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COVID-19 in Bouake (Côte D'Ivoire): Comparative Study of the Epidemiological, Clinical, Therapeutic, Evolutionary and Prognostic Aspects in Younger and Elderly Patients

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Abstract

Introduction: The clinical manifestations of many diseases vary with age, and older people often do not show typical symptoms of the disease. The present study aims to compare the epidemiological, clinical, therapeutic and evolutionary aspects of elderly patients with COVID-19 compared to young adult patients and to identify risk factors for mortality. **Patients and Methods:** This was a retrospective single-center analytical study conducted from January 27, 2021 to January 27, 2022 at the COVID-19 Care Center of the Infectious and Tropical Diseases Department of the Bouaké University Teaching Hospital. The study population consisted of all patients aged at least 18 years seen in consultation and/or hospitalized with a positive COVID-19 RT-PCR. The patients were divided into two groups: younger patients (<60 years old) and elderly patients (≥60 years old). Data analysis was done with SPSS software. The statistical tests used were the chi-square test, Fisher's exact test depending on the validity conditions and univariate and multivariate logistic regression with a significance level of 0.05. **Results:** Of a total of 779 patients, 644 (82.7%) were young. The median age of all patients was 41 years (IQR 32 - 54, extreme 18 and 96). Of all the patients 38.5% had a comorbidity. Compared

to younger patients, chronic heart disease (61.7% vs 21.5%; p < 0.0001) and diabetes (23.4% vs 10.9%; p = 0.006) predominated in elderly patients. Patients were symptomatic in 89.2% of cases. In the elderly patients, the predominant symptoms were cough (85.1% vs 66%; p < 0.0001), dyspnea (48.7% vs 17.9%; p < 0.0001), ageusia (48.8% vs 24%; p < 0.0001), diarrhea (8.3% vs 3.3%; p = 0.013), impaired consciousness (4.1% vs 1.2%; p = 0.041) and insomnia (2.5 vs 0.3; p = 0.011). Younger patients were hemodynamically more stable unlike elderly patients (p < 0.0001). The therapeutic modalities were different in the two groups (p < 0.0001). The duration of confinement or hospitalization did not differ statistically according to the two groups (p = 0.551). The evolution was favourable in 92.9%. A total of 55 patients died, including 23 (3.6%) younger patients and 32 (23.7%) elderly patients with a significant difference between the two groups (p < 0.0001). Mortality risk factors were age (p < 0.001), dyspnea (p = 0.001), impaired consciousness (p = 0.020) and fever (p = 0.009). **Conclusion:** Elderly people with COVID-19 have a different clinical presentation from younger, characterized by more atypical symptoms. Mortality risk factors are age, dyspnoea, impaired consciousness and fever. It is therefore necessary to act on its various factors to improve the prognosis of COVID-19 in this age group.

Keywords

Epidemiology, Coronavirus, SARS-Cov2, Age, Bouaké

1. Introduction

Since November 2019, an outbreak of coronavirus disease 2019 (COVID-19) has hit Wuhan, China [1]. It is a disease that causes severe acute respiratory syndrome (SARS) caused by the SARS-CoV-2 virus, and which is transmitted by air, from person to person through close contact with an infected person. The disease spread rapidly in several countries around the world and was declared in March 2020 by the World Health Organization (WHO) as a pandemic [2]. Over the period from December 31, 2019 to January 27, 2022, 367,009,330 confirmed cases and 5,657,166 deaths from COVID-19 were recorded worldwide [3]. All age groups are affected by the disease. Current scientific evidence indicates that older people have a higher risk of serious illness and mortality from COVID-19, especially those with comorbidities [4] [5]. The main symptoms of COVID-19, as identified by the Centers of Disease and Control and Prevention (CDC), include fever, cough, shortness of breath or difficulty breathing, fatigue, muscle or body aches, headache, loss of taste or smell, sore throat, stuffy or runny nose, nausea or vomiting, and diarrhea [6]. However, it is well documented that the clinical manifestations of many diseases vary with age and that older people often do not show typical symptoms of the disease [7] [8]. This may delay diagnosis and worsen prognosis in this population. Literature data has shown that, the mortality rate of COVID-19 increases rapidly with age. Thus, this rate is less

than 1% for people aged under 50 and reaches 1.3% at age of 50, 3.6% for those aged 60, 8% for people in their seventies and 14.8% for octogenarians [1]. Côte d'Ivoire is one of the countries in the world with a relatively young population of which only 4.5% of the population is over 60 years old [9]. In this country in 2020, UNICEF data noted a 25% percentage of patients over the age of 60 with COVID-19 [10]. However, data on clinical manifestations and prognostic factors in elderly people with COVID-19 as well as their particularity compared to young people are scarce or non-existent. The present study aims to compare the epidemiological, clinical, therapeutic and evolutionary aspects of elderly people with COVID-19 compared to young adult people and to identify risk factors for mortality.

