Description of Post-discharge Outcomes of Patients with COVID-19 in a Tertiary Referral Center in the Philippines

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ABSTRACT

Background and Objectives. The immediate post-discharge period of COVID-19 patients is a vulnerable state due to several complications that may arise during this time. Some patients get readmitted shortly after being discharged while others report persistence of symptoms, develop specialized needs, or observe a decline from their baseline functional capacity. Information on the outcomes of post-COVID discharge patients in our institution is currently lacking. This study described the outcomes of patients with COVID-19 after their discharge from the service areas of Philippine General Hospital.

Methods. This study is a retrospective chart review involving charts of all adult patients discharged from the PGH COVID service areas last August 2021 to October 2021. Data from their follow up consults at 1 week, 1 month, and 3 months post-discharge were reviewed. Baseline characteristics and post-discharge outcomes including post-COVID symptoms, special care needs, mortality, rehospitalization, emergency consult, level of dependence, and ability to return to work were assessed.

Results. A total of 171 patient charts were included. The mean age of patients was 53.7 years. Most were male (60.2%), unemployed (59.7%), non-smoker (55%), hypertensive (57.9%), diabetic (50.2%), and obese (50.2%). Most of them were oxygen requiring (80%) and with severe to critical COVID infection (72.5%) during admission. At 3 months post-discharge, 113 (66%) were stable and able to complete the follow up, 8 (4.6%) died, 9 (5.2%) got readmitted, and 41 (23.9%) were lost to follow up. Among those who were able to follow up after 3 months, 84 (74%) were asymptomatic. Among those who remained symptomatic, the most common symptoms were dyspnea, fatigue, and cough. After 3 months, 100 (88%) did not require special care needs, 100 (88%) were fully independent, and 45 (39.8%) were able to return to baseline work.

Conclusions. Despite the majority of patients having severe to critical COVID infection during admission, most were asymptomatic within 3 months post-discharge. In those who developed persistent symptoms, dyspnea, cough, and fatigue were the most common symptoms identified regardless of COVID severity. Majority did not require special care needs.

Keywords: COVID-19, post-COVID, outcomes

INTRODUCTION

The post-discharge period, which is three months from the onset of COVID-19 infection, is a vulnerable state due to several complications that may arise during this time.[1,2] Several authorities have defined the post-COVID state to further elucidate this vulnerable period. The World Health

Organization estimates that the median time from disease onset to recovery in severe COVID-19 is 3-6 weeks.[3] Long COVID is the general term used for recovered patients who still experience symptoms for far longer than expected. In the United Kingdom, the NICE COVID-19 guideline proposed a unified definition of long COVID which includes persistent COVID symptoms of more than four weeks. Despite the increasing recognition of long COVID as a clinical entity, data on the post-discharge outcomes of COVID-19 patients remain sparse.

In the Philippines, the Department of Health (DOH) has reported a total of 3,667,542 cases as of March 6, 2022.[4] With the majority of cases concentrated in the National Capital Region (NCR), PGH has had a high volume of COVID-19 admissions and discharges since the time it was designated as a COVID-19 referral center in March 2020. According to the UP-PGH COVID-19 Daily Report, 9,327 COVID-19 admissions have been reported as of March 30, 2022. Eighty percent (80%) of these admissions have recovered and were subsequently discharged.[5]

In our institution, there are informal reports of prolonged and persistent symptoms, readmissions, and delayed referrals for adjunctive services (e.g., rehabilitation and specialized nutrition) among patients discharged from the COVID areas. While tremendous efforts have been made to improve the emergent and short-term needs of admitted patients such as the streamlining of COVID-19 diagnostics, expansion of service areas, environmental design adjustments, and more intensive training and policies for infection prevention and control, there is a paucity of interventions to transition patients more effectively from hospital to home care and to provide out-of-hospital services that patients may benefit from. This led to the creation of the COVID discharge pathway.

The COVID discharge pathway consists of a structured follow up care that enables accurate documentation of persistent symptoms and outcomes. It also integrates the different adjunctive services involved in the post-discharge care of COVID patients and provides entry points for referral to avoid delays. All patients discharged from the COVID service areas are automatically enrolled in the COVID discharge pathway. A dedicated COVID care coordinator schedules the follow up consultation at 1 week, 1 month, and 3 months post-discharge. Patients and/or their relatives if the patient is unavailable or has expired already were called three times a day on three separate days over a 1-week period before they were classified as lost to follow up. This process closely parallels that of Kingery et al.[6] In their study, patients were called up to six times over a 2-week period. Patients who did not answer the calls were considered lost to follow up if data could not be obtained even with the use of healthcare proxy.

Information on the current outcomes of discharged patients with COVID-19 will serve as baseline data and benchmark for quality improvement strategies that will be employed in our institution. The said data can also be used to start a more comprehensive collection of outcomes of patients

admitted for moderate to critical COVID-19 illness within and outside of PGH. Given the still limited information on the long-term outcomes of this disease, data on this referral center cohort can be a basis for national registry for COVID-19.

