

Assessment of Post – COVID 19 Sequelae: A Retrospective Study

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Abstract

Background: COVID-19 is an acute respiratory illness caused by SARS-CoV-2. COVID-19 created a major impact on physical, cognitive, mental health and social status in patients with SARS-CoV-2. **Aim and Objective:** To assess the post COVID sequelae in COVID19 recovered individuals. To assess the functional limitations using post COVID functional status scale after 4weeks of onset of illness. **Materials and Methods:** Subjects were selected from compiled list of Triage OP from Chengalpattu Medical College and Hospital. The semi structured questionnaire enclosed with Socio – demographic details, physical and socio – psychological domains based on COVID-19 Yorkshire Rehabilitation Screening tool (C19-YRS) were assessed and the impact of each domain was graded using a Likert scale. Post – COVID 19 functional status scale (PCFS) to assess functional limitations was also sent through Google form and the details were collected. **Analysis:** Collected data was analyzed using Microsoft Excel with descriptive statistics. **Result:** 1044 individuals participated in the study. On Assessment of post COVID sequelae fatigue was major symptom reported followed by cough and other neuropsychiatric symptoms. 53.4% of COVID recovered individuals had functional limitations and 2.4% of these individuals had severe functional limitations and they require assistance for daily living. **Conclusion:** Most COVID-19 recovered individuals had persistence of some clinical symptoms. From PCFS it was observed that 23% individuals had moderate to severe functional limitations, therefore early detection and rehabilitation measures are recommended.

Key words: *Fatigue, Functional limitations, Post COVID functional status, Post COVID symptoms.*

Introduction

The novel Corona virus disease 2019 (COVID-19) is an acute respiratory illness caused due to Severe acute respiratory syndrome

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coronavirus-2 (SARS-CoV-2). SARS-CoV-2 belongs to a family of single-stranded RNA viruses called corona viruses. Due to high attack rate and case fatality rate, World Health Organization (WHO) has declared this outbreak as a global pandemic. ^[1]

Common symptoms of COVID-19 include cough, fever, dyspnea, musculoskeletal symptoms (myalgia, joint pain and fatigue), gastrointestinal symptoms and anosmia/dysgeusia. There is a high

incidence of Pneumonia, pulmonary embolism, myocardial damage/myocarditis and neurological complications, in critically ill patients with COVID-19^[2].

COVID-19 has a major impact on physical, cognitive, mental and social health status, in COVID patients even with mild disease presentation. In previous corona virus outbreaks of severe acute respiratory syndrome (SARS) in 2002 and Middle East respiratory syndrome (MERS) in 2012, post discharge symptoms were observed which was similar to the post discharge symptoms of COVID-19. A meta analysis of 28 follow up studies found that one fourth of the individuals who have recovered from SARS and MERS had reduced lung function and exercise capacity at 6 months after discharge from the hospital. Likewise mental health problems such as Post traumatic stress disorder (PTSD), depression, anxiety, and reduced quality of life were also observed in one third of the recovered individuals at 1 year after discharge^[3]. So, it is necessary to follow-up these COVID 19 recovered individuals and perform assessments for functional limitations to detect early the disabilities and initiate appropriate management towards their physical, psychological and social realm.

Hence this study was done to assess the post COVID sequelae in COVID recovered individuals and to assess the functional limitations using post COVID functional status scale after 4weeks of onset of illness.

Materials and Methodology

The retrospective cross sectional study was conducted at Chengalpattu Medical College,

Chengalpattu during the period of January and February 2021, after ethical clearance on COVID 19 recovered individuals, who were infected during COVID I wave.1044 individuals after 4 weeks of onset of illness, aged between 18 to 60 years of both genders responded and participated in the study.

The semi structured questionnaire was developed based on the COVID-19 Yorkshire Rehabilitation Screening tool^[4] and post COVID – 19 Functional Status (PCFS) Scale^[5] in both English /Tamil, Likert scale was included along with semi structured questionnaire to grade the severity of post COVID symptoms and sent to individuals through WhatsApp / telephone who had attended triage OP earlier.

Post COVID symptoms were expressed as physical and socio – psychological domains. Physical domains included in this questionnaire were breathlessness, cough, palpitations, chest pain, loss of appetite, weight loss and fatigue whereas socio – psychological domains included were trouble sleeping, panic, irritability and anger, difficulty in doing routine activities / physical exercise, recollecting recent incidents, ability to relax or to initiate the daily activities. Each domain was graded using Likert scale to assess the post COVID symptoms in recovered COVID-19 individuals. Likert scale was graded from 0 to 10. Severity of post Covid symptoms were graded as Grade 0 to 4 represents mild, grade 5 to 7 as moderate and grade 8 to 10 as severe.

POST COVID 19 FUNCTIONAL STATUS SCALE was also used to grade the functional limitations using Likert scale^[5].

