Factors Associated with the Outcome of Patients tested positive to Covid-19 at the Bertoua Regional Hospital-Cameroon

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ABSTRACT

Introduction: Coronavirus is indeed the greatest public health crisis of the 21st Century in living memories worldwide and Cameroon is not left out. The objective of this study was to analyse the factors associated with the outcome of Covid-19 patients at the Bertoua Regional Hospital (BRH).

Materials and Methods: The study was quantitative with descriptive and analytical aims, carried out over a period of 07 months from April to October 2020. The study population included investigation sheets of confirmed cases to Covid-19 during the period of study. Socio-demographic and clinical characteristics were the variables studied. Data analysis was purely descriptive, calculating prevalence and 95% confidence interval using SPSS software version 22.1.

Results: Out of the 958 investigations sheets of these confirmed cases at the BRH, the mean age of patients who tested positive to Covid-19 was 37.60 years old and the median of 35.50 ± 13.00 years old. The Lom and Djerem department was representative with 82.7%, 65.3% were men and 67.4% were traders/farmers/drivers. The case fatality rate was 2.9% and patients cared for at home were 4.7 times more at risk of death [95% CI : 1.33-16.66; p = 0.016], while those on oxygen therapy were 6.4 times more at risk [95% CI : 3.33-7.56 ; p = 0.021].

Conclusion: The site of care (V cramer=0,870) was the most associated variable to the outcome of patients who tested positive to Covid-19. The need to develop collaboration mechanisms as well as the culture of comparative analysis between hospital structures in the management of Covid-19 cases is imperative.

Keywords: Associated Factors, Outcome, Patients Tested positive, Covid-19, Bertoua, Regional Hospital, Cameroon.

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Introduction

Coronavirus disease (COVID-19), is an infectious disease caused by a newly discovered Coronavirus and causes persistent morbidity and mortality in the world, with 57,705,979 confirmed cases, 1,373,695 deaths, and a case fatality rate of 2.38% between December 31st, 2019, and November 21st, 2020.[1] This situation is

observed with an increase of approximately 32 million confirmed cases and approximately 566 thousand deaths from December 2019 to January 12th, 2021 in the World; 2,946,448 confirmed cases and 70 441 deaths in Africa and 27,336 confirmed cases and 451 deaths in Cameroon.[2] The East region, the 7th most affected region in Cameroon, has recorded 1,218 confirmed cases and 28 deaths.[3]

Moreover, apart from affecting most countries socially and economically, the current Covid-19 pandemic equally prompted the fear of falling sick, dying, helplessness, and stigma.[4] As well, this disease also created profound psychological distress and some important consequences on mental health including stress, anxiety, depression, frustration, and uncertainty worldwide.[5] It has completely changed the daily way of life, depriving the most basic rights such as those to coming and going, meeting, attending public events, going to restaurants, travelling, and going to work.[6] Globally, studies have focused for example, on the psychological impact of Covid-19 on emergency Health Care Workers[7], Clinical Profile and Treatment of Covid-19 patients [8], epidemiological profile of Covid-19, knowledge, and practices of its barrier measures[9], and the psychosocial experience of the pandemic.[10]

On the other hand, to prevent the situation from worsening further whilst breaking the chain of transmission, each country had implemented a number of preventive measures. The most common were: (i) closure of all borders; (ii) confinement; (iii) mandatory wearing of face masks in every public area; (iv) keeping 1.5 meters of social distancing; (v) prohibition of gatherings of more than 50 people throughout the country; (vi) regular hand washing with clean running water and soap within a time interval of 15-20 minutes; (vii) testing & treating patients; (viii) quarantining suspected persons through contact tracing; (ix) maintaining complete or partial lock down[11] and (x) use of traditional medicine.[12]

The persistence of cases of Covid-19, the restrictions and requirements it imposes on lifestyle habits and interactions remains a major problem that urgently needs to be investigated. The results of this study will guide us in a new strategic approach for a better response system and clinical management and also make it possible to reorient these strategies to fight against Covid-19. This goes in line with the principle from the Sustainable Development Goal (ODD) Number 3: “ensuring healthy lives and promote well-being for all at all ages”.

