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Neighborhood Deprivation and Social Vulnerability Indices Predict Risk for Violent Trauma Against Children

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Keywords

Child; Social Determinants of Health; Incidence; Social Vulnerability; Socioeconomic Factors

Abstract

Purpose: Children with social determinants that negatively impact health are at a disproportionately greater risk for injury and poor clinical outcomes. To reduce inequities in pediatric trauma incidence and outcomes, social determinants of health must be addressed. This study aims to be the first to evaluate the relationship between two composite deprivation indices, the Social Vulnerability Index (SVI) and Area Deprivation Index (ADI), with pediatric violent injuries within our catchment area and identify neighborhoods at heightened risk for violent trauma.

Methods: A retrospective review of children (≤ 18 years old) was performed at two level 1 pediatric trauma centers between 2018 and 2022. Those injured by a firearm or stabbing ($n=118$) and those diagnosed with child physical abuse (CPA) ($n=181$) were included. Accidental stabbings were excluded. Patient addresses were geocoded to the census block group and tract to estimate ADI and SVI, respectively. Patient demographics, injury, and clinical outcomes were compared with parametric statistical tests. Significance was defined by $p < 0.05$.

Findings: The included children resided in 252 (7.2%) of the 3477 census block groups and 223 (18.8%) of the 1185 census tracts within our catchment area. Hispanic children were more likely to live in higher SVI ($p=0.004$) and higher composite ADI/SVI ($p=0.026$) areas. The average ADI was significantly higher in census blocks and tracts with at least one incidence of violent injury compared to those without (ADI 40 vs. 35, $p < 0.001$; SVI 0.68 vs. 0.49, $p < 0.001$). Average scene and transport time were longer in higher ADI neighborhoods ($p=0.018$ and 0.003 , respectively). There were no differences in clinical outcomes (ICU length of stay (LOS), hospital LOS, hospital charges, mortality) between patients from higher and lower-deprivation neighborhoods.

Conclusion: Our study found that children who suffer violent trauma live in higher ADI and SVI areas and experience longer pre-hospital scene and transport time, yet have similar clinical outcomes when treated at our pediatric trauma centers. Defining areas at risk for violent, traumatic injury allows for effective, targeted interventions for community-wide injury prevention.