Neighborhood-Level Social Determinants of Health Are Associated with Acute Pediatric Surgical Outcomes

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Background

• Delay in diagnosis & surgical care → increased risk of higher disease severity, emergency surgery, high costs & postoperative complications
• Little is known about the effects of neighborhood-level social determinants of health (SDoH) on children’s surgical access and outcomes
• Appendicitis is most common acute pediatric surgical condition
• Complicated appendicitis may indicate a delay in definitive diagnosis and care
• The Child Opportunity Index (COI) is a comprehensive measurement of 29 neighborhood characteristics known to impact children’s health

Aims & Hypothesis

(1) Examine the effect of neighborhood SDoH on the odds of presenting with complicated appendicitis
(2) Evaluate whether neighborhood SDoH are associated with unplanned post-discharge healthcare utilization (ED visits & readmissions)

Hypothesis: Children from lower COI neighborhoods have a ↑ probability of presenting with complicated appendicitis and unplanned post-discharge healthcare utilization

Methods

• Study Design: Retrospective, observational study
• Study Population and Years: Patients ≤ 18 years old diagnosed with appendicitis between 2016-2018
• Data sources: Pediatric Health Information System (PHIS) and COI 2.0 Databases
  • Zip code COI measurements divided into quintiles (very low to very high opportunity)
• Analysis: Hierarchical logistic regression conducted after adjusting for age, sex, race/ethnicity and insurance type
  • Odds of presenting with complicated appendicitis
  • Odds of unplanned healthcare utilization (simple & complicated appendicitis)

Results

Odds of Complicated Appendicitis

Figure: Adjusted odds ratio of complicated appendicitis based on COI level. Adjusted for sex, age, race/ethnicity and insurance type.

• Patients living in very low COI neighborhoods were 34% more likely to present with complicated appendicitis compared to those in very high COI neighborhoods.

Odds of Unplanned Post-Discharge Healthcare Utilization

• Adjusted OR for simple appendicitis demonstrated ↑ unplanned healthcare utilization for Non-Hispanic Black (1.29), Hispanic (1.23), publicly-insured (1.21) and young age 0-4 years (1.56)
• No difference in OR for complicated appendicitis based on patient demographics
• The odds of unplanned healthcare utilization was not associated with COI level for either simple or complicated appendicitis

Discussion

• Conclusions: Vulnerable neighborhood SDoH are adversely associated with access to care and definitive treatment of pediatric acute appendicitis
  • No association between neighborhood SDoH and unplanned healthcare utilization post-discharge

• Implications: Providers should implement SDoH screening either preoperatively for elective procedures or while inpatient for emergency procedures
  • Health systems, community health organizations, insurers and government should strategically invest in communities to increase opportunity level and access to care (i.e., telemedicine and mobile clinics)
  • Critical to address upstream effects of neighborhood SDoH to improve disparities in pediatric surgical access and outcomes

Limitations

• Limited to pediatric tertiary centers in PHIS database
• May underrepresent patients living in rural communities
• ICD-10 code discrepancies in defining simple vs. complicated appendicitis
  • Followed previously published studies and defined length of stay > 48 hours for complicated appendicitis
• Reasons for ED visits may differ from readmissions
• Complicated appendicitis patients may present late unrelated to access

Next Steps

• Examine the effects of neighborhood SDoH on other pediatric surgical conditions
• Evaluate the impact of specific neighborhood-level policies and interventions on health outcomes

References


Table: Adjusted odds ratio (OR) of unplanned healthcare utilization (emergency department (ED) visit and 30-day readmission) after discharge.