Study Design, Period and Setting: This was a quantitative study with descriptive and analytical aims, carried out over a period of 07 months from April to October 2020, on 958 investigation sheets of confirmed cases to Covid-19, and obtained using a systematic probability sampling.

Participants and sampling: The target population was made up of patients who tested positive for Covid-19 disease, isolated and receiving care at the care unit of the Bertoua Regional Hospital, and those being cared for at home.

Inclusion and Exclusion criteria: All patients tested positive to Covid-19 in the Bertoua Regional Hospital were included in

the study provided they met inclusion criteria which included; isolation (both at the care unit or home) and who gave their consent. The exclusion criteria were all those patients tested positive to Covid-19 by the Bertoua Regional Hospital, isolated (both at the care unit and home) who did not give their consent.

Data management and data analysis: The data collected by means of a collection grid were entered with CS Pro version 6.0 software, processed, and analysed using SPSS 25 and SPAD 5.5 software. Socio-demographic and clinical characteristics were the variables studied. We performed univariate, bivariate, and multivariate analysis. At the univariate level, the proportions were used to interpret results, Chi2 at the bivariate level and the Relative Risk (RR) at the multivariate level. The characteristics with a p-value of 0.05 at the binomial logistic regression were considered statistically significant.

Ethical Considerations: This study has received ethical approval (N°2020/020389/CEIRSH/ESS/MSP) from the Institutional Ethics Committee of Research for Human Health. It was approved institutionally by the Director of the Bertoua Regional Hospital (N° BPP757/L/MINSANTE/SG/DRSPE/BFP). Nasopharyngeal and blood samples were only taken from patients who signed an informed consent form, and only the investigator had access to their data, in order to respect the patient's confidentiality. Patients under the age of 21 have the parental consent form and the minor's assent form.

Results

Socio-demographic parameters of patients tested positive to Covid-19

Patients tested positive to Covid-19 were between 5 to 85 years old, with those of age 29 years being the most represented in the sample. The average age was 37.60 years old. Half of the participants were 35.50 ± 13.00 years old (Table1).

Central tendencies and dispersion	Parameters
Mean	37.60
Median	35.50
Mode	29.00
Standard deviation	13.00
Minimum	5.00
Maximum	85.00

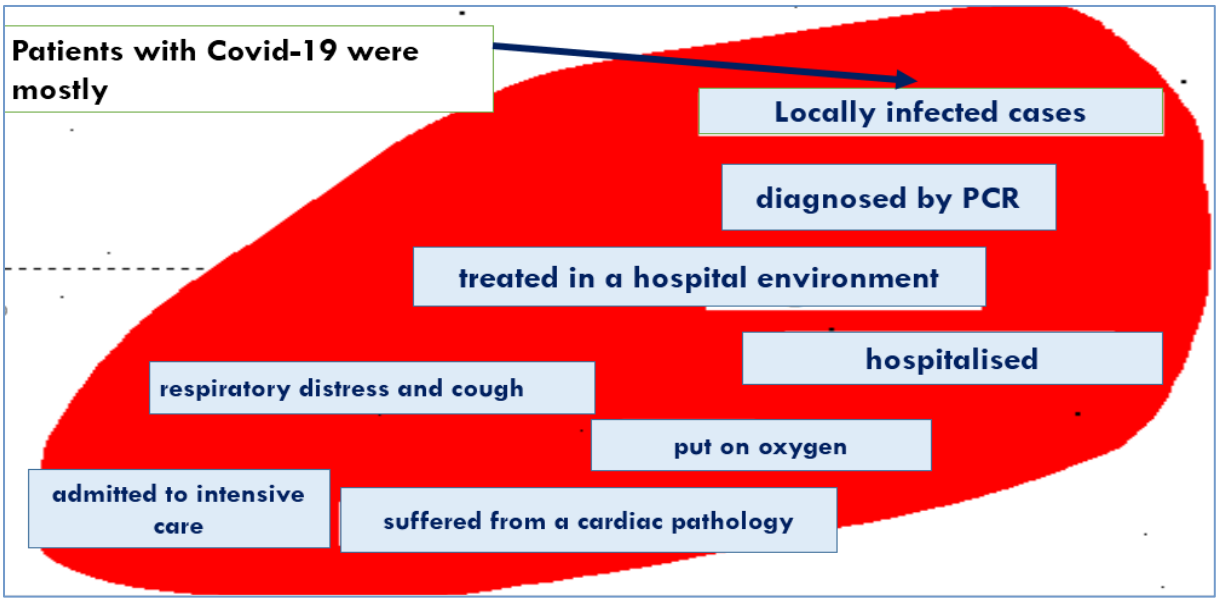
Table 1: Parameters of central tendencies and dispersion by age in the study