OBJECTIVES

This study aimed to describe the short- and longer-term outcomes of patients with COVID-19 admitted at the service areas of Philippine General Hospital.

Specific Objectives
1. To describe the baseline characteristics of discharged COVID-19 patients in PGH.
2. To identify common post-discharge symptoms among COVID-19 patients at 1 week, 1 month, and 3 months after discharge.
3. To determine the proportion of patients according to COVID-19 severity who develop these symptoms at 1 week, 1 month, and 3 months after discharge.
4. To identify common special needs of patients post-discharge.
5. To determine the proportion of patients who require specialized care post-discharge.
6. To determine the proportion of adult COVID-19 patients at 1 week, 1 month, and 3 months after discharge, in terms of the following:
   a. Mortality
   b. Rehospitalization
   c. Emergency consult
7. To determine the level of dependence of COVID-19 patients in terms of Barthel's index at 1 week, 1 month, and 3 months post-discharge.
8. To determine the proportion of patients who are able to return to work at 1 week, 1 month, and 3 months post-discharge.

METHODS

Study Design
This study utilized a retrospective chart review of COVID-19 patients admitted at the Philippine General Hospital from August 2021 to October 2021

Study Population
All charts of adult COVID-19 recovered patients discharged from the service areas of the Philippine General Hospital were included. Patients who were transferred to another institution during this time period were excluded.

Sample Size
The sample size was computed using G*Power version 3.1 as the computing software and based on the following conditions – an estimated number of 200 COVID-19 patients

seen in the institution within a three-month period, a power and level of confidence set at 80% and 95%, respectively. A reported proportion of new breathlessness (50%) among patients with COVID-19 based on the study of Halpin, et al. (2020), and an oversampling set at 10% to account for non-response were considered in the computation, and a need to include 145 patients in the current study.

Data Collection and Management

All charts of patients discharged from August 2021 to October 2021 through the PGH COVID discharge pathway were included in the study. A list of 171 patients was generated after a total enumeration of all discharged patients during this time period. Patients were called three times a day on three separate days over a 1-week period. Patients who did not answer the calls were considered lost to follow up if data could not be obtained even with the use of healthcare proxy (Figure 1). Chart records of their outpatient follow up consults at 1 week, 1 month, and 3 months post-discharge through the COVID discharge pathway were requested from the institution's medical records division. Unique passwords of their electronic medical records were generated and sent privately to the investigators. All chart entries were successfully recovered and included for data collection. Since the study is only limited to chart review of the patient records generated from the COVID discharge pathway, missing data were accounted for by gathering the charts and including in the outcomes the reasons why they were not able to follow up, as this will impact post-discharge care. Confounders were not controlled as the study design is just descriptive.

Baseline characteristics (Appendix A) including age, sex, socioeconomic status based on medical social service (MSS) classification, occupation, smoking status, body mass index classification (underweight, normal, overweight, obese), COVID-19 severity, length of hospital stay, pre-COVID functional capacity classified according to Barthel's index (Appendix B). Presence of co-morbidities, and extra-pulmonary COVID-19 manifestations (anemia, hyper-glycemia, elevated liver enzymes, venous thromboembolism, etc.) were also extracted from the patient's chart. Patient-reported symptoms with each follow up consult were docu-mented (Appendix C). The occurrence of these symptoms were tabulated per COVID severity and per consult [special care needs, ability to return to work, and outcomes (mortality, rehospitalization, and ER consult)] were gathered according to chart review.

A password-protected electronic form using Google Forms was created and provided to the research assistant (RA) for data collection and encoding. Prior to starting data collection, the RA was trained and given a manual of standard operating procedures (SOP) on how to collect and encode relevant study data. An investigator who is not involved in data collection validated 10% of the total data collected by the RA against the source documents. Any inconsistencies in the data were discussed with the RA to

identify and address the sources of the discrepancies. After completion of data extraction, the data set was exported to a password-protected Microsoft Excel sheet accessible only to the study investigators. Codes and data validation were embedded in the Excel database.

Data Analysis

Data were analyzed using Microsoft Excel 2021. Qualitative variables were described using frequencies and percentages, while quantitative variables were described using mean and standard deviation. The post-discharge symptoms, and special care needs were presented in tabular forms, while the rest of the outcomes were presented using bar graphs.

Limitations

The study is prone to information bias since the data analyzed depended on the available information on patient records. The authors did not look into the specific COVID-19 variants affecting the patients which could be a factor in disease severity. The study was limited to a descriptive study design involving retrospective chart review. No inferential statistics were done in this study.

