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.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
Brief Communication

Are hospitals epicentres of COVID19 transmission? Findings of serial serosurveys among healthcare workers from a tertiary hospital in South India

Sindhulina Chandrasingha, Carolin Elizabeth George, Leeberk Raja Inbaraj

ARTICLE INFO

Keywords:
COVID-19
Seroprevalence
Healthcare workers
HCW
Infection control

ABSTRACT

We conducted a serial cross-sectional study and used blood bank donors serosurvey and the ICMR serosurvey reports for comparison. Seroprevalence was 0% among HCWs (n=211) and blood bank donors (n=210) during the first phase while ICMR serosurvey reported 0.5% among general population in the district at the same time. In phase 2, we estimated a seroprevalence of 9.2% as compared to 18.8% among general population. Seroprevalence among HCWs was comparable to that of the general population during both phases. We postulate that good infection control policies and practice can provide safe working environment without additional risk to HCWs.

1. Introduction

In the fight against COVID 19, healthcare institutions played a critical but complex role holding the dual moral responsibility of serving the sick population and the safety of their workforce. It was assumed that the hospitals were epicentres of transmission and increased risk of Health care workers (HCW) to the disease. We designed a study to estimate the period seroprevalence of COVID-19 in two-time points among HCW and to compare this with the seroprevalence of the general population at the same time.

2. Materials and methods

Serial seroepidemiological surveys were conducted among HCW of a 340-bed tertiary care hospital. We assumed 15% seroprevalence and calculated a sample size of 204 with 5% absolute precision. Apparently, healthy HCW and tested negative for SARS CoV2 in the past were recruited between May–June 2020 (phase 1) and from September to November 2020 (phase 2) after informed consent. We excluded HCW with a history of SARS CoV2 positivity in the past. We administered a questionnaire before collecting 4 ml of blood. We used delinked samples collected from blood bank donors from May to June 2020 as a proxy for the general population during phase 1.

The samples were tested for high-affinity antibodies against the nucleocapsid (N) protein of SARS-CoV-2 using the qualitative Elecsys Anti SARS CoV2 assay (Roche Diagnostics, Switzerland) [1]. This electro chemiluminescent assay (ECLIA) employs a cut-off index for reporting positive (≥1.0) and negative (<1.0) results and has a sensitivity of 97.2% and specificity of 99.8% [2]. The data were analysed using Statistical Package for Social Sciences (SPSS) version 20. Sero-prevalence was calculated and reported with 95% CIs. The study was approved by Institutional Review Board of Bangalore Baptist Hospital.

3. Results

We recruited 211 HCW with a mean age of 35.3 (SD-9.3) years in phase-1; 66.4% were females (66.4%), and 38.4% were doctors. All HCW were seronegative during the first phase. (Table 1). All 210 (100%) delinked blood bank donor plasma samples collected during the same period tested negative.

Among 206 who participated in Phase-2, 60% (123) had participated in both surveys. The mean age was 35.04 (SD-9.58) years and similar to the age distribution in phase 1. There was a relatively larger proportion of clinical staff as compared to the first survey. The seroconversion rate was 10.5% (13/123). We estimated a seroprevalence of 9.2% (95% CI: 8.6–9.4) (Table 2). in the phase 2. Seroprevalence was comparable among age groups, gender and job profile (p > 0.05).
followed the community’s infection rate, explaining the higher percent-

university. Studies have reported 4

perspective of personal protective equipment (PPE) across clinical and non-clinical staff in

lower than the government of Karnataka among the general population. Hunter et al. also reported

earlier months. The seroprevalence among HCW was almost a half

showed a seroprevalence as low as 0% in Malaysia to as high as 26% in

infection as compared to the

hospital. Written Informed consent was taken from all the participants

and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

CRediT authorship contribution statement

Sindhulina Chandrasingh: Conceptualization, Methodology, Validation, Supervision, Investigation, Writing – original draft. Carolin Elizabeth George: Conceptualization, Data curation, Writing – original draft. Leeberk Raja Inbaraj: Methodology, Formal analysis, Writing – review & editing.

