

Disparities in Access to Operative Management of Rotator Cuff Tears: *A Nationwide Sampling*

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I (and/or my co-authors) have nothing to disclose directly related to this talk.

I have no conflicts



Introduction

- Rotator cuff tears common
 - Especially in the geriatric population
- While non-operative management is often offered initially
 - Surgical intervention may be required in symptomatic patients
 - to achieve the best possible functional outcomes
- Racial & socioeconomic disparities exist in orthopaedics
 - Total Joint Arthroplasty
 - Spinal Fusion
 - Humeral Fracture Fixation
 - Carpal Tunnel Syndrome Release
- Paucity of rotator cuff studies
 - Large database studies have only examined outcomes
 - Cite longer operative time for Black patients
- Purpose
 - Utilize large national database to investigate disparities in rotator cuff management

SDOH

Social
Determinants
of Health



Methods

- **Healthcare Cost and Utilization Project's National Inpatient Sample (NIS Database)**
 - **Years of Interest**
 - 2006-2014
 - **International Classification of Diseases, Ninth Revision (ICD-9) Diagnosis**
 - Full rotator cuff tear (727.61)
 - Partial rotator cuff tear (726.13)
 - Rotator Cuff Syndrome NOS (726.10)
 - **ICD-9-CM Procedure Codes**
 - Rotator cuff repair (83.83)
 - Arthroscopy of shoulder (80.21)
 - Other repair of shoulder (81.83, 83.88)
 - **Baseline Demographics**
 - Age
 - Sex
 - Race/ethnicity
 - Primary payer
 - Socioeconomic status proxy (ZIP code Income Quartile [Q])
- **Unadjusted and Adjusted Analyses ($\alpha=0.05$)**



Results

- **Baseline Demographics**

- **Total**

- 46,167 patients

- **Operative Management**

- 33,617 (72.8%)

- **Non-Operative Management**

- 12,550 (27.2%)

- **Patients receiving non-operative management, when compared to operative management, were**

- **Older**

- **Higher percentage female**

- **Higher percentage minority race/ethnicity**

- Black

- Hispanic

- Asian or Pacific Islander (API)

- Native American

- **Higher percentage publicly insured (Medicare, Medicaid) or uninsured**

- **Lower mean income quartile**

- **All P-values <0.05**

Data are reported as mean \pm SD or No. of patients (%).
SD, Standard Deviation

*Statistically Significant ($\alpha=0.05$)

Baseline Demographics for Patients Undergoing Inpatient Management of a Rotator Cuff Tear

	Non-Operative 12,550 (27.2)	Operative 33,617 (72.8)	P-value
Age	66.0 \pm 16.8	64.0 \pm 11.4	<0.001*
Sex			<0.001*
Male	4,495 (35.8)	15,509 (46.1)	
Female	8,055 (64.2)	18,108 (53.9)	
Race/Ethnicity			<0.001*
White	7,885 (62.8)	26,975 (80.2)	
Black	2,425 (19.3)	2,604 (7.7)	
Hispanic	1,573 (12.5)	2,507 (7.5)	
Asian or Pacific Islander	218 (1.8)	524 (1.6)	
Native American	85 (0.7)	168 (0.5)	
Other	364 (2.9)	839 (2.5)	
Primary Payer			<0.001*
Privately Insured	2,631 (21.0)	10,505 (31.2)	
Medicare	7,650 (61.0)	18,272 (54.4)	
Medicaid	1,161 (9.2)	1,244 (3.7)	
Self-Pay	543 (4.3)	165 (0.5)	
No Charge	83 (0.7)	28 (0.1)	
Other	482 (3.8)	3,403 (10.1)	
Income Quartile			<0.001*
Q1	3,807 (30.3)	8,191 (24.4)	
Q2	3,098 (24.7)	8,955 (26.6)	
Q3	2,977 (23.7)	8,515 (25.3)	
Q4	2,668 (21.3)	7,956 (23.7)	

