



Change in pediatric trauma-related visits in a tertiary hospital in Colombia during coronavirus disease 2019 lockdown

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Purpose: During the coronavirus disease 2019 pandemic, Colombian government declared a lockdown, forcing children to stay at home. The authors aimed to analyze the change in the pattern of trauma-related visits during the lockdown.

Methods: We carried out a retrospective descriptive study on injured children aged 17 years or younger who visited the emergency department of a tertiary pediatric hospital in Bogotá, Colombia from March 15 through May 15, 2019 (control period) and the same period in 2020 (lockdown period). Between the 2 periods, baseline characteristics and injury profiles were compared.

Results: Among the study population (n = 1,485), 1,122 and 363 children visited the emergency department during the control and lockdown periods, respectively. In the midst of 73.9% decrease in numbers of overall visits between the 2 periods, a 67.6% decrease was noted in number of trauma-related visits. Regarding the proportions, trauma-related visits increased from 7.9% to 9.8%. During the lockdown, increases occurred in the proportions of the following variables: children younger than 5 years (25.5% to 50.7%; P < 0.001), mechanisms other than blunt, minor fall or traffic accident (e.g., bite, 3.9% to 6.6%; P = 0.032), child abuse (1.2% to 4.1%; P = 0.003), hospitalization (4.6% to 35.8%; P < 0.001), open wound (21.1% to 36.9%; P < 0.001), the use of computed tomography (6.3% to 9.9%; P < 0.001), and abnormal imaging findings (28.8% to 31.7%; P = 0.003).

Conclusion: During the lockdown, children with trauma may show an increase in overall severity, and also a higher risk of abusive trauma. This finding indicates a sensible need of educating families in prevention of domestic injury.

Key words: Child; Confined Spaces; COVID-19; Quarantine; Wounds and Injuries

Introduction

Coronavirus disease 2019 (COVID-19) became a public health emergency on January 30, 2020, and on March 11, it was declared a pandemic by the World Health Organization^{1,2}. On March 6, the first

case of the disease was identified in Colombia, and the government declared a lockdown that began on March 15 and ended on May 15, 2020. Our emergency department (ED) has the second-largest volume of exclusive pediatric care in Bogotá, Colombia. During the lockdown, we observed that trauma-related visits remained relatively steady even with a higher severity, despite the reduction in overall visits to the ED from before the lockdown. There is a paucity of the literature regarding the pattern of pediatric trauma-related visits during the pandemic. To widen the knowledge about this topic, we aimed to investigate the change in pediatric trauma-related visits during the lockdown.

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Methods

A retrospective descriptive study was conducted on injured children aged 17 years or younger who visited the ED at Clínica Infantil Colsubsidio in Bogotá, Colombia from March 15 through May 15, 2019 (control period), and the same period in 2020 (lockdown period). Children with incomplete medical records were excluded. This study was approved by the institutional review board with a waiver for informed consent (IRB no. Comité de Bioética Clínica Infantil Colsubsidio no. 632).

Medical records were reviewed to build a database in Excel (Microsoft Corp., Redmond, WA). Baseline characteristics included age groups (< 2, 2–5, 6–10, and 11–17 years), sex, visit via ambulances, index of multidimensional poverty (detailed below), injury mechanism (blunt, cut, penetrating, crushing, burn, bite, minor fall [from a child's own height], high fall [higher than a child's own height; e.g., from the bed and other furniture in the house], and traffic accident), emergency measures (suture, analgesia, immobilization, and surgical procedures [debridement, open reduction, and osteosynthesis material]), child abuse (neglect and physical), hospitalization (overall and intensive care unit [ICU]), and in-hospital mortality. The index of multidimensional poverty, which was developed by Oxford Poverty and Human Development Initiative, was measured in Colombia as deprivation in different variables, including education (illiteracy, poor school performance, and school absence), child labor, unemployment or informal employment, access to health and to public services, housing conditions, and overcrowding³¹. The index was considered high when at least 5 dimensions were deprived³¹. Details of injury and relevant imaging tests were analyzed. Given the commonness and relevance to emergency medicine, we specifically collected data regarding abnormalities of head computed tomography (CT) and fractures.

Categorical variables were expressed as total numbers with percentages and analyzed using the chi-square or Fisher exact tests. For all comparisons,

the tests were 2-tailed and between-group differences were considered significant at $P < 0.05$, using IBM-SPSS for Windows software, version 21 (IBM Corp., Armonk, NY).

Results

During the control period, 14,145 children visited the ED, of whom 1,122 (7.9%) did for trauma. During the lockdown period, 3,696 children visited the ED, of whom 363 (9.8%) did for trauma. Compared with the 73.9% decrease in numbers of overall visits, the decrease in the numbers of trauma-related visits was 67.6%. In addition, there was a 1.9% increase in the proportion of trauma-related visits.

