

# Effect of Covid-19 Pandemic on the Management of Surgical Emergencies at the Yaounde Emergency Centre

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## Abstract:-

**Introduction:** The current corona virus pandemic (COVID-19) has put the world into an unprecedented global crisis. Health systems have been faced with an enormous challenge to provide the necessary care for this vast burden of patients. As a result, emergency and scheduled care for non-COVID patients has been affected. **Objective:** Evaluate the effect of the COVID-19 pandemic on the management of surgical emergencies at the Yaoundé Emergency Centre. **Method:** This was an analytical cross-sectional study with an exhaustive sampling. The data of all patients consulted in surgical emergencies from March to September 2019 and 2020 were collected using a review grid inside the registers of surgical emergencies. The analysis was done in Epi-info version 7.2.2.6 and Microsoft Excel software 2016. **Results:** Data were collected from 2584 patients in surgical emergencies. COVID-19 pandemic has eventually increase the rate of surgical emergencies [aOR=1.13, 95% CI=1.03-1.24, P=0,01] with statistically significant results but didn't impact significantly the rate of mortality [aOR=0.95, 95% CI=0.64-1.41, P=0,79]. In surgical emergencies, Road Traffic Accidents remained the first cause of consultations 56.94% (2019) against 52,30% (2020) and mortality 79,91% (2019) compared to 69,23% (2020).

**Conclusion:** It emerges from this study that the COVID-19 pandemic has increased the attendance in surgical emergencies but didn't affect significantly the rate of mortality.

**Keywords:-** surgical emergencies, COVID-19, YEC, Yaoundé.

## I. INTRODUCTION

CoViD-19 is an infectious respiratory disease caused by the novel corona virus SARS-CoV-2, COVID-19. It was declared a pandemic by the World Health Organization (WHO) on 11 March 2020 [1]. Since then, the number of infections has continued to rise, putting pressure on our health care system and forcing widespread containment and reorganization of services to improve our care for patients with COVID-19 [2]. This had medical consequences for the people served by the hospitals [3]. The management of emergencies has become a very sensitive issue in the

organization of the health system. Since their creation in the mid-1960s, the activity of hospital emergency departments has been increasing year after year [13]. This constant increase in the number of patients in emergency departments is a phenomenon common to all countries that have them [14].

It is a real public health problem in Africa because emergencies affect the young population, mainly males, which is a characteristic found in the African series [15-17]. This is a reflection of our demography where the age pyramid has a broad base. In the West, on the other hand, where the population is aging, we find higher average ages [18].

In sub-Saharan Africa, the management of emergencies is characterized by an inadequacy concerning the demand for care due to the absence of a financing framework, the non-existence of an organized system of pre-hospital management of emergencies, and the inadequacy of the reception health structures in terms of their treatment, the nature of which has been modified by explosive urbanization [19].

This study aimed to describe the specifics of surgical management of patients with urgent conditions in the context of this pandemic.

## II. METHOD

### A. Study design and setting

This was an observational, analytical cross-sectional study with two parts, which served to evaluate the effect of the COVID-19 pandemic on the management of surgical emergencies at the YEC.

The descriptive component was to determine the distribution and mortality of patients at the surgical emergency department.

The analytical component was to investigate whether or not there was an association between exposure to the COVID-19 pandemic and surgical emergency room attendance and mortality rates. In this arm, exposed patients were those seen in surgical emergency departments from March to September 2020 (during the pandemic) and unexposed patients were those seen in surgical emergency

departments from March to September 2019 (before the pandemic). The study was conducted at the Yaounde Emergency Centre in the MFOUNDI department, located at the Cité Verte Health District, in the MESSA neighbourhood.

#### B. Ethical consideration

This study was approved by the Institutional Research of the University of Dschang and the Regional Ethics Committee of the Centre Region. Administrative authorization was obtained from the administration of the Yaoundé Emergency Centre and all the heads of surgical departments provided written informed consent. We carried out this study according to the declarations of Helsinki.

#### C. Study population

The participants included in the study were all patients admitted at surgical emergencies of all the years, both males and females. They were recruited using registries from the 06<sup>th</sup> of March to the 06<sup>th</sup> of September 2019 for the unexposed and from the 06<sup>th</sup> of March to the 06<sup>th</sup> of September 2020 for the exposed.

