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Commentary

Comparisons of COVID-19-infected healthcare staff between the BA.1.2-dominant period and the BA.5-dominant period

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Abstract: The initial omicron SARS-CoV-2 subvariants, BA.1 and BA.2 (BA.1.2), were progressively displaced by BA.5in Japan in 2022. In the BA.5-dominant period, there were significantly more healthcare staff infected by nosocomial contact with persons with confirmed SARS-CoV-2 infection than those infected by household contact, compared with the BA.1.2-dominant period. The staff infected via nosocomial contact included non-patient-facing staff, in the BA.5-dominant period, although they did not become infected by SARS-CoV-2 through nosocomial contact in the BA.1.2-dominant period. These data suggest the importance of infection control and care for non-patient-facing staff, in the same way as for patient-facing staff.

Keywords: SARS-CoV-2, Transmission, Airborne Infection, Medical Staff

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1. Commentary

Omicron (B.1.1.529) became the dominant variant of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in 2022, and the initial omicron subvariants, BA.1 and BA.2 (BA.1.2), were being progressively displaced by BA.5 in many countries, including Japan [1, 2]. BA.5 showed greater transmissibility and a higher level of immunological evasion than BA.1.2, but it appeared to have less pathogenicity [2]. In Japan, COVID-19 BA.1.2 patients were predominant from January to March 2022, followed by BA.5 patients from July to September 2022. In both periods, screening for SARS-CoV-2 infection was performed by drive-through type tests by polymerase chain reaction (PCR) methods using the nasal swabs of staff who had a history of contact with persons who were confirmed to have SARs-CoV-2 infection later in our hospital. All recruited staffs were working and received practice and class about infection control equally and routinely once a few months in our hospital. The vaccinations including booster shots have also already finished. These conditions were not different between the patient-facing staff and non-patient-facing staff.

This study was approved as #2022-032 by the Institutional Review Board of Saitama Medical University International Medical Center on July 06, 2022 and registered as UMIN000047691, and the patients whose specimens were used provided written, informed consent to have their case details and any accompanying data published. The Declaration of Helsinki were also adhered in this study.

In the BA.1.2-dominant period, 26 of 101 (25.7%) staff were SARS-CoV-2 PCR-positive, and all 26 positive staff members were infected from the 76 staff members who had a history of household contact with patients with COVID-19 (26/76=34.2%, usually from

children and spouses) (Figure 1A). The other 25 staff members who had a history of nosocomial contact with patients with COVID-19 (usually from colleagues) were all negative on SARS-CoV-2 PCR tests.

In contrast, in the BA.5-dominant period, 47 of 161 (29.2%) staff were SARS-CoV-2 PCR-positive (Figure 1B). 21 of 53 (39.6%) staff members who had a history of household contact and 26 of 108 (24.1%) staff members who had a history of nosocomial contact with patients with COVID-19 became positive.

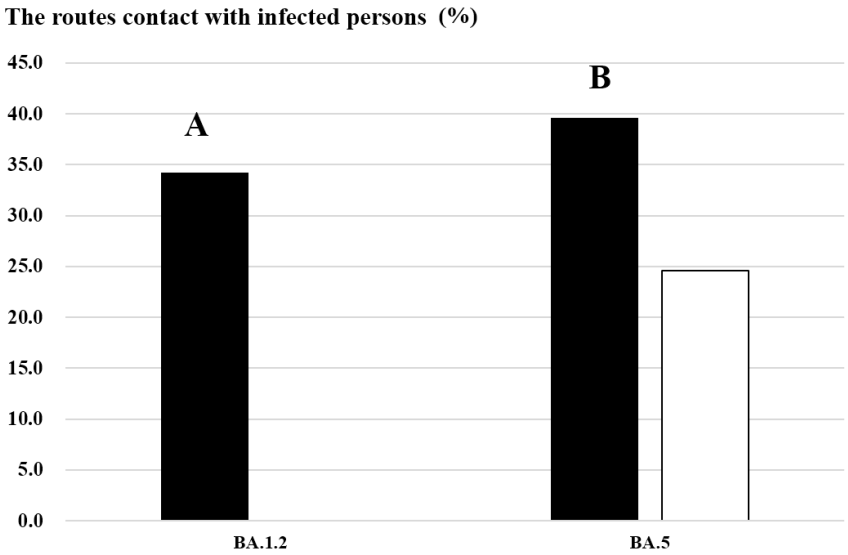

Figure 1. The positivity rates of PCR tests for staff with suspected SARS-CoV-2 infection through either household contact or nosocomial contact with COVID-19 patients in the BA1.2-dominant period and the BA.5-dominant period. (A) BA.1.2-dominant period, (B) BA.5-dominant period. Black bars: household contact, and white bars: nosocomial contact.

From the perspective of job-dependent classification, the staff infected with SARS-CoV-2 by household contact were equally found among patient-facing staff such as doctors and nurses, and non-patient-facing staff such as dieticians, medical radiological technicians, and clerks in both the BA.1.2-dominant period and the BA.5-dominant period (Figure 2A). In contrast, in the staff infected with SARS-CoV-2 by nosocomial contact, infections among non-patient-facing staff were found and became dominant although small number of the patient-facing staff were found in the BA.5-dominant period (Figure 2B) (21/26= 80.8% vs 5/26=19.2% , $P<0.001$ by chi square and Fisher's exact test). The patient-facing staff and non-patient-facing staff might not use exactly same protective measures, however, the rates of wearing surgical masks and washing hands by alcohol-containing disinfectants were not different in the general spaces of the hospital (data not shown). The use of the masks and hand-washing methods might be incorrect and not enough in non-patient-facing staff.

