Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Letter to the Editor

The utilization of HCWs surveillance as an early warning of COVID-19 epidemic activity in the community

Dear editor,

In a recent issue of this journal, Brown and colleagues reported data relating to point-prevalence PCR surveillance of COVID-19 infection in health care workers (HCWs) in England.[1] Their snapshot study results showed higher prevalence of SARS-CoV-2 infection in HCWs compared to the general population. This resembles earlier data that portrayed health care settings as high-risk areas in that they combine community and health care sources.[2] In this letter, we report the utility of COVID-19 surveillance in HCWs for indicating community spread and hospitalization due to disease.

The ministry of health in the Sultanate of Oman developed Tarassud, an electronic surveillance system, for reporting and follow-up of PCR-confirmed COVID-19 cases in the population (characteristics, admission, mortality) and a national database for disease surveillance in HCWs, specifically. The first imported cases of COVID-19 in Oman were diagnosed on 24 February 2020 in two citizens traveling back from Iran.[3] Implementing public health and social measures, particularly mobility restrictions at different stages of the pandemic, was effective in breaking the chain of disease transmission. However, lifting the measures was associated with resurgences resulting in multiple waves noticed in the country's disease epidemiological curve.[4]

In this retrospective cross-sectional study, we describe the characteristics of HCWs with PCR-confirmed COVID-19 during the first wave of the pandemic in Oman (February to July 2020) and the relation between the epidemiological curve of the disease in HCWs and that of community and hospitalization stratified by different phases of epidemic activities in the community. The study combines data from the national database of COVID-19 in HCWs and Tarassud for the disease in community and admissions. The data from the first wave was selected as it represented an immunologically naive population from natural infection and occurred before the vaccination campaign began for both HCWs and the community. Analysis was done using Pearson correlation between daily numbers of infected HCWs with community cases and admission for the same period. The admission and community data were stratified according to percentage from peak activity into three strata, '<33% of peak activity of community cases', '33–66% of peak activity community cases' and '>66% of peak activity community cases'.

A total of 136,792 PCR-confirmed cases of COVID-19 were diagnosed during the study period where 1721 (1.26%) of them were HCWs and 2660 (1.2%) were admitted. For the infected HCWs, 58% were female, 78% non-national, and 49% were from the age category (30–39).The infection was highest among nurses (48%) followed by physicians (17%) and other HCWs constituted remaining (35%). Regarding the working areas, 30% of the infected HCWs were working in inpatient, 26% were outpatient, and only 7% of the infected HCWs were working exclusively in COVID units. The remaining were in non-clinical areas (20%), supporting clinical services (12%), and in the emergency department (5%). Forty-two percent of infections were labeled as community acquired, 19% as health care associated infections, and 39% remained with no identified source. Most of the infections in HCWs were mild (97%), 6 required admissions to intensive care and one HCW unfortunately died. (Supplementary Table 1)

The epidemiological curve of the community confirmed cases, the admission curve, and the confirmed HCWs cases curve is shown in Fig. 1. It shows that the cases within the community and HCWs started and peaked around the same time; however, the peak of hospitalization came later.

A high positive correlation was found between daily infected HCWs and community cases (0.86, P-value <0.005) and a moderate positive correlation was noticed between daily infected HCWs and admissions (0.62, P-value <0.005); this was all noted during the <33% of peak activity. We did not capture any significant correlation between daily infected HCWs and admissions or community cases during the >33% of peak activity of disease (Fig. 2).