Results

- Independent impact on odds of surgical intervention
 - Race
 - Ethnicity
 - Primary payer status
- When compared to White patients
 - Black OR 0.31
 - Hispanic OR 0.49
 - Asian or Pacific Islander OR 0.72
 - Native American OR 0.65
- When compared to Privately Insured
 - Medicare OR 0.76
 - Medicaid OR 0.33
 - Uninsured OR 0.08
- Adjusted association with income quartile
 - Less definitive evidence
 - While not significant, the data trends indicate less operations being performed for patient in Q1

Results of Multivariable Logistic Regression: Likelihood of Operative Management

	Adjusted Odds Ratio (95% CI)	P-value
Race / Ethnicity[†]		
Black	0.31 (0.29-0.33)	<0.001*
Hispanic	0.49 (0.45-0.52)	<0.001*
Asian or Pacific Islander	0.72 (0.61-0.84)	<0.001*
Native American	0.65 (0.50-0.86)	0.002*
Primary Payer Status[‡]		
Medicare	0.76 (0.72-0.81)	<0.001*
Medicaid	0.33 (0.30-0.36)	<0.001*
Self-Pay	0.08 (0.07-0.10)	<0.001*
Median Household Income (Quartile) [§]		
Q2	1.09 (1.03-1.16)	0.004*
Q3	1.03 (0.97-1.10)	0.324
Q4	1.02 (0.96-1.09)	0.547

Results were adjusted for age and sex. CI, Confidence Interval
 *Statistically Significant ($\alpha=0.05$)
[†]Reference: White, [‡]Reference: Privately Insured, [§]Reference Q1



Discussion & Conclusion

- Overall, minority patients without private insurance
 - **Significantly less likely to receive operative management for rotator cuff tears**
- Study presents most inclusive, nationally representative evidence, of disparities in access to operative management for rotator cuff tears
 - **Limitations of the NIS database**
 - Restricted to inpatient visits
 - Missing race data
 - Specificity of ICD-9 codes
- Health inequities exist in the United States
 - **Multifaceted causes**
 - Decreasing, highly variable reimbursements
 - Low representation of underrepresented minorities in orthopaedics
 - Barriers to healthcare access
- Further studies, action will be required
 - **To provide equitable care for all**



