Central African Journal of Public Health
2022; 8(4): 151-157
http://www.sciencepublishinggroup.com/j/cajph
doi: 10.11648/j.cajph.20220804.13
ISSN: 2575-5773 (Print); ISSN: 2575-5781 (Online)

Waiting Time in the Chain of Care for COVID-19 in Guinea, 2020-2021

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To cite this article:

Sadou Sow, Alpha Oumar Diallo, Manengu Casimir Tshikolasoni, Idrissa Diallo, Abdoulaye Sow, Fode Bangaly Diakité, Check Tidiane Sidibe, Aamadou Bailo Diallo, Jean Konan Kouame, Georges Alfred Kizerbo, Ahmadou Barry, John Chukwudi, Traore Tieble, Mamadou Oury Balde. Waiting Time in the Chain of Care for COVID-19 in Guinea, 2020-2021. *Central African Journal of Public Health*. Vol. 8, No. 4, 2022, pp. 151-157. doi: 10.11648/j.cajph.20220804.13

Received: June 10, 2022; **Accepted**: July 4, 2022; **Published**: July 20, 2022

Abstract: Introduction: SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2), emerged in December 2019 in Wuhan, China. The objective of this study was to assess the waiting time at each stage of COVID-19 case management in Guinea. Methodology: Prefectures with confirmed COVID-19 cases were the setting for this study. This was an evaluative cross-sectional survey of 440 participants. We performed a descriptive analysis of the data over periods: March- June and July-November 2020. The study focused on health professionals practicing in the epidemiological treatment centers and diseases. Results and discussion: The study involved a total of 440 participants including 125 health workers, 299 discharged cured (67.95%) and 141 still hospitalized (32.05%). About 90.36% of the subjects surveyed came from five communes of the special city of Conakry, namely Matoto (26.14%), Matam (14.55%), Ratoma (22.95%), Dixinn (13.18%) and Kaloum (4.55%) and the prefectures of Coyah (4.09%) and Dubreka (4.09%). Regarding gender, in total, 68.41% of the subjects surveyed were men and 31.59% were women, i.e. a sex ratio of 2.17. The waiting time for the results was longer between March and June compared to July and November without any statistically significant difference. The results of our study showed that the professional experience does not influence the change of attitude among the agents of care in the epidemiological treatment centers.

Keywords: Waiting Time, Care, COVID-19, Guinea and Significant Statistical Difference

1. Introduction

SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2), emerged in December 2019 in Wuhan, China. The new human disease is called Coronavirus Disease-2019 (COVID-19, for short) by the World Health Organization in February 2020 [1].

Currently in the world, there are more than 10 million confirmed cases and with more than five hundred thousand deaths. The International Committee on Taxonomy of Viruses named the new virus SARS-CoV-2 in February 2020. This new disease called COVID-19 presents with fever, dry cough, dyspnea, headache and pneumonia [2]. According to results from studies conducted by the WHO, SARS CoV-2 RNA can be detected in patients within one to three days before the onset of symptoms. Other studies have also shown that the duration of RT-PCR positivity would typically be one to two weeks for asymptomatic or pauci asymptomatic individuals. This positivity can be as long as 3 weeks depending on the degree of disease, i.e. mild to moderate. In some cases, this positivity could be longer in patients with a severe form of COVID-19 [3]. In recent history, we have recorded the following situations:

In 2012, about 10 years later, another coronavirus triggered Middle East respiratory syndrome (MERS-CoV) in Saudi Arabia with 858 deaths out of 2494 confirmed cases, [4].

Eight years later, that is, in late 2019, a new zoonotic coronavirus (SARS-CoV-2) and responsible for coronavirus-19 disease (COVID-19), appeared in Wuhan, China [4]. Because of its rapid spread, COVID-19 became a pandemic in only a few months. Some authors have stated that the virus enters through the mucous membranes of the upper respiratory tract, later affecting the lungs [5]. Given the magnitude of the pandemic, the World Health Organization (WHO) classified it as a "Public Health Emergency of International Concern" on January 30, 2020. According to current literature data as of July 7, 2020, 11,780,467 cases have been confirmed with 6,775,477 cured and 541,775 deaths [6].