2. Patients and Methods

This was a single-center, analytical retrospective study conducted over a period of 12 months from January 27, 2021 to January 27, 2022. It took place at the COVID-19 Care Center of the Infectious and Tropical Diseases Department (ITDD) of the University Teaching Hospital (UTH) of Bouaké. The ITDD Bouaké COVID-19 Care Center is located within the Bouaké University Teaching Hospital, 350 km from Abidjan, the economic capital, the only tertiary level center covering approximately 60% of the national territory. This center has three units, namely a consultation unit, a hospitalization unit and an intensive care unit. The hospitalization and resuscitation rooms are individual and are equipped with a wall-mounted oxygen device. The reception and the visit of the patients were daily and ensured by the doctors helped in their task by the nurses, caregivers and hospital service agents. The study population consisted of all patients aged at least 18 seen in consultation and/or hospitalized. Were included all asymptomatic or symptomatic patients, contact cases or not and whose RT-PCR for COVID-19 after a nasopharyngeal swab was positive. Were not included in the study, all suspected cases and patients whose medical records were not usable. A total of 779 patients were selected for the study and divided into two groups: young patients (<60 years old) and elderly patients (≥60 years old). Patients meeting the inclusion criteria underwent a clinical examination by an infectious disease specialist. This clinical examination was meticulous and aimed to look for signs of hemodynamic instability (sepsis, septic shock or hemodynamic shock) and signs of vital distress (respiratory distress, dehydration, hyperthermia, adynamia). Patients with no signs of hemodynamic instability and/or vital distress were confined to their homes. Patients who were hemodinamically unstable and/or with signs of vital distress were hospitalized at the ITDD COVID-19 Care Center at the Bouaké UTH. Hospital and home visits were daily. The variables studied were sociodemographic, clinical, therapeutic, evolutionary and prognostic. This study was carried out after obtaining the authorization of the Medical and Scientific Department and the Head of Service of the ITDD of Bouaké. The collection of data was done from a pre-established survey sheet, including the study variables. The information collected was made anonymous by a coding system. Data were

entered and analyzed using Statistical Package for the Social Sciences Software (SPSS), version 22.0; IBM Corporation, Somers, NY, USA. The characteristics of the two groups were compared. Continuous variables were expressed as the median with interquartile range (IQR) as well as the extremes, and compared by the Z test. The qualitative variables were expressed as proportions and compared by the chi-square test and Fisher's exact test depending on the validity conditions. The search for mortality risk factors was made by univariate and multivariate logistic regression with calculation of the R-squared coefficient of Nagelkeke and Cox and Snell. The significance level of the statistical tests was set for a value of $p \leq 0.05$.

3. Results

3.1. Epidemiological Characteristics

Of a total of 779 patients, 644 (82.7%) were young. The median age of all patients was 41 years (IQR 32 - 54, extreme 18 and 96). The median age of younger patients was 38 years (IQR 30 - 46, extreme 18 and 59). In elderly patientd, the median age was 70 years (IQR 64 - 74, extreme 60 and 96). Among all the patients, the male gender represented 50.1%, 43.5% were public servants and 83.1% exercising in an extra-hospital environment. Of all the patients 38.5% had a comorbidity. Common patient comorbidity was chronic heart disease (32.3%), diabetes (14.3%) and asthma (11.3%). Compared to younger patients, chronic heart disease (61.7% vs 21.5%; $p < 0.0001$) and diabetes (23.4% vs 10.9%; $p = 0.006$) predominated in elderly patients. Contact cases represented 64.6% of all patients. Young patients were more contact cases than elderly patients ($p < 0.001$). The epidemiological characteristics of the patients are shown in Table 1.

3.2. Clinical Characteristics

There were 2 peaks in disease occurrence in September and January (Figure 1).