These data suggest the higher transmissibility and immunological evasion levels of BA.5 in comparison to BA.1.2, and the insufficiency of our precautions for non-patient-facing staff as important infection control targets during the BA.5-dominant period.

It was usually reported that healthcare workers had a risk of SARS-CoV-2 infection, and their risk of SARS-CoV-2 positivity increased with working in clinical areas [3, 4]. However, it was also reported that staff engaged in direct patient care, including those working in COVID-19 units, had a similar probability of being seropositive as non-patient-facing staff [5]. Patient-facing work in a healthcare facility during the SARS-CoV-2 pandemic might be safe as long as adequate personal protective equipment is used. In contrast, an increased probability of infection was observed in staff reporting interactions

with SARS-CoV-2–infected coworkers or personal contacts, or exposure to COVID-19 patients without appropriate personal protective equipment, and this suggested that infection prevention practices should be followed both inside and outside the hospital [5]. All of the staffs received PCR and/or antigens tests using by their nasal swabs routinely in our hospital, and there were no difference about positive detection rates of SARS-CoV-2 genes and antigens although patient-facing staff had more chance to see COVID-19 patients in the wards consequently than non-patient-facing staff.

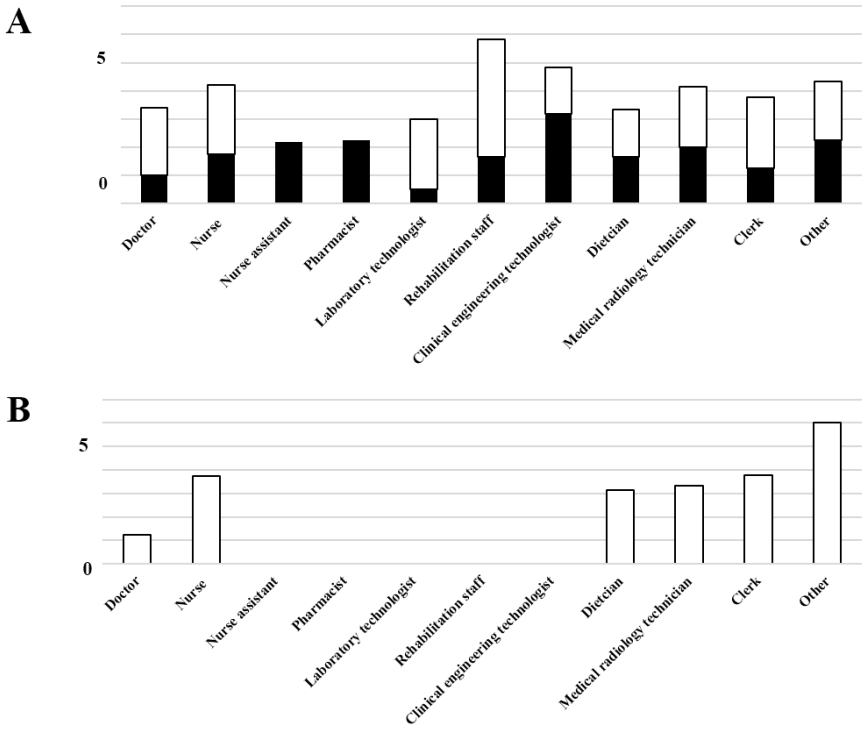

Figure 2. The job-classified suspected SARS-CoV-2 infection routes between the BA1.2-dominant period and the BA.5-dominant period. (A) Household contact, and (B) Nosocomial contact. Black bars: BA.1.2-dominant period, and white bars: BA.5-dominant period.

In addition, Klompas *et al*. compared healthcare worker SARS-CoV-2 infection rates in 2 similar hospitals with high vs low utilization rates of airborne infection isolation room but otherwise identical infection control policies, and they found no difference in healthcare worker infection rates between the two hospitals, nor between patient-facing vs non-patient-facing staff [6]. These data suggested that the appropriate measures to use equipment and penetration of the infection control policies to the staff were more important than the large amount, but the inappropriate supplied equipment and the building services.

As the infection control team in the hospital, we should take care of not only patient-facing staff, but also non-patient-facing staff equally and provide the forum for varying perspectives on a certain topic to penetrate the infection control policies and appropriate methods to prevent for the infection when there is a wave of COVID-19 and related highly transmissible viruses.

2. Conclusion

The rates of positive PCR tests for SARS-CoV-2 in staff who had a history of either household or nosocomial contact with COVID-19 patients in our hospital were investigated and compared between the BA.1.2-dominant period and the BA.5-dominant period.

Although no staff who became SARS-CoV-2-positive by nosocomial contact with COVID-19 patients were found in the BA.1.2-dominant period, they were found in the BA.5-dominant period. Among the staff who became SARS-CoV-2-positive through nosocomial contact, non-patient-facing staff were found dominantly in the BA.5-dominant period. Infection control, care, and education are needed for all hospital staff members, regardless of place of work and/or position.

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None

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