Table 1 shows the baseline characteristics. We noted increases in the proportions of young children (0–5 years), mechanisms other than blunt, minor fall or traffic accident (e.g., bite and high fall), child abuse, and hospitalization. Compared to the control period, more children were hospitalized to the ICU during the lockdown period (0 [0%] vs. 3 [0.8%]; $P = 0.015$) while no in-hospital mortality occurred in both periods.

Table 2 shows that during the lockdown, open wounds increased whereas fractures decreased. Although overall frequency of imaging tests decreased, the use of CT and abnormal imaging findings increased in the proportions. Appendix 1 (<https://doi.org/10.22470/pemj.2022.00563>) shows the increases in proportions of fractures of the skull and humerus.

Discussion

Our study shows a 67.6% decrease in trauma-related visits to the ED in the midst of 73.9% decrease in overall visits during the lockdown. In detail, we noted the increases in young children, most injury mechanisms, child abuse, hospitalization, open wounds, the use of CT, and abnormal findings of imaging. This indicates the increase in over-

Table 1. Baseline characteristics of the study population

| Characteristic | Control (N = 1,122) | Lockdown (N = 363) | P value |
|------------------------|------------------------|-----------------------|---------|
| Age group, y | | | < 0.001 |
| < 2 | 116 (10.3) | 71 (19.6) | |
| 2-5 | 170 (15.2) | 113 (31.1) | |
| 6-10 | 325 (29.0) | 90 (24.8) | |
| 11-17 | 511 (45.5) | 89 (24.5) | |
| Boys | 585 (52.1) | 196 (54.0) | 0.546 |
| Via ambulances | 139 (12.4) | 69 (19.0) | 0.588 |
| High index of poverty* | 408 (36.4) | 142 (39.1) | 0.119 |
| Injury mechanism 1 † | | | 0.032 |
| Blunt | 933 (83.2) | 278 (76.6) | |
| Cut | 89 (7.9) | 35 (9.6) | |
| Penetrating | 27 (2.4) | 15 (4.1) | |
| Crushing | 21 (1.9) | 13 (3.6) | |
| Burn | 19 (1.7) | 12 (3.3) | |
| Bite | 44 (3.9) | 24 (6.6) | |
| Injury mechanism 2 | | | < 0.001 |
| Minor fall* | 500 (44.6) | 135 (37.2) | |
| High fall* | 121 (10.8) | 90 (24.8) | |
| Traffic accident | 16 (1.4) | 5 (1.4) | |
| Others | 485 (43.2) | 133 (36.6) | |
| Emergency measures | 534 (47.6) | 166 (45.7) | 0.536 |
| Suture | 72 (6.4) | 52 (14.3) | |
| Analgesia | 250 (22.3) | 55 (15.2) | |
| Immobilization | 155 (13.8) | 39 (10.7) | |
| Surgical procedures | 57 (5.1) | 20 (5.5) | |
| Child abuse | 14 (1.2) | 15 (4.1) | 0.003 |
| Neglect | 6 (0.5) | 11 (3.0) | 0.003 |
| Physical | 8 (0.7) | 4 (1.1) | 0.490 |
| Hospitalization | 52 (4.6) | 130 (35.8) | < 0.001 |

Values are expressed as numbers (%).

* See details or definitions in the results section.

† Mutually inclusive.

all traumatic severity, which is troublesome, given that children should be safer at home. Generally, our findings are in line with the previous studies. Governments in different countries decreed lockdowns as a measure to deal with COVID-19, causing a 40.7%–65.4% decrease in overall ED visits with an increase in the proportion of trauma-related visits relative to overall visits from 25.2% to 40.0%^{1,2,4,5}. An Irish study reported a general decrease in pediatric trauma consultation during quarantine, compared to the previous 12 years⁶. A Singaporean study showed that trauma-related visits decreased by 40.0% while respiratory- and gastrointestinal-

related visits decreased by 87.9% and 72.4%, respectively⁷.

A Turkish study showed that the mean age of children with fracture in 2020 decreased compared to 2018–2019 (7.1 years vs. 8.2–8.6 years)⁸. This finding corroborates our findings that the age group most affected in the lockdown was young children. Likewise, at Toulouse University Hospital, home accidents increased from 40% in 2017–2019 to 74% in 2020 with the proportion of age of 2–5 years increased from 33% to 38%⁹. A study conducted between March 15 and April 15, 2020 at the Pennsylvania Children's Hospital showed a decrease in the mean age of chil-

