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ORIGINAL PAPER

Doctors Spreading SARS-CoV-2 Infection to Their Patients and Health Workers. What is the Likelihood of This Scenario?

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ABSTRACT

Aims: *In this particular study, we report our experience of eight doctors infected with SARS-CoV-2 and discuss the probability of in-hospital virus transmission to patients or the rest of the hospital personnel. The importance of PPEs is highlighted.*

Materials and methods: *We explore the data of eight doctors who were tested positive for SARS-CoV-2 after returning from their summer vacation. More specific, we evaluated the time they spent working before they got tested after their return, the symptoms they developed and the results of their tracking through their patients and the rest of hospital workers.*

Results: *All doctors followed their working schedule, ranging from 2–4 days after their summertime off, without knowledge of being infected. They had been keeping all suggested protection precautions, while no further virus transmission to patients and/or other healthcare workers occurred, even though they had close contact and cooperation with many of them.*

Conclusion: *Our experience suggests that, if healthcare workers conform to established safety procedures, the likelihood of further transmission both to patients and their colleagues, even in asymptomatic state, appears to be minimal.*

Keywords: COVID-19, SARS-Cov-2, health workers, patients, PPE.

INTRODUCTION

The ways of transmission and infection of SARS-CoV-2 constitute a daily problem and dangerous state, introducing a new state of reality globally. Each day, doctors and nurses come into close contact with thousands of patients in healthcare facilities. However, patients with COVID-19 are not the only source of infection for hospital personnel. There is always the possibility for healthcare workers to be infected, just like the rest of the population, through their social environment and contacts, or by living in a community with high viral outbreak (1).

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During the second wave of this outbreak, eight doctors of different specialties in our hospital, an academic tertiary referral setting, were tested positive for SARS-CoV-2 after returning from their summer vacation in August 2020. This particular incidence has instantly alerted the hospital and civil protection authorities, triggering a series of actions in an effort to minimize the spread of the infection to the rest of the community, personnel, patients, and high risk individuals according to worldwide guidelines and protocols (2, 3).

In this study, we report our experience from an out-hospital infection of eight doctors infected with SARS-CoV-2 and the possibility of virus transmission to patients and the rest of health workers. After thorough testing and evaluation of both hospital personnel and patients with whom they had come into contact, such a transmission was not verified in our study. Even more, the importance of personal protection equipment (PPE) use is highlighted. ❑

MATERIALS AND METHODS

In-hospital contacts of eight SARS-CoV-2 positive healthcare workers (HCW), all doctors, were included in the present study. All doctors tested positive for SARS-CoV-2 infection during the second wave of the pandemic in August 2020, after their return from a short summer leave. Data from doctors' personal anamnesis, epidemiological and contacts' tracking data for the time period they were working before their proper testing were noted. Furthermore, the number of participants' contacts with patients and colleagues after their return to daily practice was calculated. The infection status of patients who were treated by the infected medical personnel was assessed by phone calls, since all of them were discharged up to 14 days post-discharge, according the STROCSS 2019 guidelines (4).The total number of close contacts was subjected to specific questions regarding their symptoms, general health status and the possibility of being tested for any reason to RT-PCR at this specific time period. ❑

RESULTS

The mean age of the eight SARS-CoV-2 positive doctors (four males and four females) was 29.9 years. Six of them had recently returned from a short summer leave, and all came into close contact with an infected person (Table 1).

TABLE 1. Epidemiological characteristics of infected health care workers

Sex N (%)	**Male**	4 (50%)
	Female	4 (50%)
Age (mean, SD, min, max)		29.9 (4.3, 27, 38)
Contact with positive SARS-CoV-2 infected patient N (%)		8 (100%)
Recent travel N (%)		6 (75%)

TABLE 2. Infection and diagnosis timeline

	Mean (SD)	**Min-Max**
Duration of summer leave (days)	5.25 (1.6)	3-7
Return to work until diagnosis (days)	4.25 (2.6)	0-7
Infection until diagnosis (days)	5.75 (1.9)	2-8
Evoked symptomatology until testing (days)	0.63 (1.2)	0-3

Regarding infection timeline, the mean time of their summer leave was 5.25 days, the mean time of their return to work to the day of diagnosis was 4.25 days, while the calculated time from the presumed day of infection to diagnosis was 5.75 days. The speculated time of developing symptoms related to SARS-CoV-2 until their testing was 0.63 days, pointing out that most of them were asymptomatic when they were tested (Table 2). The mean time period needed for their tests to become negative was 14.5 days and the time off duty was 21.6 days.