Ethical Considerations

This study was approved by the UP Manila Research Ethics Board with the code UPMREB 2021-0480-01. A waiver of informed consent was requested from and approved by the UPMREB panel since (1) the study only reviewed medical records (2) anonymity was maintained (3) information sought is non-sensitive, in accordance to the provisions cited in National Ethical Guidelines for Health and Health-related Research 2017 11.2 page 102.
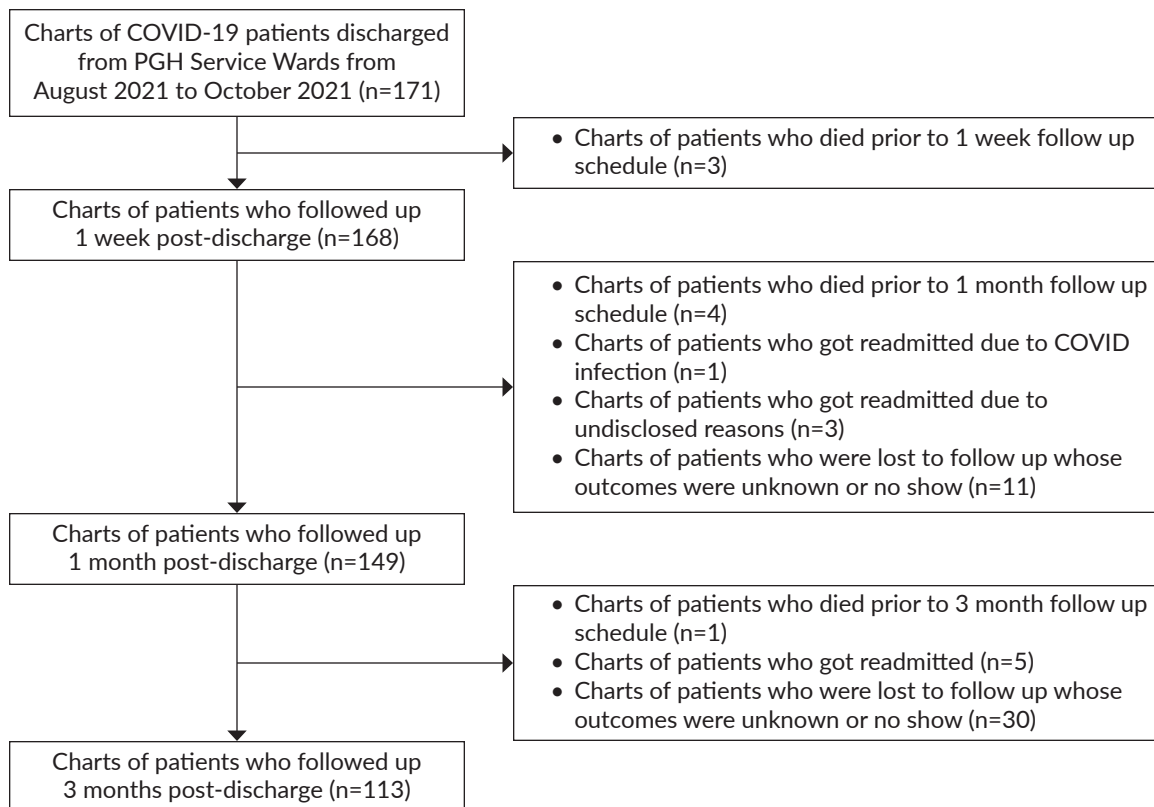
RESULTS

A total of 171 charts of patients discharged from the COVID service areas were included in the study (Table 1). The mean age is 53.7±14.9. Majority were male (60.2%), obese (35.1%), non-smoker (55%), unemployed (59.7%), and belonged in the low socioeconomic class (91.2%). Majority had severe and critical COVID-19 (72.5%) at the time of admission. The most common comorbid conditions identified were hypertension (57.9%), diabetes mellitus (50.2%), and obesity (50.2%). Other important comorbidities include chronic kidney disease (9%), malignancy (5%), rheumatologic disorders such as lupus and arthritides (5%), gastrointestinal disorders such as GERD and liver disease (4%), and pregnancy (2%).

Majority of the patients are oxygen-requiring, with high flow nasal cannula being the most common oxygen support (31%). Majority (64%) had no other extrapulmonary manifestations, but a significant proportion had hematologic involvement such as anemia (18%), endocrine manifestations such as hyperglycemia (8%), hepatic involvement particularly elevated liver enzymes (5%), venous thromboembolism (1%),

Table 1. Baseline Characteristics of Participants (n = 171)

	Values, N (%)
Age (years)	53.7 (14.9)*
Sex of the patient	
Male	103 (60.2)
MSS Classification	
Class A, B	-
Class C	15 (8.8)
Class D	156 (91.2)
Occupation	
Unemployed	102 (59.7)
Smoking Status	
Non-smoker	94 (55)
Previous smoker	50 (29.2)
Current smoker	22 (12.9)
No information	5 (2.9)
BMI Classification upon Admission	
Underweight (<18.5)	2 (1.2)
Normal (18.5-22.9)	53 (31)
Overweight (23-24.9)	17 (9.9)
Obese (>25)	60 (35.1)
No information	39 (22.8)
COVID-19 Severity	
Mild	4 (2.3)
Moderate	43 (25.1)
Severe	65 (38)
Critical	59 (34.5)

