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Low socioeconomic status worsens access to care and outcomes for rotator cuff repair: a scoping review



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Background: Poor socioeconomic status (SES) is consistently associated with poor quality of health care, particularly in the field of orthopedics. Expanding insurance coverage has created a larger patient population by specifically making health care more accessible, translating to greater demand for care in the low-SES population. The purpose of this article is to provide a scoping review of literature observing access and outcomes of rotator cuff repair surgery among low-SES populations.

Methods: We performed a systematic review of articles using PubMed, Embase, and EBSCO (May 2021) from 2010 onward. Peer-reviewed articles that recorded at least one SES measure specific to patients who underwent rotator cuff repair from the United States were included. SES measures were methodically defined as income, occupation, employment, education, and race. All data that aligned with these SES measures were extracted.

Results: Of the 1009 titles reviewed, 109 studies were screened by abstract, 23 were reviewed in full, and 7 studies met criteria for inclusion. Of the 5 studies investigating access, all 5 found disparities among postoperative physical therapy, orthopedic consult, and surgery, using Medicaid status as a proxy for income in addition to other income measures. Of the 3 studies analyzing outcomes, 2 found that low-SES patients had worse pain and function, again based on Medicaid status and other income measures. Education did not have a significant impact on outcomes, as per the 1 study that included it. No studies included measures of occupation or employment.

Conclusion: Patients of low SES face reduced access to cuff repair care and worse associated outcomes, despite federal and state government efforts to reduce health care disparity through health care reform. The small nature of this review reflects how measures of SES are often not examined in rotator cuff repair studies.

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Poor socioeconomic status (SES) has historically been closely associated with poor health care access and outcomes.² The inception of the Affordable Care Act in 2010, and the ensuing Medicaid expansion in 2014, aimed at addressing disparities in American health care.⁴⁵ Improvements have been seen in several medical specialties regarding access, coverage, affordability, and outcomes.^{25,29,32,47} Questions remain, however, on if these benefits have reached the field of orthopedic surgery.^{15,28,36,62} Several studies have noted reduced access to care for low-SES patients for conditions such as ankle fracture,²⁸ meniscus tear,⁶³ flexor tendon laceration,¹⁴ and pediatric injury.^{41,53,54} Furthermore, worse postoperative outcomes associated with low SES persist in orthopedic

surgeries, such as total joint arthroplasties^{13,59} and spine surgery.^{31,35} Several studies observe similar trends in care for rotator cuff tear.^{8,12,24,30,39,44,48}

Rotator cuff tears are one of the most common causes of shoulder pain and dysfunction, with some estimating a near 20% prevalence in adults.^{64,65} These injuries present both direct and indirect costs, such as loss of income due to missed work³⁷ and negative impacts on mental health.⁹ Rotator cuff repair surgery is highly effective at improving function and quality of life,^{10,18,34} and 250,000 patients undergo cuff repair annually.³⁷ Rates are expected to rise with the aging population,³⁷ in addition to greater demand in low-income populations created by expanded Medicaid coverage under the Affordable Care Act.⁵ Meanwhile, socioeconomic disparity is pervasive in the United States, indicated by the 34.0 million living under the poverty line,⁵¹ 72.2 million adults covered under government-subsidized health care,³⁸ and 92.5 million with only a high school degree.⁵⁸

Institutional review board approval was not required for this review article.

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The purpose of this study was to review the existing literature examining access and outcomes of rotator cuff repair surgery among low-SES individuals.

Methods

A scoping literature review was conducted using PubMed, Embase, and EBSCO in June 2021. Our purpose was to identify and include all English-language, peer-reviewed studies on access to rotator cuff surgery care and outcomes for low-SES populations. The search was completed using keywords: “rotator cuff”, “disparities”, “socioeconomic status”, “economic status”, “social status”, “insurance”, “Medicare”, “Medicaid”, “income”, “ethnicity”, “access”, and “predictors”. The search strategy for PubMed is presented in [Table I](#).