In reference to underlying diseases, most of them (up to 75%) were current smokers or suffered from another chronic disease (*i.e.*, β-thalassemia major). The most common symptoms included fever (62.5%) and headache (50%), while half of them presented anosmia and/or ageusia. Other symptoms such as dyspnea, cough, rhinosinusitis and gastrointestinal disorders had lower rates. Half of the doctors were admitted to Infectious Diseases Department and one out of eight was intubated and admittted to ICU.

All eight infected doctors were wearing a PPE (Personal Protective Equipment) when they

TABLE 3. In-hospital contacts of the eight SARS-CoV-2 infected doctors with PPEs*

Healthcare workers		Patients	
n	Infected	n	Infected
124	0	115	0

*PPE=personal protective equipment

came into close contact with approximately 124 people from the rest of the hospital personnel and 115 patients (Table 3). Personal protection was ensured by the use of masks (FFP, KN95, surgical mask), gloves, aprons, protective glasses, proper hygiene and sanitization (5, 6) as well as social distancing (7, 8) and other precautions, including those indicated by WHO (9). Similar PPEs were used by the whole hospital personnel, while the majority of patients wore only surgical mask. It is also important to highlight that every doctor changed his/her PPE after each patient examination and regularly throughout their daily routine. As soon as the eight doctors tested positive, patients were contacted by phone and evaluated by specific questions about their clinical status or suspicious symptomatology for Covid-19. At that point, none of the contacts reported back as positive for SARS-CoV-2 after their assessment. A second surveillance of the same patients after 14 days of the initial contact with HCW has again showed negative test results. ❑

DISCUSSION

As this pandemic continuous to interfere to our lives, HCW and civil protection authorities should be constantly alerted. At first, it is more than important to outline the significance of screening procedures in health care facilities. It is possible that focusing only on testing people who are strictly meeting the criteria for Covid-19 as a clinical case would lead to missing an important population share who remains asymptomatic and pauci-symptomatic (10). According to the majority of studies, the most prevailing symptoms among hospital personnel appear to be anosmia, fever and myalgia (5); also in our study group, almost all infected employees had fever, headaches and/or ageusia with higher frequency, and for some of them, admission to the Infectious Diseases Department and even Intensive Care Unit was necessary. For this reason, HCW should be tested thoroughly in an effort to prevent in-hospital outbreaks.

Moreover, strictly following the protocols for PPE use should be well established. Scientific evidence suggests that wearing face mask helps to reduce respiratory droplets from infected individuals even when being asymptomatic (13). Healthcare workers should be equipped with a respirator that fits well and eye protection such as visor or goggles. For respiratory shortage, using a medical face mask and other recommended options (5) should be considered. Surgical masks adapt rather loosely to the face and should be used for a maximum of eight hours, but it is recommended to change them earlier when damaged or visibly wet. It is highly contraindicated to be worn around the neck in-between use in order to avoid self-contamination (11) Another important measure is the use of gloves and gowns with long sleeves, especially when there is a high risk for contact with body fluids, or alternatively aprons when there is a low risk for contact with body fluids. The change of equipment is mandatory between patient contacts, while the procedure to safely remove the PPE should be done in a correct order. Also, proper hygiene and sanitization of hands and all used equipment and surfaces, should be done thoroughly. It is important that all healthcare workers are educated and well trained regarding the proper use of PPE, in order to minimize any possibility for in-hospital transmission (10). Our study highlights and documents the importance of PPEs, proper hygiene and sanitization in preventing the spread of SARS-CoV-2 within hospital and health facilities, since although our doctors continued to work until diagnosis and came into close contact with more than 200 patients and hospital personnel, none reported back as positive.

While the majority of the existing literature reports on different ways of Covid-19 transmission and prevention among populations, a recent systematic review and meta-analysis shows that HCW seemed to have been infected with SARS-CoV-2 during the first six months of the pandemic, with a high incidence of hospital admission but a lower mortality. Further studies are needed to document not only the continued risks among HCW, as the pandemic continues (12), but also the transmission from infected HCW to their patients. ❑

CONCLUSION

The findings of our study showed that infection occurred at approximately the same time in all tested subjects, as confirmed by contact tracking and search, which was done immediately after the first doctor appeared with suspected COVID-19 symptoms. Also, analysing the hospital outbreak enables us to conclude that the likelihood of a scenario where doctors infect their patients is rather remote when PPEs are thoroughly used in daily practice, given that all infected doctors who took all available safety precautions prevented the spread of infection to their colleagues and patients, although they kept working for a mean time of 4.25 days after returning from vacation, without knowing they were SARS-CoV-2 positive. ❑

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