	Values, N (%)
Length of stay (days)	29.8 (7.4)*
Presence of Co-morbidities	
Hypertension	99 (57.9)
Diabetes mellitus	85 (50.2)
Impaired Fasting Glucose	13 (7.6)
Malignancy	9 (5.3)
Bronchial asthma	8 (4.7)
COPD	5 (2.9)
Heart Failure	9 (5.3)
Cerebrovascular disease	9 (5.3)
Obesity	85 (50.2)
Dyslipidemia	61 (35.7)
Chronic Kidney Disease	16 (9.4)
Others	26 (1.52)
Oxygen requirement	
Room air	42 (24.6)
Nasal Cannula	42 (24.6)
Face Mask	26 (15.2)
BiPAP	—
HFNC	53 (31)
ET/Tracheostomy	8 (4.7)

*Standard Deviation

Figure 1. Flow chart describing the number of patients and reasons for dropout per follow up.

and arrhythmia (0.6%). Majority of patients were classified as COVID severe (38%) and critical (34.5%).

Tables 2 and 3 show symptoms at 1 week, 1 month, and 3 months post-discharge categorized based on COVID severity. Overall, most patients were asymptomatic throughout the post-discharge period. The most common reported symptoms were dyspnea, cough, and fatigue regardless of COVID severity.

Majority of the patients did not have any special care needs at 1 week, 1 month, and 3 months post-discharge. During the first week of follow up, 36 (21%) were enrolled in pulmonary and physical rehabilitation programs of the Rehabilitation Medicine service, 23 (14%) needed a caregiver at home, 8 (5%) were dialytic even pre-admission, and 7 (4%) were newly oxygen requiring. There were 2 patients (1%)

who required psychiatric consultation for depression (Table 4). On follow up after 1 month, 7 (4.7%) were still oxygen requiring, 5 (3.4%) stayed in the said rehabilitation programs, 5 (3.4%) were still dialytic, 3 (2%) were still in follow up with psychiatry, and 11 (7.4%) needed caregiver at home. At 3 months follow up, only 3 (2.7%) were oxygen requiring, 2 (1.8%) still enrolled in the rehabilitation program, 4 (3.5%) were dialytic, 3 (2.7%) were still in follow up with psychiatry, and 6 (5.3%) still needed caregiver at home.

From August 2021 to October 2021, there were a total of 8 (4.6%) confirmed deaths, 9 (5.2%) got readmitted due to different reasons, and 41 (23.9%) were lost to follow up.

Three (2%) patients died within 1-week post-discharge (Figure 2). One died of pulmonary congestion from heart failure while one died of septic shock from cholangitis. The

Table 2. Symptoms at 1 Week, 1 Month, and 3 Months Post-discharge

Symptoms	Period after discharge					
	1 week		1 month		3 months	
	n=168	%	n=149	%	n=113	%
Asymptomatic	74	44.0	93	62.4	84	74.3
Dyspnea	62	36.9	40	26.8	17	15.0
Cough	38	22.6	16	10.7	6	5.3
Fatigue	18	10.7	15	10.1	7	6.2
Sputum production	7	4.2	3	2.0	1	0.9
Chest pain	4	2.4	—	—	—	—
Diarrhea	3	1.8	—	—	—	—
Sore throat	3	1.8	1	0.7	6	5.3
Palpitations	2	1.2	1	0.7	—	—
Dysgeusia	2	1.2	1	0.7	—	—
Lack of appetite	2	1.2	—	—	—	—
Myalgia	2	1.2	1	0.7	—	—
Joint pains	1	0.6	—	—	—	—
Vertigo	1	0.6	—	—	—	—
Anosmia	1	0.6	2	1.3	—	—

Table 3. Most Common Symptoms at 1 Week, 1 Month, and 3 Months Post-discharge based on Severity

COVID severity	Period after discharge		
	1 week	1 month	3 months
Mild	n=4 Asymptomatic (100%)	n=4 Asymptomatic (75%) Myalgia (25%)	n=4 Asymptomatic (100%)
Moderate	n=41 Asymptomatic (56.1%) Cough (24.4%) Dyspnea (17.1%)	n=35 Asymptomatic (71.4%) Dyspnea (14.3%) Fatigue (8.6%) Cough (8.6%)	n=24 Asymptomatic (87.5%) Dyspnea (8.3%) Fatigue (4.2%)
Severe	n=64 Dyspnea (37.5%) Asymptomatic (34.4%) Cough (21.9%)	n=59 Asymptomatic (68%) Dyspnea (24%) Fatigue (10%)	n=46 Asymptomatic (84.8%) Fatigue (6.5%) Dyspnea (6.5%)
Critical	n=59 Dyspnea (52.5%) Asymptomatic (42.4%) Cough (23.7%)	n=51 Asymptomatic (54.9%) Dyspnea (41.2%) Cough (19.6%)	n=40 Asymptomatic (60%) Dyspnea (30%) Cough (12.5%)

cause of death for the last mortality was not reported. The remaining 168 (98%) patients were stable and had their follow up consultation.

There were an additional 4 (2%) patients who died on second follow up. Three of these patients died of septic shock from hospital-acquired pneumonia. One patient died of acute respiratory failure from COVID pneumonia one month after his discharge. Four (2%) patients were readmitted, one because of another COVID infection and three because of undisclosed reasons. Eleven (7%) patients were lost to follow up, reasons for which are unknown.

