

Clinical Course of Healthcare Workers Diagnosed as COVID-19 Suspects and Contacts during the Coronavirus Disease 2019 Pandemic: A Cross-sectional Study

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ABSTRACT

Background. COVID-19 infection can present in various clinical forms. Anosmia has been significantly associated with a positive RT-PCR, but it usually appears after four days and has also been observed among COVID-19 negative patients. Knowledge on the clinical course of COVID-19 can guide decision-making on screening, diagnostic testing, and quarantine/isolation procedures.

Objectives. To describe the clinical course of healthcare workers (HCWs) with COVID-19-related exposure, symptoms, differential diagnoses, and time to return to work clearance.

Methods. This was a cross-sectional study involving HCWs diagnosed as COVID-19 contacts/suspects between April 2020 and April 2021. Information on demographics, time elapsed between clinical events, outcomes, and final diagnoses were collected from hospital records. Categorical data was presented in frequencies and percentages, while numerical data were reported as range and median values.

Results. There were 4755 consultations for COVID-19-related symptoms or exposure that were included in the study. Symptoms developed at a median of one day post-exposure. Consultation was at two days following symptom onset or four days after exposure. RT-PCR was done on the day of consult. Symptoms resolved after a median of six days. Return to work (RTW) was seven days from consult. Common presenting symptoms were respiratory (56.71%) and systemic (34.04%). COVID-19 was positive in 13.79% of consults. Almost all HCWs recovered (99%) as outpatient (88%). Differential diagnoses were usually other respiratory infections (8.60%) and allergic rhinitis (2.37%).

Conclusion. The clinical course for HCWs who consulted for COVID-19-related symptoms or exposure lasted for two weeks from symptom onset or exposure until clearance for work resumption. The most common symptoms were respiratory and systemic in nature. Recovery was noted after six days. The most common alternative diagnoses for COVID-19 negative cases were respiratory infection and allergic rhinitis.

Keywords: COVID-19, healthcare worker, clinical course



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INTRODUCTION

COVID-19 presented a challenge to clinicians especially during the first few months of the pandemic, because of the quick and varied ways of transmission as well as the wide range of disease manifestation. The transmission of COVID-19 is through respiratory droplets from symptomatic individuals, viral shedding from asymptomatic carriers, contaminated surfaces, and close or prolonged contact.¹⁻⁵ Infection can present in various clinical forms including respiratory, systemic, and gastrointestinal symptoms, while some infections can be asymptomatic.⁶⁻⁸

One symptom, anosmia or the loss of sense of smell, has been associated with COVID-19 infection. A preliminary study done in 2020 in France showed that anosmia was significantly associated with positive RT-PCR ($p < 0.0001$).⁹ While anosmia can be present during the illness onset, it usually appeared after four days, and it can also be found among patients who are COVID-19 negative.^{9,10} Therefore, questions arise as to whether anosmia can be used as a pathognomonic symptom for COVID-19, or whether symptom-based screening may be used for this infection.

This is an important consideration especially in resource-limited settings like the Philippines, where test kits had been severely limited during the start of the pandemic. Medical personnel who have 3-4 times the risk of being infected with COVID-19 have to undergo repeated testing for various symptoms and exposure.^{11,12} Strict quarantine protocols following COVID-19 exposure have been implemented to control the spread of infection. However, placing healthcare workers (HCWs) under quarantine leads to a decrease in hospital manpower which can hinder service delivery. There is a need to balance the hospital's efforts for an efficient health service delivery to its patients as well as its mandate to address the health needs of its employees. Thus, testing and quarantine/isolation protocols must be supported by evidence on the clinical course, symptomatology, and outcomes of COVID-19.

This study aimed to describe the clinical course of HCWs following exposures and/or the development of symptoms during the COVID-19 pandemic. It sought to determine which symptoms are consistently seen in exposed HCWs, what the common differential diagnoses for COVID-19 are among hospital staff, and how long it would typically take for a COVID-19 suspect/contact medical personnel to be cleared to resume work.

METHODS

Study Design and Setting

This was a cross-sectional study involving COVID-19-related consults by HCWs from the Philippine General Hospital (PGH), a public tertiary hospital, over a period of one year.

Study Participants and Sampling

There was no sample size computation and sampling, since all COVID-19-related consults were screened based on inclusion/exclusion criteria. All eligible consults were included to avoid selection bias. COVID-19-related consults by HCWs who were directly or indirectly involved in health services during the pandemic were included in the study. Likewise, subsequent enrolment to the telemonitoring service was among the inclusion criteria. Consults by HCWs who underwent RT-PCR to fulfill a requirement, who had the test done in outside facilities, and who already had RT-PCR done prior to consultation were excluded.

