

Geography as a Proxy for Socioeconomic Status in Total Joint Arthroplasty: Associations with BMI and Complications

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Background: Volumes of total joint arthroplasty (TJA) of the hip, knee, and shoulder are projected to increase substantially by 2030, while postoperative complications remain prevalent. Nutritional status is a modifiable risk factor for adverse outcomes and is more common among older adults and populations with obesity, food insecurity, and lower socioeconomic status (SES). Because patient-level SES is not routinely captured in orthopaedic registries, ZIP-code-derived geographic regions may serve as a pragmatic SES proxy.

Objectives: To evaluate whether a regional socioeconomic proxy (ZIP-derived region) is associated with BMI and postoperative complication rates among adults undergoing primary TJA at UAMS.

Methods: We conducted a 3-year retrospective cohort study of adults undergoing primary TJA at UAMS (N=2,266). Region was categorized using a six-level ZIP-code grouping as a proxy for SES. Postoperative complications were defined as documented postoperative problems and/or joint revisions. BMI differences by region were assessed using Welch's ANOVA (Kruskal-Wallis sensitivity). Complication rates were compared using Pearson's chi-square testing. Multivariable logistic regression evaluated associations between region and complications adjusting for age, BMI, sex, race, and procedure type.

Results: Mean BMI did not differ by region (Welch ANOVA $p=0.087$; Kruskal-Wallis $p=0.142$) with values shown in Table 1. Complication rates were similar across regions ($p=0.636$) and remained non-significant after adjustment ($p=0.573$).

Table 1. Regional BMI \pm SD in TJA Patients at UAMS

Region	BMI (Mean \pm SD)
Central	30.29 \pm 5.99
Southeast	31.14 \pm 6.14

Southwest	30.40±6.35
Northwest	30.02±5.36
Northeast	31.49±6.25
Outside Arkansas	30.07±5.21

Conclusions: ZIP-derived region showed no evidence of BMI or postoperative complications differing by region. Geographic SES proxies alone may be insufficient to identify patients at elevated risk, supporting the need for patient-level nutritional and social risk measures.