

# Impact of the covid-19 pandemic on pediatric surgical practice: the experience of a Senegalese tertiary children's hospital

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## Abstract

**Introduction:** The covid-19 pandemic has led many pediatric surgical services to adjust their practice. In Africa, few reports have been published in the pediatric surgical milieu. We report our experience at the Albert Royer National Children's Hospital Center.

**Methods:** We conducted a cross-sectional study, comparing activities between two six-month periods, before and after the emergency state declaration. Numbers have been compared using Pearson's Chi-squared.

**Results:** Compared to the period before the proclamation of emergency state, consultations were reduced by 62.7%, hospitalization by 46%, surgical interventions by 52.4%, and emergency surgical operations by 55.8%. All reduced activities were statistically significant with  $p < 0,001$ .

**Conclusion:** During the pandemic, we noted a global reduction in all activities in our service of pediatrics. Further studies should be conducted on the impact of covid-19 on residency programs.

**Keywords:** Impact, covid-19 pandemic, pediatric surgery, Senegal, Africa.

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## I. Introduction

The coronavirus disease nineteen (covid-19), linked to SARS-CoV-2 arose in December 2019 in Wuhan city, in China [1]. Since then, the disease rapidly spread around the world, so on March 2<sup>nd</sup>, 2020, Senegal registered its first case as on March 11<sup>th</sup>, 2020, the World Health Organization (WHO) declared the pandemic [2].

In Senegal, the disease's rapid progression led to the emergency state's proclamation on 23rd March 2020, with a partial stay-home decision (from 7 pm to 6 am), suppression of assemblies, and closing of public places, including schools. All this led to the limitation of movement [3]. Like in other parts of the world, such measures resulted in a reduction in hospital attendance. In Senegal, such reduction was reported in pediatric patients, with an increase in out-hospital mortality [3].

Worldwide, concerning pediatric surgical activity, the impact of the pandemic resulted in lower consultations, reduced surgical interventions, and increased delayed diagnosis[4–8]. However, no study describing the situation in Senegal has been reported.

We aimed to evaluate the impact of the covid-19 on pediatric surgical activities at Albert Royer National Children's Hospital Center of Dakar, in Senegal. We evaluated consultation, hospitalization, and elective and emergency surgical intervention activities.

## II. Methods

We conducted an analytic cross-sectional study at Albert Royer National Children's Hospital Centre, the only tertiary pediatric hospital in Senegal. The study was retrospective, considering patients who consulted and/or were operated on in our service of pediatric surgery. The study period went from 24 September 2019 to 23 September 2020. It was subdivided into two six-month periods: the first, before the national emergency, was declared (24 September 2019 to 23 March 2020), and the second, during the national emergency period (24 March to 23 September 2020).

From the data of the service of medical information, we retrospectively collected the number of outpatient and emergency consultations, the number of hospitalized patients, and the number of those who underwent surgical intervention. The waiting time for elective surgery was collected from the registry of planning elective surgical interventions.

During the pandemic period, our service of pediatric surgery initiated some changes to reduce the exposition of health workers to covid-19. This included: (a) reduction of staffing, allowing morning meetings only between teams on call for briefing; (b) cancellation of in-presence courses, with their replacement by online courses, mainly using Zoom platform; (c) categorization of surgical intervention in elective, semi-elective and emergencies (**Table 1**), with the latter two being practiced during the pandemic period. Results are presented in numbers and percentages. A comparison of numbers between the two six-month periods was made using Pearson's chi-squared test, considering the difference to be significant with a p-value < 0.05.

