

Coronavirus Pandemic

COVID-19 outbreak in Mauritania: epidemiology and health system response

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Abstract

Introduction: In Africa, the first case of COVID-19 was reported in February 2020. Mauritania's first case was confirmed in March 2020.

Methodology: We provide an update of the COVID-19 epidemic in Mauritania as of December 2020, and describe the country's Health System Response.

Results: In total, 133,749 diagnostic tests were performed, 14,364 (10.7%) were positive (309 cases/100,000 inhabitants). Case fatality rate was 2.4%. The 20-39 year-olds (41%) and males (59.1%) were most commonly affected. Comorbidities among fatal cases included cardiovascular diseases (44.8%) and diabetes (37.1%). Clinical symptoms included fever (57%), cough (52%), running nose (47%) and headache (26%). After the first case, prevention measures were progressively tightened, and quarantine implemented for all suspected cases. Schools and universities were closed, and flights to Mauritania suspended. Restaurants and cafeterias were closed, and night curfews installed. Friday prayers were suspended nationwide, and movements between regions restricted. These measures helped to contain the spread of SARS-CoV-2 during the first pandemic wave, which peaked in June 2020 with low rates. However, the number of daily cases reached high levels in December 2020, during the second wave (40.1% of all cases and 48.9% of deaths). During the first wave, there were 38 ICU beds nationwide, but the ICU's capacity increased in short time.

Conclusions: Mauritania has passed through the first pandemic wave with relatively low case fatality rates, currently being at the end of the second wave. As the country's health system is very vulnerable, there is a need for strict public health measures during epidemics.

Key words: COVID-19; epidemiology; health system response; Mauritania; Africa.

J Infect Dev Ctries 2021; 15(8):1048-1053. doi:10.3855/jidc.15016

(Received 08 March 2021 – Accepted 27 May 2021)

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Introduction

Coronavirus disease 2019 (COVID-19) is an emergent infectious disease caused by the severe acute respiratory syndrome coronavirus type 2 (SARS-CoV-2). The virus has most probably emerged from humans who had contact with animals, resulting in a major outbreak since late 2019 [1–3]. The first cases worldwide were registered on 29 December 2019 in Wuhan, the capital city of Hubei province in central China [4]. The viral infection was declared a global pandemic on 11 March 2020 [5]. SARS-CoV-2 has since then been spreading rapidly throughout the world, causing a significant number of hospitalized cases and deaths [6–8]. In Africa, the first case of COVID-19 was reported on 14 February 2020 [9]. As of 20 March 2020, there were 769 confirmed cases in 37 African countries, with 15 deaths [10]. In addition, many African countries

suffer from heavily underfunded health systems, and only a few African countries have been successful in implementing effective detection, prevention, and control measures [9,11].

The Islamic Republic of Mauritania is situated in northwest Africa (Figure 1). The country comprises a territory of more than 1 million km² with a very low population density. The majority of its 4.4 million inhabitants depend on agriculture and livestock farming [12]. The Human Development Index (HDI) in 2019 was 0.546, representing a worldwide rank of 157 [13]. The country's first known COVID-19 case was confirmed on 13th March 2020. This index patient was an Australian citizen aged 40 years, working for a Gold mining company in north Mauritania (Taziazet) [14]. He was returning from Australia via Europe on 9 March [14]. The second case was confirmed on 18 March

2020, a female Senegalese household worker, aged 41 years, returning from Senegal 10 days before her diagnosis [15]. There were seven imported cases, before the first autochthonous case among Mauritanian citizens was announced on 28 March 2020. This was an elder woman living in the south of Nouakchott city. Two days later, the first death related to COVID-19 was announced in Mauritania [14].

According to WHO recommendations, sharing information and countries experiences is pivotal to tackling the COVID-19 pandemic [10]. However, there are still little data regarding the COVID-19 outbreak in Africa. Specifically, from Mauritania there is extremely limited evidence available on the COVID-19 pandemic [14].

Methodology

Based on official data, we provide an update as of end of December 2020 of the epidemiologic situation and the clinical outcomes, describe the country’s

Figure 1. Location of Mauritania on the African continent.

