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Comparison of patient length of stay in care between home-based care and hospitalized covid-19 patients in northern and West Nile regions, Uganda

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Abstract

SARS-CoV-2-caused COVID-19 was first detected in Wuhan, China, in December 2019. Uganda reported her first COVID-19 case on March 21, 2020. The pandemic placed an enormous burden on health systems across the world. This retrospective cross-sectional study compared COVID-19 patient length of stay in care and associated factors for hospitalised patients in Regional Referral Hospitals and those who underwent home-based care in Northern and West Nile regions in Uganda. 400 patients were studied (200 inpatient and 200 home-based).

All patients were confirmed COVID-19 cases with a positive real-time PCR test result. Regardless of signs or symptoms development, all individuals with confirmed SARS-COV2 infection were eligible for admission to the hospital during this period.

It was found that hospitalized and home-based care patients were similar. 61.1% died within 14 days and 59.9% recovered under both types of care. Hospitalized patients stayed 14.8 days and home-based patients 15.0.

The difference in the mean length of stay in care among hospitalized patients and patients under home-based was not statistically significant (t=0.28, p=0.38) and there was no association between type of care and length of stay in care (OR: 0.96: 95% CI 0.64 to 1.43: p=0.837).

Symptom Status of patients and their occupation were found to be one of the important factors influencing recovery. It was observed that symptomatic patients were associated with longer stay in care (OR: 1.96, p=0.01). Likewise, law enforcement officers had a higher likelihood of staying longer compared to people involved in health-related work (OR: 3.28, p=0.03).

Covid-19 patient length of stay in care is not dependent on the approach used in case management. Therefore, the decision of whether a patient should be hospitalised or treated at home requires careful consideration of all relevant factors and an individual evaluation of the patient's circumstances.

Introduction

In December of 2019, the SARS-CoV-2 strain known as COVID-19 was first discovered in Wuhan (1). The World Health Organization (WHO) declared it a pandemic on March 11, 2020, with devastating effects on millions of people and economies worldwide (2, 3, 4). Uganda reported her first COVID-19 case on March 21, 2020 (5).

Hospitalisation is costly and places a strain on healthcare systems due to the high number of COVID-19 cases; therefore, home-based care was examined as an alternative (6, 7). Patient management, quality, and cost are all impacted by length of stay. Uganda has not adequately characterised the factors that influence the length of stay in various care settings, such as disease severity Knowing the time spent by patients under the different types of care and associated factors is important in the mobilization of resources for cost-effectiveness (8).

In September of 2020, Uganda began isolating and treating COVID-19 patients at home (9). Home-based treatment and isolation aimed to reduce nosocomial infection and protect hospital resources for COVID-19 patients who were not critically ill, but larger families and less affluent living conditions make this challenging to implement (10). The amount of time a patient spends in care can be affected by the care model used (11). Thus, it is important for clinicians and other carers to get an awareness of the features associated with hospital and home-based lengths of stay in order to better identify patients, develop cost-effective strategies to minimise lengths of stay, and ultimately reduce resource utilization (12). Considering insufficient testing capacity, economic strain, access to healthcare, and variable test results based on prolonged viral shedding, the World Health Organization (WHO) revised the criteria for discontinuing transmission- based precautions without requiring testing (13, 14). The new WHO discharge criteria from a healthcare facility or and isolation unit states that symptomatic patients can be discharged 10 days after the first day of symptom onset and a minimum of 3 days without symptoms whereas asymptomatic patients can be discharged from isolation 10 days after the first positive (15).

To date, no data is available on the length of stay in care of COVID-19 patients under home care and their recovery needs compared with hospitalized cases. This study therefore sought to compare the length of stay in care for home- based care of

COVID-19 patients versus hospital admissions and associated factors.