Thank You



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References

1. Adelani MA, Harrington MA, Montgomery CO. The Distribution of Underrepresented Minorities in U.S. Orthopaedic Surgery Residency Programs. *The Journal of bone and joint surgery American volume*. 2019;101(18):e96-e96. doi:10.2106/JBJS.18.00879
2. Amen TB, Varady NH, Rajae S, Chen AF. Persistent Racial Disparities in Utilization Rates and Perioperative Metrics in Total Joint Arthroplasty in the U.S. *Journal of Bone and Joint Surgery*. 2020;102(9):811-820. doi:10.2106/JBJS.19.01194
3. Ang DC, Ibrahim SA, Burant CJ, Siminoff LA, Kwoh CK. Ethnic differences in the perception of prayer and consideration of joint arthroplasty. *Medical care*. 2002;40(6):471-476. doi:10.1097/00005650-200206000-00004
4. Armstrong K, Ravenell KL, McMurphy S, Putt M. Racial/ethnic differences in physician distrust in the United States. *American journal of public health*. 2007;97(7):1283-1289. doi:10.2105/AJPH.2005.080762
5. Best MJ, McFarland EG, Thakkar SC, Srikumaran U. Racial Disparities in the Use of Surgical Procedures in the US. *JAMA Surgery*. 2021;156(3):274-274. doi:10.1001/jamasurg.2020.6257
6. Bill-Harvey D, Rippey RM, Abeles M, Pfeiffer CA. Methods used by urban, low-income minorities to care for their arthritis. *Arthritis care and research : the official journal of the Arthritis Health Professions Association*. 1989;2(2):60-64. doi:10.1002/anr.1790020207
7. Casper DS, Schroeder GD, Zmistowski B, et al. Medicaid Reimbursement for Common Orthopedic Procedures Is Not Consistent. *Orthopedics*. 2019;42(2):e193-e196. doi:10.3928/01477447-20181227-06
8. Chun DS, Leonard AK, Enchill Z, Suleiman LI. Racial Disparities in Total Joint Arthroplasty. *Current reviews in musculoskeletal medicine*. 2021;14(6):434-440. doi:10.1007/s12178-021-09718-3
9. Colvin AC, Egorova N, Harrison AK, Moskowitz A, Flatow EL. National trends in rotator cuff repair. *The Journal of bone and joint surgery American volume*. 2012;94(3):227-233. doi:10.2106/JBJS.J.00739
10. Farley KX, Dawes AM, Wilson JM, et al. Racial Disparities in the Utilization of Shoulder Arthroplasty in the United States: Trends from 2011 to 2017. *JB & JS open access*. 2022;7(2). doi:10.2106/JBJS.OA.21.00144
11. Galatz LM, Griggs S, Cameron BD, Iannotti JP. Prospective longitudinal analysis of postoperative shoulder function : a ten-year follow-up study of full-thickness rotator cuff tears. *The Journal of bone and joint surgery American volume*. 2001;83(7):1052-1056.
12. Groeneveld PW, Kwoh CK, Mor MK, et al. Racial differences in expectations of joint replacement surgery outcomes. *Arthritis and rheumatism*. 2008;59(5):730-737. doi:10.1002/art.23565
13. Hwang A, Zhang L, Ramirez G, Maloney M, Voloshin I, Thirukumaran C. Black Race, Hispanic Ethnicity, and Medicaid Insurance Are Associated With Lower Rates of Rotator Cuff Repair in New York State. *Arthroscopy : the journal of arthroscopic & related surgery : official publication of the Arthroscopy Association of North America and the International Arthroscopy Association*. Published online July 2022. doi:10.1016/j.arthro.2022.06.028
14. Ibrahim SA, Siminoff LA, Burant CJ, Kwoh CK. Variation in perceptions of treatment and self-care practices in elderly with osteoarthritis: a comparison between African American and white patients. *Arthritis and rheumatism*. 2001;45(4):340-345. doi:10.1002/1529-0131(200108)45:4<340::AID-ART346>3.0.CO;2-5
15. Kim CY, Wiznia DH, Hsiang WR, Pelker RR. The Effect of Insurance Type on Patient Access to Knee Arthroplasty and Revision under the Affordable Care Act. *The Journal of Arthroplasty*. 2015;30(9):1498-1501. doi:10.1016/j.arth.2015.03.015
16. Koh HK, Graham G, Glied SA. Reducing racial and ethnic disparities: the action plan from the department of health and human services. *Health affairs (Project Hope)*. 2011;30(10):1822-1829. doi:10.1377/hlthaff.2011.0673
17. Linker JA, Eberlin CT, Naessig SA, et al. Racial Disparities in Arthroscopic Rotator Cuff Repair: An Analysis of Utilization and Perioperative Outcomes. *JSES International*. Published online September 2022. doi:10.1016/j.jseint.2022.09.002
18. Malik AT, Kopechek KJ, Bishop JY, Cvetanovich GL, Khan SN, Neviasser AS. Declining trends in Medicare physician reimbursements for shoulder surgery from 2002 to 2018. *Journal of shoulder and elbow surgery*. 2020;29(12):e451-e461. doi:10.1016/j.jse.2020.02.005
19. Rudisill SS, Eberlin CT, Kucharik MP, et al. Sex Differences in Utilization and Perioperative Outcomes of Arthroscopic Rotator Cuff Repair. *JSES International*. Published online August 2022. doi:10.1016/j.jseint.2022.07.003
20. Zhang W, Lyman S, Boutin-Foster C, et al. Racial and Ethnic Disparities in Utilization Rate, Hospital Volume, and Perioperative Outcomes After Total Knee Arthroplasty. *Journal of Bone and Joint Surgery*. 2016;98(15):1243-1252. doi:10.2106/JBJS.15.01009

