Insurance Matters: Examining Demographics and Outcomes After Total Joint Arthroplasty with a Spotlight on ED Utilization Rates

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INTRODUCTION: It is well studied that socioeconomic status (SES) can impact outcomes following total joint replacements. However, more granular investigations of these associations are needed, particularly with respect to insurance status. Medicaid patients have lower income than those with Private/Commercial insurance. However, it is difficult to establish the impact of differential income levels on post-operative outcomes. In order to further assess socioeconomic status, three variables were associated with each patient. The first two of which are state and national area deprivation index (ADI). ADI is calculated on a scale of 1-10 at the state level and 1-100 at the national level and incorporates the theoretical domains of income, education, employment, and housing quality. Higher values of ADI are associated with higher levels of socioeconomic disadvantage and vice versa. The social vulnerability index (SVI) groups individuals by zip code income and additional variables on a scale from 1-100 with higher levels also being associated with lower socioeconomic status. The purpose of this study is to investigate the relationship between insurance type and outcome measures following TJA at a single institution. Specifically, we assessed Medicaid and Private/Commercial insurance beneficiaries.

METHODS: Patients who were >90 days post-operation from a primary total hip arthroplasty (THA), total knee arthroplasty (TKA), total shoulder arthroplasty (TSA), or reverse total shoulder arthroplasty (rTSA) between December 2020 and May 2023 were retrospectively recruited for this study from an urban, academic tertiary medical center. Prisoners, individuals < 18 years of age, traumatic injuries, infection, and revision surgeries were excluded from this study. Medical charts were reviewed for patient address, demographics, medical comorbidities, perioperative and postoperative information, and subsequent hospital visits. Socioeconomic status approximations including national ADI, zip code designated SVI, and insurance status (private/commercial vs. Medicaid) were assessed.

Patients who met inclusion criteria were grouped into two cohorts based on their insurance type: Medicaid and Private/Commercial. Demographic data, socioeconomic indices, and peri/post-operative information were compared between the two insurance groups. All patients underwent TJA at the same institution. Follow-up visits and emergency department (ED) utilization were likewise monitored at the same institution. The study cohorts were compared using Wilcoxon rank sum test and Fisher's Exact Test for Count Data. This research is IRB-approved by the institution of study.

RESULTS SECTION: A total of 302 patients met inclusion criteria, 200 patients with Medicaid and 102 patients with Private/Commercial insurance. As for demographic difference, patients in the Private/Commercial insurance group were more likely to be older ($p = 0.037$) and have a lower BMI ($p = 0.045$) (Table 1). There were no significant differences in sex and race/ethnicity. Diabetes mellitus was more prevalent in patients with Medicaid ($p = 0.017$), while cardiovascular disease, chronic obstructive pulmonary disease, anxiety or depression, and smoking status were not significantly different between the two insurance groups (Table 1). Both state and national ADI were significantly higher in the Medicaid group ($p < 0.001$). However, SVI was not significantly different between the two groups (Table 1). Procedure type, laterality, surgery cancellation/postponement rates, and discharge disposition did not significantly differ between groups (Table 2). 33% of patients with Medicaid visited the ED within 90 days of TJA, which was significantly higher than patients with Private/Commercial insurance (13%) ($p < 0.001$) (Table 2). There were no significant differences in 90-day readmission rates following TJA amongst the two insurance types.

DISCUSSION: Our findings suggest that patients with Medicaid undergoing TJA have significantly greater rates of ED visits within 90 days of surgery. However, we did not find significant differences in 90-day hospital readmission rates following primary TJA across insurance types. A limitation of this study is that all ED visits and hospital readmissions were only assessed at one hospital. Thus, it is difficult to determine the true rates of ED visits and hospital readmissions within this study cohort. As expected, Medicaid patients had significantly higher socioeconomic deprivation scores than Private/Commercial insurance patients. It is likely that the deprivation experienced by these patients may contribute to the increased rates of ED visits following TJA. Ultimately, future studies should investigate the impact of specific socioeconomic factors on ED utilization rates following TJA.

SIGNIFICANCE/CLINICAL RELEVANCE: Lower insurance status of a patient is associated with adverse outcomes following a primary TJA, particularly visiting an ED within 90 days after the procedure. Effective care strategies should be implemented pre/peri/post-operation to manage a patient's comorbidities and procedure outcomes following a TJA to avoid the need for an ED visit.

IMAGES AND TABLES:

Table 1. Comparison of Patient Demographics Across Different Insurances

Insurance	Medicaid, N = 200[1]	Private/Commercial, N = 102[1]	p-value[2]
Age	58.8 ± 10.0	60.8 ± 9.5	**0.037**
Sex			0.386
Female	123 (62%)	57 (56%)	
Male	77 (39%)	45 (44%)	
Race/Ethnicity			0.076
Asian	6 (3.0%)	1 (1.0%)	
Black/African American	107 (54%)	57 (56%)	
Hispanic/Latinx	44 (22%)	21 (21%)	
White/Caucasian	33 (17%)	23 (23%)	
Other	10 (5.0%)	0 (0%)	
BMI	32.8 ± 5.4	31.6 ± 5.9	**0.045**
Illinois ADI	6.1 ± 2.4	5.0 ± 2.4	**<0.001**
National ADI	63.0 ± 21.2	52.1 ± 22.3	**<0.001**
Social Vulnerability Index	74.5 ± 26.8	70.7 ± 30.0	0.169
Smoking Status			0.246
Active	34 (17%)	10 (9.8%)	
Former	67 (34%)	36 (35%)	
Never	99 (50%)	56 (55%)	
Cardiovascular Disease	30 (15%)	17 (17%)	0.738
Chronic Obstructive Pulmonary Disease	11 (5.5%)	5 (4.9%)	>0.999
Diabetes Mellitus	71 (36%)	22 (22%)	**0.017**
History of Anxiety or Depression	44 (22%)	17 (17%)	0.293

[1] Mean ± SD; n (%)
[2] Wilcoxon rank sum test; Fisher's Exact Test for Count Data; Fisher's Exact Test for Count Data with simulated p-value (based on 2000 replicates)

Table 2. Comparison of Peri/Post-Operative Information Across Different Insurances

Insurance	Medicaid, N = 200[1]	Private/Commercial, N = 102[1]	p-value[2]
Procedure			0.193
Total Hip Arthroplasty	71 (36%)	43 (42%)	
Total Knee Arthroplasty	107 (54%)	50 (49%)	
Total Shoulder Arthroplasty	7 (3.5%)	0 (0%)	
Reverse Total Shoulder Arthroplasty	15 (7.5%)	9 (8.8%)	
Laterality			0.068
Left	87 (44%)	56 (55%)	
Right	113 (57%)	46 (45%)	
Surgery Cancelled/Postponed	21 (11%)	7 (6.9%)	0.402
Discharge Disposition			0.277
Home with home care	78 (39%)	31 (30%)	
Home without home care	97 (49%)	60 (59%)	
Institutional Rehabilitation Facility	7 (3.5%)	3 (2.9%)	
Skilled Nursing Facility (SNF)	18 (9.0%)	7 (6.9%)	
Other	0 (0%)	1 (1.0%)	
Emergency Department Visit within 90 days	65 (33%)	13 (13%)	**<0.001**
Patient Readmitted within 90 days	27 (14%)	9 (8.8%)	0.265

[1] Mean ± SD; n (%)
[2] Wilcoxon rank sum test; Fisher's Exact Test for Count Data; Fisher's Exact Test for Count Data with simulated p-value (based on 2000 replicates)