

Outcomes and Clinical Profiles of Health Care Workers who Recovered from COVID-19: A Cross-sectional Study on Follow-up and Post-COVID-19 Syndrome

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ABSTRACT

Background. Infection from SARS-CoV-2 have transient and long-term complications. Persistent symptoms post-recovery with perceptions of overall physical and mental health status are crucial information to construe on follow-up care.

Objective. To describe the clinical profile, general, and mental health outcomes of hospital staff who recovered from COVID-19 at follow-up 12 weeks or more post-convalescent.

Methods. This was a cross-sectional study on follow-up of hospital staff who recovered from COVID-19. Study population included staff or health care workers of a COVID-19 referral tertiary hospital, who had laboratory-confirmed COVID-19 via RT-PCR. Informed consent was obtained through phone calls and google forms. Data collection was through a self-administered, on-line google form or voice-call interviewer-assisted questionnaire. Analysis was done with Stata 17 using frequencies, proportions, and cross-tabulations.

Results. Persistent symptoms reported several months post-recovery from COVID-19 included fatigue (25%), difficulty of breathing (23%), muscle weakness (16%), nasal congestion (12%), cough (10%), sore throat (5%), anosmia (3%), and ageusia (2%). Symptoms of physical and mental fatigue post-COVID-19 were reported by 25% (N = 93) with extreme fatigue reported by four staff. Fifteen percent (N = 57) reported that they feel that their workload or schedule needed modification after recovery. Feelings of isolation, depression, and anxiety were the most common mental health issues reported. Screening using validated tools showed that depressive symptoms were present in 45% (N = 145) and anxiety in 18% (N = 53).

Conclusion. Healthcare workers who recovered from COVID-19 for at least 12 weeks or more described their health status as comparable to their overall health one year before the infection. Physical and mental health symptoms reported 12 weeks post-recovery include fatigue, breathlessness, anxiety, and depression and were described in various levels of severity.

Keywords: *post-COVID-19, clinical outcomes, post-COVID syndrome*



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INTRODUCTION

Health care workers (HCWs) are vulnerable to SARS-CoV-2 infection due to the occupational risks of hospital work. Infection rate among HCWs has been reported to be 3.7 times higher compared to the general population.¹

Infections due to COVID-19 have been reported to have transient and long-term complications. Long-term sequelae of SARS-CoV-2 infection include post-COVID-19 syndrome, post-COVID-19 asthenia, and issues related to mental health (post-traumatic stress disorder, anxiety, depression).

The hospital employees' clinic has been monitoring staff with COVID-19 from the time of diagnosis until return to work. However, there is no documentation of long-term clinical outcomes, including mental health conditions of COVID-19 recovered health care workers. There is no program for follow-up and post-infection care for COVID-19 survivors despite reports on long-term sequelae of COVID-19 affecting the quality of life of the general population. This study aimed to follow-up on the clinical profile, mental health status, and general outcomes of health care workers who recovered from COVID-19 at 12 weeks or more post-convalescent.

METHODS

Study Design and Population

This was a cross-sectional study on follow-up of employees who recovered from COVID-19. The study population included staff or health care workers of a COVID-19 referral tertiary hospital who had laboratory-confirmed COVID-19 via RT-PCR and who were managed either as inpatient or outpatient.

Exclusion criteria were employees who retired from service after recovery and who have a definitive diagnosis of any psychiatric condition prior to having COVID-19. Employees were also informed that they could withdraw anytime from participation if they felt discomfort or inconvenience regarding the study proposal or data collection procedure.

Study Setting, Sampling, and Sample Size

The study was conducted from April to September 2021 at the hospital employees' clinic.

There was no sample size computation and sampling as all HCWs with laboratory confirmed SARS-CoV-2 RT-PCR during the study period were screened based on inclusion criteria. All employees who met the inclusion criteria were invited by short messaging service (SMS) to participate.

Data Collection Procedure

A sampling frame of diagnosed COVID-19 employees was assembled from a database of clinic's telemonitoring and a master list from the hospital's Infection Control Unit. Communication with healthcare workers included in the study was conducted through short messaging and voice

calls. No response to three interval attempts of SMS were considered as no consent for participation.

Informed consent for participation in the study was secured through phone calls and google forms. Data collection was based on employees' preference, either through a self-administered google form or voice-call interviewer-assisted questionnaire.

