


Prevalence of coronavirus disease 2019 (COVID-19) among healthcare professionals working in hospital emergencies during the first-wave peak in 2020 in Porto Alegre, Brazil

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To the Editor—Brazil ranks third among countries with the highest number of coronavirus disease 2019 (COVID-19) cases in the world, with 11.5 million documented infections as of March 2021. Healthcare professionals (HCPs) are possibly the occupational category at the highest risk for severe acute respiratory coronavirus virus 2 (SARS-CoV-2) exposure. We determined the seroprevalence of SARS-CoV-2 among HCPs working in hospital emergencies in Southern Brazil during the first-wave peak in 2020.

Methods

In this cross-sectional study, we evaluated the prevalence of COVID-19 in HCPs working in the emergency departments of 5 large tertiary-care hospitals located in Porto Alegre, Southern Brazil (population 1.5 million). HCPs were evaluated on July 20–24, 2020, and again after 3 weeks, in August 10–14, 2020. At each encounter, clinical data were obtained and a blood sample was taken by finger pricking for antibody detection (Standard Q COVID-19 IgM/IgG Duo-Biosensor, South Korea). Data were analyzed using Statistical Package for the Social Sciences version 22.0 software (IBM, Armonk, NY). Categorical variables were expressed as absolute and relative frequencies. Continuous variables were presented as mean values \pm standard deviations (SD).

Results

In the first phase of the study, 1,163 HCPs were evaluated (87.1% of study population). Most were woman (66.6%), and the median age was 38 years (SD, ± 10 years). Professional roles included nursing assistants (43.5%), physicians (23.0%), nurses (15.0%), administrative workers (12.9%), and cleaners (3.6%). The most frequent chronic health conditions among these individuals were asthma (8.0%), arterial hypertension (7.9%), rhinitis (2.4%), hypothyroidism (2.3%), and diabetes mellitus (1.5%).

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Nearly all study participants reported the use of individual protection equipment, including masks (99.8%), face shields (90.3%), and gloves (85.6%). Known exposure to COVID-19 patients was reported by 82.3% of the HCPs, mostly in June 2020 (62.3%). Most HCPs had been asymptomatic during the COVID-19 pandemic (58.2%), while some reported fever (11.7%), shortness of breath (27.8%), and cough (11.6%). A few of these HCPs had laboratory-confirmed COVID-19 in June (2.8%) and July (2.2%).

In the first phase of the study, 5.5% ($n = 64$) were found to have antibodies against COVID-19: 26 had IgM type, 19 had IgG type, and 19 had both. Of these 78 HCPs, 27 (34.6%) had been previously diagnosed with COVID-19. Marked variation was observed among hospitals, regarding COVID-19 seroprevalence (Fig. 1). After 3 weeks, 911 individuals (78.3% of original sampling) returned for testing (study phase 2), and 5.6% tested positive for an antibody: 17 for IgM, 17 for IgG, and 17 for both. IgM became negative in the second study evaluation in 55.3% of participants who had previously tested positive for these antibodies, and IgG became negative in 50.0% who had previously tested positive.

Discussion

This is the first study to evaluate the prevalence of SARS-CoV-2 in HCPs in Brazil. Previous studies conducted elsewhere have addressed the question, mostly using real-time polymerase chain reaction (PCR) tests. The occupational health service of Massachusetts performed a study to assess COVID-19 prevalence in HCPs, revealing that 14.0% had a positive PCR test at the initial evaluation.¹ In Hong Kong, 29% of HCPs were found to be infected using PCR.² In 2 Dutch hospitals, 6% of HCPs were infected with SARS-CoV-2 in March 2020.³ However, conducting epidemiological surveys with PCR is not practical because PCR results reflect viral detection at the moment of sampling only. Alternatively, SARS-CoV-2 prevalence can be determined by antibody detection. In Italy, a study showed that 14.4% of HCPs working in the hospital had detectable IgM antibodies against SARS-CoV-2.⁴ In the New York city area, a study conducted in June 2020 showed a 13.7% prevalence of SARS-CoV-2 antibodies in HCPs.⁵ In a