Declaration of competing interest

SC, CEG, LR declare no conflict of interest.

Acknowledgements

The authors acknowledge the support of Mr Tata Rao for referencing. We are thankful to our colleagues who participated in the study during the most testing times. The authors thank Azim Premji Foundation for funding the testing kits used in this research. We also gratefully acknowledge the contribution of Dr Indira Menon and Dr Nithya Manyath in PPE designing and practice protocols, Dr Kingsly Robert Gnanadurai and Dr Indu Nair in clinical management and protocols, Dr Neena John in providing access to delinked Blood Bank donor samples, Mr Pradeep for HCW recruitment, the laboratory testing team and many others who pitched in with practical ideas and all who adhered strictly to protocols to make our workplace safe. We also want to thank Dr Roshni Joan for help in editing this manuscript.

References

[1] Elecsys® Anti-SARS-CoV-2 Immunoassay for the qualitative detection of antibodies against SARS-CoV-2. Roche website; 2020. Published, https://diagnostics.roche.com/content/dam/diagnostics/Blueprint/en/pdf/cps/Elecsys-Anti-SARS-CoV-2-factsheet.pdf. [Accessed 3 April 2021].

[2] National SARS-CoV-2 Serology Assay Evaluation Group. Performance characteristics of five immunoassays for SARS-CoV-2: a head-to-head benchmark comparison. Lancet Infect Dis 2020 Dec;20(12):1390–400.

[3] Murhekar MV, Bhattrag T, Selvaraju S, et al. Prevalence of SARS-CoV-2 infection in India: findings from the national serosurvey, May-June 2020. Indian J Med Res 2020;152(1 & 2):48–60.

[4] Murhekar MV, Bhattrag T, Selvaraju S, et al. SARS-CoV-2 antibody seroprevalence in India, August-September, 2020: findings from the second nationwide household serosurvey. Lancet Glob Health 2021;9(3):e257–66.

[5] Babu GR, Sundaresan R, Athreya S, et al. The burden of active infection and anti-SARS-CoV-2 IgG antibodies in the general population: results from a statewide sentinel-based population survey in Karnataka, India. Int J Infect Dis 2021;108:27–36.

[6] Goenka M, Afzalpurkar S, Goenka U, et al. Seroprevalence of COVID-19 among health care workers in a tertiary care hospital of a Metropolitan City from India. J Assoc Phys India 2020;68(11):14–9.

[7] Baveja S, Karnik N, Natraj G, Natkar M, Bakshi A, Krishnan A. Rapid volunteer-based SARS-CoV-2 antibody screening among health care workers of a hospital in Mumbai, India. Indian J Med Sci 2020;72(3):148-54.

[8] Singhil T, Shah S, Naik R, Kazi A, Thakkar P. Prevalence of COVID-19 antibodies in healthcare workers at the peak of the pandemic in Mumbai, India: a preliminary study. Indian J Med Microbiol 2020 Jul-Dec;38(3 & 4):461–3.

[9] Madhusudan M, Sankar J, Dhanalakshmi K, Puthalai S, Balasubramanian S. Seroprevalence to SARS-CoV-2 among healthcare workers in an exclusive pediatrics hospital. Indian Pediatr 2021 Mar;58(3):279–80.

[10] Woon YL, Lee YL, Chong YM, et al. Serology surveillance of SARS-CoV-2 antibodies among healthcare workers in COVID-19 designated facilities in Malaysia. Lancet Reg Health West Pac 2021;9:100123.

[11] Patel M, Nair M, Pirzoozi E, Cienfuegos MC, Aitken E. Prevalence and socio-demographic factors of SARS-CoV-2 antibody in multi-ethnic healthcare workers. Clin Med 2021 Jan;21(1):e5–8.

[12] Hunter BR, Dbeibo L, Weaver CS, Beelee C, Saysana M, Zimmerman MK, Weaver L. Seroprevalence of severe acute respiratory coronavirus virus 2 (SARS-CoV-2) antibodies among healthcare workers with differing levels of coronavirus disease 2019 (COVID-19) patient exposure. Infect Control Hosp Epidemiol 2020 Dec;41(12):1441–2.