During the third follow up, there was one mortality (1%) due to tension pneumothorax. Five (3%) readmissions were noted due to the following reasons: one for urgent dialysis from under-dialyzed state from end stage renal disease, one for blood transfusion for aplastic anemia, one from upper gastrointestinal bleeding from bleeding esophageal varices,

and two were unknown. Thirty (20%) were lost to follow up. The remaining patients (68%) were stable on follow up.

Almost 60% of patients are unemployed pre-COVID. Twenty percent of those who followed up one week post-discharge were able to return to work already, while 33% and 40% were able to return to work 1 month and 3 months (Figure 3) post-discharge, respectively. Ten patients (9%) had to shift to a less demanding work because of health symptoms from COVID, while five (4%) never returned to work even until the third consult due to undisclosed reasons. Information was lacking in the remaining 8% of patients up until 3 months post-discharge.

As shown in Figure 4, the majority of patients (79%) were fully independent based on Barthel's index. Seventeen (10%) were minimally dependent, 9 (5%) were partially dependent, 11 (6%) were very dependent and totally dependent.

Table 4. Special Care Needs 1 Week, 1 Month, and 3 Months Post-discharge

| Special Care Needs | Period after discharge | | | | | |
| | 1 week | | 1 month | | 3 months | |
	n=168	%	n=149	%	n=113	%
Tube feeding	1	0.6	1	0.7	1	0.9
Ostomy feeding	0	0.0	0	0.0	0	0.0
Parenteral Nutrition	0	0.0	0	0.0	0	0.0
Oxygen support	7	4.2	7	4.7	3	2.7
Rehabilitation Program	36	21.4	5	3.4	2	1.8
Dialysis	8	4.8	5	3.4	4	3.5
Psychiatric Support	2	1.2	3	2.0	3	2.7
Caregiver	23	13.7	11	7.4	6	5.3
None	136	81.0	128	85.9	100	88.5
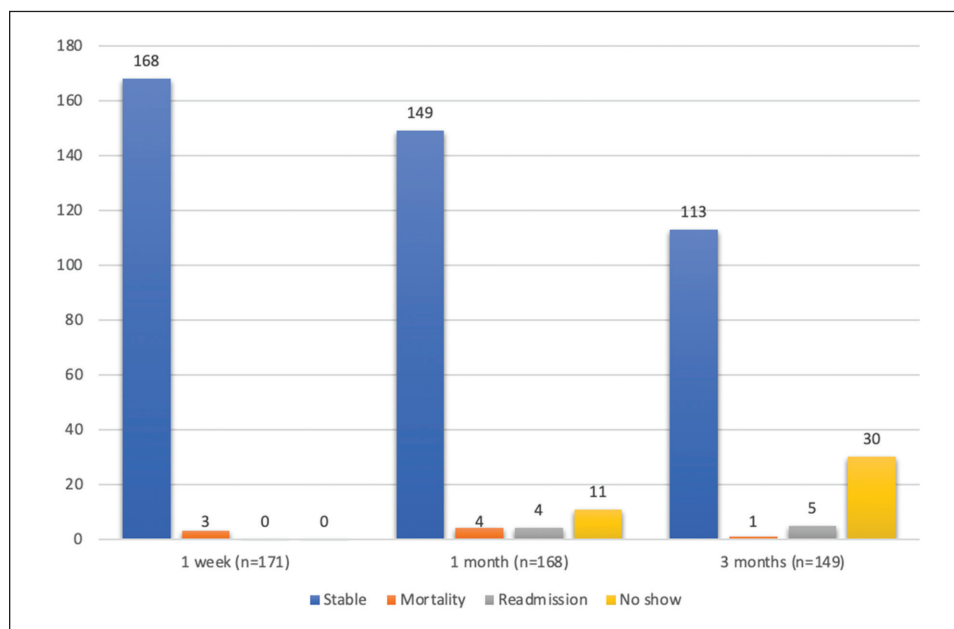
Figure 2. Outcomes of patients 1 week, 1 month, and 3 months post-discharge.

DISCUSSION

In our study, majority of post-discharge patients were males in the middle age group, which is consistent with the WHO report on the national situation at that time and to other similar studies done in China, Italy, and Spain.[7-10] Majority in our cohort of patients were non-smokers. This is comparable with the findings of the study involving 599 patients wherein 66% were non-smokers.[11] Smoking, however, is associated with reporting persistent symptoms at 12 weeks or more after onset of infection and is recognized as an independent risk for disease progression and mortality.[12,13]

