



Racial and Ethnic Disparities in Post-Surgical Pain Management Among Patients Undergoing Orthopedic Surgery in the United States

Ibrahim Alfayoumi, MS¹, Surachat Ngorsuraches, PhD²

¹Department of Health Outcomes Research and Policy, Auburn University, Auburn, AL – USA

Background and Objective

Background: Postoperative pain management is essential for recovery following orthopedic procedures. Prior studies have largely focused on inpatient analgesic use, with limited evidence on outpatient prescribing, especially opioid, and disparities across populations.

Objective: To evaluate factors associated with postoperative opioid prescribing within 30 days, with emphasis on racial ethnic and socioeconomic disparities, using real-world data.

Methods

- Design:** Retrospective cohort study.
- Data Source:** All of Us Research Program (electronic health record (EHR) + survey data).
- Population:** Adults ≥18 years undergoing total knee arthroplasty (TKA), total hip arthroplasty (THA), or rotator cuff repair.
- Outcome:** Opioid prescription within 30 days post-surgery
- Analysis:** Multivariable logistic regression to estimate adjusted odds ratios (aORs) and 95% CIs.
- Covariates:** Demographic, clinical, socioeconomic, and behavioral variables.
- Sensitivity Analysis:** Models with and without average deprivation index (ADI) to address missingness.

Results

Final cohort: N = 8,887; 83.0% received opioids within 30 days post-surgery.

Clinical factors:

- Pre-index opioid use → higher odds of postoperative opioid prescribing (strongest predictor).
- Higher comorbidity (CCI ≥3) → lower odds of opioid prescribing.

Demographic factors:

- Hispanic (vs Non-Hispanic White) → lower odds of opioid prescribing.
- Non-Hispanic Black (vs Non-Hispanic White) → no significant difference.
- Increasing age → higher odds of opioid prescribing.

Socioeconomic factors:

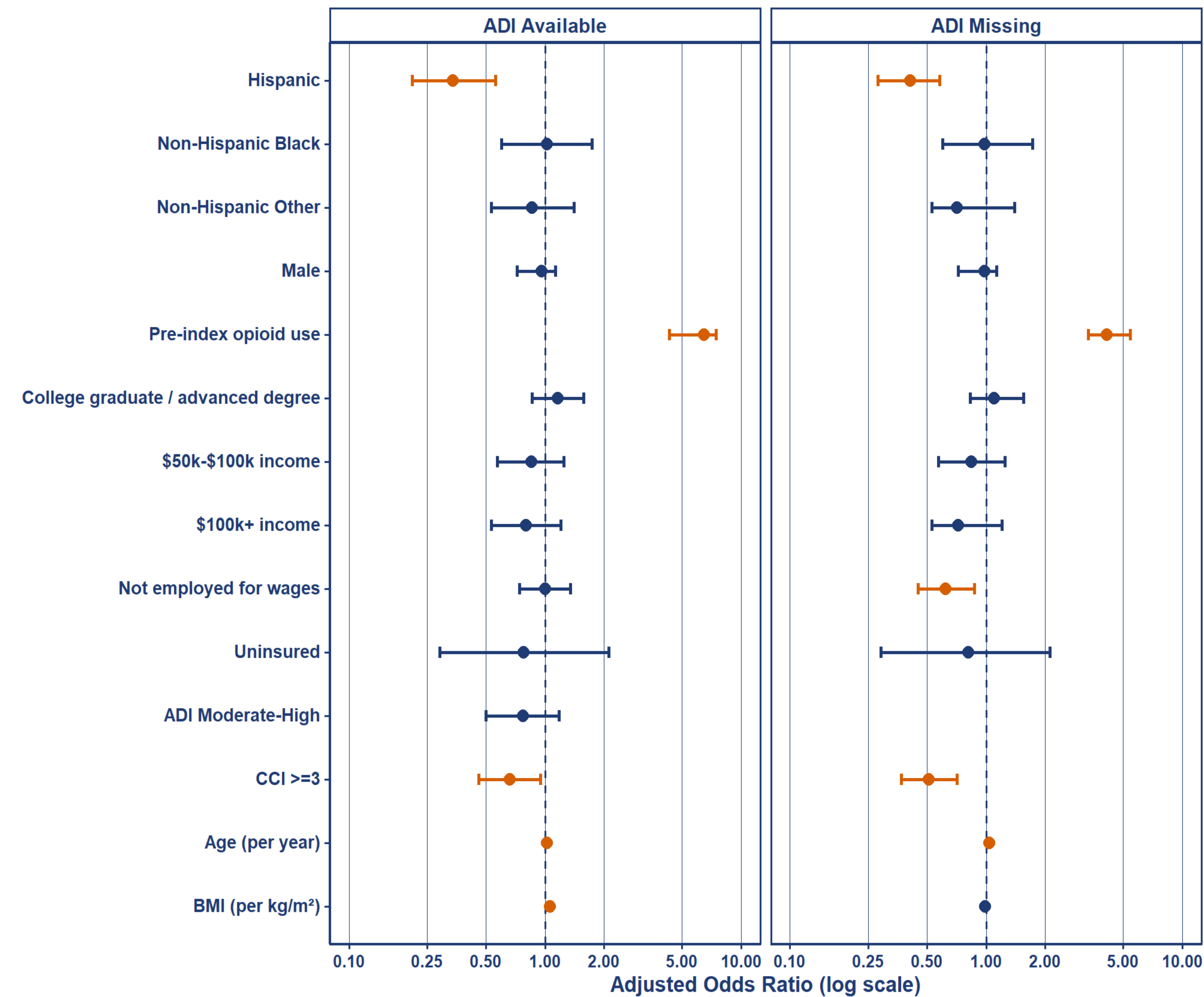
- No consistent association with opioid prescribing across models.

