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Clinical presentation, outcomes and factors associated with mortality: A prospective study from three COVID-19 referral care centres in West Africa

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ABSTRACT

Objectives: The overall death toll from COVID-19 in Africa is reported to be low but there is little individual-level evidence on the severity of the disease. This study examined the clinical spectrum and outcome of patients monitored in COVID-19 care centres (CCCs) in two West-African countries.

Methods: Burkina Faso and Guinea set up referral CCCs to hospitalise all symptomatic SARS-CoV-2 carriers, regardless of the severity of their symptoms. Data collected from hospitalised patients by November 2020 are presented.

Result: A total of 1,805 patients (64% men, median age 41 years) were admitted with COVID-19. Symptoms lasted for a median of 7 days (IQR 4–11). During hospitalisation, 443 (25%) had a SpO2<94% at least once, 237 (13%) received oxygen and 266 (15%) took corticosteroids. Mortality was 5% overall, and 1%, 5% and 14% in patients aged <40, 40–59 and ≥60 years, respectively. In multivariable analysis, the risk of death was higher in men (aOR 2.0, 95% CI 1.1; 3.6), people aged ≥60 years (aOR 2.9, 95% CI 1.7; 4.8) and those with chronic hypertension (aOR 2.1, 95% CI 1.2; 3.4).

Conclusion: COVID-19 is as severe in Africa as elsewhere, and there must be more vigilance for common risk factors such as older age and hypertension.

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Introduction

As of 05 May 2021, it was estimated that 153 million people had been infected with SARS-CoV-2 and that COVID-19 had killed 3.2 million people worldwide. Africa accounted for 3% of deaths from COVID-19, although 17% of the world’s population lives there. Europe (10% of world population, 34% of deaths from COVID-19) and North America (4% of world population, 19% of deaths from COVID-19) have been impacted comparatively much higher (WHO Coronavirus (COVID-19) Dashboard, n.d.). Therefore, the death toll from COVID-19 seemed lower in Africa than in Europe and North America, although some predictions indicated the opposite (Martinez-Alvarez et al., 2020). This may have been due to the heterogeneity of systems for reporting cases and causes of death, the level of preparedness in a continent that has faced threatening epidemics in the recent past, or differences in environmental characteristics, circulating strains or population susceptibility (Galloway et al., 2020; Nagai et al., 2020; Price-Haywood et al., 2020; Williamson et al., 2020). To study this latter point, it would be useful to verify whether the clinical presentation, mortality and factors associated with COVID-19 are similar in Africa to those described in other continents. There have been a few retrospective population or hospital-based cohorts reporting mortality rates from COVID-19 in Africa so far, but no cohorts that provide individual-level prospective evidence on the severity of the disease (Abdela et al., 2020; Bouille et al., 2020; El Aidaoui et al., 2020; Elimian et al., 2020; Kirenga et al., 2020; Mekolo et al., 2021; Nachega et al., 2020). This study reports prospectively collected clinical data on patients hospitalised in the COVID-19 referral care centres of two West African countries between March and November 2020.

Methods

Participants, settings and follow-up

Burkina Faso and Guinea, two West African countries, decided at the start of the COVID-19 pandemic to accommodate everyone detected as carriers of SARS-CoV-2 in specific centres, whether asymptomatic or symptomatic, and in the latter case regardless of the intensity of their symptoms. The Ministries of Health in the two countries set up the COVID-19 referral care centres (CCCs) in collaboration with the non-governmental association ALIMA (The Alliance for International Medical Action). In Guinea, the CCC was opened at the Donka hospital in Conakry. In Burkina Faso, two CCCs were opened at the Tenganda and Clinique Princesse Sarah hospitals, in Ouagadougou. This study describes the data collected from all people hospitalised with symptomatic COVID-19 and a positive RT-PCR SARS-CoV-2 test in each of these three centres. Those placed in isolation at the centres and asymptomatic were excluded from this study. The study period was between 01 April and 04 November 2020 in Guinea; and between 01 March and 12 November 2020 in Burkina Faso.

