SARS-CoV-2 Seroprevalence Among Ugandan Blood Donors: 2019-2022

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BACKGROUND

COVID-19 in Africa was less severe when compared globally, with fewer reported cases, hospitalizations and deaths. The lack of surveillance systems made estimating the burden of infection in Africa challenging. Serosurveillance can help to determine the actual frequency of infection within this population.

The goal of this study was to:

1. Estimate SARS-CoV-2 seroprevalence
2. Describe SARS-CoV-2 antibody levels
3. Investigate associations of seropositivity among Ugandan blood donors.

METHODS

- Blood samples were obtained from the Mirasol Evaluation of Reduction in Infections Trial (MERIT n=3517), a randomized, double blind, controlled clinical trial that evaluates transfusion transmitted infections, and a secondary cohort of samples (n=1876) was collected between November-December of 2021.
- Blood donor samples were tested for antibodies (Ab) to SARS-CoV-2 nucleocapsid (N) and spike (S) using a V-Plex SARS-CoV-2 Panel 24 IgG multiplex electrochemiluminescence immunoassay assay (Mesoscale Discovery).

Table 1. Characteristics of the sampled population. N and S seroprevalence is shown for the secondary cohort.

	MERIT Cohort	Secondary Cohort	
	No.	No.	Seroprevalence (%)
Age, years			
16-19	449	129	58.1
20-24	821	447	57.7
25-29	867	495	53.5
30-34	578	288	56.3
35-39	352	211	52.1
≥40	448	306	60.8
Sex			
Female	968	474	58.0
Male	2547	1402	55.7
HIV			
Negative	3490	1851	56.5
Positive	23	17	35.3
Donation Site			
Kampala	3517	1245	58.8
Hoima	-	174	47.7
Jinja	-	119	47.9
Masaka	-	338	54.4

Main Findings

- The SARS-CoV-2 seroprevalence is high (82.5%) among Ugandan blood donors
- A high proportion of cases of SARS-CoV-2 in Uganda were likely asymptomatic or mild
- The findings underscore the need for improved testing and reporting

Figure 1. Seroprevalence among MERIT Cohort and COVID-19 vaccination in Uganda

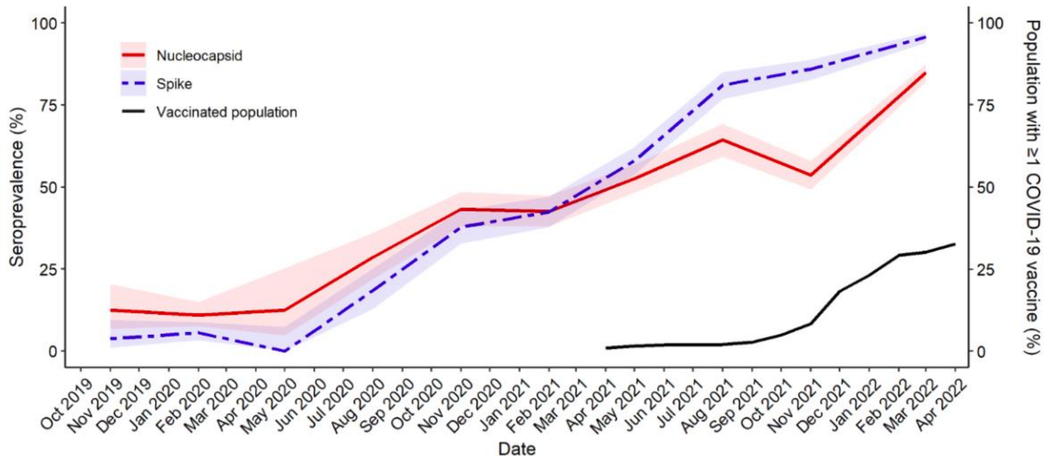
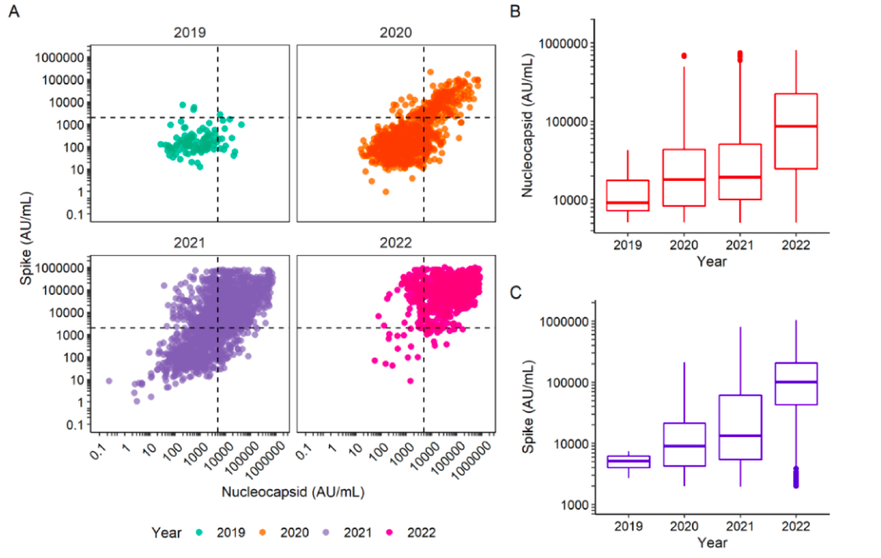


Figure 2. Nucleocapsid and spike antibody levels among MERIT Cohort donors by year



RESULTS

- SARS-CoV-2 seroprevalence increased from;
  1. 1.0% between October 2019-June 2020 to 33.6% in October-December 2020 in the first wave (Fig1)
  2. 45.5% in April-June 2021 to 62.0% in July-September of 2021 in the second wave (Fig 1)
  3. 51.5% in October-December 2021 to 82.5% in January-April 2022 in the third wave. (Fig 1)
- SARS-CoV-2 N and S antibodies levels transitioned from low-positive levels in 2019, to high-positive levels of antibodies in 2022 (Figure 2A).
- Median N antibody levels increased from 9,160 AU/mL in 2019 to 86,544 AU/mL in 2022 (Figure 2B) and median S antibody levels increased from 5,179 AU/mL in 2019 to 100,537 AU/mL in 2022 (Figure 2C).
- High seroprevalence of 58.8% was observed in Kampala compared to Hoima, Jinja and Masaka (Table 1).
- Higher seroprevalence of 56.5% was observed among HIV negative donors than 35.3% of HIV positive donors (Table 1)

CONCLUSIONS

- The sampled blood donors in Uganda showed evidence of SARS-CoV-2 infections by March of 2022, indicating that the infection levels were similar to many other regions of the globe.
- Higher seroprevalence was observed in the urban areas compared to the more rural areas.
- Higher seroprevalence was observed within HIV negative donors than HIV positive donors.
- Increasingly high antibody levels among seropositive donors may indicate repeat infections.
- The lower COVID-19 mortality in Uganda was not due to lack of exposure to the SARS-CoV-2 virus but other factors such as a younger population or previous immunity to similar viruses may likely be responsible.

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