Methods

Study design

This was a cross-sectional study that used data from patients who had a SARS-CoV-2 RT-PCR positive result. COVID-19 infected patients with a positive COVID-19 RT-PCR result from the Northern and West Nile regions admitted to Gulu and Arua Regional Referral Hospitals COVID-19 treatment units or patients who received home-based care in the West Nile districts of Adjumani, Arua, Moyo, and Yumbe from 1 June 2020 to 31 March 2021 and had their initial samples analysed in the Adjumani Mobile Laboratory. Regardless of signs or symptoms development, all individuals with confirmed SARS-COV2 infection were eligible for hospitalisation during this period. Gulu Regional Referral Hospital served as the inaugural COVID-19 treatment unit for both the Northern and West Nile regions. Patients were classified based on the type of care they received after diagnosis (hospitalisation or home-based care).

Study sites

The research was carried out in two regional referral hospitals (Gulu, Northern Uganda, and Arua, West Nile, Uganda) and four districts that were implementing home-based care in the West Nile region, namely Adjumani, Arua, Moyo, and Yumbe (Fig. 1). Gulu regional referral hospital is located in the northern part of the country and serves nine districts: Agago, Amuru, Gulu city, Gulu, Kitgum, Lamwo, Nwoya, Omoro, and Pader. It was included due to its strategic location and was the inaugural COVID-19 treatment unit, which served both the Northern and West Nile regions of Uganda.

Arua regional referral hospital serves 13 districts in the West Nile region of the country, including Zombo, Arua, Arua city, Madi-Okollo, Maracha, Nebbi, Pakwach, Terego, Yumbe, Koboko, Adjumani, Moyo, and Obongi. Individuals with confirmed SARS-COV2 infection were eligible for hospitalisation regardless of the development of signs or symptoms.

West Nile region was cited as one of the COVID-19 transmission hotspots in the country by Ministry of Health and also had the highest number of districts to implement home- based care of COVID-19 patients (seven of the twenty two districts where home-based care was first implemented in the country were from the West Nile region) (9).

Estimation of sample size

According to the West Nile region surveillance reports the estimated recovery rate for COVID-19 patients in the region was 95% while the death rate was 2.1% by January 2021.

Assuming an 80% power, the study sample size for each group was calculated, (16).

The estimated sample size was 137 for both arms, however, 46% of the sample size was added for both arms to increase precision considering the high likelihood of medical chart incompleteness for the variables of interest. Finally, a sample size of 200 for both arms was considered giving a total of 400 for the overall target population.

Sample Selection

Data Collection

For patients under home based care, 200 cases were selected from each group using stratified sampling technique (Table 1) (17). For hospital based participants, patients' files were separated in each facility for the period of interest, and they were purposively sampled based on availability of the required variables (Table 2).

Laboratory data such as patient demographic information (age and gender), clinical information including signs and symptoms, date of symptom onset, commodities, date of sample collection, result date, and sample type were extracted from the National COVID-19 Results Dispatch System (RDS) into excel sheets and merged with patient clinical information obtained from patient case management forms at the hospital. This included the date of admission or the start of home-based care, the date of discharge, patient transfer records if the patient was transferred, the date of death, the patient's occupation, and the patient's outcome.

Table 1
Sample sizes of homebased care participants from the districts of study.

District	Stratum Size	Sample Size
Arua	146	83
Adjumani	97	56
Yumbe	25	14
Moyo	83	47
Total	**351**	**200**

Table 2
Sample sizes of hospitalized participants from the districts of study.

District	Stratum Size	Sample Size
Arua Regional Referral Hospital	156	41
Gulu Regional Referral Hospital	600	159
Total	**756**	**200**

Statistical Analysis

Data in Microsoft excel was cleaned and imported to STATA version 14 software for statistical analysis.

All data were then classified for univariate analysis into the following categories: gender, age group, occupation, symptoms, comorbidities, initial CT value (low, medium, and high), final outcome, and length of stay in care (shortest and longest). Age, initial CT value, and length of stay in care were all transformed into categorical variables. These were shown as percentages.

For bivariate analysis, Chi-square was used to investigate the independence of patient characteristics in the two populations, and conclusions were drawn based on the p-values; with the null hypothesis being that patient characteristics under home-based care were like those of hospitalised patients, and the alternative hypothesis being that patient characteristics in the two populations were different. The variables were not categorised, and the analysis was limited to the recoveries, in order to compare the length of stay in care between hospitalised patients and those who received home-based care. Patients who were transferred from home-based care to the hospital due to deterioration were excluded, leaving only 377 patients who completed a follow-up period and were discharged from care after meeting the discharge criteria. The Lavene test for equality revealed that the variances in the two populations were unequal, so the independent two-sample t-test for unequal variance was used to determine the mean length of stay in care for each population and the differences in the means studied.