Study responses were checked to screen for potential mental health issues needing immediate interventions. Assessment, consultations, and structured counselling were done through voice call if deemed warranted.

Tools

The study questionnaire was developed based on the objectives and variables needed. It was generated using google forms and deployed using the email address of the employees' clinic with responses stored into the google drive for security purposes. The questionnaire was semi-structured with closed and open-ended questions. It had three consecutive sections which included the consent form for the online questionnaire, clinically relevant symptoms, and other scales. The tool was written in English with specific questions accompanied by Filipino translation.

The mMRC scale is a five-category scale describing exertional dyspnea where higher scores indicate higher perceived breathlessness. Chronic fatigue was assessed with the use of the 10-item Fatigue Assessment Scale (FAS).

PHQ-9, or Patient Health Questionnaire-9, is a self-administered tool designed to screen for depression, while GAD-7, or Generalized Anxiety Disorder-7, is a measure of anxiety symptom severity and can be used to screen for panic, social anxiety, and post-traumatic stress disorder. These two validated tools, translated in Filipino, were available at no cost in the internet.

Outcomes

The primary outcomes included proportion of employees who reported persistence of symptoms such as fatigue, dyspnea/difficulty of breathing, loss of smell, cough, sore throat, colds, or loss of taste after 12 or more weeks from date of COVID-19 recovery.

Secondary outcomes included overall perception of health, breathlessness, fatigue, and mental health issues such as perception of discrimination, loneliness, sleep problems, anxiety, and depression. Other outcomes were health care utilisation post COVID-19 which included visits to the employees' clinic and private health facilities, diagnostic tests performed, and hospitalizations within several months after recovery.

Data Analysis Plan

Data were analysed using IBM SPSS Statistical version 27. Descriptive statistics was used to summarise continuous variables, while categorical or nominal items were described as frequencies, cross tabulations, and percentages.

PHQ-9 score included assigning scores to responses: Not at all = 0; several days = 1; more than half of the days = 2; nearly every day = 3. Interpretation of PHQ-9 total scores include: 1-4 minimal depression, 5-9 mild depression, 10-14 moderate depression, 15-19 moderately severe depression, and 20-27 severe depression. On the other hand, scoring GAD-7 Anxiety Severity was calculated by assigning scores of 0, 1, 2, and 3 to the responses. The total score for the 7 items ranges from 0-21 (0-4: minimal anxiety, 5-9: mild anxiety, 10-14: moderate anxiety, and 15-21: severe anxiety).

Each item of the FAS tool is answered using a five-point Likert scale ranging from 1 (never) to 5 (always). Items 4 and 10 are reverse scored. Total scores range from 10 indicating lowest level of fatigue, to 50 denoting the highest.

Response Plan

For health workers screened to have moderate to severe depression or anxiety with an equivalent score of 5 or more on PHQ-9 and GAD-7, and those who reported suicidal ideations, a response plan was prepared. A follow-up voice call was made to verify mental health status and if needed, either an immediate intervention through a structured counselling or referral to a psychiatrist was provided. All interventions were documented in the Electronic Medical Records of the employees.

Ethical Considerations

The proposal was approved by the Ethics Review Board of the University of the Philippines-Philippine General Hospital (UPMREB). Data collection, entry, and analysis were done in accordance with the Implementing Rules and Regulations of the Data Privacy Act of 2012. There was no identifying information on the final database for analysis and the results were reported in the final manuscript as aggregated data.

Respondents' email addresses were collected due to the basic nature of the on-line study. However, all email addresses were deleted in the main database during data management and analysis. The study included a response plan which assessed risk and burdens to health care workers who decided to participate. The tools utilized were validated to screen for anxiety and depression. Likewise, all study investigators had training to give initial interventions for counselling and mental health concerns.

Investigators declared that there was no conflict of interest in the conduct of the study.

RESULTS

There were 1286 employees who tested positive on SARS-CoV-2 RT-PCR from April 2020 to March 2021. There were known exposure to COVID-19 in 46% or 597 HCWs, while 9% (N = 117) were uncertain of being exposed to the infection.

COVID-19 positivity rate in the telemonitoring data was higher among clinical personnel (46%), followed by administrative (32%), maintenance (8%), and laboratory staff (7%). There were more female employees (57%) who got ill with COVID-19 than males (43%) with an overall average age of 39 years old (SD ± 11.74).