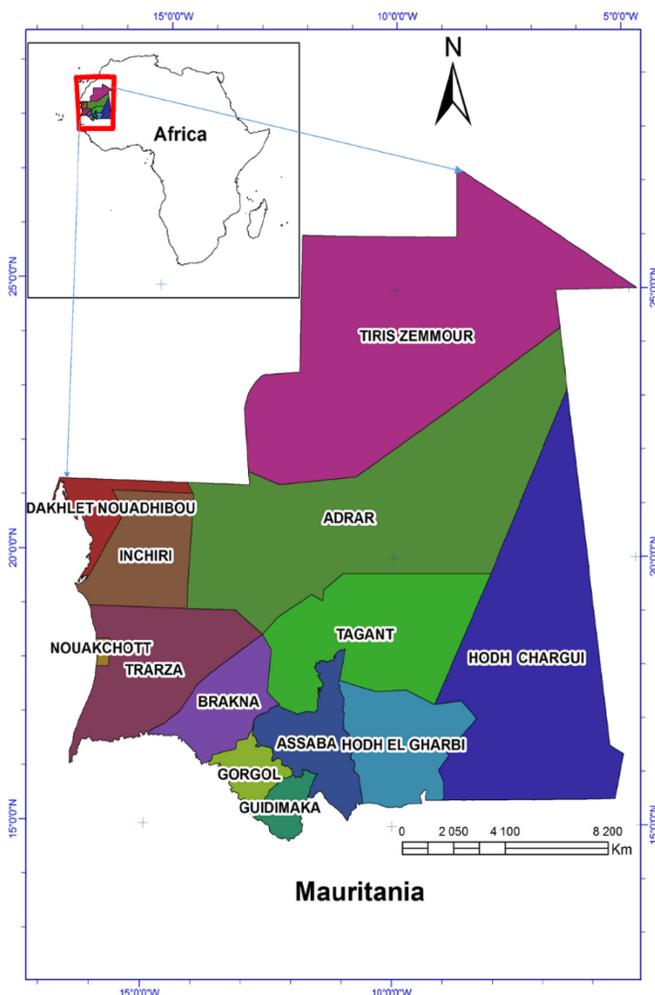
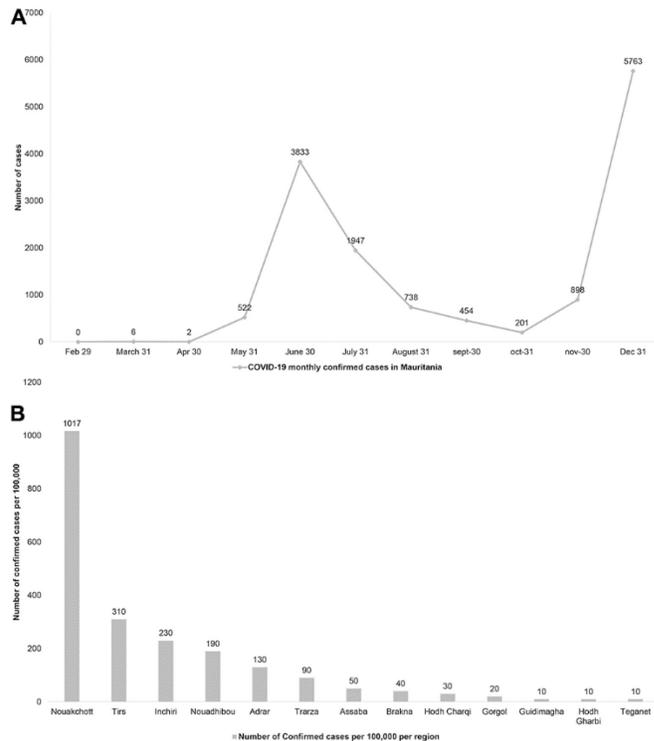


Figure 2. A. Number of confirmed cases per month in Mauritania; B: Number of Covid-19 confirmed cases per 100,000 habitants in Mauritania per region.



specific Health System Response, and compare the situation to neighboring countries.