Consistent with other local and international studies on outcomes of COVID infection, the most common comorbidities identified were hypertension (58%), diabetes mellitus (50%), and obesity (50%). Other significant comorbidities include chronic kidney disease (9%) and malignancy (5%). These comorbid conditions are recognized risk factors associated with developing more severe infection. In the Unified COVID-19 algorithms, presence of any of these comorbidities will classify a patient as COVID-moderate even in the absence of pneumonia or desaturation.[14-16] In relation to this, more than 70% of patients in this study had severe to critical COVID-19 infection. The severity of the
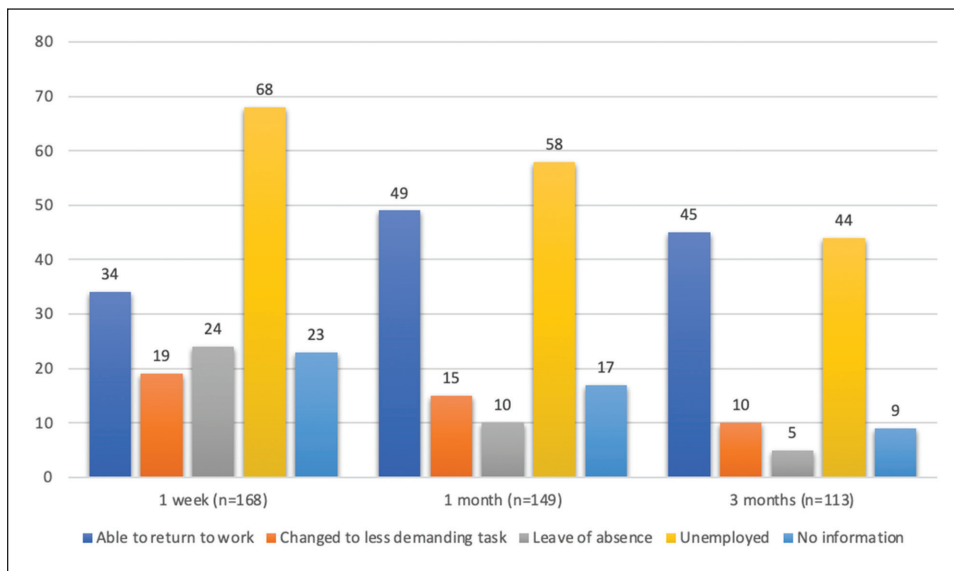

Figure 3. Ability of patients to return to work 1 week, 1 month, and 3 months post-discharge.
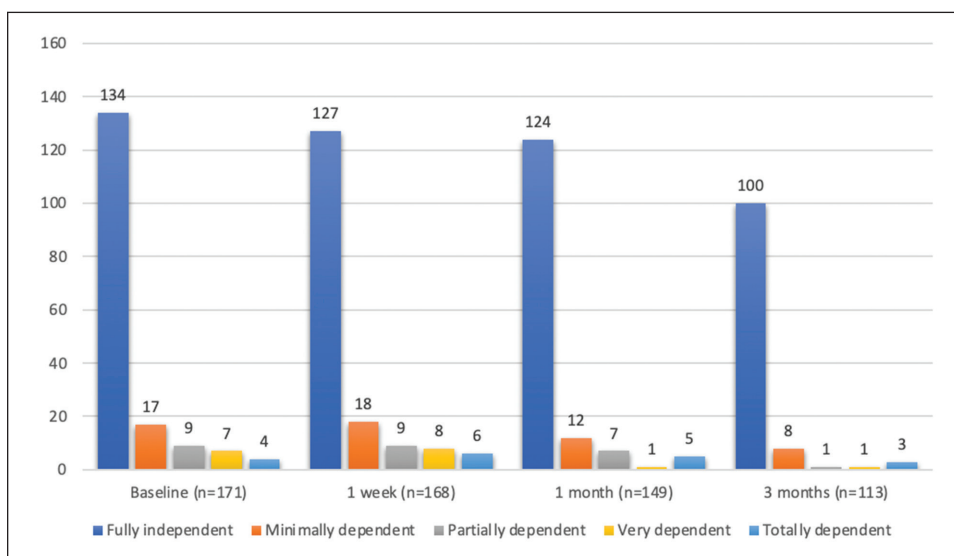

Figure 4. Functional capacity of patients based on Barthel's index on admission and 1 week, 1 month, and 3 months post-discharge.

infection may have been influenced by the predominant COVID-19 variant at that time. In August 2021, a total of 216 cases of the Delta variant (B.1.517.2) of COVID-19 had been detected in the Philippines. This variant of the virus is recognized to have enhanced transmissibility and increased virulence.[17]

Persistence of symptoms after acute COVID-19 infection has been described in several studies.[18-20] Fernández-de-las-Peñas et al. classified the persistence of symptoms into acute COVID-19 for symptoms lasting for up to 4 weeks; ongoing symptomatic COVID for symptoms lasting from 4 to 12 weeks; and, post-COVID for symptoms that developed during or after an infection and continuing for more than 12 weeks.[7] In a survey study, patients still experience symptoms even after three months after acute COVID infection. These symptoms develop not just among patients with severe infection but also among patients with mild infection.[21]

Presentation of symptoms after acute COVID-19 is variable, however, most studies show that dyspnea and cough are two of the most common symptoms. In our study, patients presented commonly with dyspnea followed by cough, fatigue, and sputum production. In a similar study done in the UK, breathlessness was the most commonly reported symptom on follow up (60%), followed by myalgia, anxiety, extreme fatigue, low mood, and sleep disturbance.[22] In two Italian studies, fatigue was the most common symptom, followed by dyspnea and cough.[10,23]