This study shows that monitoring the cases of infected HCWs can be used as an early warning system for community spread and for COVID-19 admission surge. HCWs infection with SARS-CoV-2 focused interventions in minimizing health care exposure risk while the exposure in the community was proven to be more significant in driving the epidemiology of COVID-19 in health care.[5,6] The vulnerabilities identified in the response to the epidemics and pandemics resulted in straining health care facilities and amplifying the spread of disease from the facility to the communities and vice versa.[7] Our analysis has proven that reporting and monitoring COVID-19 in HCWs is a useful tool in predicting the spread in the community during the early phases of the disease waves, especially in settings where community testing is limited. This can be utilized to help health care facilities prepare for potential surges in COVID-19 cases and admissions. Identifying SARS-CoV-2 infected HCWs early in the disease course will prevent spread to co-workers and patients contributing significantly to prevention and control measures within the facility.[8] Thus, enhancing disease surveillance in HCWs thereby utilizing the ready access of this category of population to testing facilities can serve the purpose of preventing nosocomial infection and early preparedness for disease surge. This study's results may not be applicable in populations with heterogeneous immunity to the virus from natural exposure or immunization unless the emerging new variants might escape the natural or vaccination immunity. The ongoing COVID-19 pandemic is not expected to abate soon and the investment in building robust surveillance systems and infection prevention and control will stand as

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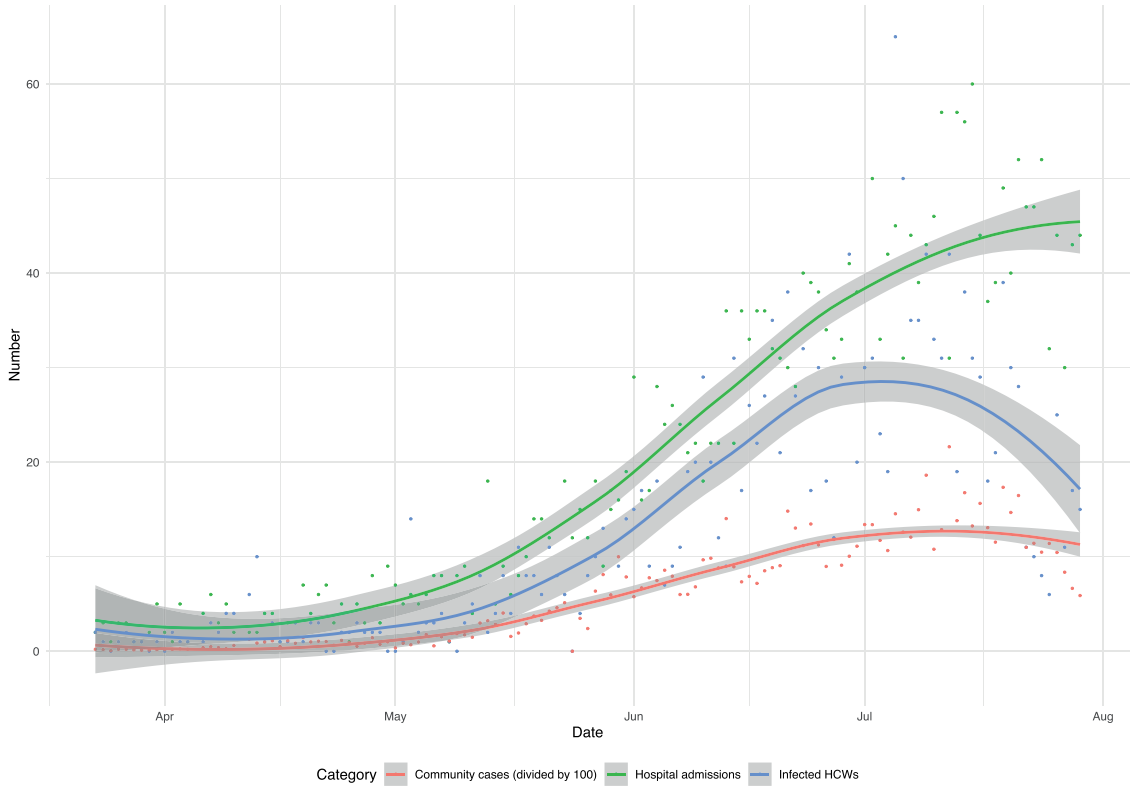

Fig. 1. Epidemiologic curves of community COVID-19 cases, admissions, and infected HCWs, Oman, April 2020 to July 2020.