In the United States the epidemic has progressed very rapidly with a high case fatality of 2,582,938 confirmed cases for 125,974 deaths [7]. In South America, Brazil is currently the country most affected by COVID-19. The epidemic curve of coronavirus follows that of the most affected European countries such as France, Spain, Italy and the United States [8].

In Europe, as of July 7, 2020, the main endemic outbreaks are concentrated in the United Kingdom 196806 cases with 43575 deaths, Italy 241146 confirmed cases and 34786 deaths, Spain 248970 confirmed cases and 28346 deaths and France 201389 confirmed cases resulting in 29813 deaths. The rest of Europe has not been spared, with Russia counting 617202 confirmed cases and 8061 deaths [9].

In Africa, according to the African Center for Disease Control and Prevention, the continent has 144291 confirmed cases with 2529 deaths [10]. Although less impacted compared to other continents, the African continent has not been spared by the COVID-19 pendemia. The first case in Africa appeared in February 2020 in Egypt and currently, all 54 countries of the continent have been affected by the coronavirus. The African continent is diversely affected by the coronavirus. South Africa is the most affected country on the continent with 144,291 confirmed cases resulting in 2,529 deaths followed by Egypt with 66,754 confirmed cases and 2,872 deaths [11].

The West African sub-region has been no exception to the spread of COVID-19. Among the countries affected are Nigeria, 66754 confirmed cases with 2,872 deaths followed by Ghana 17351 confirmed cases with 112 deaths [12].

Guinea reported its first case of COVID-19 on March 12, 2020 in the city of Conakry. As of July 12, 2020, Guinea had a total of 6044 confirmed cases, of which 559 were hospitalized, 4802 were cured, and 37 died in hospital. As of May 16, 2020, out of 10903 cases tested, 2563 cases were positive, representing a positivity index of 23.5%. Of the 2563 positive cases, 2245 (92.5%) are from the city of Conakry, 152 (6.3%) from Kindia, 23 (0.9%) from the region of Boké and the rest of the cases are from other regions [1].

Of the 2,312 cases in the health districts, 823 (35.6%) are in Ratoma, 569 (24.5%) in Matoto, 274 (11.9%) in Dixinn, 237 (10.3%) in Matam, 229 (9.9%) in Kaloum, 109 (4.7%) in Coyah, 37 (1.6%) in Dubreka, and 18 (0.8%) in Fria. The other prefectures affected are Boké, Pita, Kankan, Labé and Faranah [13].

Faced with this situation and in order to limit the spread of the disease to other regions, the Guinean government and its partners have taken strong measures to try to curb the epidemic in Guinea. This resulted in the declaration of two periods of state of emergency from March 26 to May 15, 2020, and from May 16 to June 15, 2020, with an extension to July 15, 2020 [14].

Early management of COVID-19 cases is a priority to reduce lethality, avoid complications and sequelae. The capacity to manage epidemics varies from one country to another and sometimes within the same country depending on the context. In order to face this pandemic, the country has set up care structures. The establishment of epidemiological treatment centers (CTePi) should ensure enhanced response capacity and preparedness for future disease outbreaks and other health emergencies [15].

In our experience during the Ebola epidemic, only decentralization of curative care can reduce the time between the first symptoms and the initiation of treatment. The chosen strategy should ensure the availability of adequate treatment at all levels of the health pyramid. Treatment centers should be set up to cover all health districts affected by the epidemic.

To this end, the Ministry of Health, through the National Health Security Agency and its main partners such as WHO, CDC, IOM, and MSF, has put in place response strategies to limit the spread of the disease.

However, despite these efforts, the accessibility of patients to treatment centers, the waiting time of patients at the level of the sampling sites, the waiting time at the level of the different epidemiological treatment centers for their care and their release once the control test is negative still seem to pose problems and deserve to be analyzed.

Although the mode of transmission of the disease and the treatment protocol are known, clinicians and public health professionals must make an effort to improve the waiting time for patients throughout the process from specimen collection, the time from the day of collection to the delivery of results, the reception of patients at the CT-Epi and their release at the CT-Epi when patients test negative. Currently, we have insufficient information on patient waiting time. The results of this study will be able to address these areas of uncertainty.

