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Short Communication

SARS-CoV-2 seroprevalence among people living with HIV in Guinea–Bissau



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ABSTRACT

Objectives: In low-income countries with poor SARS-CoV-2 monitoring and high HIV burden, the prevalence of SARS-CoV-2 is scarcely studied in people living with HIV (PLWH). We set out to measure SARS-CoV-2 seroprevalence in this group.

Study design: Serosurvey of SARS-CoV-2 in PLWH.

Methods: We measured IgG/IgM antibodies using point-of-care rapid tests in 294 PLWH with HIV-1, HIV-2 or HIV-1/2 dual infection at an HIV clinic in Guinea–Bissau between June 1, 2021, and October 1, 2021.

Results: Unvaccinated PLWH ($n = 195$), constituting 66% of the total study population, had a seroprevalence of SARS-CoV-2 antibodies of 27.7%. Of SARS-CoV-2 seropositive unvaccinated PLWH, 71.2% reported no symptoms of COVID-19 since the start of the epidemic up to the inclusion date. Among all participants, 90.1% reported never having been tested for SARS-CoV-2 by any test ($n = 292$). Six participants reported a household death, corresponding to a crude annual death rate of 3.3 per 1000 people.

Conclusions: Despite a low number of officially registered cases of SARS-CoV-2 in Bissau, we found a high seroprevalence of SARS-CoV-2 of 27.7% in unvaccinated PLWH. Coupled with few ever tested for SARS-CoV-2, it indicates that official PCR testing likely underestimates prevalence and that SARS-CoV-2 monitoring is challenged for PLWH. The low number of symptoms from seropositives may stem from survival bias, some effect of herd immunity or, coupled with a low crude annual death rate, that disease symptomatology and severity could be lower than expected.

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Introduction

The first case of coronavirus disease of 2019 (COVID-19) in Guinea–Bissau was registered on March 25, 2020.¹ The epidemic has continually been monitored with a low testing capacity. By November 1, 2021, 103,820 people (5.5% of a total population of 1.9 million) had been tested by PCR with 6150 (5.9% of tested people) positive for SARS-CoV-2 and 143 deaths.² A recent study from Bissau found SARS-CoV-2 seroprevalence of 18% in healthcare workers.³ A meta-analysis found a pooled African seroprevalence of

SARS-CoV-2 of 22%.⁴ Vaccination in Guinea–Bissau started April 2, 2021, prioritizing at-risk groups like people living with HIV (PLWH) using the AstraZeneca vaccine. On August 25, Sinopharm and Johnson vaccines were added to the program and the three vaccines were all administered afterwards. Guinea–Bissau has a high HIV prevalence of 3% nationally⁵ and 6.7%⁶ in the capital of Bissau. The prevalence of SARS-CoV-2 infection in PLWH in Guinea–Bissau is unknown and we aimed to assess it in this study.

Methods

Participants of the study were PLWH attending follow-up at the HIV clinic at Hospital National Simão Mendes (HNSM) who agreed to participate on the day of follow-up. Initially, an equal amount of HIV-1, HIV-2 and HIV-1/2 dually infected patients was planned to be

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included, but rarity of the two latter led to more HIV-1 inclusions. All participants were aged 18 years or older. Participants were interviewed about demography, lifestyle and COVID-19–related symptoms (fever, cough/sore throat, muscle/joint pain, loss of taste/smell and difficulties breathing), and a drop of blood from the finger was applied to a 2019-nCoV IgG/IgM Rapid Test Cassette (Hangzhou Alltest Biotech Co, Ltd, Hangzhou, China), detecting antibodies to the nucleocapsid protein, to determine SARS-CoV-2 antibody status. Testing and interviews were conducted by local assistants at the clinic. Data collection on SARS-CoV-2 antibody status started June 1, 2021, and ended October 1, 2021.

Results

Sixty-six percent of participants ($n = 195$) were not vaccinated. Among unvaccinated participants, SARS-CoV-2 seroprevalence was 27.7% (see Table 1). Among vaccinated participants ($n = 98$), 73.5% were seropositive ($P = <0.001$).

Analysis of unvaccinated participants

Fifty-four participants (27.7%) tested positive for SARS-CoV-2 antibodies. Among positives, 48 (88.9%) were IgG-positive, 3 (5.5%) were IgM positive and 3 (5.5%) were IgG + IgM positive. No significant difference in SARS-CoV-2 seroprevalence was found between any of the HIV serotypes, different sex, education status or whether people lived inside or outside the capital. Age among seropositives tended to be higher than among seronegatives (49.7% vs 46.4%, $P = 0.07$). A large part of SARS-CoV-2 seropositive participants (71.2%) never experienced any symptoms of COVID-19 from the arrival of the pandemic in Guinea–Bissau on March 25, 2020, up to their day of inclusion between June 1, 2021, and October 1, 2021. For SARS-CoV-2 seronegative patients, 73.3% never experienced any symptoms with no significant difference between the two groups ($P = 0.76$).

Six people reported death in their household during 17 pandemic months with an average reported household size of 6.7 giving a crude annual death rate of 3.3 per 1000 people.