The factors associated with the length of stay in care were investigated using a logistic regression analysis. To determine the relationship between each independent variable and the outcome in bivariate analysis, logistic regression was used. The level of association was determined using the crude odds ratio and its level of significance; p-value and 95% confidence intervals (95% CI).

Only variables with a p-value of 0.05 were then fitted into the final multivariate logistic regression model for multivariate analysis. The odds ratios were reported along with their level of significance, p-value, and 95% confidence intervals (95% CI). The logistic regression was used, with one independent variable added at a time depending on the criteria, using the forward stepwise method. The effect of each characteristic was evaluated while other factors were controlled for. Statistical tests' p-values were two-sided, and statistically significant results were defined as those with p-values less than 0.05.

Results

Characteristics of study participants

The study used data from patients in the first wave and included all levels of disease severity. The participants' baseline characteristics were compared using the chi square test by the type of care received (hospitalised or home-based care) (Table 3).

Up to 161 hospitalised patients (80.5%) were symptomatic, compared to 136 patients (68.0%) receiving home-based care (p = 0.004). The most common symptoms under both types of care were cough (193 patients), with 100 receiving home-based care and 93 receiving hospitalization, and headache (102 patients), with 37 receiving home-based care and 65 receiving hospitalisation. However, more hospitalised patients had multiple symptoms, and there were significant differences in the number of patients with each symptom between home-based care and hospitalisation (P -value 0.001). (Table 4).

Table 3
Cross tabulation of characteristics of COVID-19 patients by type of care.

Characteristic	Overall, n = 400	Homebased care case n = 200	Hospitalized cases,n = 200	P-value
Gender				
Female	140 (35.0)	77 (38.5)	63 (31.5)	0.142
Male	260 (65.0)	123 (61.5)	137 (68.5)	
Age group				
0–18 (Children)	46 (11.5)	26 (13.0)	20 (10.0)	
19–35 (Youth)	171 (42.8)	82 (41.0)	89 (44.5)	0.767
36–64 (middle-aged adults)	162 (40.5)	82 (41.0)	80 (40.0)	
≥ 65(Elderly)	21 (5.2)	10 (5.0)	11 (5.5)	
Occupation				
Health worker/ Health related work	58 (14.5)	40 (20.0)	18 (9.0)	
Trucker Driver/ Transporter	36 (9.0)	12 (6.0)	24 (12.0)	< 0.001
Trade/ Business	76 (19.0)	26 (13.0)	50 (25.0)	
Law enforcement officer	21 (5.2)	13 (6.5)	8 (4.0)	
Others	209 (52.3)	109 (54.5)	100 (50.0)	
Symptoms				
Symptomatic	297 (74.2)	136 (68.0)	161 (80.5)	0.004
Asymptomatic	103 (25.8)	64 (32.0)	39 (19.5)	
Comorbidities				
Has Comorbidities	52 (13.0)	12 (6.0)	40 (20.0)	< 0.001
No Comorbidities	348 (87.0)	188 (94.0)	160 (80.0)	
Initial Ct value				
≤ 20 (Low)	46 (11.5)	18 (9.0)	28 (14.0)	
21–35 (Medium)	295 (73.7)	145 (72.5)	150 (75.0)	0.048
≥ 36 (High)	59 (14.8)	37 (18.5)	22 (11.0)	
Final Outcome				
Recovery	381 (95.2)	193 (96.5)	188 (94.0)	0.24
Death	19 (4.8)	7 (3.5)	12 (6.0)	
Length of Stay in Care				
≤ 14 (Shortest)	240 (60.0)	119 (59.5)	121 (60.5)	
≥ 15 (Longest)	160 (40.0)	81 (40.5)	79 (39.5)	0.838

Table 4
Cross tabulation of symptoms of COVID-19 patients by type of care.

