the characteristics of the clinical evaluation, the available data, as well as information from previous epidemics of the Corona virus, allow hypothesis of the long-term consequences in patients who have overcome the infection of COVID-19 into two categories. The first category, sub-acute or persistent, includes complaints 4-12 weeks after the acute infection, and the second category includes the chronic syndrome that persists or exists 12

weeks after the onset of acute COVID-19[17-19]. Asthenia is a feeling that varies between people and without a tangible test to confirm this diagnosis, but in general, people previously diagnosed with depression or anxiety are more likely to suffer from asthenia [20]. In a continuous sample study of 129 patients with COVID-19 by Zolotovskaia *et al*. (2021), they found evidence of a higher incidence of asthenic syndrome after COVID-19. In another previous study by Carvalho-Schneider and colleagues (2021) of 150 patients with COVID-19, the persistence of symptoms was followed up for two months. They found that two-thirds of infected adults had complaints related to loss of smell, shortness of breath or asthenia [22]. On the other hand, significant psychological complications have been recorded in post-COVID periods, including symptoms of depression, generalized anxiety disorder, brain fog or loss of mental clarity. This infection during recovery has had clinical implications for general mental health, with evidence of increased symptoms of depression and anxiety [23]. As for the respiratory consequences, the lungs are the target organ for the virus, so many patients need mechanical ventilation to avoid or reduce the possibility of sequelae of the pulmonary organs [24]. In a study conducted by Gupta *et al.* (2022) by collecting data related to post-COVID complications for previously infected patients, it was confirmed that cardiovascular disease is most common among COVID-19 survivors[25]. In addition, cases of thrombosis have been reported in other studies as sequelae of post-infection COVID-19, and warning responses associated with the risk of thrombosis have been exacerbated [26].

Conclusion

There is an actual need to follow up and care for patients with COVID-19 infection after hospital discharge, and to urge outpatient clinics to provide comprehensive care for these recovered patients. This study came out with a recommendation to form a multidisciplinary team of internal medicine physicians, cardiologists, rehabilitation specialists, pulmonologists and even psychologists in order to complete the long-term follow-up of patients after recovery.

References

1- Neisi A, Goudarzi G, Mohammadi MJ, Tahmasebi Y, Rahim F, Baboli Z, Yazdani M, Sorooshian A, Attar SA, Angali KA, Alam K. Association of the corona virus (Covid-19) epidemic with environmental risk factors. Environmental Science and Pollution Research. 2023 Apr 6:1-2.

2- Ghareeb OA, Ramadhan SA. COVID-19-a novel zoonotic disease: Origin, prevention and control. Pak. J. Med. Health Sci. 2021 Jan 1;15:221-223.

3- Kzar AJ, Faiq TN, Ghareeb OA. Recent infection with black fungus associated with COVID-19: a review. Pakistan Journal of Medical and Health Sciences. 2021;15(5):1771-1773.

4- Faiq TN, Ghareeb OA. Association of Chronic Rhinosinusitis with Risk of COVID-19 Infection. Journal of Research in Medical and Dental Science. 2022 Jan;10(1):407-410.

5- El-Kassas M, Alboraie M, Elbadry M, El Sheemy R, Abdellah M, Afify S, Madkour A, Zaghloul M, Awad A, Wifi MN, Al Balakosy A. Non-pulmonary involvement in COVID-19: A systemic disease rather than a pure respiratory infection. World Journal of Clinical Cases. 2023 Jan 1;11(3):493.

6- Szpulak A, Garlak U, Ćwirko H, Witkowska B, Rombel-Bryzek A, Witkowska D. SARS-CoV-2 and its impact on the cardiovascular and digestive systems-the interplay between new virus variants and human cells. Computational and Structural Biotechnology Journal. 2023 Jan 19.

7- Sultan AI, Ibrahim JM, Ghareeb OA. The Prevalence of Emergency Surgical Conditions among Covid-19 Patients in Kirkuk Province, Iraq. Pakistan Journal of Medical & Health Sciences. 2021; 15(4):1087-1090.