Study time limit was set to March 2010 onward in effort to scope around the time which Affordable Care Act was signed into law, fundamentally changing health care access in the United States of America.^{45,47} Results had to be specific to patients who underwent rotator cuff repair, excluding shoulder arthroplasty and solely nonoperative treatment. Further inclusion criteria required studies to include at least one measure of SES; only one SES measure was required in effort to obtain a fuller scope, and primary measures of SES were defined according to the American Psychologic Association and the US Department of Justice: occupation, income, education level, and employment.^{1,4} In addition, we chose to include ethnicity as a measure because minority ethnicities are shown to be closely associated with low SES.^{1,2} Inclusion was limited to US populations with the notion that socioeconomic influences on health care in the United States differed from that of other countries based on several factors, such as health care laws and practice.⁴² Articles without full text available and those based on opinion were excluded.

All titles and abstracts were reviewed for relevance. Those relevant progressed to full-text reviews for inclusion. Relevance was defined by clear naming of an SES measure, the implication of disparity in association with access or outcome, or focus on predictors of care. Data were extracted and included measures of SES, number of subjects, and patient characteristics. In addition, all result data that aligned with SES measures, including statistical analysis regarding access and outcome (ie, measures of central tendency, relative ratios, confidence intervals, regression models), were also extracted for summary ([Table I](#)).

Two reviewers independently assessed the methodological quality and reliability of the included studies. Cohort studies were evaluated using the Newcastle-Ottawa Scale,⁶¹ and cross-sectional studies were evaluated using an adapted Newcastle-Ottawa Scale.²³ Studies were assessed for potential sources of biases, generalizability, and control of confounding factors. Reviewers resolved discrepancies by consensus. Studies were included if they were, at least, “satisfactory” ([Table II](#)). Risk of bias across studies to assess cumulative evidence was determined independently by two authors and settled by consensus.

Results

The search strategy yielded 1695 studies after duplicate screening within searches, 686 of which were removed as duplicates across searches leaving 1009 titles reviewed. Of these, 109 studies were screened by abstract and 23 were reviewed in full. All authors came to a consensus for the 7 studies that met criteria for inclusion ([Fig. 1](#)). Collectively, these studies consisted of 674 provider clinic visits (603 physical therapies and 71 outpatient orthopedics) and 50,898 patients with cuff tear. Six studies assessed SES based on income, 2 studies additionally used race, and one

Table 1
The search strategy used for PubMed.

Search strategy: Pubmed			
1.	Rotator cuff	7.	Medicare
2.	Disparities	8.	Medicaid
3.	Socioeconomic status	9.	Income
4.	Economic status	10.	Ethnicity
5.	Social status	11.	Access
6.	Insurance	12.	Predictors
Search term: 1 AND (2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12)			
Limits: Date: 2010-2021; Language: English			

study solely used the highest level of education. In 4 studies, data were obtained via cross-sectional design, whereas 3 studies were carried out by cohort design, 2 of which were retrospective.

Significant disparity in access to care for low-SES patients with cuff tear was found in all 5 of the studies that explored access ([Table II](#)). All five of these studies used government-subsidized health insurance as a proxy for individual income to represent SES. In addition, 3 noted regional income measures, and 2 recorded patient race. Rogers et al⁴⁴ and Curry et al¹² reported this finding in physical therapy clinics. Patterson et al³⁹ reported on outpatient orthopedic practices. Finally, Chapman et al⁸ and Li et al³⁰ reported on medical centers.

Rogers et al⁴⁴ and Curry et al¹² conducted cross-sectional analysis of physical therapy clinics posing as Medicaid and privately insured patients who underwent cuff repair. In both studies, Medicaid insurance was accepted less often than private insurance. Rogers et al⁴⁴ found that Medicaid patients encountered longer average days to first appointment, and low community income measures had no significant impact. Curry et al¹² found the opposite, with an insignificant difference in wait time and physical therapy clinics more likely to accept Medicaid lower household income communities. Medicaid expansion states had higher overall rates of coverage acceptance, although a greater range of wait times, which the authors suggest may be indicative of demand exceeding supply. Patterson et al³⁹ presented similar findings for orthopedic practices, with reduced Medicaid acceptance. There was no significant difference in wait time, although Medicaid patients were less likely to receive an appointment within the requested 2 weeks. Chapman et al⁸ retrospectively investigated treatment decisions for atraumatic rotator cuff tears and found that lower income and minority race played a significant role. Specifically, African American and Hispanic patients were less likely than Caucasian patients to undergo surgery and more likely to be treated with watchful waiting; African Americans were also less likely to undergo physical therapy. Medicaid dual-eligible patients had similar findings to African Americans. Although several factors could have influence (eg, physician bias and patient attitude), the authors objectively identify the confounding impact of geographic variation as regions with a greater supply of surgeons and physical therapists had higher surgery rates and physical therapy rates, respectively. Li et al³⁰ found disparity between the patient populations of low- and high-volume facilities and surgeons. Univariate analysis revealed that low-volume facilities and surgeons saw a greater proportion of Medicaid patients, low-income patients, and minority race patients ([Table II](#)). In all these studies, the regional nature poses a potential source of selection bias, limiting their generalizability and ability to analyze confounding community characteristics ([Table III](#)).