Symptoms	Total n (%)	Home based care cases, n = 195	Hospitalized cases, n = 200	P-value
Cough	193 (48.86)	100 (51.28)	93 (46.50)	0.342
Headache	102 (25.82)	37 (18.97)	65 (32.50)	0.002
Flue	76 (19.24)	14 (7.18)	62 (31.00)	< 0.001
Fever	51 (12.91)	21 (10.77)	30 (15.00)	0.21
Chest pain	46 (11.65)	18 (9.23)	28 (14.00)	0.14
Sore throat	45 (11.39)	10 (5.13)	35 (17.50)	< 0.001
Shortness of breath	43 (10.89)	17 (8.72)	26 (13.00)	0.172
General body weakness	36 (9.11)	5 (2.56)	31 (15.50)	< 0.001
Chills	24 (6.08)	13 (6.67)	11 (5.50)	0.627
Loss of taste and smell	12 (3.04)	2 (1.03)	10 (5.00)	0.021
Runny nose	11 (2.78)	2 (1.03)	9 (4.50)	0.036
Others	55 (13.92)	6 (3.08)	49 (24.50)	< 0.001
Total	694 (175.70)	245 (125.64)	449 (224.50)	

Length of stay in care of COVID-19 patients

The primary outcome of this study was the length of stay in care (measured in days) from the time of admission to the time of discharge after recovery. This analysis excluded 5 patients who were transferred from home-based care to hospital due to deterioration and 18 patients who died while receiving both types of care.

The study considered the length of stay in care as an outcome variable. Patients who stayed for 14 days were classified as not having a prolonged stay, whereas those who stayed for 15 days were classified as having a prolonged stay.

The average length of stay in care for hospitalised patients was 14.8 days, and 15.0 days for home-based patients. The difference in mean lengths of stay was 0.28, but it was not statistically significant. (p = 0.38).

Under both types of care, those who died in less than 14 days were 61.11%, and those who recovered were 59.95%. After 15 days of treatment, 7 patients (38.89%) died, while 151 patients (40.05%) recovered.

Factors associated with length of stay in care

For both populations, we investigated factors associated with length of stay in care. The length of stay in care was associated with age group, occupation, and symptom status on admission in the bivariate analysis.

Compared to children, youths were associated with a longer length of stay in care of more than 15 days (OR: 2.32, 95%CI: 1.12 to 4.78, p = 0.023), whereas law enforcement officers were associated with a longer length of stay in care of more than 15 days (OR: 3.27, 95%CI: 1.14 to 9.36, p = 0.027). Being symptomatic was also associated with a longer stay in care than asymptomatic cases (OR: 1.79, 95% CI: 1.11 to 2.89, p = 0.018). There was no correlation between care length and gender, comorbidities, final outcome, initial Ct value, or type of care (Table 5).

When compared to other symptoms, having a cough on admission was associated with a longer length of stay (Table 4).

We included age group, occupation, and symptoms in the final multivariate logistic regression model. There was no association between length of stay in care and age group in this analysis, despite youths having a longer stay in care than the other age groups (OR: 1.99, 95%CI: 0.94 to 4.26, p = 0.07). The relationship between occupation and length of stay in care was reduced, with law enforcement officers still predicted to stay longer in care than health workers and those involved in health-related work (OR: 3.28, 95% CI: 1.12 to 9.60, p = 0.03). A statistically significant link between symptomatic patients and length of stay in care was also observed. In comparison to asymptomatic patients, symptomatic patients stayed in care for a longer period of time (more than 15 days). (OR: 1.96, 95% CI: 1.18–3.28, p = 0.001) (Table 5). None of the expected symptoms of COVID-19 infection were associated with length of stay as shown in Table 6.

Table 5
Logistic regression of patient demographic characteristics with their length of stay in care.

