Characteristics and outcomes of patients with laboratory-confirmed COVID-19 during the first wave in Senegal

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Short Report

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Abstract

Background

Few studies have focused on the effects of coronavirus disease 2019 (COVID-19) on African populations. During the first wave (May 1, 2020 to July 31, 2020), all patients with laboratory-confirmed COVID-19 in the Thiès medical region of Senegal were isolated in two types of treatment centers of epidemics (TCEs): hospitals (hTCEs) or out-of-hospital TCE (oTCEs). We have described the demographic characteristics and outcomes of patients in TCEs.

Methods

Results

A total 600 cases of COVID-19 were diagnosed. The median age of the patients was 34.0 years; 357 (59.5%) were men and 243 (40.5%) were women. The incidence of reverse transcriptase polymerase chain reaction (RT-PCR)–positive findings of COVID-19 was 12 per 100,000 inhabitants per month. Forty-six (7.7%) patients with severe or critical disease and 99 (16.5%) patients with high-risk conditions and nonsevere disease were hospitalized in hTCEs; 455 (75.8%) patients were quarantined in the oTCEs. In hTCEs, the severely ill patients had a median age of 68 (range, 52–88) years and were older than both the less ill patients in the hTCEs (median age, 45 years; range, 7–78 years; $p < 0.0001$) and the patients in oTCEs (median age, 30 years; range, 1–86 years; $p < 0.0001$). Nine patients (7 men, 2 women) died (median age, 73 years; range, 52–88 years); thus the total case fatality rate was 1.5%. Of the patients quarantined in the oTCEs, 340 (74.7%) had no symptoms, and 115 (25.3%) had mild or moderate symptoms; only 2 (0.4%) developed severe disease during the follow-up period.

Conclusion

In this retrospective cohort, patients were young (median age, 34.0 years) and mostly asymptomatic (67.8%); the overall fatality rate was low at 1.5%.

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), Senegalese patients who had a suspected COVID-19 were tested with 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 were also tested. All cases tested positive for COVID-19 were isolated at the Treatment Center of Epidemics (TCE). Senegalese health authorities adopted 2 management strategies for the Thiès Medical region, which is 70 km from Dakar and comprises three departments (Thiès and Tivaouane, which contain 1,390,602 inhabitants, and Mbour, one third which

depend directly on the Thiès medical region (ie around 276831 inhabitants). Patients with severe and critical forms or high-risk conditions for severe COVID-19 were hospitalized at TCE hospitals (hTCE) at the Thiès Hospital, while patients without symptoms and those with mild and moderate symptoms were quarantined with regular follow-up at the out-of-hospital TCE (oTCE) at the Thiès military base. Patients in the oTCE were isolated for at least 7 days. The exit criterion was 2 consecutive negative RT-PCR tests performed at least 48 h apart. RT-PCR was performed every 48 h. This study aims to describe the incidence, demographic characteristics, and outcomes of patients with a laboratory confirmed COVID-19 in the medical Thiès region during the first wave between May 1, 2020, and July 31, 2020.

Methods

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 who were admitted to the Thiès TCE between May 1, 2020 and July 31, 2020. 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). During the study period, variant analysis in 100 patients from Thiès and Dakar was performed at the Institute for Research in Health Sciences and Formation, per methods described previously [4].

Overall baseline characteristics were documented and classified according to the patients' status (severe/critical vs. nonsevere and survivors vs. nonsurvivors) at the cutoff date (July 31, 2020). Continuous variables were calculated as medians (ranges) and means (first and third quartiles) 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 the Fisher's exact test. Furthermore, we used the nonparametric Kaplan–Meier method to determine date of discharge with a 95% confidence interval (CI). To analyze statistical data, we used SAS version 9.4 (SAS Institute, Cary, NC, USA).

Results

During the study period, 600 cases of COVID-19 were diagnosed, including 59.5% men (M) and 40.5% women (W), with a median age of 34.0 years. At baseline, 46 patients (7.7%) with a severe or critical form of disease and ninety-nine (16.5%) non severe patients with high-risk conditions were hospitalized at the hTCE, and 455 patients (75.8%), including 6 pregnant women, 4 breastfeeding women, and 49 children (age ≤ 14 years), were quarantined at the oTCE. The 46 patients with severe disease were older (median age 68 years, range 52–88 years), than the 99 inpatients without severe disease (median age 45 years, range 7–78 years; $p < 0.0001$) or the 455 patients in the oTCE (median age 30 years, range 1–86 years; $p < 0.0001$). Among the 46 patients who were hospitalized at Thiès hTCE, 9 died (median age 73 years range 52–88 years, 7 M and 2 W), resulting in a global case fatality rate of 1.5% (Table 1). The 99 patients at the hTCE without severe symptoms were followed, none presented severe disease during the follow up.