So far, it is unclear what the wait time is at each step of this process. This paper presents results from an evaluative cross-sectional survey to understand the waiting time at each stage of the management of COVID-19 cases in Guinea.

2. Methods

The health district that recorded at least ten confirmed cases of COVID-19 formed the framework of this study. This was a cross-sectional survey with an evaluative aim. The data were collected from health professionals working in epidemiological treatment centers, screening sites, confirmation laboratories, and patients. Patients hospitalized in epidemiological treatment centers or recovered from COVID-19 aged 18 years and over, health workers working in epidemiological treatment centers, laboratory assistants, or sampling agents with mental ability to answer questions were included in the study.

The investigation focused on hospitals. The variables studied were socio-demographic, clinical and the opinion of the people surveyed. For patients, random sampling was done from the sampling frame provided by the National Health Security Agency (ANSS).

The sample size (n) was calculated using the Raosoft sample size calculator [16]. The Roasoft sample size calculator is based on the following conventional formula: $\eta = Z^2 \times P \times Q/d^2$. With a 5% margin of error, and a 95% confidence level, the value of Z is equal to 1.96; the degree of precision is estimated at 0.05 when α = 5%. Since the P proportion of the good quality COVID-19 care system is not known, we will apply the WHO principles (P = 50% and Q = 50%). The sample size thus calculated for the survey will be 384. With an adjustment of 5% as the non-respondent rate, the chosen sample size is 402 people.

In this process, the first step is to determine the demographic weight of each health district within each health category. We interviewed 299 recovered from COVID-19, 125 healthcare workers in all categories, and 65 inpatient laboratory assistants and sampling agents. Data collection took 11 days, including training and pre-survey.

Epi data 3.1 software, Excel, and SPSS were used for data entry and analysis. We did a descriptive analysis of the data. Chi-square test and (95%) confidence intervals were calculated for the qualitative variables. Participation in the study was free and voluntary. The protocol was submitted and validated by the National Commission of Ethics for Health Research (CNERS).

Table 1. *Distribution of respondents people according to their sociodemographic characteristics (March-December 2020).*

Sociodemographic Charateristics	Number (N = 440)	%	95% CI	
Region				
Conakry	358	(81,36)	77,46	84,73
Kindia	57	(12,95)	10,13	16,42
Boké	25	(5,68)	3,88	8,25
Health district				
Matoto	115	(26,14)	22,25	30,44
Ratoma	101	(22,95)	19,27	27,11
Matam	64	(14,55)	11,56	18,15
Dixinn	58	(13,18)	10,34	16,66
Kindia	24	(5,45)	3,69	7,99
Boké	22	(5)	3,32	7,45
Kaloum	20	(4,55)	2,96	6,92
Coyah	18	(4,09)	2,6	6,37
Dubreka	18	(4,09)	2,6	6,37
Profile of participants				
Recovery	299	(67,95)	63,45	72,14
Hospitalized	141	(32,05)	27,86	36,55
Sex				
Female	139	(31,59	27,42	36,08
Male	301	(68,41	63,92	72,58
Age range				
Less than 30 years	129	(29,32)	25,26	33,74
From 30 to 39 years	135	(30,68)	26,56	35,14
From 40 to 49 years	81	(18,41)	15,07	22,3
From 50 to 59 years	48	(10,91)	8,33	14,17
From 60 to 69 years	42	(9,55)	7,14	12,65
70 years amd more	5	(1,14)	0,49	2,63
Occupation				
Health care	72	(21,43)	17,38	26,13
Pupil / student	43	(12,8)	9,64	16,79
Workers	43	(12,8)	9,64	16,79
Military	42	(12,5)	9,38	16,47
Economist	29	(8,63)	6,08	12,12
Driver	25	(7,44)	5,09	10,75
Household	22	(6,55)	4,36	9,71
Trader	16	(4,76)	2,95	7,59
Engineer	8	(2,38)	1,21	4,63
Teachers	6	(1,79)	0,82	3,84
Journalist	6	(1,79)	0,69	5,11
Computer scientist	5	(1,49)	0,46	4,73
Others	19	0,6	0,16	2,14

3. Results

The table analysis showed that Conakry remains the epidemic's epicenter as 81.36% of the people surveyed come from Conakry, followed by the Kindia region, 81.36%, and 5.68% from the Boke region.