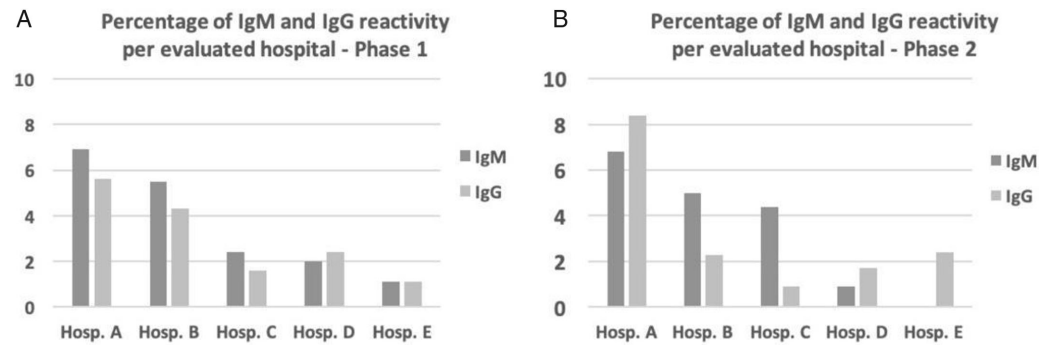


Fig. 1. Positivity for COVID-19 IgM and IgG antibodies in the first (A) and second (B) phases of the study, in the 5 hospitals studied. Hospitals are not identified in this slide, they are randomly named A–E.

hospital in Regensburg, Germany, exposed HCPs did not develop any relevant IgG antibody levels over time.⁶

In our study, a large proportion of HCPs had been exposed to SARS-CoV-2 (82.3%), had developed COVID-19 (34.6%), and had antibodies (5.6%) against SARS-CoV-2. Even though the manufacturer reported that the STANDARD Q COVID-19 IgM/IgG Duo Test had 94.3% sensitivity and 95.1% specificity (IgM and IgG combined), in our study, the test was able to detect only 34.6% ($n=27$) of HCPs previously diagnosed with COVID-19. Therefore, our prevalence rates might have been underestimated.

For most of our patients, antibodies disappeared over time. Studies show that the average time for the reduction of antibody concentrations is very variable. Corroborating our findings, one Chinese study reported that antibodies decreased within 2–3 months after COVID-19 in a high proportion (71.1%) of individuals who recovered from infection.⁷ In another analysis, also from China, the decay of antibodies started between 4 and 5 weeks after the onset of symptoms.⁸ Asymptomatic individuals are more prone for early reversal of antibody titers to negative.^{7–9}

In conclusion, our results reveal that HCPs working in emergencies in Southern Brazil had a high rate (82.3%) of exposure to SARS-CoV-2, during the peak of the first wave of the COVID-19 pandemic in 2020. In total, 5.6% of HCPs manifested antibodies against SARS-CoV-2, which is probably an underestimation due to the limited sensitivity of the diagnostic test used in the study. Antibodies became negative over time in ~50% of patients 3 weeks after their initial evaluation.

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Conflicts of interest. All the authors declare no conflicts of interest related to this article.

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Vaccines in the coronavirus disease 2019 (COVID-19) era: Game theory applications

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To the Editor—Vaccines are among the greatest inventions of science, preventing millions of deaths worldwide annually. Currently, the lack of a coronavirus disease 2019 (COVID-19) vaccine has led to

a pandemic that has brought the whole world to a near standstill. Although international collaborations to guarantee equitable access have been established, as COVID-19 vaccines are approved, national egotism is expected.¹ Game theory is the science of strategy and interactive decision making, where the outcome depends not only on one's actions but also on the actions of others.² Herein, we present applications of game theory in vaccine allocation.

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