

Retrospective mortality and prevalence of SARS-CoV-2 antibodies in greater Omdurman, Sudan: population-based cross-sectional survey

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Introduction

In Sudan, since the first Covid-19 case was declared on 13 March 2020, 32,846 confirmed cases were recorded through 10 April 2021. Of these, 72% were registered in Khartoum State alone. A convenience sample of more than 1,000 individuals from 22 neighbourhoods of Khartoum City found that between March and July 2020, 35% of sampled individuals tested positive using RT-PCR for SARS-CoV-2; 18% had anti-SARS-CoV-2 antibodies. Similar discrepancies between clinically confirmed cases and infection rates assessed by serology or PCR testing independent of symptoms have been described elsewhere in Africa.

Methods

Omdurman, the largest among the three cities composing Sudan's capital Khartoum, was chosen as the study site. Study design comprised two surveys: i) a retrospective mortality survey using two-stage cluster sampling methodology based on random geo-points with two recall periods: pre-pandemic (1 January 2019–29 February 2020) and pandemic (1 March 2020–day of the survey); and ii) a nested SARS-CoV-2 antibody prevalence survey. An adult household representative answered a standardised questionnaire for the mortality survey; all members of a sub-set of the household, regardless of age, were invited to participate in the seroprevalence study. Capillary blood was collected on dry blood spot cards and directly tested with the STANDARD Q COVID-19 IgM/IgG Combo, SD-Biosensor rapid test. Dry blood spot cards were transferred to the National Public Health Laboratory, Khartoum, for further analysis using enzyme-linked immunosorbent assay (ELISA; EUROIMMUN Anti-SARS-CoV-2). Differences between pre- and pandemic periods were assessed using Fisher's exact test, and test performance was adjusted with a random effect and Bayesian latent class model.

Ethics

This study was approved by the MSF Ethics Review Board and the Ethics Review Board, Sudan.

Results

From 1 March until 10 April 2021, data from 27,315 people (3,716 households) for the entire recall period showed a 67% (95% confidence interval (CI) 32–110) increase in death rate between pre-pandemic (0.12 deaths/10000 people/day; 95%CI 0.10–0.14) and pandemic periods (0.20 deaths/10000 people/day; 95%CI 0.16–0.23). 2,374 people participated in the seroprevalence survey. Adjusted SARS-CoV-2 seroprevalence was 54.6% (95%CI 51.4–57.8). Seroprevalence was significantly associated with age, increasing up to 80.7% (95%CI 71.7–89.7) for the oldest age group (≥ 50 years). We estimated that the number of infections were 50 times higher than the number of cases reported.

Conclusion

This population-based cross-sectional survey in Omdurman, Sudan, demonstrated significantly higher mortality in the pandemic period, compared to pre-pandemic; particularly affecting individuals aged 50 years and over. We also found elevated seropositivity in Omdurman with older populations being the most affected. Our results suggest that Omdurman was severely impacted by the COVID-19 pandemic.

Conflicts of interest

None declared.



Wendelin Moser is an epidemiologist in the emergency pool from MSF, Operational Centre Geneva. During his Master's/PhD at the Swiss Tropical and Public Health Institute, he was active in neglected tropical diseases research, with a particular interest in soil-transmitted helminths. There, he conducted multiple clinical trials and other types of research study in different countries in Africa and Asia. In 2018, he joined MSF and worked

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