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The influence of sociodemographic factors on operative decision-making in small bowel obstruction

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ABSTRACT

Background: Current guidelines for small bowel obstruction (SBO) recommend a limited trial of nonoperative management of no more than 3–5 d. For patients requiring surgery, it is uncertain if sociodemographic factors are associated with disparities in the duration of the trial of nonoperative therapy.

Methods: The Healthcare Cost and Utilization Project National Inpatient Sample from 2012 to 2014 was queried for discharges with a primary diagnosis of SBO. Primary outcomes of interest were the effects of sociodemographic factors, including race, insurance status, and income on the rate of receiving any operative management for SBO, and subsequently, among patients managed surgically, the risk of operative delay, defined as operative management ≥ 5 d after admission. We did this by using logistic hierarchical generalized linear models, accounting for hospital clustering and adjusted for sex, age, comorbidity, and hospital factors.

Results: Of the 589,850 admissions for SBO between 2012 and 2014, 22.0% underwent operations. Overall, 26.2% were non-White, including 12.2% Black and 8.6% Hispanic patients, and the majority (56.0%) had Medicare insurance coverage. Income quartiles were evenly distributed across the overall study population. In adjusted logistic regression, operative delay was associated with increased odds of in-hospital mortality (odds ratio 1.30 95% confidence interval [1.10, 1.54]). Adjusted for patient and hospital factors, Black patients were significantly more likely to receive operations for SBO, whereas Medicaid and Medicare patients were significantly less likely. However, Black, Medicaid, and Medicare patients who were managed operatively were significantly more likely to have an operative delay of 5 or more d. There was no significant association between income and operative management in adjusted regression models.

Conclusions: Significant disparities in the operative management were based on race and insurance status. Further research is warranted to understand the causes of, and solutions to, these sociodemographic disparities in care.

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Background

Small bowel obstruction (SBO) represents one of the most common conditions treated by general surgeons, representing up to 16% of surgical admissions and over two billion dollars in health-care costs in the United States.¹ Adhesive disease from prior surgeries is the most common cause of SBO in the United States, accounting for approximately three-fourths of SBO admissions.² Although most cases of SBO due to adhesive disease can be observed conservatively without operative intervention, some require surgical management. Optimal timing for surgery is uncertain, but the Eastern Association for the Surgery of Trauma (EAST) released practice guidelines detailing many of the indications for operative management, including peritonitis, fever, leukocytosis, acidosis, and prolonged hospitalization without resolution, defined as beyond 3-5 d.^{1,3}

There is an increasing body of evidence describing disparities in operative management based on racial and socioeconomic characteristics. Sociodemographic factors, including income, insurance status, race, and ethnicity, have been found to be significantly associated not only with clinical outcomes but also with physician treatment decisions.⁴⁻⁷ This is particularly interesting in surgical decisions where time to operation may alter outcomes. We sought to investigate how the sociodemographic factors of race, income, and insurance status impacted timing for operative management for SBO in a large national data set.

Methods

The Healthcare Cost and Utilization Project (HCUP) National Inpatient Sample (NIS) between 2012 and 2014 was used for this study. Developed under the Agency for Healthcare Research and Quality, the NIS is the largest all-payer, publicly available health-care data set in the United States, containing over 10 million annual discharges. All investigators with access to the NIS data have completed online training and signed data user agreements with HCUP.

Case selection

International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) codes were used to select patients with a primary diagnosis of SBO (ICD-9-CM 560.8, 560.9). Operative patients were identified as those having any of the following procedures: lysis of adhesions (ICD-9-CM 54.5X), exploratory laparotomy (ICD-9-CM 54.1X), diagnostic laparoscopy (ICD-9-CM 54.21), bowel resection or enterotomy (ICD-9-CM 17.3X, 45.0X, 45.7X, 45.61, 45.62, 45.90, 45.91), and ileostomy/colostomy (ICD-9-CM 460.X, 461.X, 462.X). Time-to-surgery (TTS), measured as number of days from admission until the first recorded operative procedure, was compared by race, insurance status, and income. Patients were excluded if they were missing data on sex, disposition, race, or TTS. The final patient selection algorithm is summarized in Figure. NIS Hospitals are coded using unique hospital identifiers which are specific to a given calendar year.

Patient race, age, sex, insurance status, and income were grouped into categorical variables. In descriptive tables, race was classified according to Agency for Healthcare Research and Quality race groupings as Asian or Pacific Islander, Black, Hispanic, Native American, other, and White. HCUP data combine race and ethnicity into a single variable, where ethnicity takes precedence. For this reason, a patient who identifies as Black and Hispanic would be ultimately classified as Hispanic. Insurance status was documented as the primary expected payer for the hospitalization and categorized as Medicare, Medicaid, privately insured, self-pay, no charge, and other. Because of low frequency, we collapsed no charge, self-pay, and other into a single group of “uninsured.” Income was classified into quartiles by the median household income of residents within the patient’s home ZIP-code, ranging from the poorest “bottom quartile” to the wealthiest “top quartile.” Age was classified as 18-40 y, 41-60 y, 61-80 y, and 81 + y. Patient comorbidity was identified by querying discharges for a predefined set of ICD-9-CM diagnosis codes, and categorized according to the Deyo adaptation of the Charlson comorbidity index (CCI) and grouped into three comorbidity classes: CCI 0, CCI 1, and CCI ≥ 2.⁸

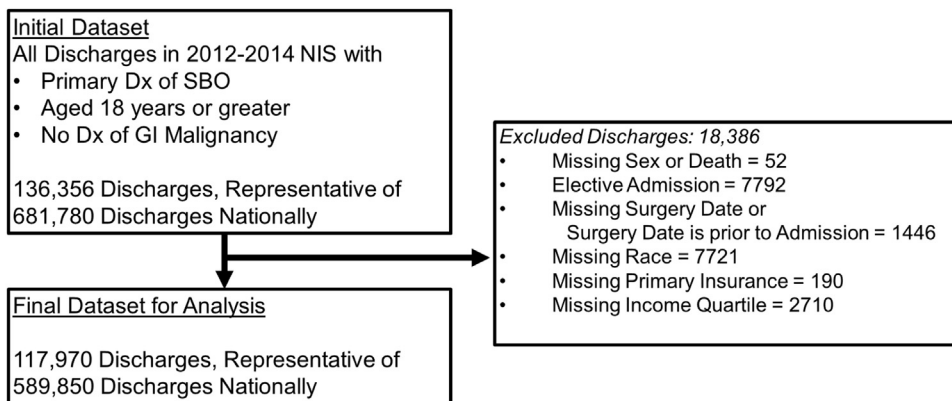


Fig – Cohort selection algorithm for NIS data set. Descriptions of excluded cases within a given level overlap and are not mutually exclusive. Dx = diagnosis; GI = gastrointestinal.

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