Interestingly, psychiatric symptoms were also commonly reported post-COVID. Anxiety was the most common complaint in a study done in Egypt while another study reported post-traumatic stress symptoms as being the most common.[24,25] In contrast to the previously cited studies, gastrointestinal symptoms were the most prevalent in a cohort of COVID-19 survivors in China.[9,10]

With the persistence of dyspnea arise the most common post-discharge care needs such as home oxygen therapy and the need for a caregiver. This is similar to a study done by Loerinc et al. involving 385 patients where seventy-five patients (24.2%) required any home service at discharge including physical or occupational therapy (13.5%), nursing (5.2%), and new home oxygen therapy (13.2%).[26] Almost 50% of patients were able to return to work at 1 month follow up. In a meta-analysis done by Sanchez-Ramirez et al., 80% of patients were able to return to work. This may be explained by the fact that the majority of our patients had severe to critical COVID, which delays recovery and symptom resolution.[27] However, it is a limitation of this study that the employment status was not considered when these patients were asked if they were able to return to work such that this question was subject to the patient's interpretation. It is then a recommendation for further studies to ask this question only to those who were previously employed. On the third month of follow up, almost 90% of patients who followed up were fully independent in activities of daily living (ADL) as measured using the Barthel's Index. It has been shown that the Barthel's index

has a prognostic value for mortality in COVID-19 patients and ADL dependence is significantly related to mortality.[28,29]

To the authors' knowledge, there is no published local data on post-COVID discharge ER consultation, readmission, and mortality. However, there was a similar study done by Kingery et al. in a quaternary referral hospital in New York City. They looked into the 30-day post-hospitalization outcomes following COVID-19 infection.[6] In their study involving 1344 patients, 16.5% returned to the emergency department. Comparing this with our data, only 2% of our discharged patients required readmission after one month. The reason for their readmission was due to their unstable comorbid conditions and unrelated to their previous COVID infection. This did not considerably increase by the 3rd month post-discharge with only four patients (3%) requiring readmission. Similarly, these patients were readmitted due to their comorbid conditions. However, the number of patients who were lost to follow up considerably increased to 20% (30 patients). It is unknown whether these patients were stable, readmitted at another institution, or died from whatever reason.

The number of patients who were lost to follow up is a limitation of the study. The follow up rate further went down by the 3rd consult at 3 months post-discharge. Since the Philippines does not have a unified healthcare network, it is inherently difficult to ascertain whether such patients were readmitted at a different institution or were lost to follow up for other reasons. A total of 58 patients (33.9%) in our study were lost to follow up. This is similar to the study done by Malijan, Cerrado, Tamondong-Lachica in 2019 in the same setting where only 36.3% of patients went to their post-discharge consult with a mean time to follow up of 15.6 ± 6.8 days.[6,19]

The same study explored the factors associated with follow up rate in the outpatient department of PGH.[19] Other than patient-related factors such as worsening clinical status, social factors such as the ability of patients to secure funds for commuting to PGH comprised 31.2%. In our study, this problem was addressed using telemedicine for conducting follow up consults. Healthcare provider related factors (16.6%) were another important reason for failing to follow up. The most common reason identified was patients not being given clear discharge instructions regarding their follow up. Lastly, patients traveling to distant home provinces was also a common reason for inability to follow up. This factor may still affect follow up rates via telemedicine due to network connectivity issues in distant provinces.

The higher follow up rate in our study may be attributed to the post-COVID discharge protocol instituted in our service areas from August 2021 to February 2022. The protocol included all COVID-19 patients discharged from the COVID service areas and intensive care units of the Philippine General Hospital. A dedicated care coordinator is tasked to schedule follow up consults at 1 week, 1 month, and 3 months post-discharge. The care coordinator informs

the patients of their schedule ahead of time to allow them to anticipate the call and ensures they are given clear instructions regarding their follow up consultation. To improve the follow up rate, patients are called several times during different times of the day over a 1-week period. This process is repeated using all available contact details registered with the hospital's information system before they are considered lost to follow up. All these aforementioned factors might have contributed to the higher follow up rate in our study.

CONCLUSION

Despite the majority of patients having severe to critical COVID infection during admission, most patients were asymptomatic within 3 months post-discharge. In those who developed persistent symptoms, dyspnea, cough, and fatigue were the most common symptoms identified regardless of COVID severity. Majority did not require special care needs while a small proportion required caregiver support, rehabilitation, dialysis, and supplemental oxygen. Having a structured follow up care protocol and designated care coordinator may positively influence follow up rates.