The samples included 958 investigation sheets of patients tested positive for Covid-19. The latter is most cases amongst these patients were men (65.3%), aged between 25-44 years old (56.9%), coming from the Lom and Djerem department (82.7%), occupying a status other than health care personnel (32.6%), and other professions such as traders, farmers and drivers (67.4%) (Table 2).

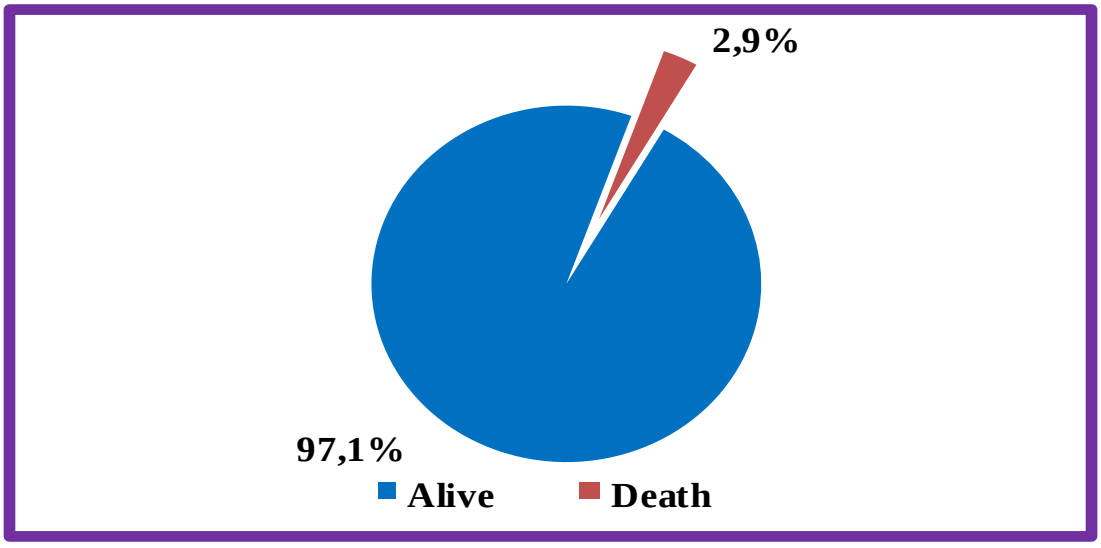
Variables	Effectif (N=958)	Percentage (P=100%)
Sex		
Male	626	65.3
Female	332	34.7
Age (years)		
5-24	110	11.5
25-44	545	56.9
45-64	196	20.5
65-85	35	3.7
Nd*	72	7,5
Department of origin		
Haut-Nyong	119	12.4
Kadey	47	4.9
Lom et Djerem	792	82.7
Profession		
Health care personnel	81	32.6
Traders/Farmers/drivers	875	67.4
Nd*	2	0.2

Table 2: Distribution of patients tested positive to Covid-19 according to their socio-demographic characteristics.

Patients with Covid-19 were mostly locally infected cases (85.4%), diagnosed by Polymerase Chain Reaction test (PCR) (58.1%), and treated in a hospital environment (85.6%). In addition to respiratory distress (31.3%) that patients presented, 3.4% of these cases suffered from a cardiac pathology. It is important to note that some cases were hospitalised (11.8%), others were put on oxygen (3.5%) and some, admitted to intensive care (0.4%).



Graph 1: Patient deaths were recorded in 2.9% (n = 28) of cases.