Characteristic	Length of stay in care n (%)		Unadjusted OR (95 CI %)	p-value	Adjusted OR (95 CI %)	p-value
	≤ 14 days	≥ 15 days				
Gender						
Female	85 (62.0)	52 (38.0)	1			
Male	152 (58.9)	106 (41.1)	1.14 (0.75–1.74)	0.546		
Age group						
0–18 (Children)	34 (73.9)	12 (26.1)	1		1	
19–35 (Youth)	93 (55.0)	76 (45.0)	2.32(1.12–4.78)	0.023	1.99 (0.94–4.26)	0.07
36–64 (middle-aged adults)	96 (60.0)	64 (40.0)	1.89(0.91–3.92)	0.088	1.66 (0.75–3.65)	0.21
≥ 65(Elderly)	14 (70.0)	6 (30.0)	1.21(0.38–3.88)	0.743	1.28 (0.37–4.41)	0.69
Occupation						
Health worker/ Health related work	36 (62.1)	22 (37.9)	1		1	
Trucker Driver/ Transporter	21 (58.3)	15 (41.7)	1.17(0.50–2.73)	0.719	1.35 (0.56–3.26)	0.51
Trade/ Business	45 (60.0)	30 (40.0)	1.09(0.54–2.20)	0.808	1.08 (0.53–2.22)	0.83
Law enforcement officer	7 (33.3)	14 (66.7)	3.27(1.14–9.36)	0.027	3.28 (1.12–9.60)	0.03
Others	128 (62.4)	77 (37.6)	0.98(0.54–1.79)	0.959	1.03 (0.55–1.93)	0.92
Symptoms						
Asymptomatic	72 (69.9)	31 (30.1)	1			
Symptomatic	165 (56.5)	127 (43.5)	1.79(1.11–2.89)	0.018	1.96 (1.18–3.28)	0.01
Comorbidities						
No Comorbidities	201 (58.6)	142 (41.4)	1			
Has Comorbidities	36 (69.2)	16 (30.8)	0.63(0.34–1.18)	0.147		
Initial Ct value						
≤ 20 (Low)	24 (54.5)	20 (45.5)	1			
21–35 (Medium)	177 (60.6)	115 (39.4)	0.78(0.41–1.48)	0.445		
≥ 36 (High)	36 (61.0)	23 (39.0)	0.77(0.35–1.69)	0.51		
Type of care						
Home-based care	116 (59.5)	79 (40.5)	1			
Hospitalized	121 (60.5)	79 (39.5)	0.96(0.64–1.43)	0.837		

Table 6
Logistic regression of patient symptoms with length of stay in care

Symptom	Length of stay in care n (%)		Unadjusted OR (95 CI)	p-value
	≤ 14 days	≥ 15 days		
Cough				
Yes	98 (54.1)	83 (45.9)	1.59 (1.05–2.41)	**0.028**
No	128 (65.3)	68 (34.7)	1	
Flue				
Yes	44 (59.5)	30 (40.5)	1.03 (.61–1.72)	0.924
No	182 (60.1)	121 (39.9)	1	
Fever				
Yes	31 (64.6)	17 (35.4)	.79 (.42–1.49)	0.483
No	195 (59.3)	134 (40.7)	1	
Sore throat				
Yes	25 (56.8)	19 (43.2)	1.16 (.61–2.19)	0.652
No	201 (60.4)	132 (39.6)	1	
Shortness of breath				
Yes	18 (62.1)	11 (37.9)	0.91 (.42–1.98)	0.808
No	208 (59.8)	140 (40.2)	1	
Headache				
Yes	60 (60.6)	39 (39.4)	.96 (.60- 1.54)	0.876
No	166 (59.7)	112 (40.3)	1	
Chest pain				
Yes	22 (59.5)	15 (40.5)	1.02 (.51–2.04)	0.949
No	204 (60.0)	136 (40.0)	1	
General body weakness				
Yes	15 (50.0)	15 (50.0)	1.55 (.73–3.28)	0.249
No	211 (60.8)	136 (39.2)	1	
Chills				
Yes	14 (63.6)	8 (36.4)	0.85 (.35–2.07)	0.716
No	212 (59.7)	143 (40.3)	1	
Loss of taste and smell				
Yes	10 (90.9)	1 (9.1)	0.14 (.02–1.14)	0.066
No	216 (59.0)	150 (41.0)	1	
Others				
Yes	24 (51.1)	23 (48.9)	1.51 (.82–2.79)	0.186