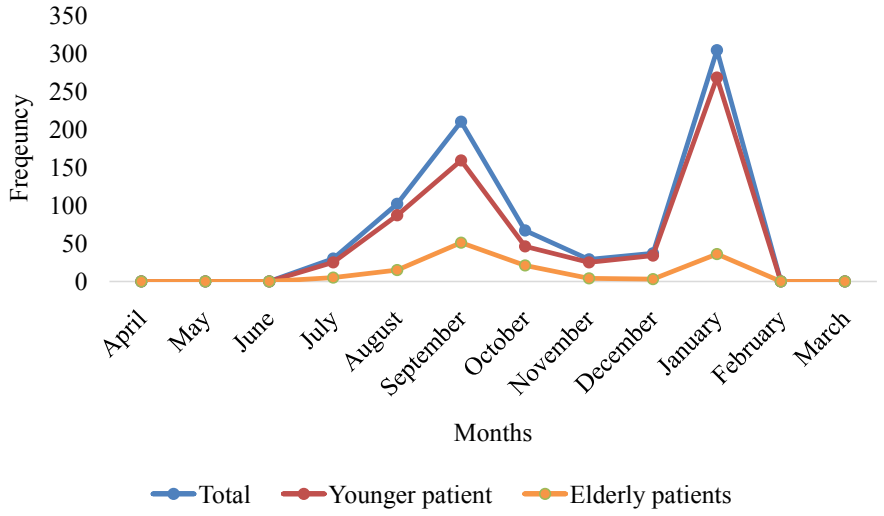

Figure 1. Distribution of patients according to the number of cases and the period.

Table 1. Epidemiological characteristics of patients.

Variables	Total (n = 779)	Elderly patients (n = 135)	Younger patients (n = 644)	p-value
Age (year)				
Median (IQR) [Min - Max]	41 (32 - 54) [18 - 96]	70 (64 - 74) [60 - 96]	38 (30 - 46) [18 - 59]	<0.0001
Gender (%)				
Male	390 (50.1)	80 (59.3)	310 (48.1)	0.019
Female	389 (49.9)	55 (40.7)	334 (51.9)	
Activity (%)				
Public servant	339 (43.5)	29 (21.5)	311 (48.3)	<0.0001
Student	122 (15.7)	0 (0.0)	122 (18.9)	<0.0001
Informal sector worker	99 (12.7)	7 (5.2)	92 (14.3)	0.004
Unemployed	219 (28.1)	99 (73.3)	119 (18.5)	<0.0001
Place of activity (%)				
Outside of hospital	647 (83.1)	133 (98.5)	514 (79.8)	<0.0001
Hospital	132 (16.9)	2 (1.5)	130 (20.2)	
Comorbidity (%)				
No	479 (61.5)	54 (40.0)	425 (66.0)	<0.0001
Yes	300 (38.5)	81 (60.0)	219 (34.0)	
Type of comoridity (%)				
Chronic heart disease	97 (32.3)	50 (61.7)	47 (21.5)	<0.0001
Diabetes	43 (14.3)	19 (23.4)	24 (10.9)	0.006
Asthma	34 (11.3)	5 (6.2)	29 (13.2)	0.086
Chronic blood disease	20 (6.7)	5 (6.2)	15 (6.8)	0.834
Chronic kidney disease	10 (3.3)	2 (2.5)	8 (3.7)	0.612
Chronic lung disease	8 (2.7)	4 (4.9)	4 (1.8)	0.138
HIV positive	7 (2.3)	1 (1.2)	6 (2.7)	0.444
Obesity	3 (1.0)	1 (1.2)	2 (0.9)	0.851
Contact case (%)				
No	676 (35.4)	131 (97.0)	545 (84.6)	<0.0001
Yes	103 (64.6)	4 (3.0)	99 (15.4)	

Patients were symptomatic in 89.2% of cases. Compared to the elderly patients, asthenia (47.9% vs 29.8%; $p < 0.0001$), fever (37.1% vs 19.8%; $p < 0.0001$) and anosmia (32.2% vs 14%; $p < 0.0001$) were more frequent in younger patients. In the elderly patients, the predominant signs were cough (85.1% vs 66%; $p < 0.0001$), dyspnea (48.7% vs 17.9%; $p < 0.0001$), ageusia (48.8% vs 24%; $p < 0.0001$), diarrhea (8.3% vs 3.3%; $p = 0.013$), impaired consciousness (4.1% vs

1.2%; p = 0.041) and insomnia (2.5 vs 0.3; p = 0.011). Signs of vital distress were found in 23.5% of all patients. The state of hemodynamic stability was different in the two groups (p < 0.0001). Younger patients were more stable unlike elderly patients. The clinical characteristics are represented in Table 2.