**Table 1: Categorization of surgical interventions**

Categories	Surgical interventions
<b>Elective</b>	Uncomplicated umbilical hernia Uncomplicated inguinal hernia Hydrocele Disorder of sexual development Undescended testis Ablation of osteosynthesis material Stoma closure Hypospadias
<b>Semi elective</b>	Pelvic-ureteric junction syndrome Tumor biopsies Tumor ablation Splenectomy for acute sequestration crisis
<b>Emergencies</b>	Acute appendicitis and its complications (perforation or abscess) Intestinal obstruction Spermatic cord torsion Acute generalized peritonitis Abdominal contusion with active bleeding Pyomyositis Subperiosteal abscess Intussusception Septic arthritis Burns Surgical treatment of fractures Debridement Wound closure

### III. Results

During the study period, a total of 6476 consultations were registered, 1696 patients were admitted in hospitalization, 1225 surgical interventions were practiced, among which 450 were carried out in an emergency.

Comparison of these activities between the two periods showed a global reduction during the pandemic period: 62.7% of reduced consultations, 46% reduction in hospitalized patients, 52.4% reduction in surgical interventions, and 55.8% reduction of emergency surgical intervention. All these differences were significant when evaluated with Pearson's chi-squared test (**Table 2**).

The mean time to elective surgery was four months eight days before the national emergency proclamation and passed to eight months and seven days during the first six months of the national emergency proclamation.

**Table 2: Comparison of pediatric surgical activity**

	Before the pandemic	During the pandemic	Total	p-value
Consultations	4715	1761	6476	<0.001
Hospitalization	1101	595	1696	<0.001
Surgical interventions	830	395	1225	<0.001
Emergency surgical intervention	312	138	450	<0.001

This shows a reduction of activities after the national emergency declaration. Differences between the two periods were significant for all activities when analyzed with the Pearson's Chi-squared test (p-value <0.001).

#### IV. Discussion

This analytic cross-sectional study aimed to evaluate the impact of the covid-19 pandemic on surgical activities at our service.

Due to the covid-19 pandemic, some medical specialties adjusted their practice to reduce viral transmission during the 'stay-home' period. In some hospitals, this allowed reorientation of some resources for better management of covid-19 patients and to keep available the remaining beds for surgical emergencies [3,9]. In surgery, some guidelines, including surgical prioritization, have been suggested. Evidence was given that guidelines lead to less contamination in patients and medical workers [10]. In turn, this led to a global reduction of activities in surgical units of all surgical subspecialties [4,5,7,11].

Our study highlighted a 62.7% reduction in outpatients' consultations. This is similar to findings reported who reported a reduction ranging from 78 to 82% [5,7,12,13]. Some teams facing this situation decided to provide telemedicine [4,14]. The main advantage is the continuation of some outpatient consultation despite the stay-at-home restriction. However, lack of physical examination and live contact is a great disadvantage [14]. In our conditions implementing a telemedicine service was not imaginable since the internet is available only for 47% of the population and the urgent implementation of a telemedicine service would be costly, especially in a period when most resources are oriented against the covid-19 pandemic. The direct consequence of outpatient reduction was a 46% reduced hospitalization rate.

During the pandemic period, many guidelines suggested the postponement of elective procedures [15]. Practiced surgeries included semi-elective and emergency surgery as reported in table 1. Globally, surgical interventions were reduced by 52.4%. This was noted by other authors who found a 62.7% reduction [7,8].

The timing to surgery for elective surgery almost doubled in our study. This is because elective surgeries were postponed while applying our guidelines. Other institutions reported a delay in elective surgeries, with an increase in the time to surgery [4].

#### Limitations

The present study has some limitations: the first concerns the non-comparison of the frequency of complicated presentations. Some authors reported increased complicated presentation during the stay-at-home period [6]. It would be interesting to evaluate in which proportion delayed presentation due to the pandemic has influenced the occurrence of complicated presentations, as well as its associated postoperative morbidity. The study could also evaluate the impact of the pandemic on the residency program in terms of surgical intervention by residents as well as evaluation of online courses.

#### V. Conclusion

The covid-19 pandemic has challenged the practice of pediatric surgery in the whole world, including in our environment. This resulted in a global reduction of all activities with consequences on pediatric health, which should be investigated in further studies.

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