

The Impact of Sex, Race/Ethnicity, and Neighborhood Socioeconomic Disadvantage on Total Hip Arthroplasty Utilization: A Multicenter Cohort Study

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INTRODUCTION: Sex-based and racial disparities are prevalent in the management of hip osteoarthritis (OA). National registry studies have shown that females are less likely to undergo total hip arthroplasty (THA) compared to males while others have described racial disparities in access to care and utilization rates. However, the impact of sex, race/ethnicity, and socioeconomic disadvantage remains unexplored, particularly at the institutional level. Our primary aim was to identify differences in THA utilization rates based on sex, race, and socioeconomic disadvantage across two tertiary academic centers. Our secondary aim was to compare the presenting symptomatology, non-operative treatment courses, and radiographic OA severity among patients based on these demographic factors.

METHODS: A database of THA candidates who were seen for initial consultation in adult reconstruction and joint replacement clinic at two tertiary academic centers from January 1, 2022-December 31, 2022, was reviewed. Patients with primary hip OA were included. Patients with post-traumatic arthritis, avascular necrosis, inflammatory arthritis, and indications for revision arthroplasty were excluded. Patient demographics, duration of symptoms from onset to initial consultation, Kellgren-Lawrence grade, Charlson Comorbidity Index (CCI), and non-operative modalities trialed (non-steroidal anti-inflammatory medications (NSAIDs), opiate medications, steroid or viscosupplementation injections, physical therapy, and bracing), were collected. The primary outcome measure of undergoing THA within 12 months of initial consultation was recorded. Area Deprivation Index (ADI), which quantifies neighborhood socioeconomic disadvantage through census block group data, was generated with zip codes; higher ADI indicates greater deprivation. Patients were stratified into ADI quartiles based on the California state ADI scale where Q4 represents the most deprived patients. Chi-square, ANOVA, and independent t-tests were employed in comparing presenting characteristics and surgical utilization rates between patient demographic groups.

RESULTS:

The combined database included 456 new patients who underwent initial consultation in 2022. In total, 343 patients were offered THA for primary hip OA, including 213 females (62%), 131 (38%) non-Hispanic non-white patients and 26 (8%) Hispanic patients. Fifty-two (15%) patients were in the most socioeconomically deprived quartile with respect to California state ADI. Mean age at time of consultation was 69.4 ± 9.2 years. Females presenting for initial consultation were significantly older than males (70.3 ± 8.6 years vs. 68.1 ± 9.7 years, $p=0.033$). Hispanic patients were younger than non-Hispanic nonwhite and non-Hispanic white patients at time of initial consultation (62.2 ± 12.1 years vs. 68.8 ± 8.7 years vs. 71.0 ± 8.4 years, $p<0.001$). In a subgroup analysis, Hispanic patients who elected to undergo THA were significantly younger at time of surgery compared to non-Hispanic nonwhite and white patients (60.6 ± 9.8 years vs. 66.8 ± 8.5 years vs. 69.5 ± 9.7 years, $p=0.010$). Hispanic patients also had significant lower CCI scores compared to non-Hispanic nonwhite and non-Hispanic white patients (2.20 ± 1.52 vs. 2.93 ± 1.49 vs. 3.28 ± 1.69 $p=0.027$). Patients with the most neighborhood socioeconomic deprivation utilized physical therapy prior to consultation more frequently than did patients with less deprivation (Q4 79% vs. Q1 62%, $p=0.006$). The overall THA utilization rate was 79%. There were no differences in proportions of patients undergoing surgery across sex, race/ethnicity, and ADI groups. Additionally, there were no differences in symptom duration or KL grade between females and males, racial/ethnic groups, or ADI quartiles.

DISCUSSION AND CONCLUSION:

Across two tertiary academic centers, THA utilization rates were high. We observed sex-based and racial/ethnic differences in presenting symptomatology for patients with primary hip OA. We also demonstrated differences in non-operative treatment allocation based on socioeconomic deprivation. While female patients presented for initial consultation at older ages, Hispanic patients were nearly 10 years younger at time of presentation compared to non-Hispanic white patients. Hispanic patients similarly underwent THA almost a decade earlier than did non-Hispanic white patients, presenting a unique postoperative risk profile that necessitates tailored patient counseling. Contrary to national registry results, we found no difference in THA utilization rates based on socioeconomic deprivation or race. These disparities may be minimized at tertiary care centers that emphasize providing equitable care to diverse patient populations. Still, there was significantly increased non-operative treatment allocation for patients with more socioeconomic deprivation prior to initial consultation at our institutions. Future work is needed to identify factors driving differences in presenting symptomatology, non-operative treatment modalities, and trends in THA utilization.

Table 1. Cohort stratified by race/ethnicity

	Overall (n=343)	Non-Hispanic Nonwhite (n=187)	Non-Hispanic White (n=249)	Hispanic (n=57)	p-value
Sex					0.324
Female	213 (62)	84 (64)	110 (59)	19 (73)	
Male	130 (38)	47 (36)	76 (41)	7 (27)	
Age at consult, y (mean \pm SD)	69.5 \pm 9.1	68.8 \pm 8.7	71.0 \pm 8.4	62.2 \pm 12.1	<0.001
Symptom duration, mo (median [IQR])	24.0 [12.0, 36.0]	18.0 [10.0, 36.0]	30.0 [12.0, 36.0]	24.0 [12.0, 36.0]	0.942
CCI	3.05 \pm 1.61	2.93 \pm 1.49	3.28 \pm 1.69	2.20 \pm 1.52	0.657
KL Grade					0.829
Grade 3	63 (26)	32 (28)	27 (25)	4 (25)	
Grade 4	177 (74)	82 (72)	83 (75)	12 (75)	
Non-operative modalities, no.					0.193
0	22 (9)	6 (5)	14 (13)	2 (13)	
1	85 (36)	39 (35)	42 (38)	4 (27)	
2	81 (34)	46 (41)	30 (27)	5 (33)	
3	48 (20)	21 (19)	24 (22)	3 (20)	
4	3 (1)	1 (1)	1 (1)	1 (7)	
Underwent surgery					0.696
No	73 (21)	31 (24)	37 (20)	5 (19)	
Yes	270 (79)	100 (76)	149 (80)	21 (81)	
Age at time of surgery, y (mean \pm SD)	67.6 \pm 9.3	60.6 \pm 9.8	69.5 \pm 9.7	66.8 \pm 8.5	0.010