Symptom	Length of stay in care n (%)		Unadjusted OR (95 CI)	p-value
	≤ 14 days	≥ 15 days		
No	202 (61.2)	128 (38.8)	1	

Discussion

Understanding COVID-19 management has come a long way. However, no known therapeutic solution exists, and preventive and control measures vary (18). As a result, case management approaches must be evaluated for effectiveness, efficiency, and applicability in order to facilitate the development and implementation of strategies to reduce length of stay in care and, as a result, shorten recovery time from COVID-19. Even though the length of stay can vary due to various factors such as disease severity, the factors that influence length of stay in various types of care are not well defined in Uganda. The length of stay is expected to vary due to a variety of factors such as the type of health facilities established around the world and the severity of disease among patients (19, 20).

In this retrospective study, we compared the length of stay in care for COVID-19 patients receiving home-based care versus those hospitalised during the first wave of the pandemic in Uganda. There were no statistically significant differences in patient characteristics between hospitalised and home-based patients. The differences in mean length of stay in care between hospitalised and home-based patients were not statistically significant. Being symptomatic on admission and the presence of law enforcement officers were factors associated with a stay in care lasting more than 15 days, regardless of the type of care.

Although we found that hospitalised patients had a shorter length of stay in care than patients who received home-based care, this difference was not statistically significant. The study also found that most symptomatic hospitalised patients had more than one symptom, with the most common ones being cough, headache, flue, fever, sore throat, fatigue, chest pain, and shortness of breath, all of which are associated with moderate to severe disease (21), and that they were more likely to spend less time in hospital than symptomatic patients receiving home-based care. Despite the fact that this was not statistically significant, it was comparable to the median length of stay reported by a systematic review of 14 days at general hospitals in China (22), though it differed from that reported outside of China of 5 days (22) and 5.5 days per patient in Korea (23). As a result, for better patient outcomes and shorter recovery times, the use of health facilities and re-purposed facilities for the management of all confirmed cases where resources allow would result in better outcomes and shorter lengths of stay in care.

Earlier studies in Uganda found that the majority of COVID-19 patients had mild disease, with the most common symptoms being fever, cough, and headache, with 28% having comorbidities and no deaths (24, 5). This contrasted with the patient characteristics observed in this study, where disease presentation ranged from mild to moderate to severe disease with a variety of symptoms, 13% of patients had comorbidities, and 4.8% died. This could be explained by the difference in data collection periods. The first two studies were conducted during the early stages of the pandemic, whereas this study included data from the middle of the first wave through the end of the pandemic in the country.

The average length of stay in home-based care was 15.0 days, while it was 14.8 days for hospitalised patients. This is comparable to other studies conducted in Fangcang hospitals in China, Japan, Northern Italy, California, and Washington, where the duration ranged from 10 to 17 days (25, 26, 27).

However, studies on the length of stay in care of patients receiving home-based care are scarce, making for more accurate comparisons. South Sudan is one of the African countries that implemented both home-based care and hospitalisation approaches for COVID-19 case management, and an analysis of the first 1330 cases in this country during the first 60 days of the pandemic revealed that with 17% symptomatic patients and 95% mild cases, only 0.8% patients were hospitalised and 99% cases were managed at home, with an overall case fatality rate of 1.1% (28).

Although it has been reported that both symptomatic and asymptomatic patients have similar viral loads (29), this study found that being symptomatic on admission was strongly associated with a longer length of stay in care for more than 15 days, which is consistent with other studies conducted in China, Korea, and Brazil (30, 23, 31, 32). This is primarily because symptomatic patients have more severe clinical manifestations of the disease than asymptomatic patients, resulting in a longer time to recovery and a longer length of stay (25). The higher prevalence of bilateral pneumonia in symptomatic patients compared to asymptomatic patients has also been reported to influence the length of stay in care for symptomatic patients (33). Cough had a significant association with prolonged length of stay in care when compared to fever and other symptoms associated with mild and moderate illness. This differs from previous studies that found fever to be the most common symptom associated with a prolonged length of stay in care due to its association with respiratory distress syndrome, a feature of severe COVID-19 disease (30).