Data Collection

The census of HCW consultations was obtained from the telemonitoring database of the employees' clinic. The clinical information gathered from the database were supplemented with data from the electronic medical record and paper-based records. Dates of relevant clinical events, initial symptoms, and progression or recovery were tracked using the daily monitoring log in the database.

Clinical outcomes were determined from the status of the employee at the end of the quarantine period. Final diagnoses were taken from medical charts. All data collected was summarized in a spreadsheet where names and other identifying information were replaced with case numbers.

Outcomes

The outcomes measured were time elapsed between relevant clinical events (exposure, symptom onset, consultation, swab test, release of swab result, symptom resolution, return to work clearance), characteristics of the study subjects, levels of risk exposure, symptoms, final diagnoses, clinical outcomes (recovery, persistence of symptoms, death), and disposition status (outpatient, outpatient subspecialist referral, hospital admission).

Data Analysis

Categorical data (HCW characteristics, symptoms, diagnoses, outcomes, etc.) was expressed in frequencies and percentages. Numerical data (age, time elapsed) was presented using the range and median. All data were analyzed in Google Sheets. Cases with missing data were retained in the dataset and were counted as "no available data."

Ethical Considerations

This study underwent ethical review by the University of the Philippines Manila Research Ethics Board. Collection of data, encoding, 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.

RESULTS

There were 8,967 COVID-19-related HCW consultations between April 2020 to 2021. Four thousand seven hundred fifty-five (4,755) consults were eligible based on the inclusion criteria. The age of the HCWs based on consultation records ranged from 19 to 68 years, with 50% falling between 28 and 42 years. Majority of consults were with female personnel (67%), and with HCWs having at least one comorbidity (53%).

The top comorbidities reported were lifestyle/metabolic diseases (hypertension, type 2 diabetes mellitus, dyslipidemia), atopic diseases (allergic rhinitis, asthma, history of allergies), and a history of respiratory infection (COVID-19, pulmonary tuberculosis). Seventy-five percent (75%) of consults were

of HCWs directly involved in patient care (doctor, nurse, nursing attendant, medical technologist, etc.). Consultations from COVID-19 areas were at 17%, while 40% had no documentation on work areas (COVID or non-COVID).

Consultations were classified as low- or high-risk exposures (37% and 36%, respectively), while there was no risk documentation identified in 21%. Seventy-eight percent of consultations (78%) had HCWs who reported symptoms and were assessed as COVID-19 suspects, while the rest (22%) had no symptoms and were assessed as COVID-19 contacts.

Clinical Course Following COVID-19-related Exposure and Symptoms

Symptoms developed within two to six days of COVID-19 exposure in 50% of consults. Consultations for symptoms or exposure occurred from one to four days after the illness onset or from two to six days post-exposure. Nasopharyngeal swabbing was performed either on the day of or one day after consultation for majority of the consults. Specimen collection for RT-PCR took a maximum of 21 days from consult in some cases.

Test results were released within 22 days of specimen collection; 50% of patients who consulted received results after only one day. Symptoms resolved after four to ten days in most consults. In some cases, resolution of symptoms took up to 125 days. Return to work (RTW) clearance was issued within five to 12 days from consult.

The time elapsed between relevant clinical intervals are summarized in Table 1.

COVID-19-related Symptoms

The most common presenting symptoms reported by HCWs were respiratory (56.71%) and systemic (34.04%) in nature. Other symptoms were gastrointestinal (6.65%), musculoskeletal (1.22%), cardiovascular (0.48%), urologic (0.17%), and dermatologic (0.11%). Additional symptoms that were reported during quarantine/isolation developed at a median time of four days (IQR=4) after initial symptom onset. These new symptoms were also found to be mostly systemic and respiratory in nature. (Figure 1)

Majority of the common symptoms (i.e., cough, sore throat, colds, myalgia/malaise, headache, fever, soft/loose stools) are present in both initial and follow up consults. Soft/loose stool was the only top symptom reported during both initial and follow up consultation that was neither respiratory nor systemic. Three new symptoms were frequent during follow up consultations: change in olfaction (anosmia, hyposmia, dysosmia), change in gustation (ageusia, hypogeusia, dysgeusia), and dyspnea.

Clinical Outcomes and Final Diagnoses

Clinical recovery was observed in 99% of HCW consultations. Twenty-eight consults (0.59%) involved patients who remained symptomatic and required additional intervention

prior to clearance. Persistent symptoms were present mostly among COVID-19 negative patients (82%) compared with positive patients (18%, n=28). There was one mortality caused by severe COVID-19. No data on clinical outcomes was found for 369 (7.76%) of consults.