Table 2. Clinical characteristics of patients.

Variables	Total (n = 779)	Elderly patients (n = 135)	Younger patients (n = 644)	p-value
Symptomatology (%)				
Symptomatic	695 (89.2)	121 (89.6)	574 (89.1)	0.864
Asymptomatic	84 (10.8)	14 (10.4)	70 (10.9)	
Reason for admission				
General signs (%)				
asthenia	311 (44.7)	36 (29.8)	275 (47.9)	<0.0001
Fever	237 (34.1)	24 (19.8)	213 (37.1)	<0.0001
Headache	174 (25.0)	26 (21.5)	148 (25.8)	0.345
Dizziness	6 (0.9)	1 (0.8)	5 (0.9)	0.618
Respiratoiry signs (%)				
Cough*	482 (69.4)	103 (85.1)	379 (66.0)	<0.0001
Anosmia	202 (29.1)	17 (14.0)	185 (32.2)	<0.0001
Dyspnea	162 (23.3)	59 (48.7)	103 (17.9)	<0.0001
Sneezing	102 (14.7)	19 (15.7)	83 (14.5)	0.725
Rhinorrhea	38 (5.5)	7 (5.8)	31 (5.4)	0.866
Chest pain	11 (1.6)	3 (2.5)	8 (1.4)	0.416
Digestive signes (%)				
Agueusia	197 (28.3)	59 (48.8)	138 (24.0)	<0.0001
Diarrhea	29 (4.2)	10 (8.3)	19 (3.3)	0.013
Anorexiea	18 (2.6)	3 (2.5)	15 (2.6)	0.810
Odynophagia	17 (2.4)	2 (1.7)	15 (2.6)	0.773
Vomiting	15 (2.6)	3 (2.5)	12 (2.1)	0.945
Dysphagia	8 (1.2)	1 (0.8)	7 (1.2)	0.915
Abdominal pain	3 (0.4)	1 (0.8)	2 (0.3)	0.76
Neurological signs (%)				
Impaired consciousness	12 (1.7)	5 (4.1)	7 (1.2)	0.041
Insomnia	5 (0.7)	3 (2.5)	2 (0.3)	0.011
Physical signs (%)				
No vital distress signs	596 (76.5)	67 (49.6)	529 (82.1)	<0.0001
Vital distress signs	183 (23.5)	68 (50.4)	115 (17.9)	

*cough: total (wet 447; dry 34); younger patients (wet 347; dry 31); elderly patients (wet 100; dry 3).

3.3. Therapeutic and Evolutive Characteristics

The therapeutic modalities were different in the two groups. Homebound patients were younger patients in 80% of cases vs 60% elderly patients. Hospitalization concerned 40% of elderly patients vs 20% of younger patients ($p < 0.0001$). The main treatments were antiasthenics (83.2%), antibiotics (66.1%), analgesic-antipyretic (30.4%), oxygen (17.5%), glucocorticoid (17.5%) and anticoagulant (17.5%). Compared to younger patients, antibiotic (78.5% vs 63.5%; $p = 0.0008$), oxygen therapy (66.7% vs 15.8%; $p < 0.0001$), administration of glucocorticoid ($p < 0.0001$) and anticoagulant ($p < 0.0001$) predominated in the elderly patients. The median duration of confinement or hospitalization was 13 days (IQR 11 - 15, extreme 0 and 65). The duration of confinement or hospitalization did not differ statistically according to the groups of patients ($p = 0.551$). The evolution was favourable in 92.9%. A total of 55 patients died, including 23 (3.6%) younger patients and 32 (23.7%) elderly patients with a significant difference between the two groups ($p < 0.0001$). The therapeutic and evolutionary characteristics are presented in Table 3.

Table 3. Therapeutic and evolutionary characteristics of patients.