Care and follow-up

All people received basic care for COVID-19, as defined in the recommendations of the ministries of health of the two countries. No additional medical action or treatment was introduced for participants in this study. Basic care was similar at the three centres, including: (i) anti-infective treatment considered to have an anti-SARS-CoV-2 effect and recommended by the national authorities; (ii) oxygen therapy via nasal probe or mask, in the event of an SpO2 of <95%; and (iii) the possibility of corticosteroid therapy (methylprednisolone 120 mg/d or dexamethasone 6 mg/d for 3 days then decreased over a total of 10 days), anticoagulant treatment (enoxaparin 100 IU/kg twice a day) and broad-spectrum antibiotic therapy, of variable indication depending on the period and treating physician’s decision.

Throughout the study, the anti-SARS-CoV-2 treatment recommended in the two countries consisted of dual therapy combining 5 days of azithromycin (500 mg at day 1 and then 250 mg/day) with 10 days of hydroxychloroquine (200 mg x tds). In Guinea, physicians had the choice of alternately using either hydroxychloroquine as monotherapy, lopinavir/ritonavir (200/50 mg bd for 10 days) as monotherapy or lopinavir/ritonavir in combination with hydroxychloroquine and azithromycin.

Each of the three centres had an intensive care unit, allowing patients on oxygen to be closely monitored and non-invasive or mechanical ventilation to be used if required.

Data

Data were recorded using the WHO COVID-19 rapid core case report form (CRF) (Global COVID-19 clinical platform: rapid core case report form (CRF), n.d.). In the context of the three urgently-established CCCs, the data were first collected on hard copy CRF and subsequently entered into an electronic database. The variables considered essential for the analysis were then monitored and the source data verified. Only these variables are presented in this article. The variables were: patient verification (exhaustivity of the patient list); sex; age; comorbidities; date of first symptoms; signs, symptoms, measurement of pulse oximetry (SpO2) at baseline and during follow-up; oxygen therapy, anti-infectious treatments, corticosteroid therapy; and vital status at the end of follow-up. Radiological data, and biological data other than the result of the initial SARS-CoV-2 test were not monitored.

Statistical analysis

The follow-up time was the time between admission to hospital and death or discharge alive from hospital. There was no post-discharge follow-up. The primary endpoint was in-hospital death. The secondary endpoint was COVID-19 clinical worsening, defined as a combination of an SpO2 <94% at least once during follow-up (including at baseline), use of oxygen therapy at any time during follow-up, or death. The analysis describes the baseline characteristics, care received during follow-up, outcomes, and factors associated with COVID-19 clinical worsening or death.

The Kaplan Meier method was used to estimate the probability of occurrence of the primary and secondary endpoints over time, overall and by sex, age category, and presence or absence of the main comorbidities. Univariable then multivariable logistic regression were used to analyse the association between the primary and secondary endpoints and the following characteristics: sex, age (<60 vs. ≥60 years), time between first symptom and hospitalisation (≤7 vs. >7 days), chronic hypertension declared by the patient (yes vs. no), diabetes declared by the patient (yes vs. no), and initial severity (in three grades, mild, moderate, severe, according to the May 2020 WHO definitions). Variables associated with the endpoint with a p < 0.20 in univariable analysis were included in the multivariable model. The analyses were carried out using the software R, version 4.0.3

Ethical considerations

The study was approved in Burkina Faso by the Comité d’Ethique pour la Recherche en Santé (ID number 2020-6-116) and in Guinea by the Comité National d’Ethique pour la Recherche en Santé (ID number 069/CNERS/20). The committees of the two
Table 1
Baseline characteristics (n = 1,805).

| Country           | n (%)         |
|-------------------|---------------|
| Burkina Faso      | 212 12%       |
| Guinea            | 1,593 88%     |

Sex, n [%]¹
- Male: 1,151 64%  
- Female: 651 36%  

Age, years, n [%]³
- <20: 132 7%  
- 20–39: 691 39%  
- 40–59: 579 32%  
- ≥60: 388 22%  