Concerning the health districts, 63.44 of the participants come from four large communes of Conakry, namely Matoto, Ratoma, Dixinn, and Matam respectively 26.14%, 22.95%, 14.55%, and 13.18%.

Regarding the age range of the participants in this study, the table shows that the 30-39 age group is the most represented, i.e., 30.68%.

Concerning the profession of the people surveyed, 21.43 of those who responded to our study were health workers.

Table 2. *Distribution of respondents by waiting time and periods.*

Waiting Time	**Periods**			**Significance**
	Mar-Nov 2020	**Mar to Jun 2020**	**Jul to Nov 2020**	
Before sampling (in minutes)				
Average	201.23	307.38	119.51	$\chi^2 = 7.26$
Standard Deviation	652.53	822.64	468.04	P = 0.007
Maximal time waiting	5760	5760	5760	
Minimal time waiting	30	30	30	
After sample (in days)				
Average	2.58	3.31	2	
Standard	1.4	1.45	1.22	
Deviation	5	5	5	
Maximal time waiting	1	1	1	
Minimal time waiting				

(X^2 = 44,87; P value = 0,000)

The average waiting time for patients at the collection sites was 202 minutes (over 3 hours). This average time is greater in the first four months of the response, 308 minutes (5 hours) compared to the last five months (July to November), 120 minutes (2 hours). The wait time was longer in the first phase (March to June) of the epidemic than the second phase (July to November).

Analysis of the data showed that 51.14% of the respondents waited less than one hour before being collected, while more than 23% waited between 1 hour and 24 hours, and 2.28% waited more than 24 hours.

About 6% of the subjects surveyed waited at least 24 hours before collecting. This shows the slowness of activities at the sampling site and the discouragement of patients (X^2 = 7.26; P-value = 0.007).

The average waiting time for results was 2.58 days. It was 3.31 days from March to June 2020 and 2.01 days from July to November 2020. Indeed, 33.64% of the respondents waited at least 24 hours before receiving their results, 43.42% waited between 1 and 4 days, while 17.95% of the respondents waited more than 4 days before receiving their results. The maximum waiting time for results was 5 days. Waiting for results was longer in the first phase (March to June) of the epidemic compared to the second phase (July to November) (X^2 = 44.87; P-value = 0.000).

Table 3. *Distribution of subjects by waiting period for attention from March to December 2020.*

Waiting period for attention	**Number**	**%**	**95% CI**	
Waiting for results after sampling				
One day	148	33.64	29.38	38.18
Two days	87	19.77	16.32	23.75
Three days	85	19.32	15.9	23.27
Four days	41	9.32	6.94	12.4
More than 4 days	79	17.95	14.65	21.81
Total	440	100.00		
Time to admission to the epidemiological treatment centre in days				
Same day	420	95.45	93.08	97.04
One day	9	2.05	1.08	3.84
Two days	7	1.59	0.77	3.25
Three days	2	0.45	0.12	1.64
Four days	1	0.23	0.04	1.28
Five days	1	0.23	0.04	1.28
Total	440	100.00		
Waiting time at reception				
Less than one hour	307	69.77	65.33	73.88
One Hour	53	12.05	9.33	15.42
Two hours	32	7.27	5.2	10.09
Three hours	10	2.27	1.24	4.13

Waiting period for attention	Number	%	95% CI	
More than three hours	38	8.64	6.36	11.63
Total	440	100.00		
Time to contact caregiver at CT-epi				
As soon as arrived	298	67.73	63.22	71.93
One hour later	71	16.14	12.99	19.86
Two hours later	25	5.68	3.88	8.25
Three hours later	14	3.18	1.9	5.27
More than three hours later	32	7.27	5.2	10.09
Total	440	100.00		
Time taken to administer first dose				
Less than one hour	247	56.14	51.47	60.7
One Hour	74	16.82	13.61	20.6
Two hours	26	5.91	4.06	8.52
Three hours	57	12.95	10.13	16.42
One day	29	6.59	4.63	9.31
Two days	5	1.14	0.49	2.63
Three days	2	0.45	0.12	1.64
Total	440	100.00		

X^2 = 43,9192; P value = 0,000).

