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# Clinical Characteristics and Outcome of Patients with COVID 19 in Sokoto, Northwestern Nigeria

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## Abstract

**Background:** The emergence of SARS-COV-2 in December 2019 marked the onset of COVID-19 pandemic that has spread to almost every country including Nigeria. Infected persons can be asymptomatic or may present with severe disease. There is paucity of information on clinical profile and outcome of patients with COVID-19 in Northern Nigeria. This study therefore examined clinical data from 108 patients with COVID-19 admitted at the Sokoto isolation center located in the northwestern region.

**Materials and methods:** This is a retrospective study conducted on COVID-19 patients admitted at Infectious Diseases Hospital in North- western Nigeria from 22nd April 2020 to 25th May 2020. Data was extracted from folders of the patients admitted during the study period. Differences and relationships between variables were tested using appropriate tests. Multiple logistic regression was conducted to determine the independent factors associated with mortality.

**Results:** The most common age group affected is 26-55 years. Most of the patients, 83 (76.9%) were male. Up to 32 (29.6%) of the patients were asymptomatic. The most common symptoms were fever and cough, 53 (49.1%) and 50 (46.3%) respectively. Diabetes mellitus and Hypertension were present in 15 (13.89%) and 11 (10.18%) of the patients respectively. The median age of the patients that died was 53.5 (41.25-72.50) years. Multiple logistic regression showed admitting $SPO_2$ less than 92% and presence of comorbidity were independent factors associated with mortality.

**Conclusion:** This paper provides a contribution to the clinical and epidemiologic factors associated with COVID-19 patients from Sokoto State, Nigeria. The findings are similar to previous reports from Nigeria and rest of the world.

**Keywords:** COVID-19, Northern Nigeria, Sokoto, Infectious diseases

## Introduction

The outbreak of a novel coronavirus associated with respiratory symptoms, known as COVID-19 in December 2019 in Wuhan, China, marked the beginning of a global pandemic of emergency concern (1, 2). The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) causes the disease (3,4). The presentation of a mild COVID-19 is usually similar to common symptoms of respiratory infections such as cough, fatigue and runny nose, while in severe cases, patients may present with severe pneumonia, acute respiratory distress syndrome (ARDS) and multi-organs failure that may lead to death (5). As of 13th September 2020, about 28, 637, 952 cases were confirmed and 917, 417 deaths were recorded across the globe (6). The disease transmission is primarily through respiratory droplets or aerosols SARS-CoV-2 positive individuals as well as contact with infected surfaces (1-7). Although a global pandemic, the number of confirmed cases of COVID-19 varies across different regions and continents of the world with Sub-Sahara Africa having the lowest number of cases (8). In Nigeria for instance, as at 16th of September 2020, 56, 604 cases had been confirmed, with Sokoto (a northwestern state) having 159 confirmed cases (9). On the same 16 September 2020, Nigeria had 1,091 confirmed deaths with Sokoto having 17 confirmed deaths out of this (9).

Recently, vaccines have been developed and approved for protection against COVID-19. But the emergence of variants of the virus pose threat to their efficacy (10). However, no single effective pharmacological agent been approved for the cure of COVID-19 (11) although some drugs have shown promise in management of the disease (12). Consequently, treatment of COVID-19 is mainly symptomatic and depends largely on the clinical presentation of the patients (13). So far, a number of reports have been documented on the clinical features of SARS-CoV-2 positive patients in many parts of the world (14-16).

However, there is a dearth of documented data on clinical characteristics and outcome of patients with COVID-19 in Nigeria and most parts of Africa. This study therefore examined clinical data from 108 patients admitted at the Sokoto isolation center for COVID-19 patients located in the northwestern region of Nigeria with the aim of contributing additional information on confirmation of cases, clinical characteristics and overall outcome of the COVID-19 in this part of the world.