Grade 0 – No functional limitations

Grade 1 – Negligible functional limitations

Grade 2 – Slight functional limitations

Grade 3 – Moderate functional limitations

Grade 4 – Severe functional limitations

The completed data was collected and tabulated for analysis with descriptive statistics using Microsoft excel.

Results

Among 1044 recovered COVID 19 individuals 515 were males and 529 were females with the mean age of 37.30 ± 13.02 . These individuals were between 4 weeks to 15 weeks after the onset of COVID illness. Post COVID symptoms were analyzed and results were tabulated.

Table I: Post COVID symptoms, duration and grading of severity of the symptoms using Likert scale in recovered COVID 19.

Post COVID symptoms	n (1044)	Duration weeks	Mild (0 to 4) (n)	Moderate (5 to 7) (n)	Severe (8 to 10) (n)
Fatigue	778	9	353	402	23
Cough	744	8	635	85	24
Difficulty to recall incident memories	554	4	450	104	0
Trouble sleeping	506	15	266	230	10
Difficulty in routine day to day	485	8	246	239	0
Loss of appetite	383	9	332	51	0
Difficulty in breathing	369	6	309	60	0
Difficulty to relax	337	7	205	132	0
Difficulty in doing exercise	235	5	133	86	16
Headache	199	8	163	16	20
Irritability and anger	157	4	125	32	0
Obvious weight loss	126	5	111	15	0
Panic	101	4	24	63	14
Palpitations	90	2	90	0	0
Chest pain	14	1	14	0	0

Table I represents the grading of severity, duration and prevalence of post COVID symptoms. This study found that all individuals who have recovered from COVID-19 had at least one

symptom even after 4 weeks of illness 74.5% individuals reported fatigue followed by cough in 71.26% during post COVID period.

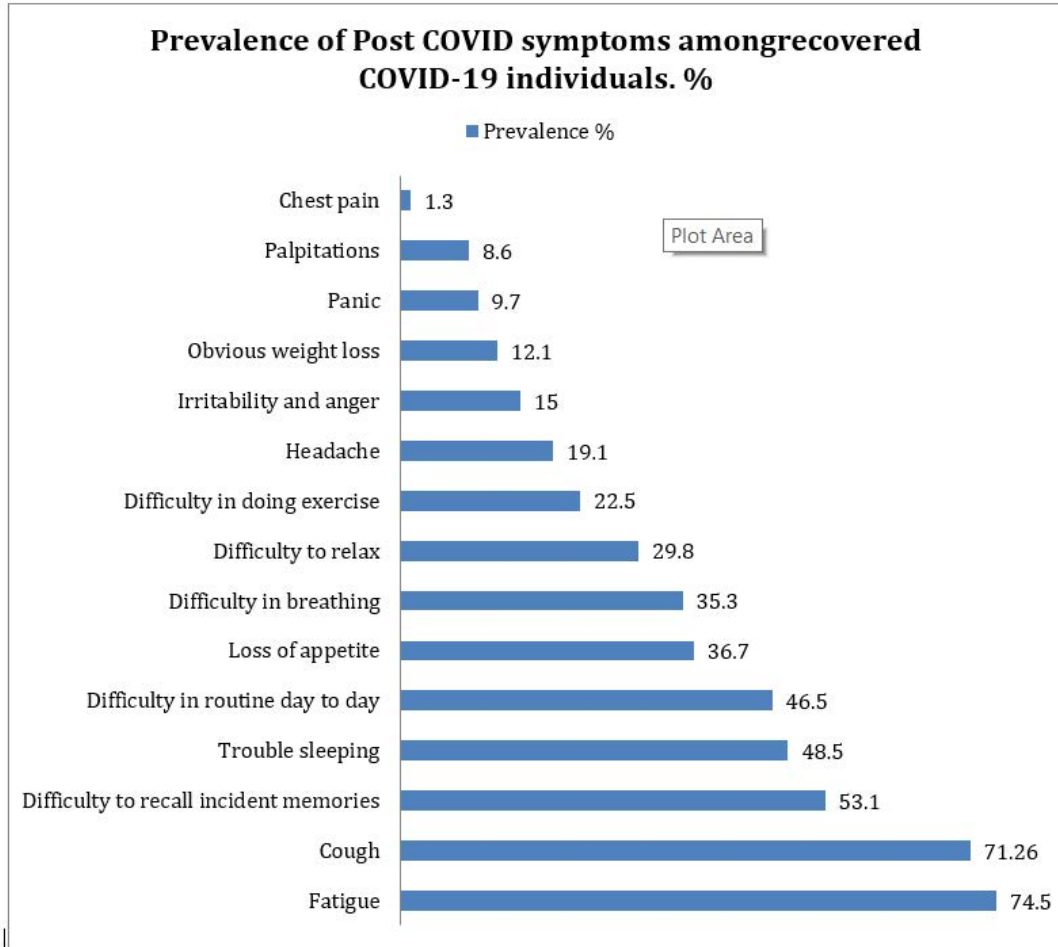


Figure I shows the prevalence of post COVID symptoms among individuals who recovered from COVID-19

Table II: Functional status of Post COVID – 19 individuals

Post COVID Functional Status (PCFS) scale	n (%)
Grade 0 No functional limitations	487 (46.6)
Grade 1 Negligible functional limitations	311 (29.8)
Grade 2 Slight functional limitations	6 (0.6)
Grade 3 Moderate functional limitations	215 (20.6)
Grade 4 Severe functional limitations	25 (2.4)

Table II represents the functional status of post COVID 19 individuals. Here 46.6% of the recovered COVID-19 individuals had no functional limitations whereas 53.4% of Covid recovered individuals had functional limitations. Out of 53.4%, 2.4% of the recovered COVID-19 individuals had severe functional limitation needs assistance for daily living.