Comorbidities, n [%]
- Diabetes: 219 12%  
- Chronic hypertension: 386 21%  
- Any other⁴: 147 8%  

Time from first symptom to admission (days), median [IQR]⁵
- Fever ≥38.0°C: 134 7%  
- Fatigue: 748 41%  
- Loss of smell or taste: 490 27%  
- Headache: 673 37%  
- Arthralgia or myalgia: 294 16%  
- Higher respiratory tract symptoms: 425 24%  
- Any lower respiratory tract symptom: 1,110 61%  
- Cough: 833 46%  
- Dyspnoea: 505 28%  
- Chest pain: 294 16%  
- Any digestive tract symptom: 311 17%  
- Vomiting: 156 9%  
- Diarrhoea: 95 5%  
- Abdominal pain: 125 7%  
- Glasgow <15: 21 1%  
- Other signs or symptoms: 36 2%  

SpO2 under ambient air
- ≥94%: 1,545 86%  
- 90–93%: 83 5%  
- <90%: 177 10%  

Severity, n [%]⁷
- Mild: 867 48%  
- Moderate: 761 42%  
- Severe: 177 10%  

N: number; X: percentage; IQR: interquartile range.

1. Mild: Symptomatic patients meeting the case definition for COVID-19 without evidence of viral pneumonia or hypoxia.
2. Moderate:
   - Adolescent or adult with clinical signs of pneumonia (fever, cough, dyspnoea, fast breathing) but no signs of severe pneumonia, including SpO2 ≥90% on room air.
   - Child with clinical signs of non-severe pneumonia (cough or difficulty breathing + fast breathing and/or chest in/drawing) and no signs of severe pneumonia.
3. Severe:
   - Adolescent or adult with clinical signs of pneumonia (fever, cough, dyspnoea, fast breathing) plus one of the following: respiratory rate >30 breaths/min; severe respiratory distress; or SpO2 <90% on room air.
   - Child with clinical signs of pneumonia (cough or difficulty breathing) + at least one of the following: Central cyanosis or SpO2 <90%; severe respiratory distress (e.g., fast breathing, grunting, very severe chest in/drawing); general danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions (55, 56). Fast breathing (breaths/min): <2 months: ≥60; 2–11 months: ≥50; 1–5 years: ≥40.

4. Chronic comorbidities:  
   - Chronic cardiac disease: (n = 25, 1%); current smoking: (n = 12, 1%); chronic pulmonary disease: (n = 17, 1%); active or previous tuberculosis: (n = 23, 1%); asthma: (n = 30, 2%); asplenia: (n = 0, 0%); chronic kidney disease: (n = 13, 1%); malignancy: (n = 4, 0%); chronic hepatic disease: (n = 19, 1%); chronic neurological disorder: (n = 8, 0%); HIV infection: (n = 5, 0%).
   - Runny nose, nasal congestion, sneezing.
   - Other signs or symptoms: confusion (n = 18, 1%), seizure (n = 6, 0%), conjunctivitis (n = 7, 0%), skin rash (n = 3, 0%), skin ulcer (n = 1, 0%), lymphadenopathy (n = 3, 0%), bleeding (n = 1, 0%).
   - Adapted from WHO May 2020 interim guidance (WHO, 2020a).

Role of the funding source

The funding sources took no part in designing the study, collecting, analysing and interpreting data, writing the report or making the decision to submit the article for publication. MJ, BS and SJ had access to the raw data. The corresponding author had full access to all data and the final responsibility for submitting it for publication.