## Materials and methods

Infectious Diseases Hospital, Amanawa is located in Dange Shuni local government area of Sokoto state. Its Isolation centre has a capacity of 135 beds. The centre was activated in February 2020 specifically for the management of patients with COVID-19. Sokoto state is located in the northwestern part of Nigeria within the savannah ecological belt with longitude 11° 3 to 13° 50 E and latitude 4° to 6° 40' N (17). Its population is projected at 5.3 million in 2018 with 65.3% of the populace below the age of 25 years (18).

This is a retrospective study conducted on COVID-19 patients admitted at Infectious diseases hospital in North- western Nigeria from 22nd April 2020 to 25th May 2020. All the participants in this study were confirmed with SARS-COV-2 infection by using real time PCR for nucleic acid detection according to WHO guidelines (19). In this study, the patients were divided into asymptomatic, mild and severe cases based on the severity of clinical presentation as defined below.

Fever was defined as axillary temperature of at least 37.8$^0$C. Asymptomatic cases were defined as confirmed cases of COVID 19 who did not have any clinical features of the disease. Mild cases were defined as confirmed cases of COVID-19 who presented with either fever or cough with no difficulty in breathing and partial pressure of oxygen ($SPO_2 > 92\%$). Severe cases were defined as confirmed cases of COVID-19 who presented with either fever or cough, difficulty in breathing and $SPO_2 < 92\%$ and abnormal lung examination findings.

All patients with COVID-19 admitted within the study period at Infectious diseases hospital, Amanawa were recruited.

**Inclusion criteria:** All patients with confirmed diagnosis of COVID-19 admitted at Infectious Diseases Hospital, Amanawa between 22nd April 2020 to 25th May 2020.

**Exclusion criteria:** Patients admitted with confirmed COVID-19 but whose clinical records were missing.

**Data collection**: Data was extracted manually from folders of patients admitted within the study period using a standardized proforma by doctors and nurses working at the isolation center. The data was transferred to SPSS where data cleaning was conducted. The proforma contain sections on socio-demography, clinical presentation and outcome of admission. The proforma was designed by the authors of this paper.

### Discharge Criteria

Patients were discharged after fulfilling the following criteria, resolution of fever for at least 48 hours; significant resolution of clinical symptoms; 2 (two) consecutive negative results of nasopharyngeal or oropharyngeal swab by real time PCR or 13th day after the onset of the first initial symptom with significant resolution of clinical symptoms (20).

### Data analysis

Data was analyzed using SPSS version 21. The analysis was carried out using descriptive statistical analysis including measures of central tendency/dispersion for continuous variables and frequencies/percentages for categorical variables. Differences and relationships were determined using Chi-square and Fisher exact tests as appropriate. We obtained unadjusted odds ratios (ORs) and 95% confidence intervals (CIs), whereas multivariate logistic regression model was used to obtain adjusted estimates to predict mortality. We used backward stepwise approach for covariate selection. The variables included in the multivariable logistic regression model were age, gender, case classification, cough, fever, dyspnoea, runny nose, headache, lethargy, vomiting, diarrhoea, abdominal pain, impaired consciousness, convulsion, sore throat, presence of comorbidity, pregnancy, tachycardia, low systolic blood pressure, low diastolic blood pressure, $SPO_2 < 92\%$. A $p$ value of $<0.05$ was considered statistically significant.

The Kaplan-Meier method was used to estimate hospitalization time, and the log rank test was applied for comparisons among asymptomatic, mild and severe cases.

Ethical approval for this study was granted by the Ministry of Health, Sokoto state, Nigeria.

## Results

### *Sociodemographic characteristics*

A total of 108 patients were recruited during the study period. The median age was 38 years (interquartile range, 27-51 years). Of these patients, 84 (77.8%) were less than 55 years. The most common age group affected was 26-55 years. Most of the patients, 83 (76.9%) were male. The median age for male and female patients were 40 (Interquartile range 27-51) and 35 (Interquartile range 26-48) years respectively (Table 1).

### *Clinical characteristics of patients*

The clinical characteristics of the subjects are shown in Table 1. About 32 (29.6%) of the patients were asymptomatic at the time of admission. The most common symptoms were fever and cough, 53 (49.1%) and 50 (46.3%) respectively. Most patients,

75 (69.45%) did not have any co-morbidity. However, Diabetes mellitus and Hypertension were present in 15 (13.89%) and 11 (10.18%) of the patients respectively. Few patients, 16 (14.8%) had $SPO_2$ less than 92% on admission.

**Table 1:** Socio-demographic and clinical characteristics of patients

| Age groups (years) | Frequency | Percentage |
|---|---|---|
| < 15 | 9 | 8.3 |
| 15-25 | 15 | 13.9 |
| 26-35 | 27 | 25 |
| 36-45 | 17 | 15.7 |
| 46-55 | 18 | 16.7 |
| 56-65 | 14 | 13 |
| > 65 | 8 | 7.4 |
| **Gender** | | |
| Male | 83 | 76.9 |
| Female | 25 | 23.1 |
| **Comorbidity** | | |
| No comorbidity | 75 | 69.45 |
| Diabetes Mellitus | 15 | 13.89 |
| Hypertension | 11 | 10.18 |
| HIV Infection | 3 | 2.78 |
| Asthma | 2 | 1.85 |
| COPD | 1 | 0.93 |
| Chronic liver disease | 1 | 0.93 |
| Tuberculosis | 1 | 0.93 |
| Leukaemia | 1 | 0.93 |
| **Clinicalfeatures** | | |
| Asymptomatic | 32 | 29.6 |
| Fever | 53 | 49.1 |
| Cough | 50 | 46.3 |
| Body weakness | 50 | 46.3 |
| Dyspnœa | 40 | 37 |
| Sore throat | 17 | 15.7 |
| Diarrhoea | 17 | 15.7 |
| Runny nose | 14 | 13 |
| Loss of smell | 12 | 11.1 |
| Headache | 7 | 6.5 |
| Abdominal pain | 5 | 4.6 |
| Loss of taste | 3 | 2.8 |
| Impaired consciousness | 3 | 2.8 |
| Convulsion | 3 | 2.8 |
| Vomiting | 1 | 0.9 |
| Enlarged tonsils | 1 | 0.9 |
| Tachycardia | 30 | 27.8 |
| $SPO_2$ < 92% | 16 | 14.8 |
| Diastolic BP < 60 mmHg | 3 | 2.8 |
| Systolic BP < 90 mmHg | 2 | 1.9 |

### *Clinical characteristics and outcome*

Table 2 depicts the comparison of duration of admission in patients with comorbidity with and their outcome and age. Of the total number of patients admitted during the study period, 96 (88.9%) were discharged while 12 (11.1%) died. The median age of the patients that died was 53.5 (Interquartile range 41.25-72.50) years while the median age of the patients that were discharged was 35 (Interquartile range 25.25-48). Table 3 shows the association between presence of comorbidity and clinical characteristics of the patients. The median length of hospital stay was 9 days (interquartile range, 7-11 days).

**Table 2:** Comparison of duration of admission in patients with co-morbidity with outcome and age.

| Duration of Admission | | | | |
|---|---|---|---|---|
| **Parameters** | | **Co-morbidity** | | |
| | | **Present** | **Absent** | |
| **Outcome** | | | | |
| **Alive** | 96 (88.89%) | 9.72 | 4.32 | <0.001 |
| **Dead** | 12 (11.11%) | 4.17 | 2.98 | |
| **Total** | 108 (100%) | | | |
| **Age (years)** | | | | |
| **< 55** | 84 (77.78%) | 8.87 | 2.73 | 0.32 |
| **≥ 55** | 24 (22.22%) | 9.92 | 8.25 | |
| **Total** | 108 (100%) | | | |

Table 4 shows the predictors of mortality among the study subjects. Factors significantly associated with mortality were age greater than 55 years (OR: 4.33 [95% CI,1.25-15.00], $P = 0.02$), lethargy (OR: 16.08 [95% CI, 1.59-129.62], $P = 0.001$), dyspnoea (OR: 11 [95% CI, 2.27-53.31], $P = 0.001$), impaired consciousness (OR: 19 [95% CI, 1.58-228.55], $P = 0.03$), presence of comorbidity (OR: 9 [95% CI, 2.25-36.98], $P = 0.001$) and $SPO_2 < 92\%$ (OR: 22 [95% CI, 5.42-89.35], $P = <0.001$). Kaplan-Meier analysis showed a significant difference in hospitalization time between asymptomatic, mild and severe cases (Figure 1). Following multiple logistic regression, factors independently associated with mortality were admitting $SPO_2 <92\%$ and presence of comorbidity.

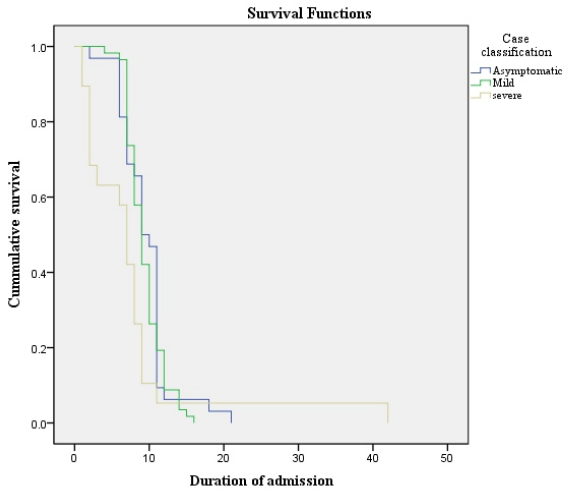


**Figure 1:** Difference between hospitalization time among asymptomatic, mild and severe cases

**Table 3:** Comparison between the presence of comorbidity and patient characteristics

| Parameter | Co-morbidity | | Total | Chi-square | P value |
|---|---|---|---|---|---|
| | Present | Absent | | | |
| **Age** | | | | | |
| < 55 | 18 (21.4%) | 66 (78.6%) | 84 (100%) | | |
| ≥ 55 | 15 (62.5%) | 9 (37.5%) | 24 (100%) | 14.84 | 0.001 |
| **Total** | 33 (30.6%) | 75 (69.4%) | 108 (100%) | | |
| **Gender** | | | | | |
| Male | 24 (28.9%) | 59 (71.1%) | 83 (100%) | | |
| Female | 9 (36.0%) | 16 (64.0%) | 25 (100%) | 0.45 | 0.62 |
| **Total** | 33 (30.6%) | 75 (69.4%) | 108 (100%) | | |
| **Disease criteria** | | | | | |
| Asymptomatic/mild | 20 (22.5%) | 69 (77.5%) | 89 (100%) | | |
| Severe | 13 (68.4%) | 6 (31.6%) | 19 (100%) | 15.58 | <0.001 |
| **Total** | 33 (30.6%) | 75 (69.4%) | 108 (100%) | | |
| **Duration of admission (days)** | | | | | |
| ≤ 5 | 6 (66.7%) | 3 (33.3%) | 9 (100%) | 7.65 | 0.09 |
| 6-10 | 17 (25.4%) | 50 (74.6%) | 67 (100%) | | |
| 11-15 | 9 (32.1%) | 19 (67.9%) | 28 (100%) | | |
| 16-20 | 0 (0.0%) | 2 (100%) | 2 (100%) | | |
| > 20 | 1 (50.0%) | 1 (50.0%) | 2 (100%) | | |
| **Total** | 33 (30.6%) | 75 (69.4%) | 108 (100%) | | |

## Discussion

The median age of patients in this study is comparable to the to mean age of 38 years reported from a previous Nigerian study (21) but lower than the mean value of 65.5 years reported from United states (22). About two third of our patient were less than 55 years. This was similar to study from China where people less than 50 years constituted about 52-55% of cases (23) and also a Nigerian study where 50% of the study participants were above 40 years (21). The implication of this finding is that there is need to pay greater attention to middle aged patients from our setting.