Statement of Authorship
All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure
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APPENDICES

Appendix A. Definition of Terms

	Definition
Age	Based on Case Record or RADISH
Sex	Male or female
Socioeconomic status	Based on the PGH Medical Social Service classification
Medical Social Service Classification (A, B, C, D)	Classification given by the Medical Social Service as stated at the case record
Occupation	Pre-COVID work or employment as written in the RADISH chart or Medical Case Record
Pre-COVID functional capacity	Based on the Barthel's Index
Barthel's Index	A 10-item ordinal scale that is used to measure functional independence with domains on feeding, bathing, dressing, bowels, bladder, toilet use, transfers, mobility and stairs (see Appendix B) 80-100 – independent 60-79 – minimally dependent 40-59 – partially dependent 20-39 – very dependent <20 – totally dependent
Smoking status	Smoker or non-smoker at the time of interview on admission; if smoker, will further classify to ≥10 pack-years or less than 10 pack-years.
BMI	Pre-admission BMI in using the Asia Pacific guidelines
COVID-19 severity	Mild, moderate, severe or critical based on the latest available PSMID guidelines
Length of stay	Measured in number of days at the COVID ward or ICU
Comorbidities	Will include hypertension, diabetes mellitus, malignancy, bronchial asthma, COPD, heart disease, stroke/cerebrovascular disease, obesity/metabolic syndrome, chronic kidney disease, chronic liver disease
Oxygen requirement during admission	Highest flow required during admission (room air, nasal cannula, face mask, high flow nasal cannula, continuous positive airway pressure ventilation, endotracheal intubation)
Extrapulmonary manifestations of COVID-19	All documented manifestations of COVID-19 other than pneumonia (arterial thrombosis, venous thrombosis, kidney injury, myocarditis, hepatitis, etc.)
Post-COVID symptoms	All symptoms related to COVID manifesting post-discharge
Specialized nutritional care	Nasogastric tube, nasoduodenal tube, nasojejunal tube, percutaneous endoscopic gastrostomy tube, total parenteral nutrition
Home oxygen support	Nasal cannula, face mask, high flow nasal cannula, BiPAP or endotracheal intubation
Need for rehabilitation program	Pulmonary or cardiac rehabilitation as assessed prior to discharge
Need for out-patient renal replacement therapy	Hemodialysis or peritoneal dialysis post-discharge
Need for psychiatric support	Psychotherapy and/or psychopharmacological consult
Need for caregiver	Professional (nurse, midwife) or non-professional assistant of the patient to fulfill activities of daily living
Mortality	Death related to COVID-19 and its complications excluding those from trauma, pregnancy
Rehospitalization	Hospitalization to any hospital/institution lasting for >24 hours
Emergency consult	Consult to any emergency department lasting for <24 hours
Window period	Time period allowable in case a patient does not follow up on the scheduled day (1 week before or after the scheduled day of follow up)
Service Area	Formerly called Charity Ward

Barthel Index Scoring Form

Patient Name: _____ Rater Name:_____ Date:_____

FEEDING
0 = unable
5 = needs help cutting, spreading butter, etc., or requires modified diet
10 = independent

BATHING
0 = dependent
5 = independent (or in shower)

GROOMING
0 = needs to help with personal care
5 = independent face/hair/teeth/shaving (implements provided)

DRESSING
0 = dependent
5 = needs help but can do about half unaided
10 = independent (including buttons, zips, laces, etc.)

BOWELS
0 = incontinent (or needs to be given enemas)
5 = occasional accident
10 = continent

BLADDER
0 = incontinent, or catheterized and unable to manage alone
5 = occasional accident
10 = continent

TOILET USE
0 = dependent
5 = needs some help, but can do something alone
10 = independent (on and off, dressing, wiping)

TRANSFERS (BED TO CHAIR AND BACK)
0 = unable, no sitting balance
5 = major help (one or two people, physical), can sit
10 = minor help (verbal or physical)
15 = independent

MOBILITY (ON LEVEL SURFACES)
0 = immobile or < 50 yards
5 = wheelchair independent, including corners, > 50 yards
10 = walks with help of one person (verbal or physical) > 50 yards
15 = independent (but may use any aid; for example, stick) > 50 yards

STAIRS
0 = unable
5 = needs help (verbal, physical, carrying aid)
10 = independent

TOTAL SCORE= _____

80-100 – independent
60-79 – minimally dependent
40-59 – partially dependent
20-39 – very dependent
<20 – totally dependent

Appendix B. Barthel's Index.

Appendix C. Checklist used by the physicians-in-charge of the patients during follow up

POST COVID FOLLOW UP

First/Second/Third Consult after COVID discharge (pls. indicate): _____

Date of consult: _____

Time of consult (start): _____

Time of consult (end): _____

Functional Capacity (Barthel Index Scoring Form)
Please mark below:

	80-100 (Fully Independent)
	60-79 (Minimally Dependent)
	40-59 (Partially Dependent)
	20-39 (Very Independent)
	<20 (Totally Dependent)

SUBJECTIVE FINDINGS

Current Symptoms? Please mark all that apply.

	Fatigue
	Dyspnea
	Cough
	Sore throat
	Anosmia
	Sputum production
	Chest pain
	Palpitation
	Dysgeusia
	Lack of appetite
	Diarrhea
	Headache
	Vertigo
	Joint pains
	Myalgia

Other subjective findings? _____