Variables	Total (n = 779)	Elderly patients (n = 135)	Younger patients (n = 644)	p-value
Therapeutic modalities (%)				
Confinement à domicile	596 (76.5)	81 (60.0)	515 (80.0)	<0.0001
Hospitalisation	183 (23.5)	54 (40.0)	129 (20.0)	
Type of treatment (%)				
Antiasthenic	648 (83.2)	77 (57.0)	571 (88.7)	<0.0001
Antibiotic	515 (66.1)	106 (78.5)	409 (63.5)	0.0008
Analgesic-antipyretic	237 (30.4)	23 (17.0)	214 (33.2)	<0.0001
Oxygen	136 (17.5)	90 (66.7)	102 (15.8)	<0.0001
Glucocorticoid	136 (17.5)	85 (63.0)	81 (12.6)	<0.0001
Anticoagulant	136 (17.5)	103 (76.3)	33 (5.1)	<0.0001
Flu medication	18 (2.3)	3 (2.2)	15 (2.3)	0.940
Antitussive	6 (0.8)	3 (2.2)	3 (0.5)	0.068
Bronchodilatator	6 (0.8)	3 (3.7)	2 (0.2)	0.053
Anxiolytic	3 (0.4)	2 (1.5)	1 (0.2)	0.079
Proton Pump Inhibitor (PPI)	1 (0.1)	1 (0.7)	0 (0.0)	0.173
Duration of confinement (day)				
Median (IQR) [Min - Max]	13 (11 - 15) [0 - 65]	13 (10 - 16) [0 - 57]	13 (11 - 15) [0 - 65]	0.551
Evolution (%)				
Favourable	724 (92.9)	103 (76.3)	621 (96.4)	<0.0001
Death	55 (7.1)	32 (23.7)	23 (3.6)	

Mortality risk factors between patients were analyzed. By univariate logistic regression (Table 4), the risk factors found were age ($p < 0.0001$), asthenia ($p = 0.010$), fever ($p = 0.009$), anosmia ($p = 0.048$), dyspnea ($p = 0.004$) and impaired consciousness ($p = 0.03$). In multivariate logistic regression (Table 5), the risk

Table 4. Mortality risk factors by logistic regression in univariate analysis.

	Value	Standard Error	Wald	Degree of freedom	p-value	OR	95% confidence interval	
							Minimum	Maximum
Age*	0.060	0.013	22.535	1	0.001	1.062	1.036	1.089
Gender	0.301	0.369	0.667	1	0.414	1.352	0.656	2.786
Contact case	17.57	3541.906	0.000	1	0.996	42735155.23	0.000	
Comorbidity	−0.89	0.488	3.355	1	0.067	0.409	0.157	1.065
Chronic heart disease	0.87	0.492	3.158	1	0.076	2.399	0.914	6.298
Asthma	0.48	0.981	0.242	1	0.623	1.620	0.237	11.075
Diabetes	0.07	0.589	0.018	1	0.895	1.081	0.341	3.426
Chronic blood disease	0.73	1.178	0.390	1	0.533	2.085	0.207	20.967
Chronic kidney disease	−0.16	1.213	0.017	1	0.895	0.852	0.079	9.176
Chronic lung disease	−0.45	1.196	0.143	1	0.706	0.637	0.061	6.630
HIV positive	−0.64	1.033	0.391	1	0.532	0.524	0.069	3.971
Obesity	−22.61	21336.082	0.001	1	0.999	0.000	0.000	
Asthenia	2.69	1.048	6.587	1	0.010	14.738	1.889	115.005
Fever	1.982	0.763	6.749	1	0.009	7.254	1.627	32.348
Cough	0.35	0.437	0.668	1	0.414	1.430	0.607	3.368
Anosmia	1.63	0.827	3.901	1	0.048	5.125	1.013	25.940
Dyspnea	−1.16	0.404	8.356	1	0.004	0.311	0.141	0.687
Agueusia	−0.30	0.460	0.443	1	0.506	0.736	0.299	1.813
Diarrhea	−0.48	0.825	0.333	1	0.564	0.621	0.123	3.130
Impaired consciousness	−1.33	0.735	3.276	1	0.03	0.264	0.063	1.117
Insomnia	−1.41	1.757	0.643	1	0.423	0.245	0.008	7.651

*increment of one unit.

Table 5. Mortality risk factors by logistic regression in multivariate analysis.

