Impact of the COVID-19 pandemic on the emergency department visits at the State University of Campinas Clinics Hospital – a retrospective observational study.

Palavras-Chave: Emergency Room Care; Coronavirus Infections; Health Impact Assessment

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INTRODUCTION: COVID-19 is an infectious disease caused by the virus SARS-CoV-2, which targets the respiratory system, causing an intense inflammatory scenario and multiple damage to lung tissue called severe acute respiratory syndrome. This illness can be lethal, and in individuals with comorbidities, the severity of the disease and the mortality rate tends to be greater (1,2)

In February 2020, the first COVID-19 case is reported in Brazil, and in March of the same year, the World Health Organization declared this disease had become a pandemic. From this moment on, several countries, including Brazil itself, started to adopt more strict actions towards containing the dissemination of this new virus, such as social distancing, quarantine, and lockdowns. Thus, places like Austria (3), China (4), South Korea (5), the United States of America (6–10), Finland (11), Italy (12–16), and other Brazilian cities (17–19) began to perceive a reduction in the number of hospital attendings that were not COVID-19 cases. Also, a spike in telemedicine visits was observed in the United States of America (20).

In Brazil, the population seeks emergency services even in cases in which the triage in the primary healthcare system with general practitioners would be sufficient (21,22). With the advent of the pandemic and the isolating measures, this habit was affected, entailing a drastic decrease in the number of patients who got taken care of in emergency hospital services.

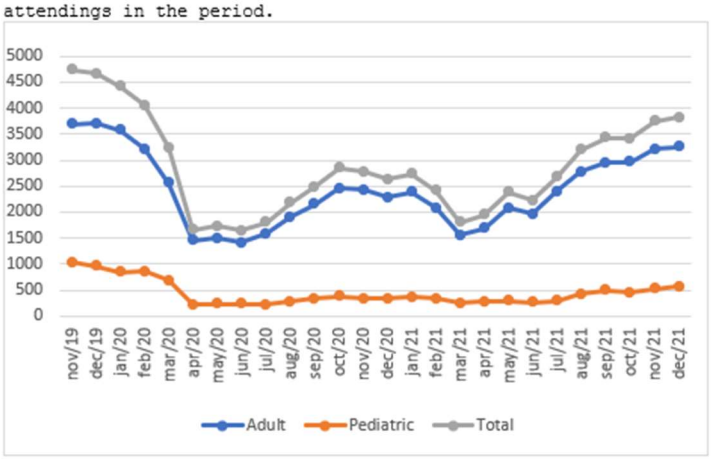
This reduction was also observed in the emergency room (ER) of the “Hospital de Clínicas” [Clinics Hospital (HC)] - one of the hospitals of the School of Medical Sciences at the State University of Campinas (UNICAMP) – after March 2020, especially after the municipal decree Nº 20.771 of March 16th, 2020 (23). Before this month, the mean number of all visits to the Reference Emergency

Unit (UER) in HC was above 4000 patients every month. Subsequently to the social distancing establishment, this number suffered a drop of approximately 60%, resulting in about 1600 patients each month initially.

Therefore, since the impacts the COVID-19 pandemic brought upon the emergency department (ED) are not yet fully clarified by the literature and that this knowledge is of great importance for the good management of HC-UNICAMP and any other hospital, this study has the objective of analyzing the effects that this global public health issue caused in the UER, especially regarding the number of total, adult and pediatric visits to this department. Also, this study aims to verify the hypothesis that the reductions in the UER visits originated from the imposition of social distancing measures, the fear of getting infected with SARS-CoV-2, and the lack of knowledge of the disease from a large part of society.

METHODS: We collected data from the HC's electronic system (CICSHCP). The monthly number of ED visits was collected from November 2019 to December 2021, as shown in Graph 1.

Graph 01. Oscillation in the number of adult, pediatric and total attendings in the period.



This study analyzes the monthly number of visitors seeking medical assistance based on three parameters: the total monthly number, the total number of visits to the adult ER, and the number of visits to the pediatric ER.

The statistical software described in the following section divided the time frame into 5 periods according to temporal trends observed by the program itself (24). Based on this compartmentalization, we compared the number of ED visits in the months before and during the COVID-19 pandemic in 2020 and 2021 while considering the possible impact of the start of vaccination and the advent of the second wave of the disease.