❖ **Key findings were consistent in models with and without ADI.**

Table 1. Baseline Characteristics of Patients Undergoing Orthopedic Surgery, Stratified by ADI Availability

Characteristics		Available ADI	Missing ADI
		(N = 4518) n (%)	(N = 4369) n (%)
Age at index (years)	Mean (SD)	64.00 (9.3)	61.05 (10.9)
	Median	65.00	62.00
Gender	Female (Ref)	2,628 (58.2)	2,604 (60.0)
	Male	1,889 (41.8)	1,764 (40.0)
	Other/Unknown	1 (0.0)	1 (0.0)
Race/ethnicity	Non-Hispanic White (Ref)	3,634 (80.4)	2,567 (58.8)
	Non-Hispanic Black	315 (7.0)	764 (17.5)
	Hispanic	230 (5.1)	630 (14.4)
	Non-Hispanic Other	339 (7.5)	408 (9.3)
BMI (kg/m ²)	Mean (SD)	32.46 (72.7)	32.29 (52.4)
	Median	30.04	31.33
Pre-index opioid use (180 days)	No (Ref)	1,814 (40.2)	1,715 (39.3)
	Yes	2,704 (59.8)	2,654 (60.7)
Education	Less than a college degree (Ref)	1,930 (42.7)	2,749 (63.0)
	College graduate or advanced degree	2,588 (57.3)	1,620 (37.0)
Household income	below 50K (Ref)	1,224 (27.1)	1,759 (40.3)
	50K–100K	1,309 (29.0)	769 (17.6)
	100K	1,397 (30.9)	799 (18.3)
	Missing	588 (13.0)	1,042 (23.8)
Employment status	Not currently employed for wages (Ref)	3,145 (69.6)	2,837 (65.0)
	Employed for wages or self-employed	1,316 (29.1)	1,246 (28.5)
	Missing	57 (1.3)	286 (6.5)
Insurance	Insured (Ref)	4,411 (97.6)	4,157 (95.0)
	Unknown	107 (2.4)	212 (5.0)
ADI	Low (Ref)	4,023 (89.0)	—
	Moderate–High	495 (11.0)	—
Charlson CCI	<3 (Ref)	3,954 (87.5)	3,601 (82.4)
	≥3	564 (12.5)	768 (17.6)

Figure 1. Adjusted Odds Ratios (aORs) for Receipt of an Opioid Regimen Within 30 Days Post-Surgery



Discussion & Conclusion

- Hispanic patients were less likely to receive opioids, suggesting potential disparities in postoperative pain management and access to care.
- Preoperative opioid use was strongly associated with postoperative prescribing, suggesting that prior exposure may drive prescribing patterns.
- Clinicians should consider standardized, equitable pain management approaches to reduce potential disparities.
- Future research should include more diverse patient populations to inform equitable, post-surgical pain management strategies for patients undergoing orthopedic surgery.