8- Al-Haidari KA, Faiq T, Ghareeb O. Clinical trial of black seeds against

covid–19 in Kirkuk city/Iraq. Indian Journal of Forensic Medicine & Toxicology. 2021;15(3):3393-3399.
9- Shi H, Xu J. The impact of COVID-19 on human body. Highlights in Science, Engineering and Technology. 2023 Mar 21;36:1186-92.
10- Dede G, Filiopoulou E, Paroni DV, Michalakelis C, Kamalakis T. Analysis and Evaluation of Major COVID-19 Features: A Pairwise Comparison Approach. InOperations Research Forum 2023 Mar 4 (Vol. 4, No. 1, p. 15). Cham: Springer International Publishing.
11- De A, Bansal M. Clinical profile and the extent of residual myocardial dysfunction among patients with previous coronavirus disease 2019. The International Journal of Cardiovascular Imaging. 2023 Jan 6:1-8.
12- Wang YJ, Xue JH, Fang ZX, Xie JW, Niu JJ, Yang TC, Lin LR. A 14+ 7 day quarantine period and a dual nucleic acid testing reagent strategy detect potentially indiscoverable Coronavirus disease 2019 infections in Xiamen, China. Clinica Chimica Acta. 2022 Jul 1;532:89-94.
13- Nguyen NN, Hoang VT, Dao TL, Dudouet P, Eldin C, Gautret P. Clinical patterns of somatic symptoms in patients suffering from post-acute long COVID: a systematic review. European Journal of Clinical Microbiology & Infectious Diseases. 2022 Apr;41(4):515-45.
14- Brodin P, Casari G, Townsend L, O'Farrelly C, Tancevski I, Löffler-Ragg J, Mogensen TH, Casanova JL. Studying severe long COVID to understand post-infectious disorders beyond COVID-19. Nature medicine. 2022 May;28(5):879-82.
15- Daher A, Balfanz P, Cornelissen C, Müller A, Bergs I, Marx N, et al. Follow up of patients with severe coronavirus disease 2019 (COVID-19): pulmonary and extra pulmonary disease sequelae. Respir Med. 2020; 174:106197.
16- Zhao Y, Shang Y, Song W, Li Q, Xie H, Xu Q, et al. Follow-up study of the pulmonary function and related physiological characteristics of COVID-19 survivors three months after recovery. E-Clinical Medicine. 2020; 25:100463.
17- Kim Y, Kim SE, Kim T, Yun KW, Lee SH, Lee E, Seo JW, Jung YH, Chong YP. Preliminary guidelines for the clinical evaluation and management of long COVID. Infection & chemotherapy. 2022 Sep 1;54(3):566-97.
18- Ong IZ, Kolson DL, Schindler MK. Mechanisms, Effects, and Management of Neurological Complications of Post-Acute Sequelae of COVID-19 (NC-PASC). Biomedicines. 2023 Jan 27;11(2):377.
19- Huang C, Huang L, Wang Y, Li X, Ren L, Gu X, et al. 6-month consequences of COVID-19 in patients discharged from hospital: a cohort study. Lancet. 2021; 397:220–32.
20- Van den Borst B, Peters JB, Brink M, Schoon Y, Bleeker-Rovers C, Schers H, et al. Comprehensive health assessment three months after recovery from acute COVID-19. Ann Med. 2020:1–14.
21- Zolotovskaia IA, Shatskaia PR, Davydkin IL, Shavlovskaya OA. Post-COVID-19 asthenic syndrome. Zhurnal nevrologii i psikhiatrii imeni SS Korsakova. 2021 Jan 1;121(4):25-30.
22- Carvalho-Schneider C, Laurent E, Lemaignen A, Beaufils E, Bourbao-Tournois C, Laribi S, Flament T, Ferreira-Maldent N, Bruyère F, Stefic K, Gaudy-Graffin C. Follow-up of adults with noncritical COVID-19 two months after symptom onset. Clinical Microbiology and Infection. 2021 Feb 1;27(2):258-63.
23- Shanbehzadeh S, Tavahomi M, Zanjari N, Ebrahimi-Takamjani I, Amiri-Arimi S. Physical and mental health complications post-COVID-19: Scoping review. Journal of psychosomatic research. 2021 Aug 1;147:110525.
24- Van der Sar - van der Brugge S, Talman S, Boonman-de Winter LJM, de Mol M, Hoefman E, van Etten RW, et al. Pulmonary function and health-related

quality of life after COVID-19 pneumonia. Respir Med. 2021; 176:106272.

25- Gupta A, Jain V, Singh A. Stacking ensemble-based intelligent machine learning model for predicting post-COVID-19 complications. New Generation Computing. 2022 Dec;40(4):987-1007.

26- Korompoki E, Gavriatopoulou M, Fotiou D, Ntanasis-Stathopoulos I, Dimopoulos MA, Terpos E. Late-onset hematological complications post COVID-19: An emerging medical problem for the hematologist. American Journal of Hematology. 2022 Jan;97(1):119-28.