Graph 2: Outcome of patients tested positive to Covid-19.

The management of patients tested positive to Covid-19 (p = 0.000), the signs and symptoms (p = 0.016), the fact that a patient is put on oxygen (p = 0.000) and the type of screening (p = 0.004) are significantly associated with the 5% threshold and the

outcome of patients with Covid-19. In other words, the risk of death tends to be high when the dose is taken at home (10.1%) and amongst patients diagnosed by Rapid Diagnostic Test (RDT) (4.8%), presenting signs of respiratory distress/asthenia (3.4%), sometimes leading to oxygenation (11.8%) (Table3).

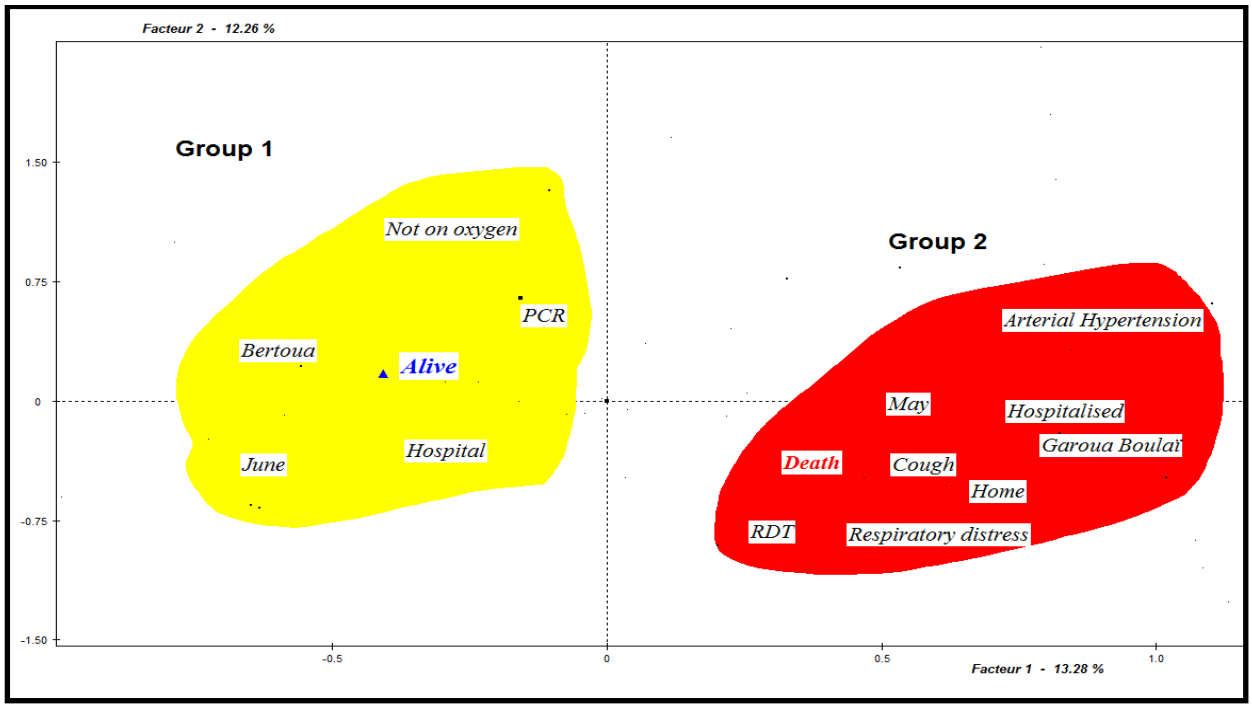
Clinical Variables	The Outcome of Patients tested positive to Covid-19			Chi2
	Alive N (%)	Death N (%)	Total N (%)	
Management of Covid-19 cases				
Hospitable	806 (98.3)	14 (1.7)	820 (100.0)	
Home	124 (88.9)	14 (10.1)	138 (100.0)	**0.000*** **
Total	**930 (97.1)**	**28 (2.9)**	**958 (100.0)**	
Signs and symptoms				
Cough/fever/others signs	381 (97.2)	11 (2.8)	392 (100.0)	**0.016** **
Respiratory distress / asthenia	490 (96.6)	17 (3.4)	507 (100.0)	
Total	**871 (96.9)**	**28 (3.1)**	**899 (100.0)**	
Patient on oxygen				
Yes	30 (88.2)	4 (11.8)	34 (100.0)	**0.000** **
No	855 (98.1)	17 (1.9)	872 (100.0)	
Total	**885 (97.7)**	**21 (2.3)**	**906 (100.0)**	
Type of screening				
PCR	548 (98.4)	9 (1.6)	557 (100.0)	**0.004** **
RDT	376 (95.2)	19 (4.8)	395 (100.0)	
Total	**924 (97.1)**	**28 (2.9)**	**952 (100,0)**	

