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Socioeconomic factors are associated with frequency of repeat emergency department visits for closed pediatric fractures

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Abstract

Background—Previous research has demonstrated both greater difficulty in obtaining follow-up appointments and increased likelihood of return visits to the emergency department (ED) for patients with government-funded insurance plans. The purpose of the current study is to determine whether socioeconomic factors, such as race and insurance type, are associated with the frequency of repeat ED visits in pediatric patients with closed fractures.

Methods—A review of ED visit data over a 2-year period from a statewide hospital discharge database in New York was conducted. Discharges for patients with a unique person identifier in the database age 17 and younger were examined for an ICD-9 diagnosis of closed upper or lower extremity fracture. Age, sex, race, and insurance type for patients with a return ED visit within 8 weeks for the same fracture diagnosis were compared to those without a return visit using standard univariate statistical tests and logistic regression analyses.

Results—Of the 68,236 visits reviewed, the revisit rate was 0.85%. Patients of non-white or unidentified race were significantly more likely to have a revisit than white patients (OR 1.27; $p=0.006$). Patients with government-funded insurance were significantly *more* likely to have a revisit than those without government-funded insurance (OR 1.55; $p<0.001$). Patients with private insurance were significantly *less* likely to have a revisit than those without private insurance (OR 0.72; $p=0.001$).

Conclusions—Our analysis revealed that non-white patients are more likely to return to the ED within 8 weeks for the same fracture diagnosis. Patients with government insurance are 55% *more* likely to have a revisit, while patients with private insurance are 28% *less* likely to have a revisit. Our results suggest that socioeconomic disparities exist in access to orthopaedic care for closed fractures in a pediatric population. Physicians and policy makers should be mindful of these health care disparities when striving to improve access to care among patients and resource utilization in the emergency department.

Level of Evidence—Prognostic Level II

Keywords

fracture; socioeconomic factors; demographics; disparities

Introduction

Timely outpatient follow-up is critical to minimize complications during non-operative management of closed pediatric fractures. Prior research has demonstrated difficulty in obtaining initial outpatient visits after being seen in the emergency department (ED) for pediatric patients with both private and government-funded insurance plans^{1,2}. This is despite policy-based efforts, such as the Children's Health Insurance Plan³, to expand health insurance coverage for American children. The positive effect of expanding the number of insured is tempered by the apparent inequality of care received by government-insured children. Previous work has demonstrated that having public insurance is associated with delays in receiving definitive orthopaedic care⁴, higher likelihood of being referred to a tertiary care center⁴, and an increased risk of returning to the emergency department for orthopaedic-related complaints⁵. These disparities in care must be further investigated to identify deficiencies in delivery of care and to devise strategies to improve access and utilization of quality orthopaedic care for all children. The current investigation is an attempt to characterize the pathways through which children with fractures receive care.

To our knowledge, there is no published investigation using population-based data to examine the incidence and demographics of return ED visits for pediatric fractures. Sturm and colleagues investigated the influence of insurance status on pediatric revisits at a single large metropolitan medical center⁵, while Skaggs^{1,6} and Iobst² have used survey methods to demonstrate an inability to obtain follow-up for patients with pediatric fractures. In the current investigation, we calculated the incidence of return visits within 8 weeks to any in-state ED for the same fracture diagnosis using population-based data from a statewide data collection system. Similar to Sturm's work⁵, we used a return visit to an emergency department for the same diagnosis as a proxy for inability to receive timely follow-up. We then examined if socioeconomic factors, such as race and insurance type, influence the frequency of repeat ED visits in pediatric patients with closed fractures.

Patients and Methods

The Statewide Planning and Research Cooperative System (SPARCS) database from the New York State Department of Health, a census of all statewide hospital admissions and ambulatory surgery procedures, was used to identify New York state residents age 17 or younger discharged from an ED with a diagnosis of closed upper or lower extremity fracture over a 2 year period (November 2004 to December 2006). Subsequent ED discharges for the same diagnosis within 8 weeks of the index ED visit were identified for these patients. The ICD-9 codes listed in Table 1 were used. Demographic data available from the SPARCS database include age, sex, race, and payer types. For the analytic dataset we categorized race as white or non-white/unknown. Multiple payers are reported for each discharge, so

indicator variables were created for each record to show if a patient had private insurance, government-funded insurance, or self-pay.