	Value	Standard Error	Wald	Degree of freedom	p-value	OR	95% confidence interval	
							Minimum	Maximum
Age*	0.060	0.010	33.003	1	0.001	1.062	1.040	1.084
Dyspnea	−1.188	0.345	11.861	1	0.001	0.305	0.155	0.599
Impaired consciousness	−1.601	0.686	5.449	1	0.020	0.202	0.053	0.774
Fever	1.948	0.744	6.853	1	0.009	7.015	1.632	30.164
Anosmia	1.425	0.760	3.521	1	0.061	4.159	0.939	18.428
Asthenia	1.428	0.767	3.461	1	0.063	4.170	0.926	18.766

*Increment of one unit. Cox and Snell R-squared = 0.421; Nagelkerke R-squared = 0.602.

factors for mortality remained age ($p < 0.001$), dyspnea ($p = 0.001$), impaired consciousness ($p = 0.020$) and fever ($p = 0.009$). Between 42.1% and 60.2% of the variability in dying from COVID-19 was attributable to these four factors (Cox and Snell R-square = 0.421; Nagelkerke R-square = 0.602).

4. Discussion

The work took place from January 27, 2021 to January 27, 2022 and aimed to compare the epidemiological, clinical, therapeutic and evolutionary aspects of elderly patients with COVID-19 to those of younger patients and to identify their mortality risk factors. The study shows that COVID-19 affects all types of adults with or without a comorbidities, with a predominance in younger patients. Clinical manifestations and evolution differ between younger and the elderly patients. Elderly patients were more prone to severe forms. Risk factors for mortality were age, dyspnea, impaired consciousness and fever. However, the results obtained must be nuanced. Indeed, this is a single-center study whose results cannot be representative of the profile of patients with COVID-19 in the Gbêkê region. Also, the retrospective nature of the study could be a source of bias due to missing data. In addition, the number of elderly patients included in this study was lower (approximately 1:5) than that of younger patients, which could contribute to a bias in the results. Despite the methodological limitations, the results of the study raise the following discussion points:

- **Epidemiological characteristics**

Of a total of 779 patients, 644 (82.7%) were younger patients. The median age of all patients was 41 years (IQR 32 - 54, extreme 18 and 96). Contact cases represented 64.6% of all patients. Younger patients were more contact cases compared to elderly patients ($p < 0.001$). This predominance of infected younger patients could be a reflection of the Ivorian population which is relatively young. Indeed, according to the 2016 demographic and health survey with multiple indicators [9] 95.3% of the population was under 60 years old. However, other factors could explain this result. First, younger patients may feel more compelled to have social interactions, regardless of the consequences on their health, which increases the rate of contact cases as in 84.6% of younger patients in this study. The number of contacts with infected people is a factor favoring infection, so the fewer contacts there are, the less chance there is of an infection resulting. Also, the elderly, feeling more vulnerable, may be more favorable to adhering to barrier measures. All of these factors likely acted in concert to produce the pattern of results achieved. Public health messages targeting young people in particular could be useful in addressing these factors and reducing the incidence of disease in this group.

In this study, COVID-19 affects both male and female patients (sex-ratio = 1). However, there is a female predominance in younger patients (51.9%) and a male predominance in elderly patients (59.3%), with a statistically significant difference ($p < 0.0001$). In the literature, only a few reports have addressed sex dis-

proportionality in the incidence and course of COVID-19. Reports from Switzerland and Germany have recently reported incidence rates (cases per 100,000 population by age and gender), which confirm an increase in the incidence of the disease in men over 60 years of age. However, there is no significant difference in incidence with respect to age and gender [11].

Patients were public servants in 43.5% of cases, with 83.1% working outside the hospital. This result is similar to that of KIM *et al.* [12] in 2020 in the USA where 93.2% of infected patients practiced outside hospitals. This low rate of infected hospital staff could be explained by the fact that hospital staff have knowledge of exposure to the disease and therefore precautions are taken on a daily basis to avoid being contaminated.

Of all the patients 38.5% had a comorbidity. Common patient comorbidity was chronic heart disease (32.3%), diabetes (14.3%) and asthma (11.3%). Compared to younger patients, chronic heart disease (61.7% vs 21.5%; $p < 0.0001$) and diabetes (23.4% vs 10.9%; $p = 0.006$) predominated in elderly patients. These results are similar to those of the main epidemiological studies carried out on COVID-19 [13] [14] and other studies comparing older patients with younger patients [15] [16]. This is not surprising given the positive association between age and comorbidity. Other authors have reported that patients with COVID-19 were more likely to have specific comorbidities, which may suggest that SARS-CoV2 is more likely to infect people with underlying chronic diseases [17].