#### D. Variables and measurement

The review grid contained two sections: rate of attendance and rate of mortality

- *Rate of attendance*: we collected data on age, sex, number of consultations at the YEC, number of consultations at surgical emergencies, confirmatory diagnoses found at surgical emergencies.
- *Rate of mortality*: we collected data on age, sex, number of deaths at the YEC, number of deaths at surgical emergencies, causes of deaths at surgical emergencies (general and specific causes)

#### E. Sample size and statistical analysis:

The sample size was exhaustive as all patients received in the emergency room during the study period had to be included in the sample to minimize selection bias.

Software such as Epi Info version 7.2.2.6 and Microsoft Excel 2016 facilitated data entry and analysis. The significance level was  $\alpha=0.05$ . Microsoft Excel was used for graphs and tables while Epi-info for various analysis and the comparison of the 2 periods, 2019 and 2020.

We have presented qualitative variables as frequencies and percentages (%). Chi Square tests were performed to investigate the association of attendance and mortality with categorical variables (exposure to the COVID-19 pandemic).

### III. RESULTS

#### A. Participants included

A total of 2584 patients were admitted at surgical emergencies with 1628 patients in 2019 and 956 patients in 2020. All these patients were included in our study.

The attendance rate in 2019 was 22.32% compared to 24.57% in 2020.

#### B. Distribution of consultations by socio-demographic characteristics:

The age of patients consulted in surgical emergencies varied between 1 and 89 years, with an average age of  $30.73 \pm 14.49$  years in 2019 and  $31.68 \pm 15.91$  years in 2020. The most frequent age group encountered was 15 to 49 years (75.18% in 2019 and 73.12% in 2020).

Men were frequently consulted in surgical emergencies during both periods (68.36% in 2019 and 65.48% in 2020) compared to women with a sex ratio of 2.17 in 2019 against 1.90 in 2020 in favor of men (**table1**).

Table 1: Distribution of patients coming for consultations at surgical emergencies according to their socio demographic characteristics

		2019	2020	
Variables	Modality	Frequency (Percentage)	Frequency (Percentage)	P-value
Age	< à 15 years	231 (14,19)	123 (12,87)	0,03
	15 à 49 years	1224 (75,18)	699 (73,12)	
	≥ 50 years	173 (10,63)	134 (14,02)	
<b>TOTAL</b>		<b>1628 (100)</b>	<b>956 (100)</b>	
Sex	Male	1114 (68,36)	626 (65,48)	0,13
	Female	514 (31,57)	330 (32,66)	
<b>TOTAL</b>		<b>1628 (100)</b>	<b>956 (100)</b>	

#### C. Distribution of consultations by month:

According to **figure 1**, the number of consultations in surgical emergencies in 2020 has decreased compared to 2019 for each month yet, 2020 has a greater rate of attendance at surgical emergencies than 2019. In 2020, we observed that May and June have the fewest consultations, yet these same months in 2019 had the highest number of

consultations in surgical emergencies. July contains the highest number of cases of patients registered for surgical emergencies for the year 2019 and March for the year 2020.