Univariate statistics and simple logistic regression models were used to compare demographic variables for patients who had a revisit versus patients who did not return to the ED. Patients with multiple payer types were analyzed with the financial entity of interest during univariate analysis (e.g., a patient with both private insurance and government-funded insurance was included in the private insurance cohort during the private vs no private insurance analysis, but also included with the publicly insured cohort in the government vs no government analysis). All analyses were performed using SAS Software version 9.2 (SAS Institute, Cary, NC).

Results

Of the 68,236 pediatric patients discharged from 208 EDs in New York State with a closed upper or lower extremity fracture between November 2004 and October 2006, there were 578 revisits (0.85%). Because the last data available were from December 2006, limiting the last index case to October 2006 permits at least two months of follow-up. Government-funded insurance (Medicaid and Medicare) was listed as a payer in 24.7% of all cases (Medicare was listed as a payer in 56 cases). Patients who returned to the ED were younger than those who did not revisit (6.7 ± 5.3 years vs 8.3 ± 5.0 years; $p < 0.001$). There was no difference in gender distribution. The majority of patients were white in both the revisit and no revisit cohorts (68.1% and 63.5%, respectively), but regression analysis showed that patients of non-white or unidentified race were 27% more likely to have a revisit than white patients (OR 1.27; $p = 0.006$). Patients with private insurance were 28% *less* likely to have a revisit than those without private insurance (OR 0.72; $p = 0.001$), while those patients with government-funded insurance were 55% *more* likely to have a revisit (OR 1.55; $p < 0.001$) than those who were not publicly funded.

Discussion

Previous work has demonstrated that barriers exist to obtaining timely outpatient follow-up for children with both public^{1,6} and private² insurance after sustaining a fracture. Our findings substantiate those reported previously, as insurance type contributed significantly to the likelihood of revisit. While difficulties in access to care seem to affect children of all insurance types, there are striking disparities in quality of care received by patients with government-funded insurance, as children in our study with government-funded insurance were 55% *more* likely to have a revisit.

The work of Sturm et al. was the first to evaluate the influence of insurance status on rate of return visits to the ED for pediatric orthopaedic complaints⁵. They reported that after implementation of a managed Medicaid program, return visits comprised 6.5% of all orthopaedic visits with approximately one-quarter of the return visits due to inability to obtain outpatient follow-up⁵. This rate of return visits is substantially higher than the rate (0.85%) in our study, but they noted that their reported rate of return visits for orthopaedic complaints may have been transiently high due to initial difficulties associated with plan

administrative changes. Subgroup analysis in Sturm's investigation showed that Medicaid patients are 6.1 times more likely than non-Medicaid patients to return to the ED due to inability to obtain outpatient follow-up for all pediatric orthopedic complaints. While our results do not show as dramatic a difference, our investigation demonstrated that patients with government-funded insurance were 1.55 times more likely to return to the pediatric ED for the exact same fracture diagnosis.

No other studies focused on access to pediatric orthopaedic care have evaluated the influence of patient race. We have shown that patients of non-white or unknown race are 27% more likely than white patients to have a return visit to the ED for the same fracture diagnosis. The underlying cause of this disparity is likely multi-factorial, but may have some relation to accessibility of outpatient orthopaedic care. Previous multivariable analysis controlling for numerous potential confounders, including poverty level and health insurance coverage, has demonstrated that parents and guardians of Latino and Asian children perceive significantly greater difficulty than parents and guardians of white children in getting specialty care⁷. Continued monitoring of the influence of race and ethnicity on access to quality care for children is critical, as these factors contribute significantly to disparities in health care after controlling for other variables related to access to care⁸. It should also be noted that our estimates include unknown race. Because race is a voluntarily reported field in SPARCS, there may be substantial bleed-over of white patients into this group. This would result in a conservative estimate of the effect of race on return to ED. The true disparity may be larger.