Three hundred seventy (N = 370) had responded to initial SMS and had given consent for follow-up of persistent symptoms. Response rate was at 29%, and employees were excluded if there was no response after three consecutive SMS sent at weekly intervals.

Hypertension (26%), bronchial asthma (16%), other lung problems (14%), and diabetes mellitus (8%) were reported as pre-existing co-morbidities among the employees who had COVID-19. Fifty-seven percent (N = 212) were managed as outpatients.

Overall health of HCWs was rated to be similar to one year before COVID-19 infection by 51% (N = 189), however 15% (N = 57) reported that they needed modification of workload or work schedule post-recovery. Physical health 12 weeks post-COVID-19 was scored at an average of 4.09 (SD ± 0.795) over a perfect score of 5 points with the lowest score at 1 point being categorized as poor health.

Employees' health care utilization 12 weeks from date of recovery includes employees' clinic visits (31%), private clinics consultations (11%), and 6% needing hospital admissions. Thirty-seven percent had diagnostic tests done in order to evaluate persistent symptoms post-COVID-19.

Persistent Symptoms

Persistent symptoms reported by the employees several months post-recovery from COVID-19 included fatigue (25%), difficulty of breathing (23%), muscle weakness (16%), nasal congestion (12%), cough (10%), sore throat (5%), anosmia (3%), and ageusia (2%).

Symptoms of physical and mental fatigue post-COVID-19 were reported by 25% (N = 93) with extreme fatigue reported by four staff. Fifty-nine percent (N = 192) were bothered by symptoms in varying levels; twenty employees reported being always or often bothered by fatigue; and 185 experienced it occasionally.

Dyspnea or difficulty of breathing was assessed by the breathlessness scale and was reported to be experienced by 55% of employees during different levels of activity. Shortness of breath on exertion (i.e., when hurrying on level ground, going up a hill, or on strenuous exercise) was reported by 49%, while six percent relayed having difficulty of breathing on less than ordinary activities.

Mental Health Issues

Feelings of isolation, depression, and anxiety were the most common mental health issues. Screening using validated tools showed that depressive symptoms were present in 45% (N = 145) and anxiety in 18% (N = 53). Overall, PHQ-9 scores averaged at 5.37 (SD ± 3.12), categorized as minimal

depression, while GAD-7 scores were at 2.12 (SD \pm 3.583) indicating minimal anxiety level.

Persistent difficulty in sleeping has been experienced by 32% (N = 118) of respondents post-recovery from COVID-19. Shortened sleep duration was experienced most of the time by 18% (N = 66), problems in sleep initiation were reported by 13% (N = 49), and 15% (N = 55) had poor quality of sleep months after COVID-19 infection.

Lack of companionship was felt occasionally by 14%, while two percent reported having persistent feelings of being alone. On the other hand, discrimination in terms of co-workers avoiding them was experienced by 36% (N = 133), and 32% (N = 119) reported having co-workers who felt uncomfortable around them after the diagnosis of COVID-19.

Moderate to severe depressive and anxiety symptoms warranted interventions in 6% (N = 23) and 7% (N = 26) of employees on follow-up, respectively. Eleven percent (N = 41) had feelings of hopelessness with ten employees who admitted to having suicidal ideations at the time of study survey.

Counselling interventions were provided for 38 personnel who were screened to have moderate to severe anxiety or depression. Twenty-nine percent (N = 11) of the employees needing counselling did not respond to the follow-up phone call as part of the response plan for mental health issues. Initial counselling was done for twenty-seven employees, 85% (N = 22) of whom were referred to the Family Practice Center, while 12% (N = 3) were referred to the Psychiatry Department for further evaluation and management. Two employees refused to be referred but were given options on how to consult.

DISCUSSION

Persistent physical and mental health symptoms were reported by health workers several months post-recovery from COVID-19. Symptoms of fatigue, breathlessness, depression, and anxiety were among the reported physical and mental health concerns. Counselling and specialty referrals were offered and provided to employees who gave consent.