#### D. Distribution of consultations by pathology:

**Figure 2** shows us the general causes recorded in surgical emergencies before and during the pandemic.

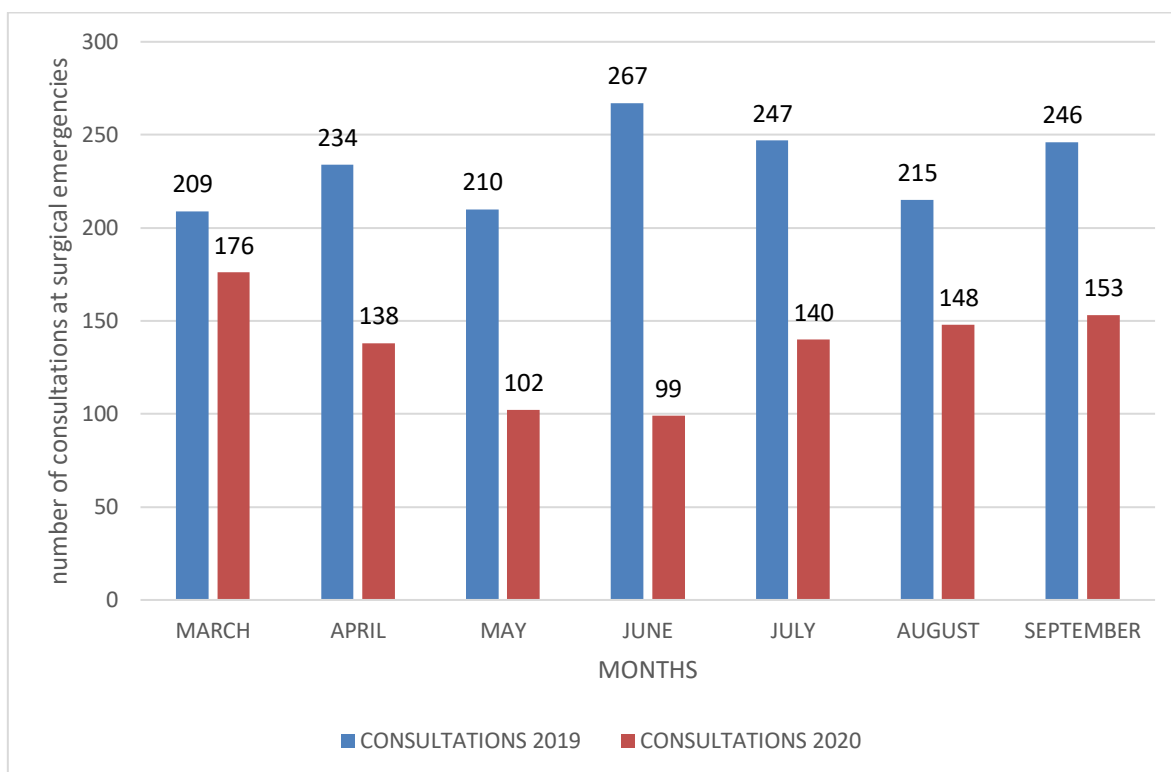


Fig. 1: Distribution of the number of consultations in 2019 and 2020 by months.