Results

Expansion of Covid-19 in Mauritania

Based on the Ministry of Health’s daily reports, a total of 133,749 diagnostic tests (RT-PCR and RDT) were performed during 2020. Of these, 14,364 (10.7%) were positive tests, 11,318 (78.8%) recoveries, 2,699 (18.8%) active cases, and 347 (2.4%) deaths [15]. The overall rates were 2,876 tests per 100,000, and 309 confirmed cases per 100,000 habitants. One third of confirmed cases was tested using RT-PCR; 38% were announced as community cases, and 1.3% were imported from other countries.

The age group mostly affected by COVID-19 were 20-39 year-olds (41% of cases), followed by the 40-59 year-olds (30%), and > 60 year-olds (17%) [15]. Males were significantly more affected (59.1%; 8,489/14,364) than females [15]. The first peak of the COVID-19 pandemic in Mauritania occurred during the third week of May 2020, and the proportion of tests yielding positive results started to decline in September, to increase again in December 2020 (Figure 2a).

Most confirmed cases (more than 85%) came from the capital city (three Nouakchott regions). Other cases

were identified in Assaba (3%), Nouadhibou (2%), Trarza (2%), and less than 2% in each other of the 9 regions. Consequently, the highest prevalence of COVID-19 per 100,000 per region was observed in Nouakchott city (Figure 2b). The high prevalence observed in Tirs may have been associated with the high number of diagnostic tests performed by Tasiast Society in this region.

COVID-19 deaths in Mauritania represented 2.4% of the confirmed cases, with two peaks recorded in June and December 2020 (Figure 3a). Sixty-four percent of deaths were males and 42.7% of deaths occurred among people aged > 65 years, followed by the 36-65 year-olds (Figure 3b). The most prevalent comorbidities were cardiovascular disease (44.8%) and diabetes (37.1%), followed by chronic respiratory diseases (10.1%) [16].

During December 2020, the latest month of this observation, 41,319 diagnostic tests were performed, and 5,763 (13.9%) cases with 170 deaths were confirmed. These were representing 40.1% of all confirmed cases and 48.9% of all deaths. During this month, more than 3/4 of confirmed cases were announced as community cases (no specific information about infection sources). More than 17% of confirmed cases were hospitalized, and 1/3 of COVID-19 hospitalized cases were admitted to the intensive care units (ICUs). These data suggest that the second

wave of Covid-19 pandemic was peaking in Mauritania during December and started at the end of November 2020 [17].

The most prevalent clinical signs and symptoms among confirmed cases included fever (57%), followed by coughing (52%), runny or stuffy nose (47%) and headache (26%) [16,17]. The number of suspected cases of COVID-19 increased from 374 alerts in April to 5,546 alerts in June, and returned to 697 in September 2020 [18]. Suspected cases in the alert system were defined as people who declared more than two symptoms or people with close contact to confirmed cases.

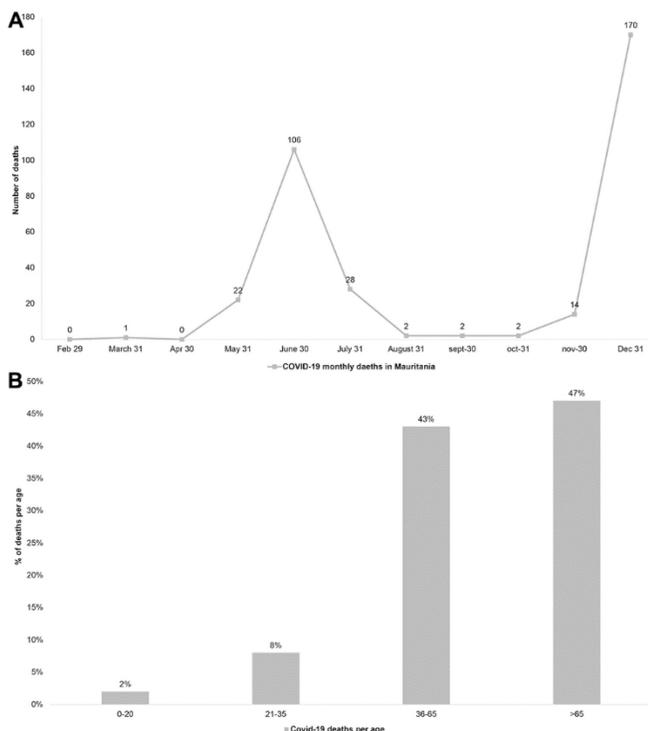
Data collected from 3,868 traced contacts who were tested for COVID-19 showed that 1,083 (28%) were tested positive. The demographic characteristics of traced contacts of confirmed cases indicated that males dominated the reported positive cases with 62%. The age group most commonly reported positive among traced contacts was the age group 15-30 years (38%) [18].

