Neighborhood Socioeconomic Disadvantages Associated with Increased Rates of Revisions, Readmissions, and Complications after Total Joint Arthroplasty

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INTRODUCTION:
Low socioeconomic status based on neighborhood of residence has been suggested to be associated with poor outcomes after total joint arthroplasty (TJA). The Area Deprivation Index (ADI) is a scale that ranks (zero to 100) neighborhoods by increasing socioeconomic disadvantage and accounts for median income, housing type, and family structure, among other variables. We sought to examine the potential differences between high (national median ADI = 47) and low ADI among TJA recipients at a single institution. Specifically, we assessed: 1) 30-days emergency department visits/ readmissions; and 90-days and 1-year; 2) revisions; as well as 3) medical and surgical complications.
METHODS: A consecutive series of primary TJAs from September 21, 2015 through December 29, 2021 at a tertiary healthcare system were reviewed. A total of 3,024 patients who had complete ADI data were included. Patients were divided into groups below the national median ADI of 47 (n = 1,896) and above (n = 1,128). Higher ADIs corresponded with increased neighborhood disadvantage. Outcomes of interest include 30-days emergency department visits and readmissions, as well as 90-days and 1-year revisions, aseptic loosenings, dislocations, deep venous thromboses (DVTs), pulmonary embolisms (PEs), manipulations under anesthesia (MUAs), periprosthetic joint infections (PJIs), periprosthetic fractures, and surgical site infections (SSIs).
RESULTS: The ADI > 47 cohort was associated with higher incidences of 30-days emergency department visits (9 versus 5%, $p < 0.0001$) and readmissions (3 versus 2%). Additionally, this group was associated with greater rates of 90-days (4 versus 2%, $p = 0.0019$) and 1-year revisions (6 versus 5%). Furthermore, patients who had ADI > 47 had more frequent PJIs, DVTs, PEs, and MUAs at both 90-days as well as one-year.
DISCUSSION AND CONCLUSION: Higher ADI (> national median of 47) was associated with higher rates of 30-days emergency department visits and readmissions as well as 90-days and 1-year revisions, PJIs, DVTs, PEs, as well as MUAs. This study utilizing ADI demonstrates potential areas of intervention and further investigation for assessing arthroplasty outcomes.

Table 1. Demographics and Baseline Characteristics

State of Maryland	ADI > 47 (n=1128)		ADI <=47 (n=1896)	
Variable	n	%	n	%
Age (years)	62	10.88	64	11.24
BMI (kg/m2)	n=1001			
BMI <20	*13*	*1.30%*	25	1.32%
BMI >20 and <30	*312*	*31.17%*	581	30.64%
BMI >30 and <40	*522*	*52.15%*	853	44.99%
BMI >40	*154*	*15.38%*	194	10.23%
Sex				
Female	*746*	*66.13%*	1120	59.07%
Male	*382*	*33.87%*	776	40.93%
Race				
American Indian or Alaska Native	*2*	*0.18%*	6	0.32%
Asian	*2*	*0.18%*	23	1.21%
Black or African American	*914*	*81.03%*	732	38.63%
White	*182*	*16.13%*	1073	56.62%
Native Hawaiian, Other Pacific Islander	*1*	*0.09%*	3	0.16%
Declined To Answer	*8*	*0.71%*	16	0.84%
Multiple	*19*	*1.68%*	42	2.22%
Alcohol Abuse	415	36.79%	763	40.24%
Tobacco Users	468	41.49%	542	28.59%
Substance Abuse	180	15.96%	161	8.49%
COPD	97	8.60%	76	4.01%
CHF	77	6.83%	91	4.80%

Key: ADI, area deprivation index; BMI, body mass index; COPD, chronic obstructive pulmonary disease; CHF, congestive heart failure

Table 2. Outcomes and Complications

	ADI > 47 (n=1128)		ADI <=47 (n=1896)	
Variable	n	%	n	%
30 day Complications				
Emergency	101	*8.95%*	93	4.91%
Inpatient Readmission	*29*	*2.57%*	36	1.90%
90 day Complications				
Aseptic Loosening	*2*	*0.18%*	3	0.16%
Dislocations	*3*	*0.27%*	6	0.32%
DVT	*25*	*2.22%*	28	1.48%
MUA	*57*	*5.05%*	50	2.64%
PE	*17*	*1.51%*	14	0.74%
PJI	*14*	*1.24%*	15	0.79%
PPFx	*1*	*0.09%*	5	0.26%
Revision	*44*	*3.90%*	38	2.00%
SSI	*0*	*0.00%*	1	0.05%
1 year Complications				
Aseptic Loosening	*9*	*0.80%*	16	0.84%
Dislocations	*9*	*0.80%*	26	1.37%
DVT	*30*	*2.66%*	30	1.58%
MUA	*92*	*8.16%*	79	4.17%
PE	*22*	*1.95%*	21	1.11%
PJI	*20*	*1.77%*	21	1.11%
PPFx	*5*	*0.44%*	9	0.47%
Revision	*72*	*6.38%*	95	5.01%
SSI	*0*	*0.00%*	4	0.21%

Key: ADI, area deprivation index; DVT, deep vein thromboses; MUA, manipulation under anesthesia; PE, pulmonary embolism; PJI, periprosthetic joint infection; PPFx, periprosthetic fracture; SSI, surgical site infection