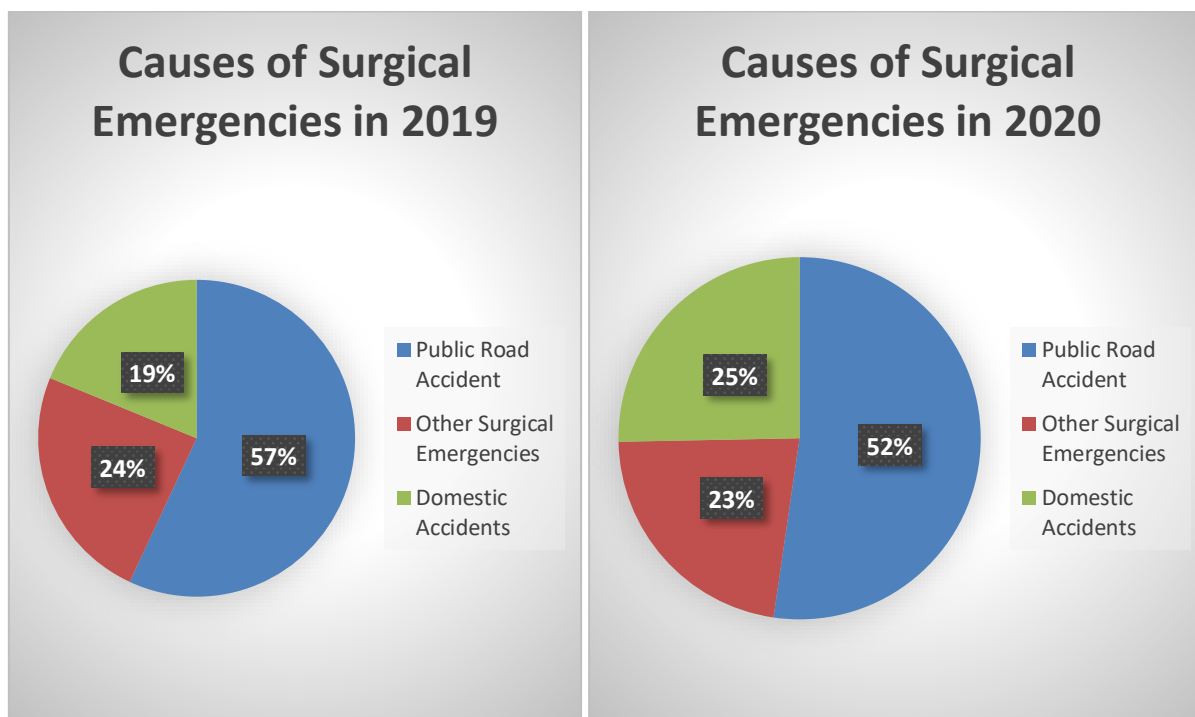


Fig. 2: Distribution of the general causes in surgical emergencies

Public Road Accidents (PRA) remain in the forefront but we note that Domestic Accidents (DA) have increased from 2019 to 2020 by 6%. **Table 2** shows the reasons for consultations in surgical emergencies in 2019 and 2020.

According to the table above, we see a statistically significant difference in domestic accidents and road accidents in 2019 and 2020.

Table 2: General and Specific causes at surgical emergencies				
		2019	2020	
General causes	Specific causes	Frequency (Percentage)	Frequency (Percentage)	P-value
Public Road Accidents	Cranial trauma and hematoma	318 (34,30)	218 (43,6)	
	Trauma and fractures of the limbs	609 (65,70)	282 (56,4)	0,02
<b>TOTAL</b>		927 (100)	500 (100)	
Domestic Accidents	Cranial trauma and hematoma	153 (50)	108 (44,63)	
	Trauma and fractures of the limbs	153 (50)	134 (55,37)	<0,001
<b>TOTAL</b>		306 (100)	242 (100)	
Other surgical emergencies	Tumor	45 (11,39)	38 (17,76)	
	Hernia	33 (8,4)	4 (1,87)	
	Infections	88 (22,28)	56 (26,17)	
	Others*	70 (17,72)	30 (14,02)	
Digestif	Peritonitis	93 (23,54)	50 (23,36)	0,29
	Appendicitis	35 (8,86)	19 (8,88)	
	Bowel Obstruction	31 (7,85)	17 (7,95)	
<b>TOTAL</b>		395 (100)	214 (100)	

\* Other: hydrocele, oesophageal foreign body, pyloric stenosis, compressive goitre, persistent peritoneo-vaginal canal  
 \* Infection: Gangrene, cellulitis, polymyositis, bedsores, emphysema, necrosis, abscess, phlegmon, arthritis, tonsillitis

**E. Distribution of death cases:**

Concerning mortality, 649 deaths were recorded at YEC during our study period, with 121 cases of death belonging to surgical emergencies. **Figure 3** shows the distribution of cases of death. The mortality rate for surgical emergencies increased from 4.24% to 5.44%.

**F. Distribution of deaths by socio-demographic characteristics:**

The age of patients who died in surgical emergencies ranged from 1 to 87 years, with a mean age of 41.19±17.77 years in 2019 and 42.27±17.15 years in 2020. The age group

most frequently encountered was 15 to 49 years (65.22% in 2019 and 71.15% in 2020).

Among the patients admitted in surgical emergencies, the mortality rate was higher in men during both periods (71.01% in 2019 and 71.07% in 2020) compared to women with a sex ratio of 2.45 in 2019 and 2.47 in 2020 in favor of men.