Of the 3 studies recording outcomes, 2 measured significant disparity in outcomes for patients who underwent rotator cuff repair of lower SES ([Table II](#)). These two studies, the studies by Li et al³⁰ and Sabesan et al⁴⁸, used government-subsidized insurance

Table II
Summary of included articles.

Article title	Date	Authors	Study design	Evidence	Focus	Participant total	Participant details	SES measure	Data	Summary of disparity
Insurance status affects access to physical therapy after rotator cuff repair surgery: A comparison of privately insured and Medicaid patients ⁴⁴	Jan-19	Rogers et al	Cross-sectional study	Level 4	Access	138	PT clinics in the Greater Boston Area	Income ^l	Medicaid vs. private Accepted: 71 (51%) vs. 133 (96%), $P = .019$ Days to appointment: 8.3 days (95% CI 7.13, 9.38) vs. 6.3 days (95% CI 5.3, 7.22), $P = .001$	Fewer PT clinics accepted Medicaid, and Medicaid patients had a longer wait time for the first available appointment.
National disparities in access to physical therapy after rotator cuff repair between patients with Medicaid vs. private health insurance ¹²	Jan-21	Curry et al	Cross-sectional study	Level 4	Access	465 [†]	PT clinics from urban centers in all 50 states and Washington DC	Income [†]	Medicaid vs. private Accepted: 245 (53%) vs. 441 (95%), $P < .00001$ Days to appointment: 2, IQR: 1-4 Range (expansion/nonexpansion): 0-72/0-10 vs. 0-43/0-11 Accepted (expansion/nonexpansion): 56%/46% ($P = .05$) vs. 97%/91% ($P = .01$)	Fewer PT clinics accepted Medicaid in all states, although a patient in a Medicaid-expansion state was more likely to receive an appointment than one in a nonexpansion state.
Access to outpatient care for adult rotator cuff patients with private insurance vs. Medicaid in North Carolina ³⁹	Oct-14	Patterson et al	Cross-sectional	Level 4	Access	71	Orthopaedic practices in North Carolina	Income [*]	Medicaid vs. private Accepted: 51 (72%) vs. 68 (96%), $P < .001$ Appointment within 2 weeks: 49 (69%) vs. 65 (92%), $P = .001$	The Medicaid patient was offered an appointment less frequently than the privately insured patient. In addition, the Medicaid patient was less likely to receive an appointment in the requested time frame.
Treatment for rotator cuff tear is influenced by demographics and characteristics of the area where patients live ⁸	Sep-18	Chapman et al	Retrospective cohort Study	Level 3	Access	32,203	Medicare patients with atraumatic RCT: C: 29,644 (92.1%) AA: 1389 (4.3%) H: 401 (1.2%) A: 264 (0.8%) Other: 505 (1.6%) MDE: 2204 (6.8%)	Race, income [*]	Odds of surgery [§] : AA: 0.78 ($P < .01$, 95% CI 0.67, 0.91) H: 0.61 ($P < .01$, 95% CI 0.44, 0.87) MDE: 0.70 ($P < .001$, 95% CI 0.61, 0.81) Odds of physical therapy [¶] : AA: 0.81 ($P < .01$, 95% CI 0.73, 0.91) H: 1.02 ($P > .05$, 95% CI 0.82, 1.26) MDE: 0.63 ($P < .001$, 95% CI 0.57, 0.69) Odds of watchful wait [‡] : AA: 1.41 ($P < .001$, 95% CI 1.26, 1.57) H: 1.23 ($P < .1$, 95% CI 0.99, 1.52) MDE: 1.86 ($P < .001$, 95% CI 1.69, 2.04)	Minority race and Medicaid-AA: dual-eligibility patients had lower odds of surgery and higher odds of watchful waiting.