*** Significant at 1%; ** significant at 5%; * significant at 10%.

Table 3: Association between the outcome of patients tested positive to Covid-19 and clinical variables

Factorial Analysis of Multiple Correspondances

The figure below shows two main groups: patients with a high risk of death (group 1) and those with the least. Allowing us to present the group at risk of death, whose characterization is as follows: the patients coming from Garoua Boulaï and under Rapid Diagnosis Test diagnosis, had the following signs and symptoms in April: fever, respiratory distress and as comorbidity, arterial hypertension. They were cared for at home or hospitalised in a hospital environment.



Graph 3: Profile of patients tested positive to Covid-19 at risk of death or not, at the Bertoua regional hospital.

Explanatory multivariate analysis

The type of treatment and the fact of being on oxygen are risk factors that influence the outcome of patients with Covid-19 at the 5% level. All other things being equal, patients tested positive to Covid-19 who received care at home were 4.71 (95% CI 1.33-16.66; p = 0.016) times more at risk of death, unlike their counterparts whose follow-up was done in a hospital setting. Likewise, this risk was high in those who have been on oxygen (RR = 6.40, 95% CI. 3.33-7.56, p = 0.021), unlike those who have not (Table 4).

Clinical factors	Relative risk	CI (95%)	More - value
Type of support			
Hospitable	4.71	1.33 – 16.66	**0.016****
Home	(Réf.)		
Have been on oxygen			
Yes	6.40	3.33 – 7.56	**0.021****
No	(Réf.)		

Table 4: Influence of clinical factors on the outcome of patients tested positive to Covid-19.

Discussion: The results of our study after processing 958 investigation sheets show that the average age of patients with Covid-19 is 37.60 years old. This central tendency parameter is close to that of Marcellin et al.[9] in the Eastern region of Cameroon who found out that 38.18 years old was the average age. These disagree with those of Akram et al.[13] in Bangladesh and Guan et al.[14] in China who reported 40.2 and 47 years old respectively as average ages. Although we noted that they conducted a cross-sectional study which is similar to ours, the differences observed could also be explained by the variations in the sample sizes. Marcellin et al.[9] had carried out a cross-sectional study from April 5th to July 30th, 2020 among 1,003 participants infected with Covid-19 or having been in contact with infected cases. Similarly, Akram et al.[13] also conducted a cross-sectional study from April 15th to April 30th, 2020, on 1,082 samples positive to SARS CoV-2. The study by Guan et al.[14] in April 2020 looked at data extracted from 1,099 laboratory-confirmed Covid-19 patients in 552 hospitals in 30 provinces.

According to our study results, we observed that most patients with Covid-19 were men (65.3%). Likewise, Olumade & Uzairue[15], reported 68% of confirmed cases of the infection in men, in a meta-analysis involving 4,490 Covid-19 patients in Africa between January 1st and October 6th 2020. Almazeedia et al.[16] in Kuwait from a retrospective cohort study between February 24th, 2020 and April 20th, 2020, recorded 81% of men in a sample of 888 patients.

The study demonstrates that patients with Covid-19 are mostly traders, farmers, or drivers (67.4%) than healthcare workers. Guan et al.[14] in April 2020 using a national method in China recorded a total of 3.5% health workers among 7,736 patients with Covid-19 who had been hospitalized at 552 sites as of January 29th, 2020. The results obtained converges partly, with those of Marcellin et al.[9] who had found, more cases of Covid-19 recorded among workers in the informal sector (59.32%) than those in the health sector/health professionals (59.32%). James et al.[17] a retrospective study of 634 patients on October 22nd discovered that 26.8% (95% CI 14.5-39) of women were working as health care personnel.