Discussion

Individuals recovered from COVID 19 had a wide range of clinical manifestations involving physical, cognitive and psychological domains. In our study, out of 1044 recovered post COVID individuals, 778 individuals (74.5%) reported fatigue as a most common symptom persisting even after recovery from illness. Similar result was reported by Tansey et al after SARS in 2003^[6] and also consistent with study of Lara et al^[7], who reported fatigue along with neuropsychiatric symptoms. An Italian follow up study also reports the same finding with 143 individuals reporting fatigue after 7 weeks of post discharge. Wang et al results were in contrast with our study where 86% of patients were symptom free for 3 to 4 weeks after discharge in Wuhan^[8].

Fatigue might occur due to changes in central, psychological and peripheral factors^[19]. Delorme et al and Guedj et al suggested that fatigue occurs probably due to cerebral hypometabolism which was observed through neuroimaging studies among COVID 19 individuals^[21, 22]. Ferrandi et al states that COVID 19 has an impact on skeletal muscle either directly or indirectly by cytokines which disrupts the muscle metabolism^[23, 24] and therefore contributing to fatigue.

Persistent cough is the second common symptom observed in 744 individuals post COVID 19 (71.26%) probably due to laryngeal hypersensitivity which involves both central and peripheral component contributing to hypersensitivity and neuroinflammation^[11]. Post COVID cough is usually associated with fatigue and breathlessness^[12].

35.3% of the individuals reported breathlessness probably due to increased cardiac metabolism and myocardial oxygen demand^[16] and fatigue may also contribute to it.

554 individuals (53.1%) reported short term memory loss and 199 individuals (19.1%) reported headache after COVID recovery. It may occur due to SARS-CoV-2 which enters through nasal route and reaches olfactory bulb^[9] causing release the various pro inflammatory cytokines such as Interleukine-6 (IL-6), Interleukin-12p40 (IL-12p40), Interleukin-15 (IL-15), tumor necrosis factor alpha (TNF- α), chemokine (C-X-C motif) ligand 9 (CXCL9) and chemokine (C-X-C motif) ligand 10 (CXCL10) in the nervous system^[10].

Individuals also reported exercise intolerance (22.5%), palpitations (8.6%) and chest pain (1.3%) which might be due to involvement of cardiovascular system. COVID-19 causes myocarditis, myocardial infarction or cardiac failure probably by binding with the ACE2 receptors in the heart and altering its signaling pathway.

Gastro intestinal symptoms such as vomiting, abdominal pain, diarrhea, loss of appetite were also common among post COVID – 19 symptoms^[17].

Individuals also reported symptoms related to Post traumatic stress such as disturbed sleep (48.5%), irritability and anger (15%), panic or anxiety (9.7%) and feeling difficulty to do routine day to day activities (46.5%) or relax (29.8 %) which may lead to functional limitations among recovered COVID19 individuals. Similar results were observed by Li et al, who states that isolation from family and friends during hospitalization and quarantine and stigma associated with the disease may likely contribute to mental illness^[18].

Further functional status of COVID-19 recovered individuals was assessed using PCFS scale. It is used to evaluate the consequences and functional limitation among recovered COVID individuals. From this scale we observed that 487 (46.6%) individuals had no functional limitations (grade 0) that they can perform day to day activities and don't had any psychological symptoms. 311 (29.8%) individuals had negligible functional limitations (grade 1) and 6% had mild limitations (grade 2) in routine activities, due to persistent of symptoms. Individuals with moderate (20.6%) limitations were found to have difficulty to do even their routine activities and it may be due to gradual increase in post COVID symptoms causing impaired quality of life. Severe functional limitations were observed in 25 (2.4%) individuals who were highly symptomatic may be due to co-morbidities requiring assistance for daily living^[26, 27].

Conclusion

Most of the individuals who recovered from COVID-19 had some post COVID manifestations such as fatigue, cough, breathlessness and

neuropsychological symptoms. Post COVID individuals who had moderate and severe functional limitations needs rehabilitation. Therefore early detection and rehabilitation measure such as close monitoring of each post COVID individuals, control of co-morbidities, yoga and meditation, respiratory physiotherapy, functional and psychological support will help to reduce post COVID clinical manifestations and improve their quality of life.

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