In this study, there were only 21 law enforcement officers (5.2%) compared to other occupations, with 13 patients (6.5%) receiving home-based care. As a result, the subgroup analysis on the relationship between occupation and length of stay in care was underpowered. Nonetheless, when compared to health workers, law enforcement officers were associated with a longer length of stay in care of more than 15 days. This could be because law enforcement officers, like health workers, are at a higher risk of exposure due to close contact with community members while maintaining law and order and enforcing public health orders, such as coordinating local lock downs (34). However, when combined with long and rotating shifts, threats of violence, the increased need for hypervigilance, and a lack of public support, policing becomes one of the most mentally taxing occupations, resulting in chronic stress on the officers (35). Chronic stress has been linked to weakened immunity and high levels of inflammatory cytokines, both of which delay disease recovery (36), and has also been linked to severe COVID-19 cases (37).

Although we did not find a significant relationship between demographic factors and the length of stay in care, we did find a weak relationship with age, with youth (19–35 years) more likely to stay in care than other age groups, which is attributed to the higher survival rate. During the first wave of the pandemic, a study conducted in Germany revealed that those with pre-existing respiratory diseases, obesity, and persistently elevated inflammatory markers were at an increased risk of developing acute respiratory distress syndrome, which lengthens their hospitalisation period (38).

Other studies conducted in China revealed that patients with chronic kidney or liver disease had a longer length of stay in critically ill patients and were also more likely to develop pneumonia than the general population (30). Diabetes has also been linked to a longer hospital stay in non-severe COVID-19 patients. This could be due to diabetes impairing macrophage and lymphocyte function and negatively affecting T-cell growth and interferon production, resulting in suppressed immunological function (33). Another study found that females were more likely than males to spend more time in care, though more research is needed to investigate the pathogenesis of COVID-19 in relation to gender differences (30).

Furthermore, we discovered that the majority of patients receiving both types of care had a medium initial Ct value (21–35), with 145 patients (72.5%) receiving home-based care and 150 patients (75.0%) receiving hospitalised care. Despite the fact that there was no significant relationship between initial Ct value and length of stay in care Previous research has shown that the higher the Ct value, the faster the viral clearance, resulting in a shorter length of stay in care. A Ct value greater than 35 predicted a 4.3-day shorter hospital stay, whereas a 2.8-day shorter time to viral clearance was associated with a 10 unit increase in Ct value, resulting in a short stay in care and isolation (39). Higher Ct values indicate low viral load as a reflection of either an early infection or recovery. Patients with severe disease have lower Ct values, which cannot be used to predict outcomes because they are influenced by many other factors, but they can be used to predict the length of stay in stable cases (40).

This study used a relatively large sample size to describe the outcomes and determinants of length of stay in care of COVID-19 patients in Uganda. However, due to the study's retrospective nature, we were unable to obtain all variables that could have influenced the length of stay in care, such as detailed laboratory tests for hospitalised patients and wealth index and marital status for patients receiving home-based care.

The study was also underpowered to conduct subgroup analyses on the relationship between occupation and length of stay. To draw more meaningful conclusions about law enforcement, a larger sample size would be required.

In light of the above findings, before admitting any COVID-19 patient to a health facility, epidemiologists and health workers should conduct a thorough examination to determine whether the infected patient can safely be isolated and treated at home, thereby avoiding overcrowding of health facilities and the transmission of nosocomial diseases. Routine testing and visits are required to monitor patient progress and prevent transmission among house members.

Youth, law enforcement officers, and symptomatic COVID-19 cases should be given special attention because their length of stay in care has been shown to be longer. This is due to their lifestyle, which provided a favourable environment for the virus to manifest for a longer period of time.

Symptomatic patients should begin treatment as soon as a positive diagnosis is confirmed, and psychosocial support should be emphasised to help patients cope with stress and heal faster.