**Figure 4** shows the general causes of death in surgical emergencies.

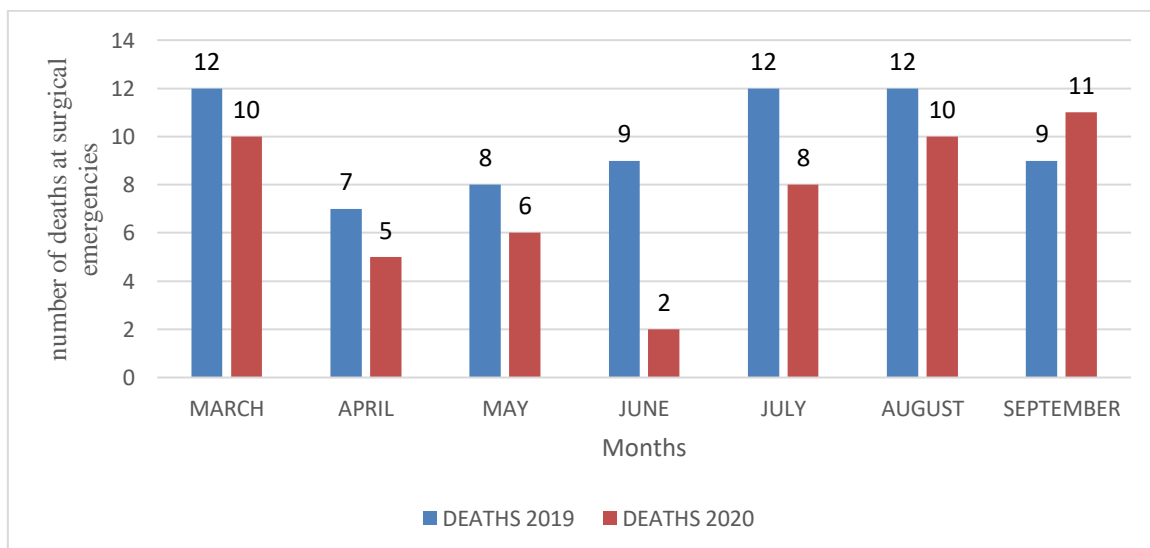


Fig. 3: Distribution of the number of death cases in 2019 and 2020.

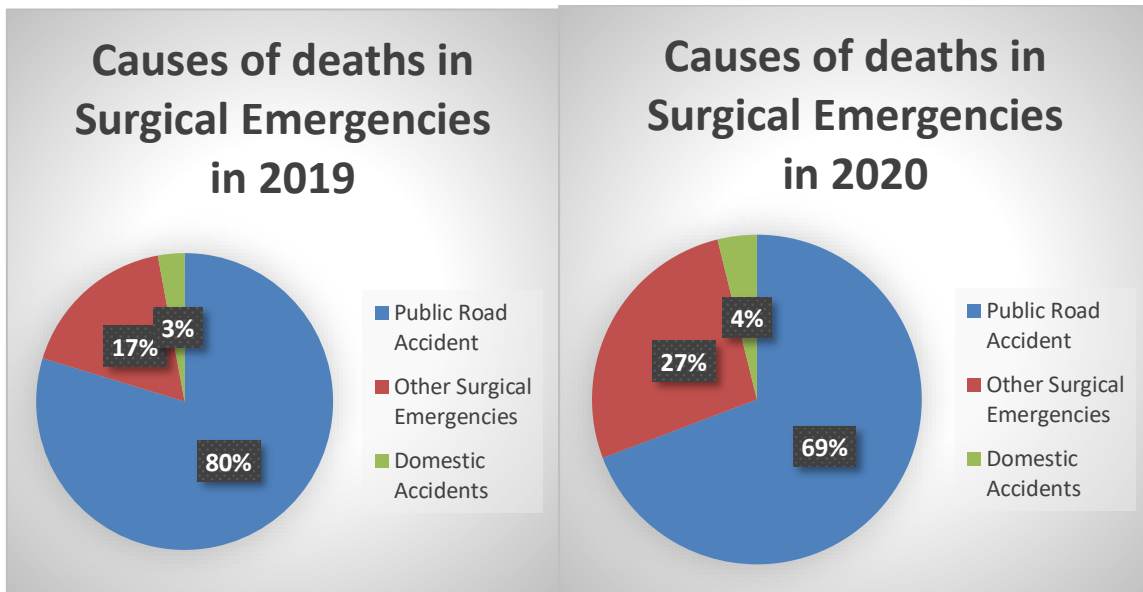


Fig. 4: General causes of deaths in surgical emergencies

In **table 3**, we have detailed the reasons for death in surgical emergencies. In the case of other surgical emergencies, the most common causes of death were digestive emergencies, particularly peritonitis. In Public Road Accidents (PRA), head injuries were frequent in 2019 (54.55%) and then decreased in 2020 (36.11%)

*G. Association between the pandemic and surgical emergencies:*

In **table 4**, we note an association between the occurrence of the pandemic and attendance and mortality in surgical emergencies but mortality was not significantly impacted but attendance was.

