

# Early Effect of the COVID-19 Pandemic on Maternal Health Services in a Country with Ebola Experience

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**Abstract:** *Introduction:* In Guinea, little is known about the influence of the COVID-19 pandemic on maternal health indicators. Indeed, Guinea presents a particular context in that it experienced from 2014 to 2016 the Ebola epidemic that negatively affected its health system and bereaved its population. The objective of this study is to assess the effect of the COVID-19 pandemic on maternal and reproductive health services in the health district of Forécariah. *Methods:* This was an analytical cross-sectional study of routine data from 01 March to 30 April 2019 and 01 March to 30 April 2020, including women of childbearing age (15-49 years) residing in the Forécariah health district over the study period. *Results:* Overall coverage of ANC1 did not statistically change from pre-COVID-19 (58%) to COVID-19 (57%). A significant decrease was observed in ANC4+ coverage from 42% before COVID-19 to 29% during COVID-19. Overall pre-pandemic coverage of SP4+ (33%) was significantly higher than during the pandemic (27%; p-value <0.001). Pre-pandemic coverage in ITNs dropped statistically significantly from 34% before the pandemic to 28% during the first two months of the pandemic. Overall coverage of HIV counseling decreased significantly from 72% before the pandemic to 61% during the pandemic (p-value <0.001). General coverage of HIV testing dropped significantly from 43% before the pandemic to 8% during the pandemic (p-value <0.001). Coverage of health center-based deliveries during the pre-COVID-19 study period dropped significantly from 27% to 22% during COVID-19 (p-value <0.001). *Conclusion:* To ensure the resilience of maternal health services in the face of epidemics, this study recommends actions to strengthen the health system by improving community confidence in the health system, even during an epidemic crisis.

**Keywords:** Maternal Health, COVID-19, Guinea

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## 1. Introduction

By 2030, the World Health Organization (WHO) aims to reduce maternal mortality to below 70 deaths per 100,000 live

births [1]. However, Africa remains behind in progress toward this target. In 2017, maternal mortality in Africa was estimated

at 525 deaths per 100,000 live births, with 803 women losing their lives every day [2].

Maternal health thus represents a major concern in sub-Saharan Africa where 66% of the world's maternal deaths occur [2]. Most of these deaths could be prevented if pregnant women received all the care they need in a timely manner, including maternal care during pregnancy, childbirth, and the postpartum period [2].

In such a context, in December 2019, a new pandemic, that of the coronavirus 2019 (COVID-19) began in China and quickly spread across the globe with a very high number of deaths, especially in Asia, Europe, and America. In Africa, 1,353,517 cases of COVID-19 have been reported with 32,576 deaths as of September 13, 2020 [3]. The COVID-19 pandemic, given its contagiousness and the large number of deaths associated with it, has led to the desertion of health services by the population, for fear of being infected. Decrease of the utilization of maternal health services has been reported in different across African countries [4, 5].

In Guinea, little is known about the influence of the COVID-19 pandemic on maternal health indicators. Indeed, Guinea presents a particular context in that it experienced from 2014 to 2016 the Ebola epidemic that negatively affected its health system [6] and bereaved its population [7]. In the aftermath of this epidemic, national and international efforts were made to strengthen the health system in order to make it resilient to future epidemics. With the onset of the COVID-19 pandemic a few years later, it is important to know how this pandemic crisis affected maternal and reproductive health indicators in the country. The objective of this study is to assess the effect of the COVID-19 pandemic on maternal and reproductive health services in the health district of Forécariah, one of the districts in the country that experienced the Ebola epidemic and the COVID-19 pandemic.

## 2. Methods

### 2.1. Study Setting

#### 2.1.1. General Setting

Guinea is a West African country of 245,857 km<sup>2</sup>. It has nearly 13.9 million inhabitants (2022), most of whom are illiterate (32%) and live in rural areas (63.4%) [8]. Almost half (44%) of Guineans lived below the poverty line in 2018 [8]. The country is composed of four natural regions (Lower Guinea, Middle Guinea, Upper Guinea and Forest Guinea), eight administrative regions and 33 prefectures. Its capital, Conakry, is composed of five communes.

Guinea's health system is based on a three-tier pyramid: primary, secondary and tertiary. The primary level (413 health centers and 726 health posts), secondary level (7 regional and 26 prefectural hospitals, 8 communal medical centers), and tertiary level (3 national hospitals).