- **Clinical characteristics**

Patients were symptomatic in 89.2% of cases. Younger patients were as symptomatic as elderly patients without statistically significant difference ($p = 0.864$). This result is similar to that of Jung *et al.* [18] in Korea in 2020, which noted that the mean and median age was similar between asymptomatic and symptomatic patients. However, compared to the elderly, asthenia (47.9% vs 29.8%; $p < 0.0001$), fever (37.1% vs 19.8%; $p < 0.0001$) and anosmia (32.2% vs 14%; $p < 0.0001$) were more common in younger patients. In the elderly, the predominant signs were cough (85.1% vs 66%; $p < 0.0001$), dyspnea (48.7% vs 17.9%; $p < 0.0001$), ageusia (48.8% vs 24%; $p < 0.0001$), diarrhea (8.3% vs 3.3%; $p = 0.013$), impaired consciousness (4.1% vs 1.2%; $p = 0.041$) and insomnia (2.5 vs 0.3; $p = 0.011$). Tan *et al.* [19] in 2021 in China showed that younger patients were more likely to develop fever than elderly patients. Anorexia was, however, more common in older patients than in younger patients. For Gomez-Belda *et al.* [20] in Spain in 2020, typical symptoms associated with a viral illness, such as fever (67.6% vs 51.3%; $P < 0.001$), dry cough (68.6% vs 56.6%; $P = 0.014$), myalgia (41% vs 23.7%; $P = 0.001$) or suspected COVID-19 symptoms, such as hyposmia (13.8% vs 2.6%; $P < 0.001$), were more common in younger patients. These results indicate that there may be differences in the pathogenesis and course of the disease between younger and elderly patients. It is well known that age can make diagnosis more complex, as infected elderly people often have atypical manifestations [1] [7]. It is therefore advisable to be cautious in this age group, especially during an epidemic, in

order to avoid misdiagnosis of COVID-19.

Signs of vital distress were found in 23.5% of all patients. The state of hemodynamic stability was different in the two groups, younger patients were more stable unlike elderly patients ($p < 0.0001$). Liu *et al.* [21] in 2020 in his study in China showed that elderly patients with COVID-19 are more likely to progress to severe disease. Reasonably, age-related comorbidities are the main cause of the severity of the disease observed in this age group as demonstrated by several studies [22] [23] [24]. However, practitioners should not necessarily extrapolate age-related trends from the population to the individual level. Otherwise, a patient may be considered high or low risk based on their age rather than their actual medical condition, which could lead to poor risk assessment and inadequate patient management.

- **Therapeutic and evolutionary characteristics**

The therapeutic modalities were different in the two groups. Homebound patients were younger patients in 80% of cases vs 60% elderly. Hospitalization concerned 40% of elderly patients vs 20% of younger patients ($p < 0.0001$). The main treatments administered were antiasthenics (83.2%), antibiotics (66.1%), analgesic-antipyretic (30.4%), oxygen (17.5%), glucocorticoid (17.5%) and anticoagulant (17.5%). Compared to younger patients, antibiotic therapy (78.5% vs 63.5%; $p = 0.0008$), oxygen therapy (66.7% vs 15.8%; $p < 0.0001$), administration glucocorticoid ($p < 0.0001$) and anticoagulant ($p < 0.0001$) predominated in the elderly. This could be explained by the high rate of unstable patients among the elderly patients observed in this study, thus requiring special medical care.

The median duration of confinement or hospitalization was 13 days (interquartile range 11 - 15, extreme 0 and 65). The duration of confinement or hospitalization did not differ statistically according to the groups of patients ($p = 0.551$). Length of hospital stay due to COVID-19 has been reported in several studies in China. A systematic review identified 52 studies and reported that the median length of hospital stay was 14 (IQR: 10 - 19, range: 4 - 53) days for China and 5 (IQR: 3 - 9, range: 4 - 21) days outside China [25]. However, in the literature, most reported risk factors related to length of hospital stay were advanced age and severity of signs [26] [27]. Chiam *et al.* [28] in Pennsylvania in 2021 noted an association between older age and longer length of stay. The difference with the results observed in this study may be of a methodological nature due to the low rate of elderly patients in this present study.