Table 3: General and Specific causes of deaths at surgical emergencies

General causes		Specific causes		2019	2020	P-value	
				Frequency (Percentage)	Frequency (Percentage)		
Public Road Accidents	Cranial trauma and hematoma			30 (54,55)	13 (36,11)	0,21	
	Trauma and fractures of the limbs			25 (45,45)	23 (63,89)		
<b>TOTAL</b>				55 (100)	36 (100)		
Domestic Accidents	Cranial trauma and hematoma			0	0	1,00	
	Trauma and fractures of the limbs			2 (100)	2 (100)		
<b>TOTAL</b>				2 (100)	2 (100)		
Other Surgical Emergencies	Tumor			2 (16,67)	1 (5,56)	0,26	
	Hernia			0	0		
	Infections			2 (16,67)	0		
	Others			0	0		
	Digestive	Peritonitis			6 (50)		9 (64,29)
		Appendicitis			0		1 (7,14)
	Bowel obstruction			2 (16,67)	3 (21,43)		
<b>TOTAL</b>				12 (100)	14 (100)		

Modality	Exposure to the COVID-19 pandemic		OR	CI at 95%	P-value
	Yes	No			
Consultations at surgical emergencies	956	1628	1,13	[1,03-1,24]	0,01
Deaths at surgical emergencies	52	69	0,95	[0,64-1,41]	0,79

#### IV. DISCUSSION

##### A. Rate of attendance:

Our study showed a rate of attendance in surgical emergencies of 22.32% in 2019 against 24.57% in 2020 with a statistically significant decrease in Public Road Accidents (PRA) from 56.94% in 2019 to 52.30% in 2020 ( $p = 0.024$ ) but we noted a slight increase in Domestic Accidents (DA) from 18.80% in 2019 to 25.31% ( $p < 0.001$ ). These variations found are similar to the results of another study conducted in France [4], with a decrease in Public Road Accidents from 14.3% in 2019 to 10.4% ( $p = 0.115$ ) and an increase in Domestic Accidents from 32.3% in 2019 to 65.5% in 2020 ( $p < 0.001$ ). This can be explained by the fact that the population is confined and there was a strong decrease in road traffic and the presence of workers in their workplace, but conversely, the risk of Domestic Accidents and acts of violence at homes had increase due to assaults, fights and other rough play at home.

Our study also showed a reduction in the number of patients in surgical emergencies of 41.28% (1628 patients in 2019 against 956 patients in 2020) which is slightly higher than that found [5] in 2021 at the Military Hospital of Instruction Mohammed V in Rabat, Morocco which had a reduction rate of 40% (12259 patients in 2019 and 7544 patients in 2020). A study in 2008 [7] at the Gabriel Touré University Teaching Hospital in Mali showed that the main reason for admission to surgical emergencies was trauma (56.79%). Among the traumas, Public Road Accidents were by far the first cause of admission with 39.49% of cases. In 2005, a study conducted [8] at the Yaoundé Central Hospital (YCH) and the Yaoundé General Hospital (YGH), found that Public Road Accidents were the most frequent etiology (55.3% of cases) of extra dural haematomas from 1999 to 2004 and this time, another retrospective study conducted [9] from 2006 to 2016 at the National Centre for the Rehabilitation of Persons with Disabilities (CNRPH) in Yaoundé showed that the main etiology of the causes of bimalleolar fractures were still Public Road Accidents (48.7%).

During our study period, 159 patients were admitted to digestive surgical emergencies in 2019 against 86 in 2020 with a reduction rate of 45.91% with peritonitis cases in the lead. This rate of reduction is higher compared to that found [2] in Tunisia which had 135 patients in digestive surgical emergencies in 2019 against 86 in 2020 with a rate of reduction of 36.30% still with peritonitis as the main reason for consultation. Similar results, especially on the number of consultations, were reported in urological surgery [10] in Italy (February to March 2019 and 2020) where 266 patients were consulted in urological emergencies in 2019 against

107 patients in 2020 (reduction = 59.77%) ( $p < 0.001$ ). The explanation would be a fear of viral contamination, which was higher in our country during the first wave of the pandemic.