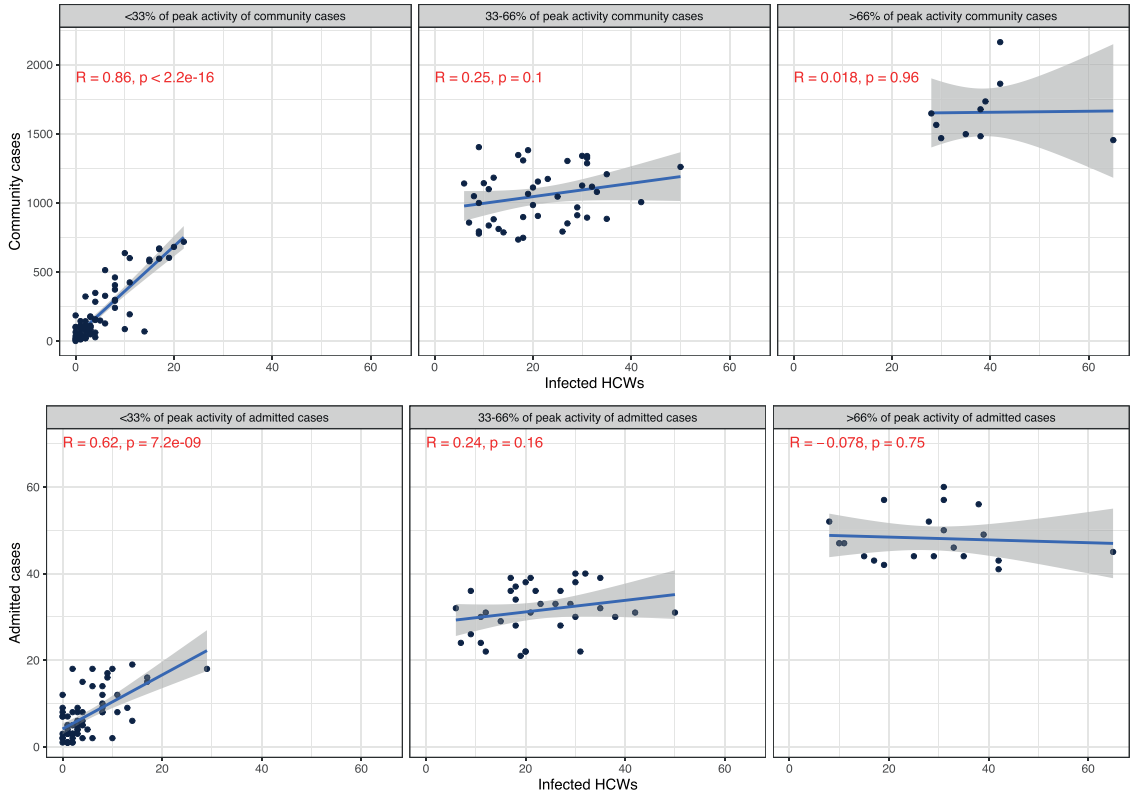

Fig. 2. Pearson correlation (with P-values), between community and infected HCWs (A) and admissions and infected HCWs (B), Oman, April 2020 to July 2020.

safeguard for transmission in health care and an extension of the disease spread in the community.[9,10]

Declaration of Competing Interest

The authors declare no conflict of interest

CRediT authorship contribution statement

Amal Al Maani: Supervision, Investigation, Funding acquisition, Writing – review & editing. **Adil Al Wahaibi:** Investigation, Formal analysis, Data curation, Writing – review & editing. **Weam Nazer:** Data curation, Funding acquisition, Writing – review & editing. **Najla Al-Zadjali:** Investigation, Data curation, Writing – review & editing. **Jokha Al Rawahi:** Investigation, Data curation, Writing – review & editing. **Iman Al-Beloushi:** Investigation, Writing – review & editing. **Jabir Al-Sooti:** Investigation, Data curation, Writing – review & editing. **Abdullah Alqayoudhi:** Investigation, Writing – review & editing. **Seif Al-Abri:** Investigation, Supervision, Writing – review & editing.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jinf.2021.12.024.

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