

Title: Area Deprivation Index is a Predictor of Readmission and Increased Medical Complications and Emergency Department Utilization After Surgery for Femoral Neck Fractures

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Introduction: It is well documented that socioeconomic status (SES) has an impact on surgical outcomes; however, its influence on femoral neck fracture (FNF) postoperative management has not been well established on a national level. Our study utilized a national claims database to assess postoperative complications following FNF surgery across ADI stratified cohorts. compared to patients in low-deprivation (LD) communities (ADI 1-90).

Methods: An insurance claims database was used to evaluate complications following surgical treatment of FNFs during the years from 2010 to 2023. Three surgical groups were independently evaluated [Screw Fixation (SF); hemiarthroplasty (HA); total hip arthroplasty (THA)]. The Area Deprivation Index scores for zip codes nationwide were used to stratify patients into 2 cohorts (High Deprivation (HD): ADI 91-100; Low Deprivation (LD): ADI 1-90). For each surgical group, the HD and LD cohorts were matched by age, sex, Elixhauser Comorbidity Index, tobacco use, illicit drug use, and presence of a mental health diagnosis.

Results: This study evaluated a total of 1,157,638 patients that were treated during the years from 2010 to 2023, consisting of a female / male ratio equivalent to the baseline population. Overall, patients residing in HD areas experience significantly higher rates of postoperative complications following FNF surgery compared to those from LD areas. In all three surgical cohorts, the risk of hospital readmission, postoperative emergency department (ED) visits, transfusions, and urinary tract infections was significantly higher for HD patients (Table 1-3).

Discussion and Conclusion: Utilizing a matched cohort design in the setting of femoral neck fractures, this study summarizes the differences in 90-day postoperative complication risks between patients of HD communities as compared to patients of LD communities. Significant results were found for each FNF surgery type evaluated. The significant increase in postoperative complications such as 90-day readmission, postoperative ED visits, and SSIs reinforces the importance of incorporating risk calculation tools such as ADI into perioperative plans and care. Future research should explore the utility of integrating ADI-informed risk assessments into the clinical care of orthopaedic surgery patients.

Significance and Relevance: These findings suggest that more work can be done to improve outcomes for vulnerable populations, which may include improving discharge planning and increasing access to postoperative care.

Patients	732,039	
Complication	Odds Ratio (95% CI)	P-value
Readmission	1.13 (1.10, 1.15)	<0.0001*
Emergency Department Visit	1.14 (1.11, 1.16)	<0.0001*
Surgical Site Infection	1.10 (1.02, 1.18)	0.0114*
Transfusion	1.21 (1.22, 1.29)	<0.0001*
Myocardial Infarction	1.13 (1.06, 1.20)	<0.0001*
Pneumonia	1.09 (1.06, 1.13)	<0.0001*
Respiratory Failure	1.05 (1.02, 1.09)	<0.0001*
Acute Kidney Injury	1.03 (1.00, 1.06)	0.0504
Urinary Tract Infection	1.08 (1.06, 1.10)	<0.0001*

Note: * P-value of 0.05 was used to determine statistical significance.

Patients	289,867	
Complication	Odds Ratio (95% CI)	P-value
Readmission	1.09 (1.05, 1.13)	<0.0001*
Emergency Department Visit	1.08 (1.05, 1.12)	<0.0001*
Surgical Site Infection	1.11 (1.00, 1.23)	0.0485*
Transfusion	1.31 (1.25, 1.38)	<0.0001*
Myocardial Infarction	1.14 (1.04, 1.24)	0.0034*
Pneumonia	1.07 (1.03, 1.11)	0.0010*
Respiratory Failure	1.05 (1.01, 1.10)	0.0179*
Acute Kidney Injury	1.05 (1.00, 1.09)	0.0343*
Urinary Tract Infection	1.10 (1.06, 1.13)	<0.0001*

Note: * P-value of 0.05 was used to determine statistical significance.

Patients	135,732	
Complication	Odds Ratio (95% CI)	P-value
Readmission	1.09 (1.05, 1.13)	<0.0001*
Emergency Department Visit	1.10 (1.05, 1.15)	<0.0001*
Surgical Site Infection	0.86 (0.72, 1.03)	0.1173
Transfusion	1.23 (1.13, 1.34)	<0.0001*
Myocardial Infarction	1.05 (0.92, 1.21)	0.4679
Pneumonia	1.04 (0.97, 1.12)	0.2984
Respiratory Failure	1.04 (0.97, 1.11)	0.3124
Acute Kidney Injury	0.99 (0.92, 1.05)	0.6603
Urinary Tract Infection	1.07 (1.02, 1.13)	0.0065*

Note: * P-value of 0.05 was used to determine statistical significance.