Health System Response

Once the pandemic was declared in China, the Mauritanian government created the COVID-19 vigilance committee at the Ministry of Health on 28 January 2020, and the operational headquarters committee was created on 2 February 2020 under the cabinet of the Prime Minister [19]. Prior to the outbreak, surveillance of COVID-19 was initiated at airports and all land borders with neighboring countries. Prevention measures were progressively tightened, including screening at ports of entry, quarantine of all arrivals from epidemic countries for 14 days, testing people who had a history of travel or contact with a confirmed case within the previous 14 days [19]. Later, this was expanded to all symptomatic people and asymptomatic contacts of confirmed cases. These rapid preventive measures have helped to contain the spread of COVID-19 during the first wave of the pandemic, which peaked in June with low rate of community transmission. Following the confirmation of the first case of COVID-19 on 13 March 2020, and the occurrence of a new case that was quarantined for 14 days, the government decided to extend the quarantining measures to 21 days, required for all suspected cases [20].

Schools and universities were closed on 16 March, and all flights to and from Mauritania were suspended on 18 March 2020. On 19 March, restaurants and cafeterias were closed, night curfews from 6 PM until 6 AM were implemented on 22 March 2020, as well as suspension of all cultural activities. Rigorous disease

Figure 3. A: Number of COVID-19 related deaths per month; B: Covid-19 deaths per age in 2020 in Mauritania.



surveillance was implemented, and a COVID-19 hotline was installed on 21 March, which can be reached by dialing 1,155, to receive COVID-19 alerts in order to test all suspected cases and inform the population about the preventive measures. On 27 March, the government announced the suspension of Friday prayers nationwide, and movements between regions were restricted on 29 March 2020. Two weeks later, on 18 April, the government announced that the country was free of coronavirus [14].

Consequently, the tight measures were loosened gradually. On 7 May 2020, the Friday prayers were reauthorized, with requests to follow the prevention measures guidelines, restaurants reopened only for carrying out meals, and the night curfew was shortened, from 11 pm until 6 am. After a few days, a new infection was declared on 12 May, and then new cases were registered on a daily basis. The Friday prayers were suspended again from 14 May to 24 June, when the pandemic reached a first peak during this period [21]. The testing algorithm was changed on 24 June, to meet the increasing needs of COVID -19 tests. Only symptomatic people were tested, and two additional auxiliary PCR diagnostic units were installed in Nouakchott city, at Hospital Cheikh Zayed and at National Institute of Virology.

On 1 September, universities and schools were reopened and all the remaining restrictions were removed from 10 September. The curfew was completely lifted, the hotline and the containment center for asymptomatic of COVID-19 patients was closed [22]. Following the gradual increase of new cases since early November 2020, the Ministry of Health started alerting the population on a possible second wave. All restriction measures were returned again from 4 December. Night curfews were imposed, schools and universities were reclosed, cultural activities and Friday prayers suspended again [23].

In general, the Mauritanian health system was not prepared to deal with this outbreak. The greatest bottleneck for the control of the pandemic and care of patients was the insufficient clinical equipment needed

to treat COVID-19 patients. For example, prior to the outbreak, there were only 38 intensive care unit beds available for 4.4 million people, with lack of oxygen stations (only 10 oxygen machines were available), and lack of intensive care specialists. There was a lack of adequate physical infrastructure and of human resources, such as infectious disease specialists, epidemiologists, and qualified laboratory technicians. In addition, there were weaknesses in terms of the response time, reliability of testing and disparities in terms of access to treatment between rural and urban areas. These conditions and the poorly funded health care system have played a major role in the health system's limitations to face major outbreaks, including the COVID-19 pandemic.