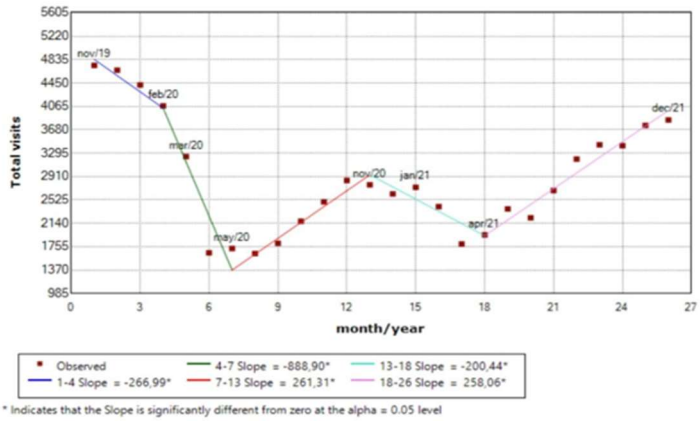
Regarding the data collected on CICSHCP, we also compared the number of visits from each medical specialty of the Hospital de Clínicas ED, the pediatric ED, the orthopedic ED, and the ophthalmologic ED between January 2020, a month before the pandemic onset, and April 2020, a month after the pandemic beginning.

Statistical analysis: The data were analyzed with joinpoint regression using the software Joinpoint Regression Program Version 4.9.0.1 (24). We considered a level of significance of 5%.

RESULTS: As discussed in the methods section, the statistical program used for our analysis divided the time frame into 5 periods according to temporal trends observed by the software. For the total number of ER visits, the first slope comprehends the period between November 2019 and February 2020 (S1T). The second slope is from February 2020 to May of the same year (S2T). The third slope (S3T) is from May 2020 to November 2020. The fourth one (S4T) is the period between November 2020 to April 2021, and the fifth one (S5T) is from April 2021 to December 2021.

After the first decree of social distancing in April 2020, the total number of visits reduced by 59.4% from February 2020 to April 2020. Furthermore, this decrease was statistically significant when comparing the S1T with S2T ($p < 0.04$). After that, the visits started increasing, and with the arrival of the second wave of SARS-CoV-2 in Brazil, they decreased again. There is a statistically significant reduction ($p < 0.001$) when comparing the S4T, the slope that represents when the second wave surged, to the S3T. From April 2021 to December 2021 (S5T), the vaccination campaign began in Brazil, and the visits increased once again when compared to S4T ($p < 0.0001$), as shown in Graph 02.

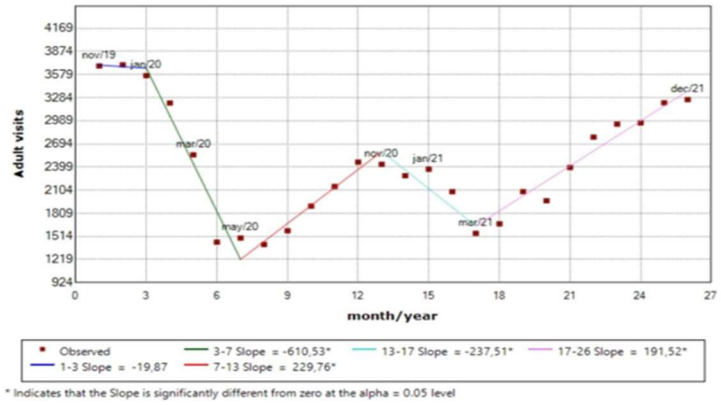
Graph 02. Joinpoint regression for all emergency room visits in the period.



S1T – blue line; S2T – green line; S3T – red line; S4T – cyan line; S5T – pink line.

For the number of adult visits to the ER, the first slope comprehends the period between November 2019 and January 2020 (S1A). The second slope is from January 2020 to May of the same year (S2A). The third slope (S3A) is from May 2020 to November 2020. The fourth one (S4A) is the period between November 2020 to March 2021, and the fifth one (S5A) is from March 2021 to December 2021. There was a 55.2% reduction in April 2020, the first month of containment measures in Campinas, compared to February 2020. In the first five months of 2020 (S2A), there was a significant reduction in the number of patients visiting the ER compared to S1A ($p = 0.015$). Additionally, when analyzing the second wave of COVID-19 (S4A) and comparing it to its previous period (S3A), a significant decrease in the growing tendency in ER visits was observed. The S5A demonstrated a rising tendency in the number of visits when compared to the S4A ($p < 0.001$). The results are in Graph 03.

Graph 03. Joinpoint regression for adult visits in the emergency room.

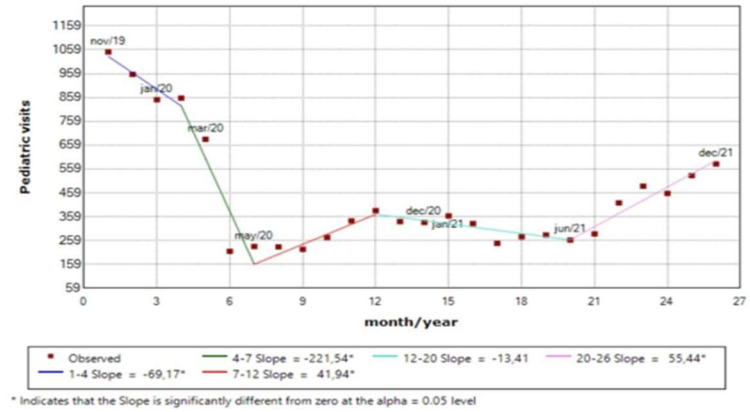


S1A – blue line; S2A – green line; S3A – red line; S4A – cyan line; S5A – pink line.