Table 2. Anatomical regions, type of injury, and imaging tests

| Characteristic | Control (N = 1,122) | Lockdown (N = 363) | P value |
|---------------------------|------------------------|-----------------------|---------|
| Anatomical regions* | | | 0.321 |
| Head and neck | 388 (34.6) | 160 (44.1) | |
| Upper limbs | 427 (38.1) | 141 (38.8) | |
| Lower limbs | 258 (23.0) | 37 (10.2) | |
| Abdomen | 5 (0.5) | 3 (0.8) | |
| Thorax | 18 (1.6) | 2 (0.6) | |
| Genitalia | 1 (0.09) | 2 (0.6) | |
| Others | 25 (2.2) | 18 (5.0) | |
| Type of injury | | | < 0.001 |
| Open wound | 237 (21.1) | 134 (36.9) | |
| Edema | 279 (24.9) | 72 (19.8) | |
| Fracture | 217 (19.3) | 55 (15.2) | |
| Minor external injuries | 369 (32.9) | 62 (17.1) | |
| None | 20 (1.8) | 40 (11.0) | NA |
| Imaging tests | | | 0.123 |
| Plain radiography | 628 (56.0) | 163 (44.9) | < 0.001 |
| Computed tomography | 71 (6.3) | 36 (9.9) | < 0.001 |
| Ultrasonography | 4 (0.4) | 1 (0.3) | > 0.999 |
| Abnormal imaging findings | 323 (28.8) | 115 (31.7) | 0.003 |

Values are expressed as numbers (%).

* The sums of proportions are not equal to 100% due to rounding.

dren with fracture due to the restriction of sports activities and going to playgrounds (7.5 years during the pandemic vs. 9.4 years in 2018 and 2019)¹⁰. These findings were also present in other series, with a marked decrease in trauma in adolescents^{7,11}. Thus, the absence of schooling can reduce the accident rate in children older than 5 years, with a relative increase in that in younger ages due to home accidents.

Blunt trauma is the most common injury mechanism, directly related to falls from trampolines and high beds⁹. In our study, minor fall and blunt trauma were also predominant. In the Irish study, the most common mechanism was fall from the child’s own height in up to 75% of cases⁶. A study conducted at a pediatric trauma center in New Zealand showed an all-time low in motor vehicle accidents and an increase from 3.6% to 19% in bicycle accidents between March 26 and April 27, 2020 (a lockdown period), compared to the same periods in 2016–2019¹². In our study, there was no change in traffic accidents. This finding might stem from

a decreased use of transportation by the children. Contrary to a study showing no change in the frequency of animal bites on the hands during the lockdown¹³, ours showed an increase in bites from 3.9% to 6.6%. A United States study reported a 3-fold increase in the rate of dog bites during the lockdown with children aged 5–9 years most commonly bitten, due to increased exposure to dogs, increased stress of dogs or decreased supervision by adults¹⁴.

Our study showed a no significant increase in the head and neck injuries during the lockdown, which has not been reported in other studies. Although a study showed a proportional increase in fractures of the tibia and femur during the lockdown⁸, this current study showed a decrease in the injuries of the lower limbs (from 23.0% to 10.2%) with a minimal increase in femur fractures. Regarding the affected anatomical regions, a British study on hand injuries during the lockdown showed that despite a global decrease in injuries, those caused by the use of tools at home increased during lock-

down¹³). In our study, the upper limbs showed no significant lockdown-related change.

A British study reported a lockdown-related increase in the monthly incidence of abusive head trauma from 0.7 to 10¹⁵. In that study, common radiological findings were subdural hemorrhage (60%), cerebral edema (40%), parenchymal contusion (40%), skull fractures (40%), subarachnoid hemorrhage (30%), and extracranial fractures (30%)¹⁵. In our study, during the lockdown, the use of head CT with positive findings increased, predominantly subgaleal hematoma. During the COVID-19 lockdown in Colombia, our hospital showed a 0.5% decrease in violent traumas. In Philadelphia, there were 141 shootings in March 2020, making it the regional worst March for gun violence in 2016–2020¹⁶. This increase was related to the inability of the most disadvantaged to stay at home, which added to the stress of the pandemic.

From March 17 to April 19, 2020, during the lockdown in France, children with trauma had higher severity in both more frequent overall and surgical unit hospitalization compared to the same period in 2017–2019⁹. In our study, trauma-related hospitalization to the ICU increased (from 4.6% to 35.8%) although the increase in the visits via ambulances was not significant. In a Peruvian study, hospitalizations for surgery were stable before and during the lockdown¹⁷.

This study has limitations. The Pediatric Trauma Score was unavailable in the medical records. In addition, we analyzed neither the length of hospital stays, nor the need for multiple surgeries, which would have been useful to assess severity

of trauma.

In conclusion, during the lockdown for COVID-19 in Colombia, children with trauma showed an increase in overall traumatic severity. In addition, there was a 1.9% increase in the proportions of trauma-related visits relative to overall visits. These findings indicate that despite being under the care of parents or relatives at home, children remain vulnerable to more serious trauma during the lockdown. We should raise awareness of domestic injury prevention among parents and caregivers.

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Conflicts of interest

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