The study reveals that patients tested positive to Covid-19 presented symptoms of respiratory distress (31.3%) and cough (25.4%). This converges on one side with the results of Zhang et al.[18], who reported as of June 5th after a study of 869 patients in China, the incidence of main symptoms, including fever (565/869; 65%), followed by cough (424/869; 48, 8%), fatigue (226/869; 26.0%), anorexia (216/869; 24.9%) and muscle pain (114/869; 13.1%), decreased over time. Unlike our study, Fu et al.[19] in its systematic review and meta-analysis of 43 studies involving 3600 patients discovered in June 2020 that, among Covid-19 patients, fever (83.3%), cough (60.3%), and fatigue (38.0%) were the most common clinical symptoms followed by increased sputum production, shortness of breath and myalgia, with prevalence estimated at just under 30% for each, respectively.

The present study counts 0.2% cases of obesity and 3.4% cases of cardiac pathology. This converges to some extent with the conclusions of Killeby et al.[20] in a study conducted in Georgia, from March 1st to April

7th, 2020 with 220 medical records of hospitalized patients and 311 out-of-hospital patients, according to which, in patients were more likely to have diabetes mellitus and obesity than outpatients. Guan et al.[14] had instead recorded in March 2020 a predominance of hypertension as the most common comorbidity (16.9%), followed by diabetes (8.2%). He further reported a total of 59 (3.7%) cardiovascular disease, 30 (1.9%) cerebrovascular disease, 28 (1.8%) hepatitis B, 21 (1.3%) chronic kidney disease, 18 (1.1%) malignancy and three (0.2%) immunodeficiency in patients.

Also, patients' deaths were recorded in 2.9% (28/958) of confirmed cases. This level is higher than 25 confirmed cases of death out of 1,003 participants infected with Covid-19 from January 3th to December 4th, 2020 by Marcellin *et al.*[9] also higher than 441 deaths out of 24,487 cases confirmed by WHO (2020) by Covid-19 in the Eastern region and lower than 976 deaths out of 39,104 confirmed cases of Covid-19 in 48 Sub-Saharan Africa countries obtained by Skrip *et al.*[5] in Burkina Faso. Thus, Skrip *et al.*[5], indicate that early detection, oxygen therapy and effective treatments are important to attenuate disease progression and prevent mortality. Marcellin *et al.*[9], meanwhile, hypothesized a poor understanding of barrier measures against Covid-19 infection.

All other things being equal, the patients who were cared for at home are 4.71 (95% CI 1.33-16.66; p = 0.016) times more at risk of death, unlike their counterparts whose follow-up was done in a hospital setting. These results would explicitly reflect poor close monitoring by health care personnel, or even poor psychological support which is likely to increase the risk in patients expressing certain loneliness and a weak spirit of resilience. An unconscious patient, heedless of his state of health, not feeling from the perspective of the theory of planned behavior, to assess the risks, the benefits of his actions, tend more likely to plunge into a state of despair, to neglect the measures and to be at risk of death.

A hospitalized patient who requires oxygen therapy is put on dexamethasone 6 mg/day for 10 days. Patients are given oxygen in the medical ward, but if their requirements exceed 10 L / min, they should be transferred to intensive care as they can get in a worse state very quickly. Late resuscitation of a physiologically incapacitated patient increases the risk of death for patients with Covid-19.

Conclusion: The management of patients tested positive to Covid-19, the signs and symptoms, the fact that a patient is put on oxygen and the type of screening is significantly associated with the 5% threshold and the outcome of these patients. In other words, the patients whose care was done at home were 4.7 times more at risk of death, while those on oxygen therapy were 6.4 times more at risk. Hence the need to strengthen community awareness, psychosocial support for patients at home, and the capacities of nursing staff and health care personnel in terms of close monitoring and management of cases under-oxygen therapy.

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