Results

During the study period, 1,938 people (Guinea: 1,593; Burkina Faso: 345) were admitted to one of the three CCCs with a positive SARS-CoV-2 test on nasopharyngeal swab. Of these, 133 were completely asymptomatic and not included in the analysis. The remaining 1,805 were included in the analysis (Guinea: 1,593; Burkina Faso: 212). Their baseline characteristics are detailed in Table 1; 64% were men and 36% women, and the median age was 41 years (IQR 30–57, range 1–99 years). The two most common comorbidities were chronic hypertension (21%) and diabetes (12%). The median weight was 73 kg (IQR 60–85). Height, and therefore body mass index (BMI), could only be measured in 645 people. In this subgroup, the median BMI was 25 kg/m² (IQR 22–29), and 119 (18%) had a BMI of ≥30 kg/m². At the time of admission, symptoms lasted for a median of 7 days (IQR 4–11). The clinical picture was dominated by signs of lower respiratory tract involvement, present in 1,110 (61%) patients. Digestive signs were present in 311 (17%) patients. A total of 177 (10%) patients had an initially measured SpO2 of 90%, and 177 (10%) were considered severe from the start on the basis of this SpO2 or other signs of respiratory severity.

The follow-up characteristics are detailed in Table 2. During hospitalization, 1,697 people (95%) received at least one specific treatment recommended by national authorities, and 97 (5%) received none. The most common treatment was the hydroxychloroquine plus azithromycin combination, received by 1,244 (73%) participants. Between admission and the end of follow-up, 231 people (13%) had a measured SpO2 of <90% at least once, 237 (13%) received oxygen and 266 (15%) received corticosteroids.

The rate of clinical worsening was 31% overall: 24% in women and 34% in men; 23%, in patients aged <60 years and 57% in those ≥60 years; 59% in diabetics and 27% in non-diabetics; 51% in patients with self-declared chronic hypertension and 25% in those without hypertension.

Overall, 86 (5%) patients died within a median of 5 days (IQR 2–10) of hospital admission. The final percentage of deaths by group was: 3% in women and 6% in men; 0%, 1%, 5% and 14% in patients aged <20, 20–39 years, 40–59 years and ≥60 years, respectively; 13% in diabetics and 4% in non-diabetics; 12% in patients with chronic hypertension and 3% in those without hypertension; and 26%, 3% and 2% in patients initially considered to be at a severe, moderate and mild stage, respectively. Patients aged <60 years at admission accounted for 38% of death (33/86). For these patients, median age was 50 years (IQR 41–56), 60% were at a severe stage at admission and 32% and 36% had diabetes and chronic hypertension, respectively. In the primary analysis, the risk of death was significantly higher in men, those aged ≥60 years, those with chronic hypertension, and those initially considered to be at a severe stage. The duration of symptoms prior to admission was not significantly associated with the risk of death (Table 3A, Figure 1 and 2). In the secondary analysis, male patients, those aged ≥60 years, those with chronic hypertension, and those with diabetes had a higher risk of clinical worsening (Table 3B, Figure 1 and 2). Patients who recovered were discharged after a median of 11 days (IQR 8–16).

countries authorised the use of medical data collection in accordance with WHO methodology to describe the course of the COVID-19 disease during routine care, without requesting signatures for specific consent.
Table 2
Follow-up characteristics (n = 1,805).

| Characteristic                      | n | %   | 95% CI  | p     |
|-------------------------------------|---|-----|---------|-------|
| Heart rate >110 beats/min at least once | 338 | 19% |         |       |
| Glasgow <15 at least once           | 37 | 2%  |         |       |
| SpO2 under ambient air, worse value |     |     |         |       |
| <90%                                | 231 | 13% |         |       |
| 90–93%                              | 212 | 12% |         |       |
| ≥94%                                | 1,362 | 75% |         |       |
| Care received, n (%)                |     |     |         |       |
| Specific drugs:*                   | 1,697 | 95% |         |       |
| Hydroxychloroquine + azithromycin  | 1,244 | 73% |         |       |
| Hydroxychloroquine                  | 227 | 13% |         |       |
| Hydroxychloroquine + azithromycin + lopinavir/ritonavir | 212 | 12% |         |       |
| Hydroxychloroquine + lopinavir/ritonavir | 7 | 0.4% |         |       |
| Lopinavir/ritonavir                 | 7 | 0.4% |         |       |
| No specific drugs                   | 97 | 5%  |         |       |
| Other drugs                          |     |     |         |       |
| Other antibiotics                   | 1,491 | 83% |         |       |
| Corticosteroids                     | 266 | 15% |         |       |
| Systemic anticoagulation            | 315 | 17% |         |       |
| Received oxygen therapy             | 237 | 13% |         |       |
| WHO ordinal scale (higher grade)**  |     |     |         |       |
| Stage 4: Oxygen by mask or nasal prongs | 151 | 64% |         |       |
| Stage 5: Non-invasive ventilation or high-flow oxygen | 83 | 35% |         |       |
| Stage 6: Intubation and mechanical ventilation | 3 | 1%  |         |       |
| Admitted to intensive care unit     | 275 | 15% |         |       |
| Final vital status                  |     |     |         |       |
| Death, n (%)                        | 86 | 5%  |         |       |
| Time from admission to death (days), median [IQR] | 5 | [2; 10] |         |       |
| Alive, n (%)                        | 1,719 | 95% |         |       |
| Time from admission to discharge (days), median [IQR]** | 11 | [8; 16] |         |       |
| Combined secondary outcome          |     |     |         |       |
| Death or oxygen therapy or oxygen saturation <94%, n (%) | 552 | 31% |         |       |

N, number; %, percentage; IQR, interquartile range.
* Missing values: Specific drugs, n = 11; time from admission to discharge, n = 1.
** See reference (WHO, 2020b).

Discussion

It is believed that this is the first African study describing the clinical presentation and outcomes of COVID-19 among symptomatic patients prospectively monitored in specialist hospital care centres. This study has strengths in that it provides partial answers to some of the questions surrounding COVID-19 in Africa, and weaknesses in that it leaves other questions unanswered.

In two West African countries where the policy was to hospitalise everyone with a positive SARS-CoV-2 RT-PCR test, regardless of the severity of the clinical picture, 5% of symptomatic people who were hospitalised died. Mortality was 14% in patients aged >60 years and 26% in people with severe respiratory signs on admission. Although no comparisons can be made between hospitals in different countries with different hospitalisation practices and levels of care, these figures are consistent with those described elsewhere (Lv et al., 2020; Olumade and Uzairue, 2021; Singer et al., 2020) and strongly suggest that COVID-19 is at least as serious in Africa as it is in other continents (Boule et al., 2020; El Aidaoui et al., 2020; Kirenga et al., 2020; Nachega et al., 2020). If the reported death toll from COVID-19 is lower in Africa than in Europe or the USA (Chilimuri et al., 2020; Galloway et al., 2020; Rossi et al., 2020; Zhou et al., 2020), it is probably not because the disease is less lethal in Africa. This reasoning is also compatible with the 2.8, 9.2 and 13.2% mortality rates reported from retrospective population or hospital-based cohorts in South Africa, Nigeria and the Democratic Republic of the Congo (Boule et al., 2020; El Aidaoui et al., 2020; Elamin et al., 2020; Guan et al., 2020; Huang et al., 2020; Kirenga et al., 2020; Nachega et al., 2020; Singer et al., 2020; Zhou et al., 2020). They emphasise the particular severity of the disease in groups at risk, in Africa as elsewhere, and the need to set up appropriate care to try to reduce the high mortality rate in these groups.

The first type of appropriate care is oxygen therapy. In the present study, participants received oxygen therapy when their SpO2 dropped below 90%, but few people with an SpO2 of between 90% and 93% did. Very few patients also benefited from non-invasive or invasive ventilation. It can be hypothesised that expanding the indications for oxygen therapy and increasing options for ventilation could have reduced mortality (Baker et al., 2020).