About two-third of the patients were males. A study of greater than 2900 patients in Iran found out that the rate at which males were affected to be almost double the rate at which females were affected, with a male-to-female ratio of 1.93:1 (24). Several theories have been proposed for the higher incidence of COVID-19 among males such as the possible down regulation of angiotensin converting enzyme 2 (ACE2) mRNA, the receptor of SARS-nCoV-2 by 17-beta estradiol (25).

Similar to the global clinical pattern of COVID-19; fever and cough were the most common symptoms from our patients, even though half of the patient did not have these typical features. This finding was similar to by studies from Asia (15), Europe (26) and Nigeria (21). More than two third of our patients did not have any co-morbidity. However, the few that had co-morbidities were majorly for diabetes mellitus and hypertension. Patients with diabetes are said to have higher predilection for severe COVID-19 disease due to an elevated level of ACE-2 receptor (27). In China about one-fourth of hypertensive COVID-19 cases had 6% of the case fatality rate and this was attributable to pandemic anxiety. Additional reason given for increased mortality amongst the hypertensive patients was the continuous use of ACE-2 inhibitors and angiotensin receptor blockers for treatment that end up, upregulating the expression of the ACE-2 receptor, thereby leading to increased susceptibility to COVID-19 infection (27).

Worldwide, COVID-19 patients had been adjudged to have silent hypoxia and measurement of oxygen saturation has been severally advocated (28). However, less than one-fourth of our patients had $SPO_2$ less than 92% on admission. The median duration of admission from our study was slightly lower than the 9 days (interquartile range, 7-11 days) observed by Bowale from Nigeria (21). This may be attributed to the change in the guidelines on admission and discharge criteria recommended by the Nigeria Center for Disease Control (29).

The case fatality rate from our study participants is about seven times the upper limit of the national average for Nigeria of 1.9%. This was a worrisome finding more so that most of the study participants from this study do not have co-morbidities. It may also be a function of lower denominator due to suboptimal testing. All samples had to be tested at NCDC referral laboratory in Abuja which is about 650 kilometers away due to the lack of a functioning molecular laboratory as at that period.

The factors significantly associated with mortality from our study were old age, presence of co-morbidity and severity of cases. Older age was reported by Mikami and colleagues as a risk factors for increase in in-hospital mortality (30). In term of clinical course of the disease symptoms, this study found a significant correlation with longer duration of hospital admission stay among patients with severest form of the disease. Yong Hoo Lee *at al.,* from South Korea (31) conducted a study correlating symptoms and virologic remission and found out that symptomatic patients take longer time to clear the virus than asymptomatic.

## Conclusion

This paper provides a contribution to the clinical and epidemiologic factors associated with COVID-19 patients from Sokoto