The establishment of CHIP has led to promising improvements in establishing a regular site of primary care, providing preventative care for many children, and lowering overall ED utilization⁹⁻¹², especially in traditionally underserved populations¹³. However, disparities in health care and specifically in orthopaedic care persist despite increases in the number of children insured. It is difficult to obtain a timely pediatric orthopaedic follow-up visit, regardless of insurance status^{1,2,6}. Iobst has suggested that orthopaedic surgeons practicing in relatively litigious communities may be unwilling to see pediatric patients due to fear of litigation². When this risk of litigation is coupled with poor reimbursement for pediatric fracture care¹, substantial challenges can arise in obtaining timely follow-up specialty care for children. The reader should consider that the referenced studies did not examine the reimbursement rate of the public insurance plans, only the presence of public insurance.

There are many reasons that children with fractures may return to the ED. Our population-based methodology does not allow us to determine reason for return visits with any greater detail than what is available in diagnosis coding. However, previous research indicates that more than half of patients treated with cast immobilization return for cast-related concerns¹⁴. Sawyer's study also demonstrated that many, if not all, of these concerns could have been safely treated in an outpatient setting¹⁴. The reasons for ED revisit should be explored in greater detail to verify the associations we have identified and to define opportunities to ensure follow-up in appropriate settings. In addition to factors directly attributable to the fracture and its treatment, there may be other factors contributing to return ED visits. For example, the communication between health care providers and parents about the importance of follow-up may not be sufficiently effective. Additionally, there are a

number of social determinants that may contribute to an inability to obtain and attend an outpatient follow-up visit, such as availability of transportation. These considerations cannot be studied in detail using our methodology and deserve further investigation.

The strengths of this study include the use of a large statewide hospital administrative database that captured uniquely identified patient data over a 2 year period. We were able to track individual patients who received treatment within any ED in the state of New York. Another strength of this study is the ability to evaluate demographic factors, such as race and payer status, to help determine potential risk factors for revisit and transfer. These demographic factors should be explored in greater detail using prospectively collected data to better examine their relationship with revisits. One of the limitations of the current study is that children may have sought subsequent treatment at an out-of-state facility that was not captured in our dataset. Another limitation is that we used return visits to the ED for the same fracture diagnosis as a proxy for inability to receive timely follow-up, as previously done in Sturm's investigation⁵. While these caveats limit the immediate clinical applicability of our findings, our population-based study can be used to inform future research that will qualitatively and quantitatively evaluate the reasons for race and insurance-based disparities in revisit rates among pediatric fracture patients.

While return visits to the ED for orthopaedic complaints are relatively uncommon (0.85% in our study), they represent a potential waste of resources. Bennett and colleagues have estimated a cost difference of nearly \$3000 per patient when comparing charge data for acute buckle fracture management in the ED and in the outpatient setting¹⁵. Pediatric EDs are not appropriately staffed to provide follow-up care for children with fractures, and patients are often discharged without any change in management and with instructions to follow-up with an orthopaedic surgeon as an outpatient⁵.

Conclusion

If ED revisits are interpreted as a proxy for inability to obtain timely outpatient follow-up, our results suggest that socioeconomic disparities exist in access to orthopaedic care for pediatric closed fractures. Both physicians and policy makers should be mindful of these health care disparities when striving to improve access to care and appropriate resource utilization in the emergency department.

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Table 1

ICD-9 codes for fracture diagnoses included.

Upper Extremity		Lower Extremity	
812.21	humeral shaft fracture	821.01	femoral shaft fracture
812.42 812.43	humeral epicondyle or condyle fracture	821.23	supracondylar femur fracture
832.02	elbow dislocation	821.21	femoral condyle fracture
813.03	Monteggia fracture	822.0	patella fracture
813.05 813.06	radial head or neck fracture	823.00	tibial plateau, tibial spine, or tibial tuberosity fracture
813.01	olecranon fracture	823.20 823.22	tibial shaft fracture
813.21	radial shaft fracture	824.0	medial malleolus fracture
813.22	ulnar shaft fracture	824.2	lateral malleolus fracture
813.23	both bones forearm fracture	824.4	bimalleolar ankle fracture
813.41	distal radius fracture	823.21	fibula shaft fracture
		823.82	tibial plafond fracture