The results of this follow-up study are similar to what is currently cited in the literature. The reported persistent symptoms among non-hospitalized adults six months post-COVID-19 were either non-specific systemic, or focused on particular respiratory and neuropsychiatric complaints.² Fatigue, dyspnea, muscle weakness, nasal congestion, cough, sore throat, altered smell-taste were reported as the most prevalent persistent symptoms beyond three months.³

Other persistent symptoms among post-COVID-19 patients that have been reported in literature also include cardiac and gastrointestinal (GI) symptoms. Chest pains, palpitations, chest tightness or wheezing were included in the pooled prevalence data by Aiyegbusi et al. in 2021.³ Myocardial injury, evidenced by troponin elevation, was reported as

an acute cardiovascular complication of COVID-19, and individuals without known cardiovascular diseases were observed to have cardiac arrhythmia, cardiomyopathy, or cardiac arrest.⁴ Residual inflammation, organ damage, and pro-coagulant activity persisting beyond recovery may have led to long-term adverse cardiovascular outcomes.^{4,5}

Acute GI symptoms were also often found in COVID-19 patients with the most prevalent symptoms of diarrhea, nausea, vomiting, and abdominal pain. The presence of SARS-CoV-2 RNA in fecal samples while being absent in respiratory specimens from recovered COVID-19 patients suggests that the virus may persist longer in the GI than the respiratory tract, and may indicate potential long-term adverse GI outcomes.⁴ However, no cardiovascular or GI symptoms have been found to persist among the respondents of this study.

Healthcare workers are vulnerable to the physical and psychological impact of COVID-19 pandemic due to a greater exposure and susceptibility to acquiring the infection being at the frontline of medical services. Though the majority of the health workers diagnosed with COVID-19 had mild infection, approximately 10% had moderate to critical conditions.⁶ Unfortunately, recovery from COVID-19 is not the same for everyone as some adults have reported persistent severe, sometimes fluctuating symptoms, months after a bout of infection.

Post-COVID-19 syndrome (PCS) has been defined as the persistence of one clinically relevant symptom at least 12 weeks after recovery that cannot be explained by another disease.^{2,5-7} A case-control study reported that adults who recovered from COVID-19 were 10.22 times (CI 5.33, 19.60) more likely to have persistent symptoms compared to non-COVID-19 patients.⁸ Long-term complications or sequelae included post-COVID-19 syndrome, post-COVID-19 asthenia, and issues related to mental health (post-traumatic stress disorder, anxiety, depression). These physical and mental health issues are hypothesized to be due to non-specific effects of hospitalization, prolonged ventilation (post-intensive care syndrome), social isolation, or impact of pre-existing conditions.⁵

The uncertainty of prognosis added to the persistence of symptoms months after recovery often resulted in feelings of fear, sadness, and anxiety.⁹ Likewise, the stigma or discrimination of working closely with highly infectious patients is also a factor that affects mental health and quality of life of health care workers.¹⁰ This study was done during the time that knowledge on COVID-19 and its long-term complications is limited. It therefore provides preliminary data on the persistent symptoms and complaints that need to be evaluated and addressed post-recovery.

Study Limitations and Recommendations

Collection of data through self-report questionnaires has its inherent limitations. Health workers may be over or underreporting physical and mental symptoms as some may

give socially acceptable responses especially with regards psychiatric problems. Similarly, the health care workers who completed the questionnaires have a positive characteristic of being one among those who are likely to answer a survey form. The non-responders in this study were not identified and persistent symptoms or lack thereof had not been followed-up or documented.

Although self-reports are easy to obtain, inexpensive, and are important method for physicians to diagnose patients, respondents can also under-assess or exaggerate symptoms resulting in less reliable reports. Likewise, the extent of long COVID symptoms documented are only select physical and mental concerns within the study period. Similarly, depression and anxiety levels might be due to or aggravated by other current or on-going non-health related problems.

COVID-19 was declared a pandemic in the year 2020 and is a disease affecting multiple organ systems. Long-term complications will likely be a part of a clinic consultation and will require thorough evaluation and therapeutic interventions. The early identification and management of physical/mental health issues as a routine part of clinic visits in recovered COVID-19 patients can help prevent the development of long-term psychological morbidity and poor quality of life.

Emotional assessment and support during admission or isolation can also be an initial part of the standard management for COVID-19 patients. Then follow-up health care services should be planned for recovered staff so timely interventions can be implemented.

Long term plans can include a dedicated clinic track for COVID-19 recovered patients with persistent symptoms. Protocols and referrals systems should be developed ahead of time to provide timely interventions.

CONCLUSION

Healthcare workers who recovered from COVID-19 for at least 12 weeks or more described their health status as comparable to their overall health one year before the infection. Physical and mental health symptoms reported 12 weeks post-recovery include fatigue, breathlessness, anxiety, and depression, and were described in various levels of severity.

Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

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