However, significant efforts were made in short time, and the ICU's capacity was increased. Until end of December, there are 99 ICU beds available with more than five additional oxygen stations installed, with 134 oxygen machines available. On 25 March 2020, the government announced the creation of an emergency fund of about 1% of GDP for urgent procurements of medical supplies and equipment, as well as intensive care free of charge.

Mauritania's medical system combating COVID-19 was based on a new strategy that was specifically implemented for this occasion. As a first step, the Ministry of Health created a national center coordinated by infectious disease specialists to delivery care for COVID-19 patients, and then created COVID-19 units. These units consist of one or two units in each hospital, with one physician, lab technicians and nurses. These units were implemented in 5 hospitals in Nouakchott regions, and in 12 regionals hospitals throughout the country. Quarantine and medical costs for patients contracting COVID-19 were covered by the government.

Vaccination plan

Mauritania is member of the COVAX campaign. This is a global initiative set up to ensure fair access to vaccines among rich and poor countries. COVAX is co-

Table 1. Covid-19 in Mauritania and neighboring countries in 2020.

Characteristics	Mauritania	Morocco	Mali	Algeria	Senegal
First confirmed case (2020)	13 March	2 March	24 March	25 February	2 March
Total cases by 31 December (2020)	14,364	439,193	7,090	99,610	19,140
Total deaths by 31 December (2020)	347	7,388	269	2,756	410
Total tests per 100,000	2,876	12,324	665	-	1,692
Total cases per 100,000	309	1,190	35	227	114
Estimated deaths by 1 April (2021)*	2,573	10,381	2,255	3,223	3,363
Population 2020	4,649,658	36,910,560	20,250,833	43,851,044	16,743,927

* according to Institute for Health Metrics and Evaluation, COVID-19 Weekly Epidemiological Update, 7 February 2021.

led by the WHO, the Global Vaccine Alliance (GAVI) and the Coalition for Epidemic Preparedness Innovation (CEPI), with the UN children Fund (UNICEF), as key implementation partner to provide COVID-19 vaccines for one fifth of the poor countries' populations. Mauritania has received 140,000 doses of Astra-Zeneca vaccine from this initiative and 50,000 doses of Sinopharm from China [24]. In addition, the government has started bilateral negotiations with other partners, with the aim to vaccinate the entire adult population. The vaccine was introduced on 21 March 2021, and was applied first to health care workers, people aged > 70 years, people with chronic diseases, entry ports workers, public transport guiders, and then to education professionals, army and security staff [24].

Comparison to neighboring countries

As compared to neighboring countries, the number of confirmed cases and deaths in Mauritania have remained low. The numbers were lower than in Morocco, Algeria and Senegal but slightly higher than in Mali (Table 1). However, the number of confirmed cases per 100,000 was highest in Morocco followed by Mauritania, Algeria, Senegal and Mali. The highest number of tests per 100,000 was reached in Morocco, followed by Mauritania, Senegal and Mali [25]. It is expected that the estimated number of cases will be high in Mauritania, as compared to other neighboring countries during January 2021, and that there will be a decline starting in the second week of February 2021. The number of estimated deaths by 1 April 2021 will be high in Morocco followed by Senegal, Algeria, Mauritania and Mali [25].

Conclusions

Mauritania is a very poor country with an underfunded health system of low resilience, thus facing major challenges during the current COVID-19 pandemic. The country has passed through the first epidemic wave with relatively low case fatality rates, currently being at the beginning of the second wave (as end of December 2020). Nationwide measures were implemented to control the epidemic and to improve the health sector response. However, the country and its population are extremely vulnerable, evidencing the need for strict public health measures during this and future epidemics.

Acknowledgements

We would like to acknowledge ministry team for their collaboration and AMDRS team for their help in collection of data

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Conflict of interests: No conflict of interests is declared.