Regarding the time taken for patients to be admitted to the epidemiological treatment centers, almost all the subjects surveyed, i.e., 95.45%, were admitted to a treatment center on the day their results were announced. However, some patients waited up to five days or more to be admitted to a treatment center. This delay in admission to the epidemiological treatment centers was due, on the one hand, to inadequate logistics and, on the other hand, to the reluctance of patients to go to the treatment centers in the first place since many patients refused to go to the treatment centers in the first place.

Concerning the origin of the patients, it appears from this table that 68.18% of patients come from their home/residence/village, i.e., 11.36%, from the sampling sites, i.e., 10.23%, from the health facilities, i.e., 6.82% and the workplace, i.e., 11%.

With regard to the channels for transmitting results, it emerged from this analysis that more than half, i.e., 57.73% of the subjects surveyed, received their test results by telephone call, while 33.40% of the subjects surveyed stated that they had received their results through medical staff, and a small proportion, i.e., 3.63%, received their results either by e-mail or by SMS. For those who were employed, 2.27% of the participants stated that they received their results either through their boss/chief or through their colleagues on duty and the remaining 2.5% of the subjects surveyed went themselves to get their results.

4. Discussion

The study involved 440 participants: 299 discharged cured (67.95%) and 141 still hospitalized (32.05%). The participants were surveyed in the administrative regions of Conakry, Kindia, and Boke, respectively 81.36%, 12.95%, and 5.69%. About 90.36% of the respondent came from the commune of Matoto (26.14%), Matam (14.55%), Ratoma (22.95%), Dixinn (13.18%) and Kaloum (4.55%)) and the prefectures of Coyah (4.09%) and Dubreka (4.09%). Up to 68.41% of the respondents were men and 31.59% were women, i.e., a sex ratio of 2.17. These differences in proportions between men and women could be explained by the fact that COVID-19 affected more men than women in Guinea during the period of our survey (national data). The average age was 38, 37 years old, with a standard deviation of + or -13.02. The average patient wait time at the collection sites was 3 hours. This time was longer in the first phase: March-June (5 hours), than in the second phase of July-November (2 hours). Most of the respondents said that this long waiting time is a source of discouragement. In our study 51, 14% of the respondents waited less than an hour before being collected, while more than 23% waited between 1 hour and 24 hours. The average wait time for results was 2.58 days. This period varies from 3.31 days from March-June to 2.01 days from July to November.

Analysis of the results showed that 33.64% of respondents waited at least 24 hours before receiving their results, and 43.42% waited between 4 and 5 days. The wait for results was longer in the first phase (March to June) of the epidemic compared to the second phase (July to November). It emerges from this analysis that the sampling sites' waiting time and the results' rendering is longer during the first phase compared to the second phase. This difference in average waiting time could be explained by the fact that the care workers were not sufficiently trained at the beginning of the pandemic on the care guide developed by the ANSS. In addition, a disproportion between the insufficient number of support staff in the CT-Epi and the high number of people tested for COVID-19. Some patients who tested positive could wait at least 4 hours in the collection sites before being transferred. This prolonged waiting time for patients at the sites led to the theme to escape, reluctance, and sometimes the revolt of parents or accompanying people. Regarding the time taken to admit patients to the Epidemiological Treatment Center, 95.45% of the respondents claimed to be admitted to the treatment center the same day as their result was announced. Among them, 68.18% of the patients went to the Epidemiological Treatment Center from their home/residence/village, and 11% were transferred from the sampling sites.