For the number of pediatric visits to the ER, the first slope comprehends the period between November 2019 and February 2020 (S1P). The second slope is from February 2020 to May of the same year (S2P). The third slope (S3P) is from May 2020 to October 2020. The fourth one (S4P) is the period between October 2020 to June 2021, and the fifth one (S5P) is from June 2021 to December 2021.

There was a 75% reduction in April 2020 compared to February 2020. The decrease in those visits is visible when comparing the S2P to the S1P ($p = 0.013$). After that period, the number of visits increased. However, subsequently to this increase, another fall started during the second wave of the disease, represented by the comparison between the S4P to the S3P ($p < 0.005$). The visits increased once more after June 2021 and sustained this tendency until the last month of the researched period (S5P) ($p < 0.0001$). These trends are shown in Graph 04.

Graph 04. Joinpoint regression for pediatric visits in the emergency room.



S1P – blue line; S2P – green line; S3P – red line; S4P – cyan line; S5P – pink line.

When analyzing the distribution of patient visits according to each medical specialty, we observed an alteration in the attendance pattern in all of them. Pediatrics suffered the greatest reduction (-74.8%), but its temporal trend results are already shown in this section. Psychiatry (-67.6%), Internal Medicine (-65.5%), and Toxicology (-64.3%) had similar percentual reductions. Other medical specialties had also presented reductions, such as Orthopedics (-60.5%), Ophthalmology (-50.8%), General Surgery (-37.6%), and Neurosurgery (-28.3%). Neurology was the specialty that showed the lowest reduction in the period (-9.9%). The total number of visits in each month analyzed and the reductions observed are demonstrated in Table 02.

Table 02. Comparison between the number of visits on each medical specialty emergency room.

January 2020		April 2020		
Specialty	Total Visits	Specialty	Total Visits	Reduction
Pediatrics	850	Pediatrics	214	-74.8,%
Psychiatry	185	Psychiatry	60	-67.6%
Internal Medicine	2404	Internal Medicine	830	-65.5%
Toxicology	84	Toxicology	30	-64.3%
Orthopedics	261	Orthopedics	103	-60.5%
Ophthalmology	1262	Ophthalmology	621	-50.8%
General Surgery	516	General Surgery	322	-37.6%
Neurosurgery	46	Neurosurgery	33	-28.3%
Neurology	71	Neurology	64	-9.9%

DISCUSSION: In Campinas, we observed a reduction of 59.4% in April 2020 in the total number of visits to the ER of the Hospital de Clínicas of UNICAMP. There were other changes in our hospital's dynamics due to COVID-19: Roversi and Lopes had previously stated that surgeries at UNICAMP decreased by 60.8% from 2019 to 2020 (19). In the Brazilian Midwest, the same happened to a cardiovascular emergency room, with a 57% decrease in visits in the same period (18). Also, other countries described the same happening, but less intensely than Campinas. For instance, Austria had a 39.4% reduction in visits seeking medical care (3), the United States (6) and Italy (12) had, respectively, a 45% and a 48.4% decrease.

In adults, there was a 55.2% decrease in visits in April 2020, representing a more significant decrease than South Korea, which reported 16.1% fewer visits (5). As seen in the other two groups, the pediatric population also demonstrated a lower tendency to seek medical assistance, with a 75% reduction. Also, it is worth noting, although the reductions at UER are expressive, a similar value was seen in Italy, varying from 73% to 88% depending on the country's region (13). Yet, these numbers are higher than in South Korea (54%) (5), the United States (51%) (10), and Finland (23.4%) (11).

We believe the reductions seen at UNICAMP are due to the stay-at-home politics and the lockdown with contribution from the fear and lack of knowledge about the disease. The fear of acquiring the SARS-CoV-2 led people to avoid visiting hospitals for less urgent problems - which was a common practice before the pandemic (22). The 83.1% reduction of plastic surgeries – a type of surgery mostly based on elective procedures of low urgency – in 2020 at UNICAMP (19) and also the increase of 50% in the amount of patients with avoidable visit diagnoses who sought medical assistance via telemedicine in Chicago on March 2020 (20) are findings that support our theory.

The short- and mid-term consequences of SARS-CoV-2 infection and the risk factors predisposing a poor prognostic are already documented in the literature (2,25–28). In contrast, the long-term effects of the decrease in seeking medical assistance due to the COVID-19 pandemic are not fully known. Psychiatric care, especially for anxiety disorders (8) and suicide ideation and attempts (29–31), has increased. Mortality of previously known and controlled diseases such as coronary artery disease has increased as well (3,7,16). Therefore, more studies are needed in this area to elucidate these long-term effects.

BIBLIOGRAPHY: