

Impact of COVID-19 on surgical emergency presentations in a tertiary hospital in the developing world

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ABSTRACT

BACKGROUND: The COVID-19 pandemic and the institution of measures to contain the spread of the virus have disrupted patients' elective and emergency care, with scarce resources being channeled towards care of emergency presentations and containing the virus. The study aimed to assess the impact of COVID-19 on surgical accidents and emergency presentations in a major teaching hospital.

METHOD: This was a comparative retrospective study. All presentations between February to July 2019 (non-COVID-19 period) were compared with the same period in 2020 (COVID-19 period). Patients' biodata, including surgical specialty that managed the patient, diagnosis, and treatment offered, were collated and analyzed with IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: I.B.M. Corp.

RESULTS: We included 3463 patients in the study; 2419 (69.9%) were males, while 1044(30.1%) were females. The mean age of the patients in 2019 was 31.83 ±19.31 years, and that of 2020 was 34.93±19.99 years (P=0.001). During the lockdown period, emergency surgical presentations declined significantly by 17% (1894 versus 1569: P=0.001). There was a general decline in surgical emergency presentations across surgical specialties, with orthopedic and otorhinolaryngology (E.N.T.) having the greatest impact (313 versus 202 P=0.044). Presentation for trauma decreased by 18% (1394 versus 1144 P=0.711). Operative interventions declined by 47% (292 versus 155 P=0.001). There was a decline of 31% in the number of admissions for in-patient care (420 versus 290 P=0.019).

CONCLUSION: The COVID-19 lockdown in Nigeria was associated with a reduction in the number of surgical emergency presentations and surgical interventions.

Keywords: Accidents, COVID-19, Pandemic, Surgery, Emergency, Nigeria

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) is caused by the severe acute respiratory syndrome coronavirus-2 (SARS-COV-2) [1]. First identified in Wuhan City, Central China, it has spread globally quickly and, on March 11th, 2020, was declared a pandemic by the World Health Organization (WHO) [2,3].

After being declared a pandemic, health care systems were re-organized to serve effectively while maintaining essential healthcare service delivery. In line with this, elective surgeries and clinics were suspended by many surgeons/hospitals, and the scarce resources used to fight the COVID-19 pandemic [4,5]. The first case of the COVID-19 virus in Nigeria was recorded in Lagos on February 27th, 2020 [6]. Like many other countries, Nigeria instituted a nationwide lockdown on March 30th, 2020, and discouraged all but essential travel in order to contain the virus [7,8]. Patients avoided visiting hospitals because of the fear of contracting the virus in a hospital setting [9].

Different regions have varying factors which can increase the mortality by this disease. Europe and North America have an aging population compared to Africa, which has a younger population base. Sub-Saharan Africa has a high burden of immune-compromised states such as human immune deficiency Virus, tuberculosis, malaria, and anemia [10]. Africa also has a high level of poverty and malnutrition. Healthcare systems in this part of the world are underfunded, with human and infrastructural deficits [11–14].

Previous authors have noted an overall decline in presentations to the surgical emergency department, linking it to the new measures to contain the spread of the virus [15,16].

This paper aimed to describe the effect of the COVID-19 pandemic on surgical emergency presentations in a significant tertiary healthcare facility in Nigeria. This knowledge is vital to this peculiar environment as it will guide the allocation of scarce resources in future pandemics and even as the effects of the virus last.

METHODS

This retrospective study was conducted in southeast Nigeria at the Alex Ekwueme Federal University Teaching Hospital Abakaliki (A.E.F.U.T.H.A.). This hospital is the only tertiary health facility in the

state and of 720-bed capacity. It is situated in Abakaliki, the capital city of Ebonyi state, with about 3 million people. It serves patients from Ebonyi and neighboring states and provides multi-specialist services. The majority of the inhabitants are farmers, traders, and civil servants.

The surgical emergency room (E.R.) is of a 12-bed capacity, headed by a consultant general surgeon. It has 11 casualty officers (doctors), 30 nurses, and 40 other supporting staff. All surgical subspecialties take calls daily in the E.R. and provide 24-hour emergency surgical services. Patients are received, triaged, and stabilized by the casualty officers before being referred to the appropriate surgical subspecialty. Subsequently, the patient can be managed and discharged home (discharged) from E.R. or admitted into the ward for continued in-patient care (admitted), depending on the clinical scenario.

All patients who presented to E.R. by February to July of 2019 (non-COVID year) and February to July 2020 (COVID-19 year) were studied. Repeated presentations to E.R. were counted as new presentations. Diagnoses/cases were conveniently grouped as traumatic or non-traumatic based on the cause of their ailments. The treatment offered was grouped into surgical and non-surgical, depending on whether the patient had an operative intervention or not. Patients brought in dead, or those who declined orthodox treatment were excluded from the study. Also, those with incomplete data or those whose records could not be traced were excluded. Data collected included patients' age, sex, diagnosis at presentation, the surgical specialty, and the treatment offered.

Data was collected from accident and emergency logs and from the theatre logs. It was analyzed using IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: I.B.M. Corp. Continuous variables were summarized as means and standard deviation, while categorical variables were presented in frequencies and percentages. Comparison among categorical data was made with Chi-square, while that of continuous variables was by t-test. Statistical significance was set at a p-value of less than 0.05

Ethical approval was obtained from the A.E.F.U.T.H.A. Research and Ethics Committee with reference number: 21/08/2020-09/09/2020.

RESULTS

A total of 3482 cases were recruited; 19 were excluded due to incomplete data leaving 3463 cases that were studied. There were 2419 (69.9%) male patients and 1044 (30.1%) females, with a male to female ratio of 2.3:1. The mean age of the patients in 2019 was lower than that of 2020 (31.83 ±19.31 years versus 34.93±19.99 years) with a statistically significant difference, as shown in Table 1.

The total number of patients received in the surgical E.R. during the COVID-19 pandemic was 17% lower than the same period in the non-COVID-19 year (Table 1).

into the wards for in-patient care saw a decline of 31 % (Table 2).

The proportion of patients managed and discharged from the E.R. during the COVID-19 era (2020) was higher than in the preceding year (81.5% versus 77.8%), as shown in Table 2.

Notably, there was a decline in operative interventions carried out during the COVID lockdown. Operative interventions declined by 47%, as shown in Table 2. The decline in admissions varied per specialty, with otorhinolaryngology having the highest decline, followed by orthopedic emergency cases. On the contrary, maxillofacial surgery saw a surge of 59% during the period of lockdown (Table 3).

Table 1: Patient characteristics

Characteristic	2019	2020	Difference	% Change	P. Value
Total Presentation	1894	1569	-325	-17 per cent	0.001
Gender					
Male	1342	1077	-265	-20 per cent	0.169
Female	552	492	-60	- 11 per cent	
Mean age	31.83	34.93			0.001
Diagnosis					
Traumatic	1394	1144	-250	-18 per cent	0.711
Non-traumatic	500	425	-75	-15 per cent	

Male admissions dropped by 20%, while the females dropped by 11% (table 1). The month of April witnessed the most significant decline in patients' presentation at the E.R., as shown in figure 1.

Trauma cases declined by 18%, and admissions

DISCUSSION

The COVID-19 pandemic has put a significant demand on Africa's already stretched medical services. At the pandemic's peak, medical practice experienced significant changes: outpatient clinics

Table 2: Treatment and admission status during the period of study

Variable	2019	2020	difference	% Change	P-value
Treatment					
Operative	292	155	-13	-47 per cent	0.001
Nonoperative	1602	1414	-18	-12 per cent	
Total	1894	1569			
Admission status					
Admitted	420	290	-130	-31 per cent	
Discharged	1474	1279	-195	-13 per cent	0.019
Total	1894	1569			

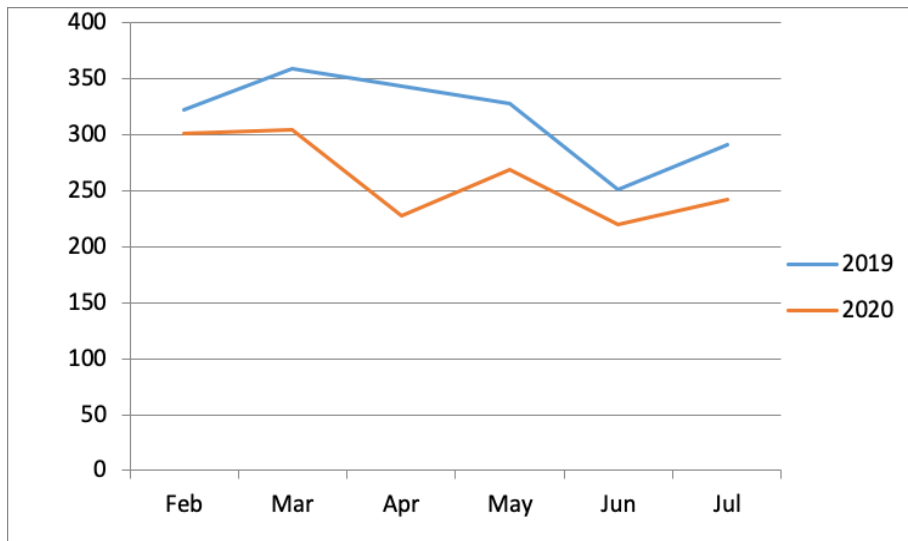


Figure 1: Line graph showing the monthly case distribution over the years of study