Regarding other ways to improve care, the data is of very limited value. The anti-infective treatments recommended in both countries and widely prescribed to patients in this study have not been proven effective so far (Kaptein et al., 2020; Maisonnasse et al., 2020; RECOVERY Collaborative Group et al., 2020; Skipper et al., 2020). The data do not provide any new insights in this regard. In the present study, a large percentage of patients received

Table 3A
Factors associated with the risk of death.

| Factor                              | Univariable | Multivariable |
|-------------------------------------|-------------|---------------|
|                                     | nN | %   | cOR  | 95% CI  | p    | nN | %   | aOR  | 95% CI  | p    |
| Sex                                 |    |     |      |        |      |    |     |      |        |      |
| Female                              | 18/651 | 3%  | -    | -      | -    | 18/643 | 3%  | -    | -      | -    |
| Male                                | 68/1,151 | 6%  | 2.2  | [1.3; 3.8] | 0.002 | 68/1,144 | 6%  | 2.0  | [1.1; 3.6] | 0.019 |
| Age                                 |    |     |      |        |      |    |     |      |        |      |
| <60 years                           | 33/1,402 | 2%  | -    | -      | -    | 33/1,400 | 2%  | -    | -      | -    |
| ≥60 years                           | 53/388 | 14%  | 6.5  | [4.2; 10.4] | <0.001 | 53/387 | 14%  | 2.9  | [1.7; 4.8] | <0.001 |
| Diabetes                            |    |     |      |        |      |    |     |      |        |      |
| No                                  | 58/1,586 | 4%  | -    | -      | -    | 58/1,570 | 4%  | -    | -      | -    |
| Yes                                 | 28/219 | 13%  | 3.9  | [2.4; 6.2] | <0.001 | 28/217 | 13%  | 1.3  | [0.8; 2.3] | 0.32 |
| Chronic hypertension                |    |     |      |        |      |    |     |      |        |      |
| No                                  | 41/1,419 | 3%  | -    | -      | -    | 41/1,403 | 3%  | -    | -      | -    |
| Yes                                 | 45/386 | 12%  | 4.2  | [2.9; 6.9] | <0.001 | 45/384 | 12%  | 2.1  | [1.2; 3.4] | 0.006 |
| Initial severity grade*            |    |     |      |        |      |    |     |      |        |      |
| Mild                                | 18/867 | 2%  | -    | -      | -    | 18/857 | 2%  | -    | -      | -    |
| Moderate                            | 22/761 | 3%  | 1.4  | [0.7; 2.7] | 0.30 | 22/753 | 3%  | 1.3  | [0.7; 2.6] | 0.37 |
| Severe                              | 46/1,777 | 26%  | 16.4 | [9.4; 30.0] | <0.001 | 46/1,777 | 26%  | 9.0  | [5.0; 16.8] | <0.001 |
| Time since first symptom            |    |     |      |        |      |    |     |      |        |      |
| ≤7 days                             | 31/778 | 4%  | -    | -      | -    | -    | -    | -    | -      | -    |
| >7 days                             | 27/510 | 5%  | 1.4  | [0.8; 2.3] | 0.28 | -    | -    | -    | -      | -    |

n = total number of patients in the category; n = number of patients in the category who died; CI: confidence interval; cOR: crude odds ratio; aOR: adjusted odds ratio; the OR for each variable shown in the table was adjusted on the other variables shown in the table.
* See reference (WHO, 2020b).
Figure 1. Kaplan Meier estimate of the probability of clinical worsening and death in the overall population.

Figure 2. Kaplan Meier estimate of the probability of clinical worsening and death, according to sex, age, and comorbidities.
corticosteroids; although this percentage is consistent with what could be expected based on SpO2 figures, there are no more details on its duration or precise indications. In addition, the data do not allow comment on anything concerning elaborate management of the complications of the disease in its inflammatory phase, but since substantial resuscitation capacities are limited, there is little hope for improving survival this way. Hopes for therapy lean more toward earlier intervention. Treatments of this nature are still experimental, and it is important for African centres to participate in trials of new curative treatments.

Finally, this study was also limited as follows. Because it was carried out at the height of an emergency, the monitoring of collected data was limited to a small number of key variables to ensure the analysis provided solid descriptive elements. Since the number of variables was limited, the analysis of factors associated with outcomes probably suffered from confusion bias.

