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Short communication

Demographics and outcomes of laboratory-confirmed COVID-19 cases during the first epidemic wave in Senegal

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1. Background

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic is a global public health problem; however, few studies have reported its impact on African populations [1]. The first case was diagnosed in Senegal by the beginning of March 2020 [2]. During the first wave of coronavirus disease 2019 (COVID-19), individuals who tested positive for COVID-19 were isolated at the Treatment Center of Epidemics (TCE). Senegalese health authorities adopted two management strategies for Thiès medical region, which is located 70 km from Dakar and comprises three departments (Thiès and Tivaouane with 1,390,602 inhabitants, and Mbour, one-third of which directly depends on Thiès medical region, i.e., around 276,831 inhabitants). Patients with the most severe forms or with high-risk conditions for severe COVID-19 were hospitalized at TCE at the Thiès Hospital (hTCE), whereas those with minor or no symptoms, both diagnosed via contact tracing or screening campaign, were quarantined with regular follow-up at the out-of-hospital TCE (oTCE) in Thiès military base. This study aimed to describe the incidence, demographic characteristics, and outcomes of patients with laboratory-confirmed COVID-19 in Thiès medical region during the first epidemic wave between May 1, 2020, and July 31, 2020.

2. Methods

Individuals suspected of having COVID-19, mainly diagnosed in the hospital based on indicative symptoms and during screening campaigns at the Blaise Diagne International airport, were tested using reverse transcriptase polymerase chain reaction (RT-PCR) for SARS-CoV-2. In case of a positive result, those who had come into contact with these members, mainly in collective habitations, were also tested. We retrospectively analyzed the patients’ demographic data (age and sex); the severity of clinical manifestations (mild/moderate/severe) at admission, as previously reported [3], and the outcomes of patients with COVID-19. COVID-19 was confirmed by a positive RT-PCR test for SARS-CoV-2 that was performed at the regional reference laboratory (Institute for Research in Health Sciences and Formation) with the Abbott® RealTime SARS-CoV-2 assay (Abbott Laboratories, Abbott Park, IL, USA) and the Allplex® SARS-CoV-2 assay (Seegene Inc., Seoul, South Korea). Patients in the oTCE were isolated for at least 7 days. The discharge criterion was arbitrarily based on two consecutive negative RT-PCR tests performed at least 48 hours apart. An RT-PCR test was performed every 48 hours.
Table 1
Demographic characteristics and mortality as per baseline status.

|                  | Non-severe (n = 554) | Severe (n = 46) | All cases (n = 600) | P-value |
|------------------|----------------------|----------------|---------------------|---------|
| **Gender**       |                      |                |                     |         |
| Male             | 330 (59.6%)          | 27 (58.7%)     | 357 (59.5%)         | >0.999a |
| Women            | 224 (40.4%)          | 19 (41.3%)     | 243 (40.5%)         |         |
| **Age (years)**  |                      |                |                     |         |
| n (%)            | 542 (97.83%)         | 46 (100.0%)    | 588 (98.00%)        | <0.001b |
| Missing values (%)| 12 (2.17%)          | 0              | 12 (2.00%)          |         |
| CI                | [32.9; 35.6]         | [65.1; 70.3]   | [35.4; 38.4]        |         |
| Median [Q1, Q3]  | 32.0 [23; 46]        | 68.0 [60; 70]  | 34.0 [23; 50]       |         |
| Range            | [1; 86]              | [52; 88]       | [1; 88]             |         |
| **Death**        |                      |                |                     |         |
| No               | 554 (100.0%)         | 37 (80.4%)     | 591 (98.5%)         | <0.001a |
| Yes              | –                    | 9 (19.6%)      | 9 (1.5%)            |         |

Results are presented as n (%) [95% CI]. % values are calculated for the non-missing values only. 
CI: confidence interval; SD: standard deviation; Q: quartile.

a Fisher’s exact test.

b Wilcoxon rank-sum test.

