Pediatric trauma more common during COVID-19 pandemic, especially for children in disadvantaged neighborhoods

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Injuries from gunshots and motor vehicle crashes increased among children and teenagers during the COVID-19 pandemic, especially those

residing in socioeconomically disadvantaged neighborhoods, according to new research being presented at the American College of Surgeons (ACS) Clinical Congress 2023.

Pandemic-related stressors appear to have worsened an already severe problem, study authors report.

"The CDC [Centers for Disease Control and Prevention] recognizes traumatic injuries as the leading cause of mortality among children," said study principal investigator Devon Pace, MD, MPH, a general surgery resident at Thomas Jefferson University in Philadelphia, Pennsylvania.

The study, conducted at Nemours Children's Health, Wilmington, Delaware, also found that disadvantaged patients—those with adverse social determinants of health (SDOH)—had significantly worse trauma outcomes than less vulnerable patients.

SDOH are non-medical factors, such as socioeconomic status and crime, that influence health outcomes, according to the CDC. SDOH, including neighborhood environment, can worsen a child's injury risk and postinjury outcomes.

Within the context of SDOH, Dr. Pace said the researchers' goal was "to see if we could identify how traumatic injuries in children are different before COVID and after COVID."

The study included more than 4,000 trauma patients up to 18 years old who received treatment at Nemours Children's Health from January 2018 to August 2022.

Patients were grouped by the date of their trauma visit. The pre-COVID group contained patients whose visit occurred before March 11, 2020, when the novel coronavirus outbreak was declared a pandemic. The

other two groups were early in the COVID pandemic (March 11, 2020, through March 11, 2021), and late in the COVID pandemic (March 12, 2021, through August 31, 2022).

The research team measured patients' SDOH risk using the area deprivation index (ADI). This index ranks U.S. census block groups, or neighborhoods, on multiple measures such as unemployment rates, housing stressors, and income levels, Dr. Pace said. A high ADI indicates high deprivation.

With statistical tests, the researchers evaluated associations between the ADI and pandemic timing and between the injury mechanism (cause) and trauma outcomes. Outcomes included intensive care unit (ICU) duration, time on a ventilator, length of hospital stay, and death.

For all patients, study findings showed that during the pandemic, pediatric injuries happened most often from motor vehicle crashes and gunshots.

Motor vehicle–related injuries increased from 12.7% of all pediatric trauma cases before COVID-19 to 14.3% early COVID and 18.6% late COVID. The number of gunshot wounds increased from 1.2% pre-COVID to 2.6% early COVID and 2% late COVID.

When evaluating differences in injury patterns by ADI, the researchers found that the group living in high-deprivation neighborhoods had disproportionately more injuries than the low-deprivation group, Dr. Pace reported.

In the high-deprivation group, the rates of injuries sustained were as follows:

- Motor vehicle crashes: 5% higher than in the low-deprivation

group

- Non-accidental trauma (child abuse): 3.4% higher
- Gunshot wounds: 2.6% higher

A higher ADI was also associated with a longer ICU stay and more days on a ventilator, Dr. Pace noted. He attributed these worse outcomes to greater injury severity, such as motor vehicle and firearm injuries.

Child abuse increased in the high-deprivation group mainly early in the pandemic, he said.

However, some studies found that child abuse did not increase during the pandemic nationwide. Additionally, reporting of child abuse decreased as children's contact with mandated reporters, including teachers and physicians, lessened.

"Despite decreased reporting, our finding that child abuse injuries significantly increased suggests that these injuries were either more severe or more prevalent than we can even measure," Dr. Pace said.

Alternatively, this injury pattern—and other patterns that Dr. Pace's team reported—may vary by geographic region, he said. Most of their patients lived in Delaware, Pennsylvania, and New Jersey.

Dr. Pace hopes their study will encourage researchers elsewhere to study the effects of the pandemic and SDOH on pediatric trauma.

"This is important," he said. "We need to identify ways that we, as physicians, can prevent these injuries from occurring."

He called for more preventive efforts by health practitioners, health care institutions, and policymakers. His suggestions included improved emergency preparedness plans, public health initiatives, and advocacy for policy changes that target reducing pediatric trauma and SDOH.

These findings add to growing evidence that pandemic-related stressors affected population-level health, according to the study authors.

"COVID caused a significant shift across the entire United States, socio-politically as well as economically," Dr. Pace said. "This study starts to evaluate just the tip of the iceberg and identifies that these issues do exist."

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More information: Pace D, et al. Perfect storm? COVID-19, area deprivation, and their association with pediatric trauma, *Scientific Forum*, American College of Surgeons (ACS) Clinical Congress 2023.

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