#### 2.1.2. Specific Setting

This study was conducted in the Forécariah health district. This district is composed of an urban commune and nine sub-prefectures, all of which are covered by at least one cell phone network, and whose population was estimated at 243,000 inhabitants in 2014 [9].

The population of Forécariah is mainly composed of farmers and fishermen and their main language is Susu. During the 2013-2015 EVD epidemic, the health district recorded 484 EVD cases, including 336 deaths. Forécariah has experienced community resistance to Ebola response activities [7]. The district has 29 health posts, 10 health centers (one urban and nine rural), and one referral hospital. Caesarean sections are performed at the referral hospital and the improved health center in Maferinyah.



Figure 1. Guinea map with the research site.

### 2.2. Study Design and Period

This was an analytical cross-sectional study of routine data

from 01 March to 30 April 2019 and 01 March to 30 April 2020. The first case of COVID-19 was reported in Guinea on March 12, 2019.

### 2.3. Study Population

Women of childbearing age (15-49 years) residing in the Forécariah health district between March 2019 and May 2020.

### 2.4. Sampling

The information of all women having sought maternal or reproductive health services in the health centers belonging to the Forécariah health district between 01 March to 30 April 2019 and between 01 March to 30 April 2020.

### 2.5. Data Collection

The data were collected using a pre-established Excel file, from the monthly reports of health centers. Data were collected on the variables of maternal health service attendance (ANC1, ANC4 or plus, facility-based deliveries), maternal health service utilization (Sulfadoxine-Pyrimethamine tablets, ITNs, HIV counseling, HIV testing).

### 2.6. Data Analysis

Descriptive data were analyzed using Microsoft Excel version 16; comparisons were performed using Stata 16 software.

Monthly trends in coverage of selected services were described as epidemiological curve before and during the COVID-19 pandemic. To estimate monthly coverage, the numbers of pregnant women or children receiving services were divided by the target population sizes for each health center, respectively.

Comparisons between pre and intra-COVID-19 coverage were done using Pearson Chi square test, with the significance level was set at 5%.

## 3. Results

### 3.1. Influence on ANC Coverage

The pre-COVID-19 trend in ANC1 coverage was up from 55% in March 2019 to 62% in April 2019. This trend was slightly down at the start of the COVID-19 pandemic from 58% to 56% (Figure 2). However, overall coverage over this period did not statistically change from pre-COVID-19 (58%) to

COVID-19 (57%) (Table 1).

As for ANC4+ coverage, it had a declining trend before the pandemic from 49% to 34%; however, over the first two months of the pandemic, it increased from 23% to 36% (Figure 1). But, a significant decrease was observed in ANC4+ coverage from 42% before COVID-19 to 29% during COVID-19 (Table 1).

### 3.2. Influence on Malaria Services

For malaria services offered to pregnant women, coverage was down for SP4+ tablets both pre-COVID-19 and during COVID-19 (Figure 3). However, overall pre-pandemic coverage (33%) was significantly higher than during the pandemic (27%;  $p$ -value  $<0.001$ ).

Coverage of pregnant women with ITNs had a rather increasing trend before the COVID-19 pandemic, as it did during the pandemic. Nevertheless, overall pre-pandemic coverage dropped statistically significantly from 34% before the pandemic to 28% during the first two months of the pandemic ( $p$ -value  $<0.001$ ).

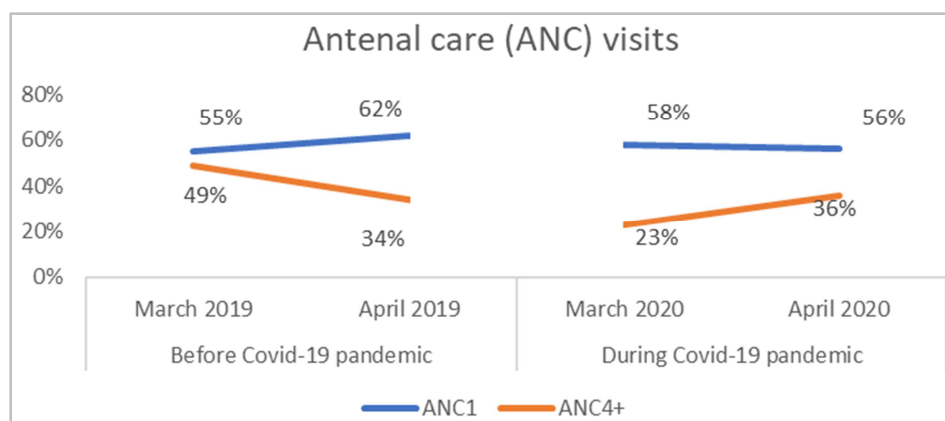
### 3.3. Influence on HIV Services

The trend in HIV counseling coverage of pregnant women was down in the pre-COVID-19 period (from 80% to 64%), but slightly up (from 61% to 62%) in the first two months of the pandemic (Figure 4). Overall coverage decreased significantly from 72% before the pandemic to 61% during the pandemic ( $p$ -value  $<0.001$ ).

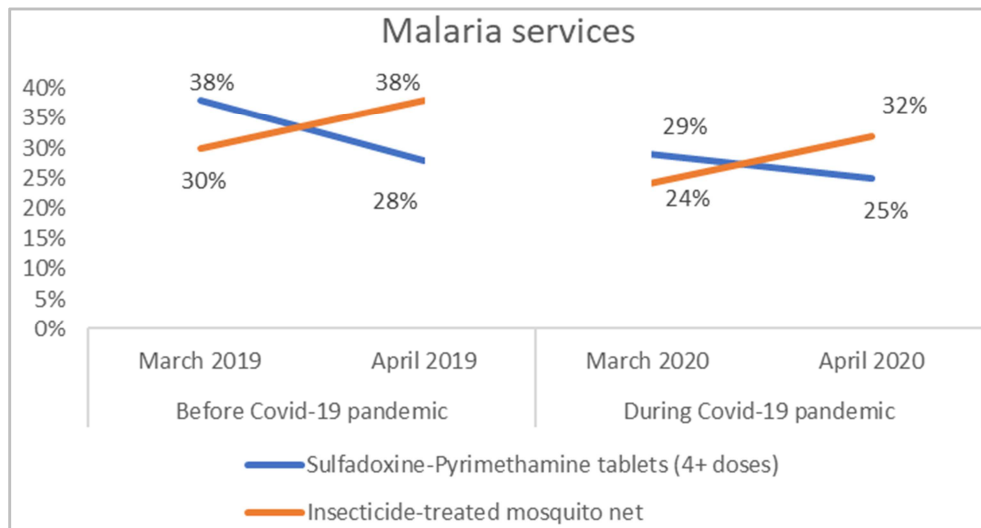
Coverage of women tested for HIV had an increasing trend before the pandemic, compared with a flat trend during the first two months of the pandemic (Figure 3). General coverage dropped significantly from 43% before the pandemic to 8% during the pandemic ( $p$ -value  $<0.001$ ).

### 3.4. Influence on Deliveries in Health Facilities

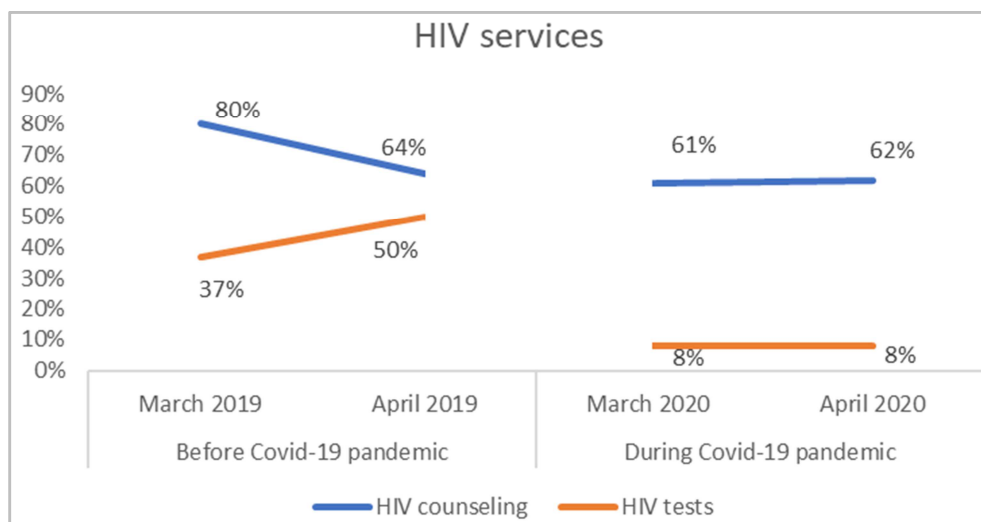
The trend in health facility delivery coverage was downward both before COVID-19 and during COVID-19 (Figure 5). Overall coverage during the pre-COVID-19 study period dropped significantly from 27% to 22% during COVID-19 ( $p$ -value  $<0.001$ ).



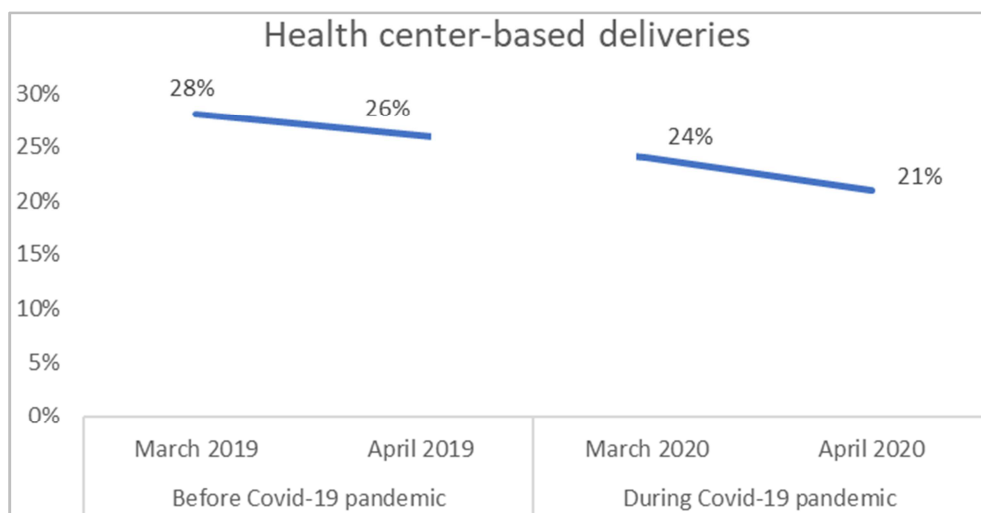
**Figure 2.** Monthly trends of antenatal care coverage before (March-April 2019) and over the first two months (March-April 2020) of the COVID-19 pandemic in the health district of Forécariah, Guinea.



**Figure 3.** Monthly trends of coverage in malaria services offered to pregnant women at health centers (March-April 2019) and over the first two months (March-April 2020) of the COVID-19 pandemic in the health district of Forécariah, Guinea.



**Figure 4.** Monthly trends of coverage in HIV services offered to pregnant women at health centers (March-April 2019) and over the first two months (March-April 2020) of the COVID-19 pandemic in the health district of Forécariah, Guinea.



**Figure 5.** Monthly trends of coverage in health center-based deliveries (March-April 2019) and over the first two months (March-April 2020) of the COVID-19 pandemic in the health district of Forécariah, Guinea.

**Table 1.** Comparison of coverage in selected maternal health services provided at health centers before (March-April 2019) and over the first two months (March-April 2020) of the COVID-19 pandemic in the health district of Forécariah, Guinea.

Indicators	Pre-COVID-19 period N (%)	First 2 months of COVID-19 N (%)	P-value
Coverage ANC visits	N=2992	N=3224	
ANC1	1709 (58%)	1837 (57%)	0.548
ANC4+	1312 (42%)	944 (29%)	<0.001
Coverage malaria services	N=2992	N=3224	
Sulfadoxine-pyrimethamine (4+ doses)	953 (33%)	880 (27%)	<0.001
Insecticide-treated mosquito net	994 (34%)	908 (28%)	<0.001
HIV services			
HIV counseling	2095 (72%)	1978 (61%)	<0.001
HIV test	1266 (43%)	258 (8%)	<0.001
Coverage facility-based deliveries	N=2992	N=3224	
Health-center based deliveries	780 (27%)	713 (22%)	<0.001

## 4. Discussion

This study is one of the first to examine the early impact of the COVID-19 pandemic in Guinea. It reveals that within the first two months of its declaration, the COVID-19 pandemic led to a decline in the use of maternal health services in Guinea, despite the context of strengthening the post-Ebola health system. The findings therefore have important implications for maternal health policy in Guinea.

First, this negative influence of the COVID-19 pandemic on maternal health indicators raises questions about the resilience of the health system that was targeted by post-Ebola health system strengthening efforts. In the aftermath of the Ebola outbreak in the country, the Guinean government and its partners had undertaken several actions to build resilience to future epidemics [10]. These included recruiting additional health workers, building the capacity of health workers to provide safe health services in times of epidemic, improving infection prevention measures in health facilities, and raising community awareness for preventive measures within communities.

The decline in the use of maternal health services in this context of health system strengthening could be explained by two things. First, the persistence of bad memories of Ebola that still negatively influence community perceptions and that were reactivated by the COVID-19 pandemic crisis [11, 12]. A study published in 2020 suggested that two years after the Ebola epidemic, rural communities in Guinea still had memories of Ebola that influenced their care-seeking behavior [13]. The second aspect that could explain the decline in the use of maternal health services is the global psychosis created by the pandemic because of its high contagiousness and the staggering number of deaths that were attributed to it [3, 14, 15, 16]. Indeed, long before its declaration in Guinea, the COVID-19 pandemic, already declared in China and the West, had been predicted to be worse in Africa where health systems are less efficient and infection prevention measures are weak. COVID-19 was thus perceived in Africa as a new epidemic crisis that challenged health systems a priori and that had to be avoided by not visiting health facilities. This study therefore recommends health system strengthening actions focused on improving community confidence in the health system even during an epidemic crisis.

In addition, it should be noted that the COVID-19 pandemic has deprived a large proportion of pregnant women of recommended essential services such as malaria prevention and HIV services. In Ethiopia, a study reported that the COVID-19 pandemic negatively influenced the use of routine HIV services [17]. Our results imply an increase in pregnancy and childbirth complications as a consequence of the COVID-19 pandemic in Guinea. It is therefore important to highlight the risk of increased maternal mortality as a collateral consequence of the COVID-19 pandemic in Guinea. More efforts are needed to strengthen the resilience of the maternal health system to future epidemic crises similar to COVID-19.

The COVID-19 pandemic has also been a significant barrier to women delivering their babies in health facilities. It has been reported that the COVID-19 pandemic has led to declining coverage of institutional delivery in several low- and medium-resource countries, with fears of increased maternal deaths as a result. [4]. The pandemic thus becomes a major barrier to women's access to emergency obstetric care, exposing more women to maternal mortality in the country.

Although ANC4+ coverage declined overall during the pandemic compared to before the pandemic, it is important to note that its trend over the first two months of the pandemic in Guinea was upward, from 23% in March to 36% in April, while the trend of the same indicator was downward over the similar period of the year before COVID-19. This increasing trend over the first months could imply an increase in morbidity cases among pregnant women in the last trimester of pregnancy at the beginning of the epidemic crisis. The increase in the frequency of maternal health problems due to the COVID-19 pandemic has been previously reported by studies.

The first limitation of this study is that it used retrospective data, which did not allow analysis of the experiences of demand and supply of maternal health care in times of COVID-19. Qualitative studies in this direction could help to better illuminate these aspects. Second, this study was confined to the first two months of the pandemic; therefore, it did not allow for an understanding of the trend in maternal health indicators over the course of the COVID-19 pandemic.

## 5. Conclusion

This study shows that the COVID-19 pandemic, from the first two months of its declaration in Guinea, caused a decline in prenatal consultations, in the use of essential malaria and HIV services for pregnant women, and in deliveries in health facilities.

It thus reveals the vulnerability of the maternal health system to the COVID-19 pandemic and questions the resilience of the post-Ebola health system.

To ensure the resilience of maternal health services in the face of epidemics, this study recommends actions to strengthen the health system by improving community confidence in the health system, even during an epidemic crisis.

## List of Abbreviations

ANC: Antenatal Consultation  
 SP: Sulfadoxine – Pyrimethamine  
 ITN: Insecticide-Treated Net  
 HIV: Human Immunodeficiency Virus  
 WHO: World Health Organization.

## Declarations

### *Ethical Approval and Consent to Participate*

This is not an interventional study, so there is no risk of negative effects for participants. This study involved anonymized and aggregated routine data of women and children attending health facilities in Forécariah.

However, before the study began, its research protocol was validated by a scientific committee of the Faculty of Health Sciences and Techniques of the Gamal Abdel Nasser University of Conakry. And a formal authorization was obtained from the managers of the health facilities before the exploitation of their data.

### *Availability of Data and Materials*

Anyone interested in obtaining the data used in this study for scientific purposes may make a request to the authors of this article.

### *Competing Interests*

The authors stated that there is no competing interest.

### *Consent for Publication*

Not applicable.

### *Authors' Contributions*

Niouma Nestor Leno, *Study design, data analysis, manuscript drafting*. Mabinty Toure, Christine Timbo Songbono, Mathias Dore, Appolinaire Souwla THEA, Jean Baptiste Dey Loua, Lucie Haba, *data collection and literature review*. Bienvenu Salim Camara, *Review of study design and manuscript review*. Alexandre Delamou, *Review and validation of study design and manuscript review*.

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