Overall baseline characteristics were documented and classified according to the patients’ status (severe/critical vs. non-severe and survivors vs. non-survivors) at the cutoff date (July 31, 2020). Continuous variables were expressed as median and range (first and third quartiles or extremes) and compared using the Wilcoxon rank-sum test. Categorical data were calculated as the number of missing values and absolute and relative counts, and compared using Fisher’s exact test. To analyze statistical data, we used SAS version 9.4 (SAS Institute, Cary, NC, USA).

4. Discussion

This study reports exhaustive data on the outbreak of COVID-19 in Senegal. It is an important study considering the lack of data on COVID-19 among African populations. This data focuses on the first epidemic wave and underscores that severe cases were uncommon, corresponding to 7.7% of all diagnoses at baseline. Our results also reveal that the overall case fatality rate was low (1.5%), similar to that reported by other West African countries [4]. When comparing case fatalities between Senegal and France, between May 1 and July 30, 2020, mortality was much higher in France than in Senegal (14.5%–13.4% vs. 0.88%–2%) [5]. This was probably due to a much more overwhelming first epidemic wave affecting an older and more comorbid population in France. Asymptomatic cases were therefore the most frequent form of the disease in Senegal, comprising 71.8% of cases at the oTCE, which is in the upper range of previous studies [6–8]. The need for quarantine at the oTCE for COVID-19 cases enabled a prolonged follow-up at the oTCE, with regular examinations confirming the diagnosis of asymptomatic cases and excluding mild or moderate COVID-19 cases. Our results seem similar to recent data on the Mauritanian outbreak, with 84% of asymptomatic cases [9]. However, the distinction between asymptomatic or pre-symptomatic status was not clearly defined in this Mauritanian study. In our study, asymptomatic cases at the oTCE had a longer time to discharge due to a longer time to obtain a negative RT-PCR test result than asymptomatic cases, as already reported [10]. This high prevalence of asymptomatic cases and low case fatality rate might be related to the younger age of the African population [4]. With a male proportion of 59.5% and a median age of 34 years in our population, the stratification by age and sex seemed similar to other reports on African subjects [9]. These data are important because they highlight the challenges faced in screening patients with COVID-19 in Africa because of the high number of asymptomatic cases. Our study included all cases with positive test results, which were the only reliable data available to determine the incidence of COVID-19 during the first epidemic wave in Senegal. However, this incidence is only representative of Thiès region (urban district) and is quite certainly underestimated because of a high number of patients not being tested. Numerous cases likely did not seek medical advice, particularly those with mild or moderate symptoms, because of very moderate symptoms, fear of diagnosis, or unwillingness to be quarantined. Contact tracing was not 100% efficient as it was only performed in residential buildings and collective habitats.

The local epidemiology of the regional variants at the time of the study was assessed in a study by Padane et al. [11], who sequenced
86 viruses from patients from Thiès Region and Blaise Diagne International Airport. Test specimens were mainly collected in 2020. Virological sequencing performed on 83 samples showed that the B1 (63%), B1.1.29 (16%), and B.1.256 (9%) lineages were circulating in the Thiès region in 2020.

There are however biases in our study owing to missing data (comorbidities, discharge date, and absolute certitude of persistence of asymptomatic status during follow-up) in the non-informative medical charts. Nevertheless, the mortality rate was low with an overall case fatality of 1.5% and accounted for 19.6% of severe cases. This figure is similar to those reported in recent African reports [12,13]. The incidence was 12 per 100,000 inhabitants per month. However, these data represent the lower range of estimation owing to the lack of testing and the high rate of asymptomatic or paucisymptomatic cases, as explained above. A seroprevalence study performed in the Democratic Republic of the Congo highlighted this point [14].

5. Conclusions

In this retrospective cohort, most patients with COVID-19 were young with limited comorbidities, similar to the population of sub-Saharan African countries. Most cases were asymptomatic, and the case fatality was low (predominantly occurring in older and male patients).

Contribution of authors

AL, MM, and SD conceived and designed the study, analyzed the data and drafted the article. ATD and SAD collected the data. FAP performed the virological analysis. CK analyzed the data and performed the statistical analyses. All authors read and approved the article.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the 1964 Helsinki declaration and its later amendments.

Disclosure of interest

The authors declare that they have no competing interest.

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