Outpatient quarantine/isolation (either at home or in facilities) was completed in 4,199 (88.31%) consults, with 36 (0.76%) requiring outpatient subspecialty referral. Hospital admission for further management and/or isolation was noted in 237 (4.98%) consults. No data on disposition status was found in 283 (5.95%) cases.

The most common final diagnoses are listed in Table 2.

DISCUSSION

The clinical course lasted two to five weeks from exposure or symptom onset to clearance for resumption of work. The most common symptoms reported were cough, sore throat, colds, myalgia/malaise, headache, fever, soft/loose stools, throat discomfort, weakness/fatigue, and nasal congestion.

Table 1. Time Elapsed between Clinical Intervals from COVID-19 Exposure to Return to Work of HCWs in a Tertiary Hospital from April 2020-2021 (n=4755)

Relevant clinical intervals	Time elapsed (days)	Median (days)	Interquartile range (IQR)
<i>Exposure to symptom onset</i>	1-97	1	4
<i>Symptom onset to consult</i>	0-120	2	3
<i>Exposure to consult</i>	0-98	4	4
<i>Consult to swab</i>	0-21	0	1
<i>Swab to result</i>	0-22	1	0
<i>Symptom onset to resolution</i>	0-125	6	6
<i>Consult to work clearance</i>	0-162	7	7

Table 2. Final Diagnoses of COVID-19 Contacts and Suspects Working in a Tertiary Hospital from April 2020-April 2021 (n=4755)

Diagnoses	Frequency	Percentage
COVID-19 confirmed	650	13.67
COVID-19 negative	3498	73.56
No alternative diagnosis indicated	2942	84.11
Respiratory tract infection (ARI, URTI)	301	8.60
Allergic rhinitis	83	2.37
Asthma	57	1.63
Acute tonsillopharyngitis	45	1.29
Acute gastroenteritis	43	1.23
Systemic viral illness	39	1.11
Allergic cough	20	0.57
Gastroesophageal reflux disease	16	0.46
Community acquired pneumonia low risk	14	0.40
Adverse effects following immunization	10	0.29
Others	198	5.66
No available data	551	11.59

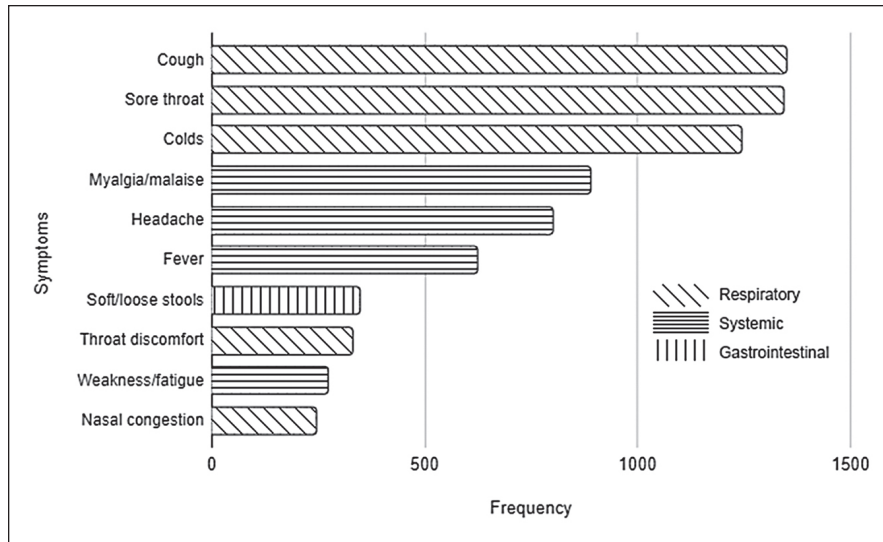


Figure 1. Most common COVID-19-related symptoms reported on initial consultation by HCWs in a tertiary hospital from April 2020-2021 (n=4755).

The most common differentials to COVID-19 were other respiratory tract infections.

The average incubation period observed within six days from exposure to symptom onset is similar to findings from earlier studies. Prior research show that COVID-19 variants exhibit different incubation periods.¹³ Early strains of the virus observed in early 2020 and 2021 have an incubation period of 1-15 days.^{3,14-17} Delta variant infections have a mean incubation period of 4.3 days, while the Omicron variant has a shorter incubation of 3-4 days.¹⁸⁻²¹ The time interval between exposure or symptom onset and clinic consultation reflects the health-seeking behavior of the health worker. Likewise, it shows availability and accessibility of health services. Observational studies on the general population found that it takes 1-4.5 days before a symptomatic individual seeks medical consultation.^{3,16} The same number of days between symptom onset (i.e., 2 days) or exposure (i.e., 4 days) and consultation was observed in this study. The health-seeking behavior of healthcare workers was not different from that observed in previous studies on the general population despite health services being readily available inside the facility. Common reasons reported by HCWs in this study for delaying consultation were reluctance to leave posts due to lack of manpower, fear of knowing they have contracted COVID-19, and having mild symptoms that they chose to manage on their own.

