BRIEF REPORTS

Analysis of COVID-19 mortality in patients with comorbidities in Côte d'Ivoire

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Abstract

Background: Although COVID-19 has spread in Côte d'Ivoire, there is no report that summarizes the comorbidities of COVID-19 death cases.

Objective: To verify the types and prevalence of commodities associated with recorded COVID-19 deaths compared with the general adult population in Côte d'Ivoire.

Methods: Data on the comorbidities of COVID-19 deaths and the country's disease structure were collected from official government reports and WHO's reports.

Results: Among 67 patients studied, the biggest age group was 60-69 years old with 23 people (34%). Fifty-four patients (81%) had non-communicable diseases (NCDs) as comorbidities. The prevalence ratio between COVID-19 deaths and general adult population was 8.96 [95% Confidence Interval: 6.86-11.68] for diabetes, 1.74 [1.27-2.37] for hypertension, and 2.16 [1.32-3.51] for obesity.

Conclusions: To reduce the risk of death from COVID-19 in Côte d'Ivoire, focused infection prevention measures for elderly and diabetic patients are needed.

Keywords: COVID19 comorbidity, Côte d'Ivoire, non-communicable disease.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) spread rapidly to countries around the world after it had caused an outbreak in Wuhan, Hubei Province, China at the end of 2019. The World Health Organization (WHO) issued a pandemic declaration in March 2020. The risk factors for COVID-19 aggravation and deaths include advanced age and non-communicable diseases (NCDs), such as hypertension, diabetes, chronic obstructive pulmonary disorder, cardiovascular diseases, and cerebrovascular disease.[1−5]

In Côte d'Ivoire, one of the West African countries, reports of positive cases have not stopped since a returnee from Italy was reported as the first case of infection in March 2020. At the same time, the country's medical system is fragile, and the number of usable beds for intensive care is limited to 76 in public hospitals.[6] Since the number of beds in a COVID-19-compatible isolation environment is even fewer, the country's healthcare system can collapse due to the COVID-19 epidemic. As of November 15, 2020, the government has announced a cumulative number of 20,976 positive cases, and the death toll was 128.[7]

The government published the comorbidities of deaths in the country only from March 27, when the first COVID-19 death occurred, to July 7, 2020. Since then, the COVID-19 infection epidemic report[8] issued by the health ministry has not summarized the comorbidities of fatal cases. This study aimed to verify the types and prevalence of commodities associated with recorded COVID-19 deaths compared with the general adult population in Côte d'Ivoire.

MATERIALS AND METHODS

We reviewed the official website of the health ministry for reports regarding COVID-19 infected persons and fatalities in Côte d'Ivoire.[9] Information on the population and disease structure of Côte d'Ivoire was collected from the official documents and websites of the government and WHO.[10,11]

For information on COVID-19 deaths, we reviewed descriptive statistics on the age, sex, date of death, place of death, presence or absence of comorbidities, and disease name in the reports that were released

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by the government. For diabetes, hypertension, and obesity, the prevalence ratio between the prevalence among COVID-19 deaths and the prevalence among adults in the country was calculated. The confidence interval (CI) for the prevalence ratio was calculated based on the country's population. The study covered cases reported from March 27, 2020, when the first COVID-19 death occurred in Côte d'Ivoire, to July 7, when the comorbidities were published for the last time.

Because this study was predominantly based on secondary data available in public domain and did not involve any contact with human or animal subjects, an ethical review was not applied.

RESULTS

Since the first report of COVID-19 infection in Côte d'Ivoire to July 7, 2020, the cumulative number of positive cases has reached 11,194, and the death toll is 76. Nine of the 76 patients had no information on the presence or absence of comorbidities or the situation at the time of death. In this study, 67 people, whose age, sex, date of death, place of death, presence or absence of comorbidities, and disease name, were reported, were included in the analysis.

Among 67 patients studied, 47 were male, while 20 were female. The average age was 59.5±12.8 years, and the biggest age group was 60-69 years old with twenty-three people (34%). The place of death was public healthcare facilities for 40 patients (60%) and private hospitals for 23 patients (34%) (Table 1).

Of the 67 subjects, comorbidities were reported in 56 (84%), of whom 54 (81%) had NCDs as comorbidities. The NCDs, in descending order of frequency, included diabetes in 30 patients (45%), hypertension in 25 patients (37%), and obesity in 13 patients (19%) (Table 1). Twenty-eight people had overlapping NCD comorbidities. Among them, 18 had two diseases, and nine had three diseases.

According to WHO 2014-2016 data,[10] the chronic conditions or diseases with the highest prevalence among adults over the age of 18 in Cote d'Ivoire were diabetes (5%), hypertension (21.5%), and obesity (9%). The prevalence ratio calculated between

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the prevalence among COVID-19 deaths and the prevalence among adults in the country was 8.96 [95% CI: 6.86-11.68] for diabetes, 1.74 [95% CI: 1.27-2.37] for hypertension, and 2.16 [95% CI: 1.32-3.51] for obesity (Table 2). In all the three diseases, the prevalence among COVID-19 deaths was significantly higher than that among general adults.

DISCUSSION

This study revealed that in the country, the proportion of COVID-19 deaths, involving NCDs as comorbidities, was high at 81%. Previous studies[2,4,12−15] in other countries have also reported that patients with NCDs as comorbidities had an increased risk of COVID-19 aggravation or mortality, and similar results were obtained in Côte d'Ivoire. The age group between 60 and 69 years old had the highest number of deaths, and the tendency for the elderly to have a higher number of deaths was similarly observed in previous studies from other countries.[1,5]

According to the study's results, the prevalence ratio of COVID-19 deaths to general adults in the country is highest in diabetes, compared to hypertension and obesity. This suggested that the risk of death was extremely high among diabetics who contracted COVID-19. Previous studies have also shown that diabetes is associated with death due to COVID-19, but cardiovascular diseases and hypertension were similarly reported to pose a higher risk of aggravation and death.[4,14] This differed from our results, and the cause of this difference is unknown. When diabetics contract COVID-19, poor glycemic control increases the risk of aggravation and death.[16] A possible reason why the diabetes prevalence ratio was higher than that of the other diseases in this study, is the high number of patients in this country who have difficulty continuing treatment. This is due to the lack of public support for insulin treatment for adults over the age of 20, given the lack of widespread medical insurance.[17] Although further research is needed to clarify this, in order to reduce the risk of COVID-19 aggravation and death in the country, it is important to promote the continuation of treatment for patients particularly with diabetes among NCDs,

as well as focusing on infection prevention measures.

The prevalence of the three general adult diseases (diabetes, hypertension, and obesity) used in this study was taken from WHO data of unknown age composition. As such, age was not adjusted when the disease prevalence among COVID-19 deaths were compared in this study. Therefore, the analysis results of the prevalence ratio have not been controlled for age.

In addition, the analysis did not control for confounding factors because it uses only information published by the government of Côte d'Ivoire. The Côte d'Ivoire government is required to publish further data in order to understand the actual situation of COVID-19 deaths in the future and to consider countermeasures.

CONCLUSIONS

The study revealed that the COVID-19 deaths in Côte d'Ivoire had NCDs as comorbidities at a high rate of 81%. Most patients were aged 60 and over. Above all, the risk of death in diabetic patients is extremely high compared to that of hypertensive and obese patients, which differed from previous studies in other countries. To reduce the risk of COVID-19 death in Côte d'Ivoire, focused infection prevention measures for elderly and diabetic patients are needed.

INFORMATION

Availability of data and materials: All data generated or analyzed during this study are included in this published article.

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TABLE 1: Summary of COVID-19 fatalities and comorbidities in Côte d'Ivoire.

	Male	Female	Total	%
Total number	47	20	67	
Age group				
18-29	1	1	2	3
30-39	4	1	5	7
40-49	6	2	8	12
50-59	7	7	14	21
60-69	17	6	23	34
70-79	12	2	14	21
80-89	0	1	1	2
Place of death				
Public healthcare facility	29	11	40	60
CHU de Treichville	22	7	29	43
CHU de Yopougon	3	3	6	9
Another facility	4	1	5	7
Private hospital	15	1	23	34
Unknown	3	1	4	6
With comorbidities				
Yes, with NCDs*	38	16	54	81
Diabetes mellitus	20	10	30	45
Hypertension	17	8	25	37
Obesity	9	4	13	19
Cardiovascular disease	5	3	8	12
Chronic kidney disease	7	0	7	10
Cerebrovascular disease	1	2	3	4
Cancer	2	1	3	4
Asthma	1	0	1	1
Nicotine dependence	1	0	1	1
Yes, without NCD	1	1	2	3
No	8	3	11	16

Due to overlapping NCD comorbidities among several patients, the total counts of the diseases do not tally with the total number of the patient with NCDs.

TABLE 2: Prevalence ratio of 3 diseases between COVID-19 deaths and general adults.

	Diabetes mellitus	Hypertension	Obesity
Number of COVID-19 deaths in the study population (%)	30 (45%)	25 (37%)	13 (19%)
Disease prevalence, over 18y in Côte d'Ivoire*	5%	21.5%	9%
Prevalence ratio [95%CI]	8.96 [6.86-11.68]	1.74 [1.27-2.37]	2.16 [1.32-3.51]

Source: WHO 2014-2016 and Côte d'Ivoire census 2014.