Table 3B
Factors associated with the risk of clinical worsening.

|                      | Univariable            | Multivariable         |
|----------------------|------------------------|-----------------------|
|                      | n/N % cOR 95% CI p     | n/N % aOR 95% CI p    |
| Sex                  |                        |                       |
| Female               | 157/651 24% 1.6 [1.3; 2.0] <0.001 | 157/643 24% 1.6 [1.3; 2.1] <0.001 |
| Male                 | 394/1,151 34% – – – – | 392/1,144 34% 1.6 [1.3; 2.1] <0.001 |
| Age                  |                        |                       |
| <60 years            | 327/1,402 23% – – – – | 326/1,400 23% – – – – |
| ≥60 years            | 223/388 57% 4.4 [3.5; 5.6] <0.001 | 223/387 58% 3.1 [2.4; 4.0] <0.001 |
| Diabetes             |                        |                       |
| No                   | 423/1,396 27% – – – – | 420/1,370 27% – – – – |
| Yes                  | 129/219 55% 4.0 [2.9; 5.3] <0.001 | 129/217 59% 2.3 [1.6; 3.1] <0.001 |
| Chronic hypertension |                        |                       |
| No                   | 356/1,419 25% – – – – | 354/1,403 25% – – – – |
| Yes                  | 196/386 51% 3.1 [2.4; 3.9] <0.001 | 195/384 51% 1.7 [1.3; 2.2] <0.001 |
| Time since first symptom |                   |                       |
| ≤7 days              | 223/778 29% – – – – | 223/776 29% – – – – |
| >7 days              | 188/510 37% 1.5 [1.1; 1.8] 0.002 | 188/508 37% – – – – |

n = total number of patients in the category; n = number of patients in the category who had an SpO2 < 94%, received oxygen, or died; CI: confidence interval; cOR: crude odds ratio; aOR: adjusted odds ratio: the OR for each variable shown in the table was adjusted on the other variables shown in the table.
Nevertheless, the analyses were consistent with what was known elsewhere, and this external consistency has the advantage of increasing confidence that the data are robust. It is therefore believed that the main results, which are the overall and group mortality rates, are credible.

In conclusion, COVID-19 is a serious disease in Africa, as it is elsewhere. Men are more likely to experience complications than women, and certain common risk factors such as age, diabetes and hypertension should make us particularly vigilant in the event of COVID-19 in these countries. Further studies should now focus on finding ways to reduce mortality from COVID-19 in Africa, overall and in these at-risk groups.

Data sharing statement

The anonymised individual data and the data dictionary of the study will be made available to other researchers by Professor Denis Malvy (denis.malvy@chu-bordeaux.fr) after approval of a methodologically sound proposal and the signature of a data access agreement.

Author contribution statement

MJ, SJ, BS, RK, ED, AP, MSS, Eudoxie Koumbem (EK), Halidou Tinto (HT), Adama Sanou (ASA), Apoline Sono (ASO), Billy Sivahera (BSH), Caroline Martin (CM), Moumouni Kinda (MK), Joseph Donamou (JD), Jean-Paul-Yassa Guiavogui (JPG), Fode Bangaly Sako (FBS), Fode Amara Traore (FAT), Flavien Kabore (FK), Braice Bicaba (BB), Hans-Joerg Lang (HJL), Sani Sayadi (SS) and Augustin Augier (AA) set up the study in Burkina Faso and Guinea, enrolled and followed the patients and recorded clinical data.

MJ, SJ, MSS, ED and BS had access to the raw data.

MJ, SJ, BS and XA performed the analysis. MJ, SJ, BS, ED, MSS, RK, Olivier Marcy (OM), XA and DM drafted the manuscript.

All authors revised the manuscript critically for important intellectual content and approved the final version before submission.

Conflict of interest

All authors declare not conflict of interest.

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Ethic approval

The study was approved in Burkina Faso by the Comité d’Éthique pour la Recherche en Santé (ID number 2020-6-116) and in Guinea by the Comité National d’Éthique pour la Recherche en Santé (ID number 069/CNERS/20).

The committees of the two countries authorised the use of medical data collection in accordance with WHO methodology to describe the course of the COVID-19 disease during routine care, without requesting signatures for specific consent.

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