Table 1
Demographic characteristics and mortality as per the baseline status

		Non-Severe (N = 554)	Severe (N = 46)	All patients (N = 600)	P
Gender	Male	330 (59.6%)	27 (58.7%)	357 (59.5%)	> 0.999 ^[1]
	Women	224 (40.4%)	19 (41.3%)	243 (40.5%)	
Age (years)	N (%)	542 (97.83%)	46 (100.00%)	588 (98.00%)	< 0.001 ^[2]
	Missing (%)	12 (2.17%)	0	12 (2.00%)	
	Mean (SD)	34.3 (16.4)	67.7 (9.1)	36.9 (18.3)	
	95% 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%)	< 0.001 ^[1]
	Yes	-	9 (19.6%)	9 (1.5%)	

Results are presented in the form N (%) [95% CI], % are calculated for the non-missing values only. SD standard deviation, Q Quartile.

^[1] Fisher exact test, ^[2] Wilcoxon rank sum test

Among the 455 patients at the oTCE, 26 patients had at least one comorbidity [hypertension (n = 19), diabetes (n = 4), asthma (n = 2), and sickle cell diseases (n = 1)]. There were 340 (74.7%) asymptomatic cases and 115 (25.3%) mild or moderate cases in the oTCE population. The average duration of follow-up at the oTCE was 17.7 ± 8.33 d (r 9–25 d). Most patients (97.8%) of the oTCE had a favorable outcome, and only 2 patients developed a severe requiring oxygen supply in Dakar. A comparison of the symptomatic and asymptomatic patients of the oTCE realized for 424 patients with full available virologic data showed that time to discharge (2 negative RT-PCR tests) was longer in asymptomatic patients than symptomatic patients, as already reported [5] (Fig. 1). Virologic analysis performed during the study period showed a predominantly B1 B and B 1.1.29 lineage.

We determined that the incidence of laboratory-confirmed COVID-19 in the Thiès medical region during the first wave was 12 per 100,000 inhabitants per month.

Discussion

This study reports exhaustive data on the outbreak of COVID-19 in Senegal and is important, considering the lack of data on COVID-19 among African populations. These data focus on the first wave and

underscore that severe cases appeared uncommon, corresponding to 7.7% of all diagnoses at baseline and that the overall case fatality rate was low 1.5%, similar to that reported from other West African Countries [6]. Asymptomatic cases were therefore the most frequent form of the disease with 71.8% of cases at the oTCE [7–9]. The necessity of quarantine at the oTCE for COVID19 patients allowed prolonged follow-up at the oTCE, and that there were no new symptoms confirming the diagnosis of asymptomatic patients. Our results appeared similar to recent data focusing on the Mauritanian outbreak wherein 84% of the patients were asymptomatic [10]; however, the distinction between the status of asymptomatic or presymptomatic was not clearly defined in this study. This high prevalence of asymptomatic cases and low rate of fatality might be related to the younger age of the African population [6]. With a sex ratio of 59.5%:40.5% (M: W) and a median age of 34.0 years in our population, the stratification by age and sex appeared similar to other reports on African subjects [10]. These data are important because they highlight the challenges faced in screening COVID-19 patients in Africa due to the high number of asymptomatic cases. These data are exhaustive because, although only a small proportion of patients had positive test results, they include all patients. Positive test results enabled us to determine the incidence of COVID-19 during the first wave in Senegal.

There are however, bias in our study owing to the 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 fatality of 1.5% and accounted for 19.6% of severe patients cases a level lower than other African reports [11, 12]. The incidence was 12 per 100000 inhabitants per month, similar to some data for African West countries (8). However, these data represent the lower extrema of estimation owing to the lack of testing and the high rate of asymptomatic or paucisymptomatic cases. Seroprevalence study performed in the Democratic republic of Congo has highlighted this point [13].

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 patients were asymptomatic, and the fatality case was low, occurring predominantly in older, and male patients.

Abbreviations

SARS-CoV-2: Severe acute respiratory syndrome coronavirus 2

COVID-19: Coronavirus disease 2019

RT-PCR: Reverse transcriptase polymerase chain reaction

TCE: Treatment Center of Epidemics

hTCE: TCE hospitals

oTCE: Out-of-hospital TCE

Declarations

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Ethics approval and consent to participate

The study was approved under a consent waiver, and the study was approved by the Ethical Committee of Medicine Odontology and Pharmacy Faculties and Hospitals (CE-2021-61).

Consent for publication

Not Applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

None declared

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None

Authors' contributions

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

Authors' information

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Figures

Figure 1

Time of discharge in days of the oTCE patients (corresponding to the results of the 2nd negative RT-PCR performed every 48 h). Sever ...: Severity.