

Measures of Neighborhood Social Vulnerability and Discharge Disposition Following

Revision Total Joint Arthroplasty: A Comparison Study

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INTRODUCTION: Discharge disposition has been a large area of focus as an opportunity for cost savings and improved postoperative outcomes in patients undergoing hip and knee revision total joint arthroplasty (TJA). Identifying risk factors associated with non-home discharge could reduce the rate of preventable discharge to institutional facilities such as rehabilitation or skilled nursing facilities. Neighborhood-level deprivation indices are becoming an increasingly popular measure of socioeconomic disadvantage in arthroplasty clinical outcomes research. This study aimed to compare the relationship between three area-level deprivation indices and nonhome discharges among revision TJA patients.

METHODS: 1,043 consecutive patients who underwent revision TJA at a tertiary institution were included in this study following Institutional Review Board approval. Three independent multivariate logistic regression analysis with the outcome of non-home discharge was performed using predictors of area deprivation index (ADI), social deprivation index (SDI), and social vulnerability index (SVI), while controlling for other demographic variables. The neighborhood-level deprivation indices were included in the analysis both as continuous and categorical variables into quartiles, with the lowest quartile representing the least deprived neighborhoods out of the patient cohort. The strength of the association of significant indices was measured.

RESULTS: Higher ADI (OR=1.93, p=0.005) and SDI (OR=1.86, p=0.007) were positively associated with non-home discharge following revision TJA, with patients in the highest quartile demonstrating higher odds of non-home discharge compared to the cohort with the lowest quartile (Table 1,2). ADI showed a stronger association with discharge disposition compared to SDI. Age, ASA status, and alcohol use were independent determinants of discharge disposition in all three logistic regression analyses. SVI was not significantly associated with discharge disposition (OR=1.01; p=0.170; Table 3).

DISCUSSION: Higher area deprivation index (ADI) and social deprivation index (SDI) were positively associated with non-home discharge following revision TJA, suggesting area-level indices such as area deprivation index and social deprivation index can be used as a marker for social determinants of health and potentially be utilized as a tool to reduce the rates of preventable non-home discharge following revision TJA.

SIGNIFICANCE/CLINICAL RELEVANCE: The findings shed light on the potential of integrating deprivation indices as tools for developing policy, intervention programs, and research to better understand and address the health disparities in revision TJA outcomes.

Table 1. Multivariate logistic regression results for the association between social deprivation index and discharge disposition.

Variable*	OR (95% CI)	P-value
Sex [Female]	0.73 (0.53-0.99)	0.045
Race [White]	1.97 (0.97-4.03)	0.061
Ethnicity [Hispanic]	6.68 (0.69-64.86)	0.101
Insurance [Private]		0.215
Public	1.37 (0.96-1.97)	0.082
No insurance	1.46 (0.38-5.59)	0.581
Age	1.07 (1.05-1.10)	<.001
BMI	1.01 (0.98-1.03)	0.634
ASA	3.11 (2.25-4.29)	<.001
Depression	1.11 (0.69-1.79)	0.655
Drug abuse	1.59 (0.52-4.88)	0.414
Alcohol	0.65 (0.47-0.91)	0.011
CCI score	0.98 (0.90-1.08)	0.727
SDI, linear	1.01 (1.00-1.02)	0.004
SDI [Q1] (≤9)		0.016
Q2 (10–16)	0.96 (0.64-1.43)	0.837
Q3 (17–38)	0.97 (0.63-1.49)	0.883
Q4 (≥39)	1.86 (1.18-2.91)	0.007

Table 2. Multivariate logistic regression results for the association between area deprivation index and discharge disposition.

Variable*	OR (95% CI)	P-value
Sex [Female]	0.75 (0.55-1.02)	0.065
Race [White]	2.29 (1.13-4.63)	0.022
Ethnicity [Hispanic]	6.19 (0.68-56.55)	0.107
Insurance [Private]		0.254
Public	1.35 (0.94-1.93)	0.103
No insurance	1.48 (0.39-5.59)	0.566
Age	1.08 (1.05-1.10)	<.001
BMI	1.01 (0.98-1.03)	0.678
ASA	2.99 (2.17-4.12)	<.001
Depression	1.18 (0.73-1.90)	0.493
Drug abuse	1.67 (0.54-5.19)	0.379
Alcohol	0.62 (0.45-0.87)	0.005
CCI score	0.99 (0.90-1.08)	0.753
ADI, linear	1.01 (1.00-1.02)	0.021
ADI [Q1] (≤12)		0.029
Q2 (13–22)	1.66 (1.07-2.57)	0.024
Q3 (23–33)	1.38 (0.89-2.13)	0.147
Q4 (≥34)	1.93 (1.23-3.03)	0.005

Table 3. Multivariate logistic regression results for the association between social vulnerability index and discharge disposition.

Variable*	OR (95% CI)	P-value
Sex [Female]	0.75 (0.55-1.02)	0.066
Race [White]	2.28 (1.13-4.63)	0.022
Ethnicity [Hispanic]	7.30 (0.79-67.78)	0.08
Insurance [Private]		0.302
Public	1.31 (0.92-1.88)	0.135
No insurance	1.58 (0.41-6.13)	0.508
Age	1.07 (1.05-1.10)	<.001
BMI	1.01 (0.98-1.04)	0.467
ASA	3.04 (2.21-4.19)	<.001
Depression	1.07 (0.66-1.72)	0.793
Drug abuse	1.88 (0.61-5.82)	0.273
Alcohol	0.65 (0.47-0.89)	0.008
CCI score	0.99 (0.90-1.09)	0.824
SVI, linear	1.01 (1.00-1.01)	0.170
SVI [Q1] (≤26.77)		0.309
Q2 (26.78–27.34)	0.75 (0.43-1.29)	0.291
Q3 (27.35–58.75)	0.94 (0.63-1.39)	0.749
Q4 (≥58.76)	1.26 (0.85-1.86)	0.245

OR= odds ratio; CI= confidence interval; BMI= Body Mass Index; ASA= American Society of Anesthesiologists; CCI= Charlson Comorbidity Index; SDI= Social Deprivation Index; ADI=Area Deprivation Index; SVI=Social Deprivation Index; Q= quartile *Variables within square brackets [] are reference categories. Ranges within round brackets () are ranges for each quartile