The rapid reception of patients was increased because 93% of patients arriving at the epidemiological treatment centers were received less than 3 hours. Analysis of the results obtained showed no statistically significant difference between the 2 phases of the response period (phase 1 from March to June and phase 2 from July to November 2020). The satisfaction ratio for March-June versus July-November is 0.64 (95% CI 0.38 to 1.07. (X^2 = 2.53; P = 0.11). The same is true for the interval between the collection of samples and the submission of results (one day or more day) X^2 = 1.24 and P = 0.6, and taking the first dose of treatment X^2 = 1.58 and P = 0.2. On the other hand, there is a statistically significant difference between the quality of the food that the patients receive in the epidemiological treatment centers (P = 0.0001); the waiting time of the patients at the sampling site (P = 0.030), how the results were returned to the patients (P = 0, 00001); waiting for patients to be received in treatment centers (P = 0.00001); time to first contact between patients for their hospitalization and the care agents (P = 0, 0057) and patient satisfaction. These factors influence the overall assessment of the quality of care.

Regarding the confidentiality of health workers in epidemiological treatment centers, only 34.09% of the respondents said that health workers find an isolated place to talk about their health problems; this situation would be the cause of reluctance and attempt to escape. The supply of drinking water was effective in the various treatment centers concerning the results of the analysis: 99.96% of the respondents declared having received drinking water. Among them, 84.99% say they are satisfied with the water quality they received during their stay. Dietary diversification was effective in almost all epidemiological treatment centers, as 96.59% of the respondents affirmed that there was dietary diversification during their stay. With regard to catering, 98.41% of the respondents appreciated the catering in terms of quantity, i.e., 3 meals per day. However, the agents did not make any efforts concerning dietary advice because 53.64% of the respondents said that they had never received dietary advice. The low proportion of dietary advice provided by care providers could negatively affect patients with co-morbid conditions. Post-hospitalization follow-up is lacking at all levels of the health pyramid.

It emerges from this analysis that only 8.18% of respondents declared having benefited from post-hospitalization follow-up. Regarding behavior change for fear of contracting COVID-19, 89.30% of respondents said they changed their behavior for the risk of contracting COVID-19. Hand washing (48.16%), physical distancing (45.82%), and correct wearing of masks (38.46%) were the main preventive measures used by patients and recovered. The provision of personal protection means to cure people was unsuccessful because 86.96% of the respondents claimed to have never received bibs, thermo flash, or disinfectants from the agents in charge of care when they leave epidemiological treatment centers. The study involved 125 health workers with an average 32.05 ± 6.11 years. The most represented treatment centers are Gbessia (30, 40%) and Donka (28%). Compared to professional categories, doctors are the most represented among the health personnel respondents (42%), followed by nurses (31, 20%). Regarding the attitude of health workers in the care of COVID-19 and their professional experience in dealing with a patient with a fever of 38°C and a runny nose, the analysis of data showed that there is no statistically significant difference between medical and paramedical staff and the length of experience of fewer than 5 years and more than 5 years. In other words, whether they are medical personnel with less than 5 years of experience or more than 5 years, the two medical and paramedical groups have the same chances of carrying out the same behavior as well. Professional experience does not influence the change in attitude among care workers in epidemiological treatment centers. Professional experience X^2 = 0.06; P = 0.81). Professional category (X^2 = 0.06; P = 0.81).

5. Conclusion

This study was carried out by collecting the opinions of confirmed cases cured of COVID-19 and the agents involved in the management of cases at the level of the various CT-PIS of the health districts that registered and treated positive cases. The patient waiting period was long throughout the patient care circuit. This long waiting time for patients during treatment has resulted in a lack of trust between patients and the care staff, the refusal of patients to cooperate after waiting days and sometimes even more than a week before getting their results, and even not being sure because of false statements. It should also be noted that this long waiting period discouraged the population from going to the sampling sites but rather preferred going to traditional healers.

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[16] With a 5% margin of error, and a 95% confidence level, the value of Z is equal to 1.96; the degree of precision is estimated at 0.05 when α = 5%. Since the P proportion of the good quality COVID-19 care system is not known, we will apply the WHO principles (P = 50% and Q = 50%). http://www.raosoft.com/samplesize.html.