**Table :** Predictors of mortality among patients with COVID-19

| Parameter | Outcome | | Unadjusted OR (95% CI) | P value | Adjusted OR (95% CI) | P value |
|---|---|---|---|---|---|---|
| | Dead | Alive | | | | |
| **Age group (years)** | | | | | | |
| ≥ 55 | | | | Fischer | | |
| < 55 | 6 (25%) | 18 (75%) | 4.33 (1.25-15.00) | *0.02 | 0.30 (0.30-3.12) | 0.32 |
| | 6 (7.1%) | 78 (92.9%) | | | | |
| **Gender** | | | | Fischer | | |
| Male | 9 (10.8%) | 74 (89.2%) | 0.89 (0.22-3.58) | 1.00 | | |
| Female | 3 (12.0%) | 22 (88.0%) | | | | |
| **Clinical features** | | | | | | |
| **Cough** | | | | | | |
| Yes | 9 (18%) | 41 (82%) | 4.02 (1.02-15.80) | *0.03 | 1.94 (0.25-14.77) | 0.52 |
| No | 3 (5.2%) | 55 (94.8%) | | | | |
| **Lethargy** | | | | | | |
| Yes | 11 (22%) | 39 (78%) | 16.08 (1.99-129.62) | *0.001 | 9.48 (0.69-130.59) | 0.09 |
| No | 1 (1.7%) | 57 (98.3%) | | | | |
| **Dyspnoea** | | | | | | |
| Yes | 10 (25%) | 30 (75%) | 11.00 (2.27-53.31) | *0.001 | 2.25 (0.30-16.97) | 0.43 |
| No | 2 (2.9%) | 66 (97.1%) | | | | |
| **Sore throat** | | | | | | |
| Yes | 2 (11.8%) | 15 (88.2%) | 1.08 (0.21-5.43) | 1.00 | | |
| No | 10 (11%) | 81 (89.0%) | | | | |
| **Diarrhoea** | | | | | | |
| Yes | 3 (17.6%) | 14 (82.4%) | 1.95 (0.47-8.11) | 0.39 | | |
| No | 9 (9.9%) | 82 (90.1%) | | | | |
| **Runny nose** | | | | | | |
| Yes | 1 (7.1%) | 13 (92.9%) | 0.58 (0.07-4.88) | 1.00 | | |
| No | 11 (11.7%) | 83 (88.3%) | | | | |
| **Headache** | | | | | | |
| Yes | 2 (28.6%) | 5 (71.4%) | 3.64 (0.62-21.26) | 0.17 | | |
| No | 10 (9.9%) | 91 (90.1%) | | | | |
| **Abdominal pain** | | | | Fischer | | |
| Yes | 2 (40%) | 3 (60%) | 6.20 (0.92-41.63) | 0.09 | | |
| No | 10 (9.7%) | 93 (90.3%) | | | | |
| **Impaired** | | | | Fischer | | |
| **consciousness** | 2 (66.7%) | 1 (33.3%) | 19.00 (1.58-228.55) | *0.03 | 11.20 (0.18-710.96) | 0.25 |
| Yes | 10 (9.5%) | 95 (90.5%) | | | | |
| No | | | | | | |
| **Tachycardia** | | | | Fischer | | |
| Yes | 5 (16.7%) | 25 (83.3%) | 2.03 (0.59-6.97) | 0.31 | | |
| No | 7 (9.0%) | 71 (91.0%) | | | | |
| **$SPO_2$** | | | | Fischer | | |
| < 92% | 8 (50%) | 8 (50%) | 22.0 (5.42-89.35) | *<0.001 | 29.89 (2.64-338.23) | *0.01 |
| ≥ 92% | 4 (4.3%) | 88 (95.7%) | | | | |
| **Diastolic BP** | | | | Fischer | | |
| < 60 mmHg | 1 (33.3%) | 2 (66.7%) | 4.27 (0.36-51.04) | 0.30 | | |
| ≥ 60 mmHg | 11 (10.5%) | 94 (89.5%) | | | | |
| **Systolic BP** | | | | Fischer | | |
| < 90 mmHg | 1 (50%) | 1 (50%) | 8.64 (0.50-148.00) | 0.21 | | |
| ≥ 90 mmHg | 11 (10.4%) | 95 (89.6%) | | | | |
| **Comorbidity** | | | | Fischer | | |
| Yes | 9 (27.3%) | 24 (72.7%) | 9.00 (2.25-35.98) | *0.001 | 14.63 (1.77-120.67) | *0.01 |
| No | 3 (4.0%) | 72 (96.0%) | | | | |

State, Nigeria. The findings are similar to previous reports from Nigeria and rest of the world.

### Limitations of the study

One of the limitations of this study is the relatively small sample size that was used, thus, a future multicenter study with higher sample size is recommended.

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## Conflict of Interest

We declare no conflict of interest.

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