The evolution was faourable in 92.9%. A total of 55 (7.1%) patients died, including 23 (3.6%) among younger patients and 32 (23.7%) among elderly patients ($p < 0.0001$). Zhang *et al.* [29] in China in 2020 noted 18.47% of deaths with 59.46% among patients over 70 and 10.27% among those under 70. Several phenomena could explain this predominance of death in the elderly patients. Firstly, as in this study, older people are more likely to have comorbidities, such as heart disease, diabetes, and lung disease, and COVID-19 mortality is higher for people suffering from underlying conditions [13] [14]. Also, there is a decline in the immune response as age increases. And since COVID-19 is a new virus,

never seen before, it's important to have more immune cells available to fight it. As age increases, the availability of naive T cells and the ratio of CD4/CD8 T cells to fight off any new pathogen becomes depleted [30]. The probability of death increases exponentially with age among those who contract the virus in all countries where this has been analysed. In every country, the percentage of deaths increases sharply after age 50, and the highest rates occur among the oldest people. The evolution of death by age is clear in all countries, even if the mortality levels are quite different [31].

In this study, four risk factors were associated with mortality and more than half (51.15%) of the variability of dying from COVID-19, was attributable to these four factors (R-square of Cox and Snell = 42, 1%; Nagelkerke R-square = 60.2%).

The main factor was the age of the patient (very low standard error (0.010); p-value < 0.0001), with a 6.2% increase in excess risk (OR = 1.062) when the age of the patient increases by one year. In the literature, advanced age is known as a risk factor for COVID-19 mortality. This rate varies from less than 1% among people aged under 50 to 14.8% for octogenarians [8].

Dyspnea (p = 0.001; OR = 0.305; CI: [0.155 - 0.599]) was the second risk factor linked to mortality. This dyspnea would probably be a manifestation of impaired lung function and could be related to ARDS [24]. This respiratory manifestation can lead to respiratory failure and therefore death.

Other factors related to mortality were fever (p = 0.009; OR = 7.015; CI: [1.632 - 30.164]) and impaired consciousness (p = 0.020; OR = 0.202; CI: [0.053 - 0.774]). Gomez-Belda *et al.* [20] in Spain in 2020, found factors like age (p < 0.0001), impaired consciousness (p = 0.001) and hypoxia (p = 0.001).

5. Conclusion

In this preliminary study in Bouaké, we compared the epidemiological, clinical, therapeutic and evolutionary aspects of elderly patients with COVID-19 compared to younger patients and identified the risk factors for mortality. This study found that older people with COVID-19 have a different clinical presentation from younger adults, characterized by more atypical symptoms. This should be taken into account to avoid misdiagnosis of COVID-19 in this population. The prognosis in the elderly is poor. Mortality risk factors are age, dyspnoea, impaired consciousness and fever. It is therefore necessary to act on its various factors to improve the prognosis of COVID-19 in this age group.

Contribution of the Authors

All the authors participated intellectually in the preparation and revision of the manuscript before its submission.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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COVID-19 Elderly and Adult Survey Sheet at Bouaké

I) Sociodemographic aspects

1) Age (year): |__|__| 2) Gender: Male |__| Female |__|

3) Place of residence: Bouaké |__| Outside Bouaké |__|

4) Activity: Student |__| Informal sector |__| Public servant |__| None |__|

5) Place of activity: Hospital |__| Outside hospital |__|

6) Notion of contact with a positive person: Yes |__| No |__|

7) Notion of travel in the previous 15 days: Yes |__| No |__|

II) Clinical aspects

8) Comorbidity: Pneumonia |__| Asthma |__| Allergic rhinitis |__| Chronic Heart disease |__| Sickle cell disease |__| Diabetes |__| Obesity |__| Epilepsy |__| HIV/AIDS |__| Chronic Kidney disease |__| Others |_____| None |__|

9) Reason for admission: Fever |__| Arthralgia |__| Asthenia |__| Anosmia |__| Ageusia |__| Dry cough |__| Wet cough |__| Breathing difficulty |__| Abdominal pain |__| Diarrhea |__| Vomiting |__| Sneezing |__| Rhinorrhea |__| Rash |__| Lethargy |__| Disorder of consciousness |__| Others |_____| None |__|

10) Period of onset of signs (months): |_____|

11) Vital distress signs: Yes |__| No |__|

III) Therapeutic aspects

12) Therapeutic modality: Home |__| Hospitalization |__|

13) Date of hospitalization or confinement |___/___/_____|

14) Treatment administered: Oxygen |__| Paracetamol |__| Vitamin C |__| Antibiotic: Amoxiclav |__| Azithromycin |__| Doxycycline |__| Ceftriaxone |__| Chloroquine |__| Antiviral |__| Others |_____|

IV) Evolutionary aspects

15) Date of discharge from hospital or confinement or death |___/___/_____|

16) Issue: Healing |__| Death |__|