Of unvaccinated patients, 176 (91.2%, $n = 193$) had never received a test for SARS-CoV-2 of any kind. Among all participants, both vaccinated and unvaccinated, 90.1% reported never having been tested for SARS-CoV-2 by any test ($n = 292$).

Discussion

In this serosurvey, 27.7% of unvaccinated PLWH in HNSM Guinea–Bissau tested positive for SARS-CoV-2 antibodies. In comparison, the official number of PCR-confirmed positives (5.9% positivity rate of general population tested) is likely underestimating the magnitude of the epidemic. PLWH in Guinea–Bissau are generally advanced in their disease with low CD4 cell counts when presenting themselves at the clinic and have a high risk of being lost to follow-up.^{7,8} Vaccines for COVID-19 are prioritized for this group, but two-thirds of participants had not received a single dose, indicating problems in vaccination efforts. Their advanced status and the low vaccine coverage mean that they could be more at risk of SARS-CoV-2 infection and higher mortality.⁹ Unvaccinated seropositive patients reported few symptoms of disease, which could indicate underestimation of SARS-CoV-2 seroprevalence due to survival bias in this group. The low number of reported symptoms and the low crude annual mortality rate (compared to the official Guinean 2018 yearly mortality rate of 9.6/1000 people¹⁰) could also indicate that PLWH, even those who are generally advanced in their HIV disease, are not necessarily at increased risk of more severe disease, symptomatology or death, or that for now some degree of herd immunity is in effect. The study population consisted only of patients on follow-up, which could underestimate reported symptoms, disease severity and mortality rate due to higher degree of immunosuppression among patients lost to follow-up. Of all participants, very few had ever received a test of any kind to detect SARS-CoV-2. This underlines the general problem of COVID-19 monitoring in the country and for this potential at-risk group specifically.

We found limits in the use of our rapid tests to detect SARS-CoV-2 antibodies because, for instance, Sinopharm will test

Table 1
Differences in baseline characteristics and COVID-19 testing and symptoms between SARS-COV-2 seropositive and seronegative unvaccinated PLWH.

	SARS-CoV-2 seropositive $n = 54$ (27.7%)	SARS-CoV-2 seronegative $n = 141$ (72.3%)	<i>P</i> -value
HIV-type $n = 195$			0.53
HIV-1	19 (35.2%)	62 (43.9%)	
HIV-2	19 (35.2%)	44 (31.2%)	
HIV-dually infected	16 (29.6%)	35 (24.8%)	
Sex $n = 195$			0.39
Male	12 (22.2%)	40 (28.4%)	
Female	42 (77.8%)	101 (71.6%)	
Age, mean in years $n = 192$	49.7	46.4	0.07
Area of residence $n = 195$			0.49
Bissau	48 (88.9%)	120 (85.1%)	
Other	6 (11.1%)	21 (14.9%)	
Any level of education $n = 195$			0.31
Yes	33 (61.1%)	97 (68.8%)	
No	21 (38.9%)	44 (31.2%)	
Previous COVID-19 test $n = 193$	4 (7.4%)	13 (9.4%)	0.69
Previous positive test	1 (25.0%)	1 (7.7%)	0.42
No symptoms of COVID-19 from start of pandemic up to inclusion $n = 187$	37 (71.2%)	99 (73.3%)	0.76

positive on a vaccinated participant and AstraZeneca will not. This is because Sinopharm, in contrast to AstraZeneca, generates an antibody response to the nucleocapsid protein, which is what our rapid tests detected. Most vaccinated patients had a positive rapid test, but because of the lack of vaccination data, it is difficult to evaluate if positivity is due to the vaccine or due to endogenous infection, because of the possibility of patients with low CD4 cell count not responding well to the vaccines. Therefore, the analysis focused on unvaccinated patients. Excluding vaccinated patients may underestimate the number of patients tested for SARS-CoV-2 by any test, due to vaccinated patients potentially being more generally informed on health issues and seeking testing when having symptoms. Excluding vaccinated patients benefitting from vaccine-mediated immunity likely increases the seroprevalence of SARS-CoV-2 antibodies derived from infection. However, 66% of the total study population was unvaccinated and the prevalence of SARS-CoV-2 in this group specifically is interesting to help assess the impact of the pandemic on the many who have no vaccine immunity.

In conclusion, our survey found a high seroprevalence of SARS-CoV-2 antibodies in PLWH in an urban African setting. More studies are recommended to understand the impact of SARS-CoV-2 in PLWH in low-income settings, both with regards to the prevalence and overall mortality of PLWH with SARS-CoV-2 compared to the general population. Studies on policymaking on how to best monitor and prevent SARS-CoV-2 in PLWH in similar settings are also recommended, as the epidemic is clearly present and sufficient monitoring and diagnostic efforts are challenged.

Author statements

Authors contributions

AD, CW, JP, CM, BLH and SJ conceived the study; AD, JP and CM carried out data collection; AD, BLH and SJ carried out analysis and interpretation of data. AD and BLH drafted the manuscript; all authors critically revised the manuscript for intellectual content. All authors read and approved the final manuscript of the paper. CW, BLH and SJ are guarantors of the paper.

Ethical approval

This study was approved by the Guinean Ethical Committee (NoRef019/CNES/INASA/2021).

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Competing interests

None declared.

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