and non-urgent and non-cancer surgeries were suspended, and resources were reserved to tackle emergencies and combat the spread of the virus [17]. The government, institutions, and hospitals' response to the pandemic resulted in a change in elective and emergency presentations [15]. Several authors have noted reductions in surgical emergency presentations [16,18,19,20]. We observed a decrease of 17 percent in surgical emergency presentations, and the decline occurred through the pandemic period under review. This decrease may be due to the reduction in vehicular travel during this period due to

movement restrictions during the lockdown [15]. However, this decrease was lower than that noted in the United Kingdom and Europe [16,20]. This difference may also be related to the patient's peculiarities in these regions. Unlike in developed countries like the U.K., our patients significantly patronize traditional medicine dealers because of poverty and ignorance. This may have also contributed to the lower emergency presentations in our study [21]. In addition, the restrictions of movement by the lockdown may have significantly heightened patronage of traditional healers by the populace.

Table 3: Patient presentations per specialty

Subspecialty	2019	2020	% Change
General Surgery	320	294	-8
Orthopedic	313	202	-35
Plastic Surgery	670	523	-22
Paediatric Surgery	6	5	-17
Urology	172	166	-3
Cardiothoracic Surgery	79	64	-19
Neurosurgery	239	231	-3
Ophthalmology	34	30	-12
Ear, Nose, and Throat	44	27	-39
Maxillofacial Surgery	17	27	+59
Total	1894	1569	
P-value			0.044

Significant declines in traumatic presentations were noted by previous authors in other regions, with some authors having a decline of as much as 45 percent [18,22,23]. This decline in trauma presentation may be due to the reduction in road traffic accidents due to reduced vehicular movement and a reduction in work accidents and crimes as a result of the lockdown [16,24]. However, geographical differences may explain these differences. The difference in the incidence of trauma presentations during this period may be due to the difference in interpersonal violence in these regions. As a case study, South Africa has a high incidence of interpersonal violence, ranking as the fourth most common cause of death in the region [25]. Another reason may be the difference in the specialization of the hospitals where these studies were done- the hospitals were trauma centers which ab initio had a high volume of trauma cases, unlike the study center, which handles other surgical emergencies in addition to trauma.

The decline in emergency operative interventions due to COVID-19 noted in this study was similar to those of earlier authors [26]. This reduction may be related to the delays in performing surgeries [27]. This is because it takes 12 to 24 hours to get the result of a COVID-19 test in study hospitals. Another reason for this steep decline in operative interventions in our study may also be related to the inability to afford the cost of operative interventions for these patients due to the economic impact of the COVID-19 restrictions on these patients [28]. The cost of a COVID-19 test and personal protective equipment significantly adds to the surgery cost. In a previous study, discharge against medical advice (DAMA) has been prevalent, especially among patients with fractures in this area [29]. The increased cost of treatment due to the COVID-19 pandemic may have heightened DAMA and patronage of traditional bone setters, contributing to the decline observed in the study. In addition, surgeons/medical personnel may have been reluctant to attend to the cases for fear of contracting the deadly virus. Little or no insurance cover and inadequate hazard allowances paid to Nigerian health workers may have led to a poor attitude to work with resultant low performance [29,30]. Therefore, a delay in performing surgeries and increased cost of treatment with the poor motivation of health workers associated with the COVID 19 contribute to the decline in operative interventions and possible patronage of traditional healers.

A global decline in emergency presentations was noted across all specialties, with a decline ranging from 3 percent to 39 percent. The decline in emergency orthopedic presentations (35%) was lower than what was found in Ireland by Elhalaway et al. [31]. This difference may be related to the fact that the institution in Ireland is an orthopedic facility with a high volume of orthopedic emergencies, and as such, a proportional decline in the presentation was expected. In contrast, our facility caters to all surgical specialties' emergencies, including orthopedics. In the same vein, the reduction in emergency presentations in E.N.T. was lower than the decline in other studies [32,33]. At the same time, other authors noted a reduction in emergency presentations in oral and maxillofacial surgery (O.M.F.S.) [34,35]. We noted an increase in the emergency presentations of O.M.F.S. in our center. The reason for this was not evident in our study. Though we did not take note of the incidence of dental abscesses in this study, a study by Blackhall et al. [36] noted an increase in dental abscesses during the lockdown, possibly due to the intake of multiple courses of antibiotics therapy, without seeking surgical intervention [36]. The decline in admission rate during the period was similar to the findings of Wong et al. in Hong Kong [15]. This decline may be due to the same reasons adduced for a reduction in operative intervention.

CONCLUSION

The COVID-19 pandemic and associated lockdown measures were associated with a general decline in surgical emergency presentations and treatment volume. This finding would serve as a template for emergency preparedness in subsequent infectious disease outbreaks.

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