Digestive pathologies represented 40% of the most frequently encountered causes in 2019 and 2020 respectively (In Other Surgical Emergencies) with peritonitis as the first cause in digestive emergencies 23.54% in 2019 and 23.36% in 2020. Our most represented age group was 15-49 years (75% in 2019 and 73% in 2020). At the National Hospital of Zinder (HNZ) [6] in 2017, (76.37%) found the 0-15 year old paediatric population to be the most represented (45.5%). In digestive surgery, acute peritonitis accounted for 51.61% of causes of consultations. This difference in age can be explained by the different socio-demographic characteristics of the two countries, which nevertheless remain below 50 years of age, showing how our African population is predominantly made up of young people.

##### B. Deaths at surgical emergencies:

The mortality rate from surgical emergencies in 2019 and 2020 during our study period was 4.24% and 5.44% respectively. This shows a slight decrease as another study [11] conducted in 2007 at the Yaoundé Central Hospital (YCH) reported a mortality rate in surgical emergencies of 8.1%, and another one done [12] in 2018 still at the YCH from December 2017 to April 2018 gave us a mortality rate in surgical emergencies of 4.9% with associated factors such as age over 65 years, and the occurrence of per or post-operative complications. These results show the efficiency of the technical platform and the nursing staff present at the YEC, which considerably reduces the risk of mortality in the emergency room despite the pandemic.

Among the causes of death in surgical emergencies, PRAs were the leading cause with prevalences of 56.94% (2019) and 52.30% (2020). They were also the leading cause of trauma and death reported by Ngowe N. *et al.* [11] in 2007 at the YCH with a prevalence of 49% followed by non-traumatic digestive emergencies (31%) with peritonitis as the most frequent cause (20%). This may be because peritonitis is a severe form of appendicitis and during the pandemic people preferred to stay at home due to the fear of viral contamination making their cases worse.

## V. CONCLUSION

This study aimed to assess the effect of the pandemic on the management of surgical emergencies. The results we obtained show that surgical emergencies account for almost a quarter of total consultations at the Yaounde Emergency Centre (22.32% in 2019 and 24.57% in 2020). Even if mortality in surgical emergencies is not statistically significant in our study despite the existing association between the pandemic and deaths recorded in emergencies, [OR=0.95 p-value=0.79, 95% CI at 95%= 0.64 - 1.41] it remains worrying because during the pandemic people feared hospital structures for fear of being contaminated, thus developing complications at home and only going to hospital when the situation was already aggravated and despite intensive care, the vital prognosis was already committed. As for consultations, there was a statistically significant association between the pandemic and the level of consultations in surgical emergencies [OR=1.13, 95%CI=1.03-1.24, P=0.01 95%] showing that the pandemic has eventually increase the rate of attendance at surgical emergencies.

In surgical emergencies, Public Road Accidents remain the leading cause of morbidity and mortality in 2019 and 2020, and is the most frequent cause of patient admission to the surgical emergency department.

### • What is known about this topic

People tend to suggest that the COVID-19 pandemic has affected surgical emergencies but didn't know whether it has increased or decreased it thus our study.

### • Competing Interest

None

### • Authors' contribution:

- Conception: Gabriel Tchatchouang Mabou.
- Design: Gabriel Tchatchouang Mabou, Charles Kouanfack, Ines Kwawa.
- Data collection: Gabriel Tchatchouang Mabou.
- Data analysis and interpretation: Gabriel Tchatchouang Mabou, Charles Kouanfack, Ines Kwawa, Marie Ange Ngo Yamben.
- Drafting of the manuscript: Gabriel Tchatchouang Mabou, Charles Kouanfack, Ines Kwawa, Marie Ange Ngo Yamben, Djam Chefor Alain, Bitang à Mafok Louis Joss, Solange Whegang Youdom, Jérôme Ateudjieu, Faustin Atemkeng and Siméon Pierre Choukem.

All the authors read and approved the final draft for publication.

### • Limitations and strengths

This study was mostly quantitative and could not research associated factors with the change in the rate of attendance at surgical emergencies thus leading to a new study. Our data before and after the pandemic are only taken 07 months from March to September to reduce selection bias in both periods but we could not find a statistic association between deaths and exposure to the pandemic thus needing to increase the length of the period of study.

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