The duration from consult to swab test reflects ease of testing, while the time from swab test to release of result reflects the laboratory turnaround time. One observational study noted a median time of 2.1 days from diagnosis to testing, which is one day longer than what was observed in this study.¹⁷ This efficient testing is likely due to the presence of a central on-site swabbing area with an in-house molecular laboratory. The increased testing efficiency for healthcare

workers was critical in containing the spread of infection during the pandemic.

Illness duration, the time from symptom onset to resolution, has been the basis for issuing Return to Work clearance. Symptomatic and/or radiologic improvement of COVID-19-confirmed patients was observed within a period of 7-37 days from initial consult.¹ Illness duration was shorter among healthcare workers included in this study. The time elapsed from consultation to RTW clearance indicates the time needed for the HCW to be cleared for work following initial contact with healthcare services. The results of this study show a faster rate of issuances of RTW clearance compared to the findings of a 2021 retrospective cohort study where it took an average of 13 days from symptom onset to RTW clearance in HCWs with mild/moderate COVID-19 infection.²² This is attributed to the presence of a dedicated and responsive telemonitoring service that focused primarily on assisting HCWs during prescribed quarantine/isolation.

There are common initial symptoms that are still reported on follow up consultation, suggesting that some symptoms are present throughout the course of illness. Meanwhile, the three additional symptoms reported more frequently only on follow up (i.e., change in olfaction, change in gustation, and dyspnea) indicate that some symptoms tend to develop much later. This is consistent with the findings of another study, where anosmia and ageusia were noted at a median of four days from symptom onset.⁴

Previous observational studies have reported that the most common symptoms in adults with COVID-19 are fever, cough, fatigue, and myalgia.²²⁻²⁴ These are also seen in the top ten most reported symptoms in this study (Figure 1). A retrospective study found no significant difference in clinical symptoms between those who tested positive for

SARS-CoV-2 and those who had two consecutive negative tests among 69 symptomatic individuals suspected of having COVID-19.²⁵ Symptom-based screening had been attempted in other studies but the wide range of symptoms (or lack thereof) in COVID-19-infected individuals render it insufficient to catch all possible infections.^{24,26} The results of this study agree with previous research that symptoms alone are not the most reliable indicator of COVID-19 infection.

Majority of COVID-19 contacts and suspects tested negative for COVID-19 and were subsequently assessed to have some other respiratory illness. Conditions of the respiratory tract are strong differential diagnoses to COVID-19 in other studies. A retrospective study that utilized multiplex PCR nucleic acid testing was able to diagnose influenza A, influenza B, adenovirus, *Chlamydia pneumoniae*, and *Mycoplasma pneumoniae* in the COVID-19 negative group.²⁵ Another retrospective study found that among 267 COVID-19 negative patients, respiratory diseases (42.7%), other infectious diseases (14.2%), and cardiovascular diseases (11.2%) were the most common differential diagnoses for COVID-19.²⁶

Ultimately, the clinical course of HCWs who consulted for COVID-19-related symptoms or exposure depended on various personal and environmental factors such as severity of symptoms, ability to recover from illness, health-seeking behavior, as well as availability and accessibility of healthcare services. Thus, it is recommended that health services be continuously evaluated to ensure the responsiveness of these programs to the needs of the employees. Likewise, strategies should be used for increased engagement with wellness programs by the employees to improve their overall health.

The results of the study were only as accurate and complete as the data upon which it was based. The telemonitoring database from which data was collected is largely encoder-dependent, i.e., the daily monitoring log was manually updated. Safeguard protocols are in place to ensure accuracy but errors in data entry cannot be fully discounted. In addition, the completeness of the database also depends on the responsiveness of the HCWs being monitored. If they do not reply to the telemonitoring service team, then data will be lacking in certain areas.

CONCLUSION

The clinical course for HCWs who consulted for COVID-19-related symptoms or exposure lasted for two weeks from symptom onset or exposure until clearance for work resumption. The most common symptoms were respiratory and systemic in nature. Recovery was noted after six days. The most common alternative diagnoses for COVID-19 negative cases were respiratory infection and allergic rhinitis.

Statement of Authorship

Both authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

Both authors declared no conflicts of interest.

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