Conclusions

The method of case management has no effect on the outcome of patients with Covid-19. Home-based care may be viewed as an effective and fulfilling strategy in the health-care system's fight against COVID-19. By predicting the demand for hospital beds, this information can also be used to plan for the next wave of the pandemic and meet the needs of a large number of patients during the public health response.

Being a law enforcement officer and having symptoms upon admission are both associated with a longer length of stay in care.

Declarations

Acknowledgment

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Ethical approval and consent to participate

This study was approved by the Uganda National Health Laboratory Services Research and Ethics Committee (reference number: UNHL-2021-34). Informed consent was obtained from all subjects and/or their legal guardian(s) before their participation in the study. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable for this study.

Author contributions

RN gathered resources, conceptualised the study, created tools, collected data, analysed data, and wrote the paper. KJ, AT, and SN contributed to the project's design by reviewing the paper draughts and tools used. The final manuscript was read and approved by all authors.

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None. However, all data used was generated from the COVID-19 pandemic case management in the selected regions in the country.

Conflict of interest

There is no conflict of interest.

Availability of data and materials used in the study

All data used and analysed during this study are available upon reasonable request from the corresponding author. The data set was stripped of all personal identifiers and replaced with anonymized study numbers.

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Figures

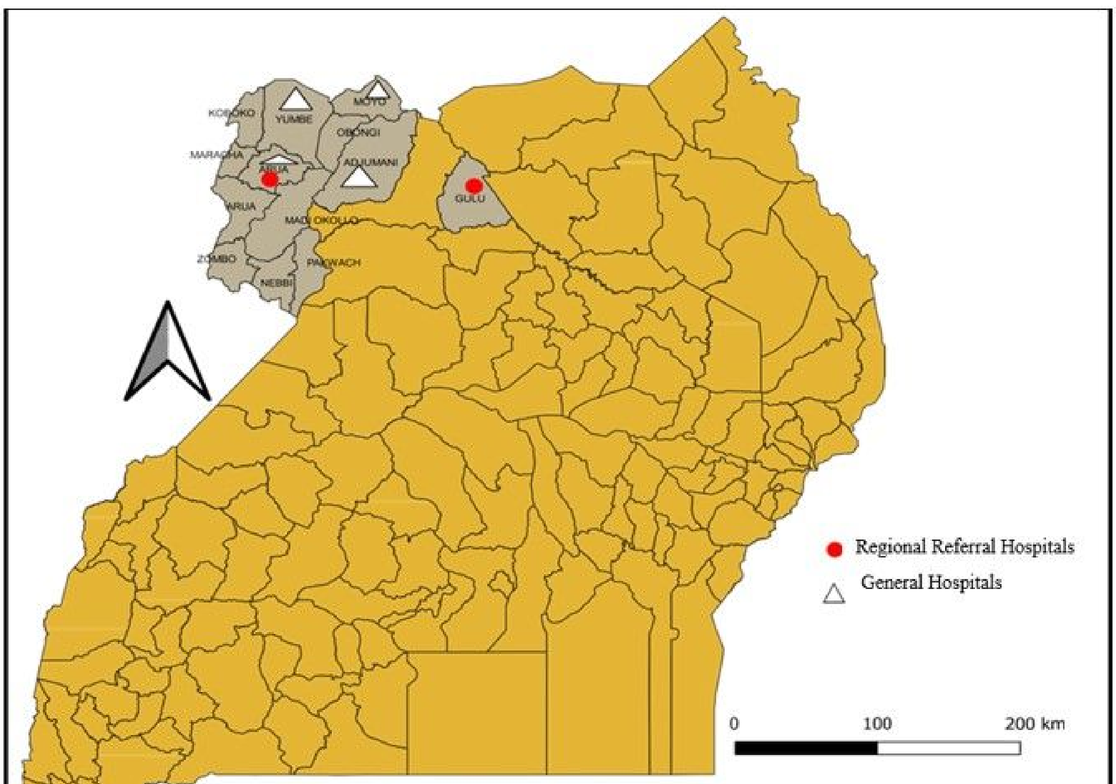

Figure 1: A map of Uganda showing Hospitals that managed and followed up COVID-19 cases in West Nile and Northern Uganda

Figure 1

Map of the study area