Table II (continued)

Article title	Date	Authors	Study design	Evidence Level	Focus	Participant total	Participant details	SES measure	Data	Summary of disparity
Disparities in cost and access by caseload for arthroscopic rotator cuff repair: An analysis of 18,616 cases ³⁰	Jun-19	Li et al	Cross-sectional study	Level 4	Access and outcome	18,616	RCR patients in Florida: C: 15,153 (81.4%) AA: 1452 (7.8%) H: 1880 (10.1%) A: 112 (0.6%) NA: 19 (0.1%) Medicaid: 372 (2.0%)	Race, income ¹	Low- vs. high-volume facilities (%): AA: 8.1 vs. 7.5, $P < .001$ H: 12.4 vs. 8.3, $P < .001$ Medicaid: 3.0 vs. 1.3, $P < .001$ Low income: 69.5 vs. 61.2, $P < .001$ Readmission: 4.95 ± 21.7 vs. 2.43 ± 15.4, $P < .001$ Low- vs. high-volume surgeons (%): AA: 8.4 vs. 7.1, $P < .001$ H: 10.9 vs. 9.3, $P < .001$ Medicaid: 3.1 vs. 0.9, $P < .001$ Low income: 70.3 vs. 61.2, $P < .001$ Readmission: 4.79 ± 21.4 vs. 2.87 ± 16.7, $P < .001$	Low-volume facilities and surgeons saw more low minority race patients and had higher readmission rates.
The effect of Medicaid payer status on patient outcomes after repair of massive rotator cuff tears ⁴⁸	Nov-17	Sabesan et al	Retrospective cohort Study	Level 3	Outcome	29	Medicaid (14) and non-Medicaid (15) patients with Massive RCR patients, undergone surgery by 1 surgeon	Income [*]	Medicaid vs. non-Medicaid postoperative: ASES: 53.7 ± 28.8 vs. 71.3 ± 22.5 $P = .095$ effect size: $d = 0.1$ PSS: 54.5 ± vs. 70.9 ± 21.6, $P = .105$ effect size: $d = -0.4$ SVV: 60.3 ± 18.8 vs. 75 ± 15.1, $P = .106$ effect size: $d = -0.7$ Medicaid preoperative vs. postoperative: Forward flexion: 107 ± 46 vs. 164 ± 34, $P = .002$ Abduction: 105 ± 60 vs. 142 ± 50, $P = .253$ External rotation: 38 ± 26 45 ± 24, $P = .448$ Non-Medicaid preoperative vs. postoperative: Forward flexion: 108 ± 53 vs. 159 ± 23 $P = .004$ Abduction: 94 ± 51 vs. 158 ± 45, $P = .048$ External rotation: 40 ± 22 vs. 52 ± 28, $P = .101$	Both groups had significant improvement from baseline; however, Medicaid patients had slightly worse ROM. Disparities in pain and function scores were present by mean, although insignificant; effect size trended better for non-Medicaid patients.

(continued on next page)

Table II (continued)

Article title	Date	Authors	Study design	Evidence Focus	Participant total	Participant details	SES measure	Data	Summary of disparity
Predictors of pain and functional outcomes after operative treatment for rotator cuff tears ²⁴	Aug-18	Jain et al	Cohort study	Level 2 Outcome	50	RCR patients aged 45+ years with 4+ weeks of symptomatic RCT	Highest level of education	Highest level of education: $P = .79$; $P = .38$ adjusted for interaction with follow-up duration	Highest level of education was not a predictor of postoperative pain and function.

SES, socioeconomic status; CI, confidence interval; IQR, interquartile range; MDE, Medicaid dual-eligible; ± mean with standard deviation; ASES, American Shoulder and Elbow Surgeons; PSS, Penn Shoulder Score; SSV, Subjective Shoulder Score; RCR, rotator cuff repair; RCT, rotator cuff tear; PT, physical therapy. Effect size interpretation: 0-0.1 = no effect, 0.2-0.04 = small effect, 0.5-0.7 = intermediate effect, ≥0.8 = large effect; positive values denote a greater effect in the Medicaid group, and negative values denote a greater effect in the non-Medicaid group.⁴⁸

¹Insurance was used as a proxy for patient income.

²In addition to insurance, other income measures were done.

³Participant total does not include nonrespondents.

⁴Reference to Caucasian. C: Caucasian, AA: African American, H: Hispanic, A: Asian, NA: Native American.

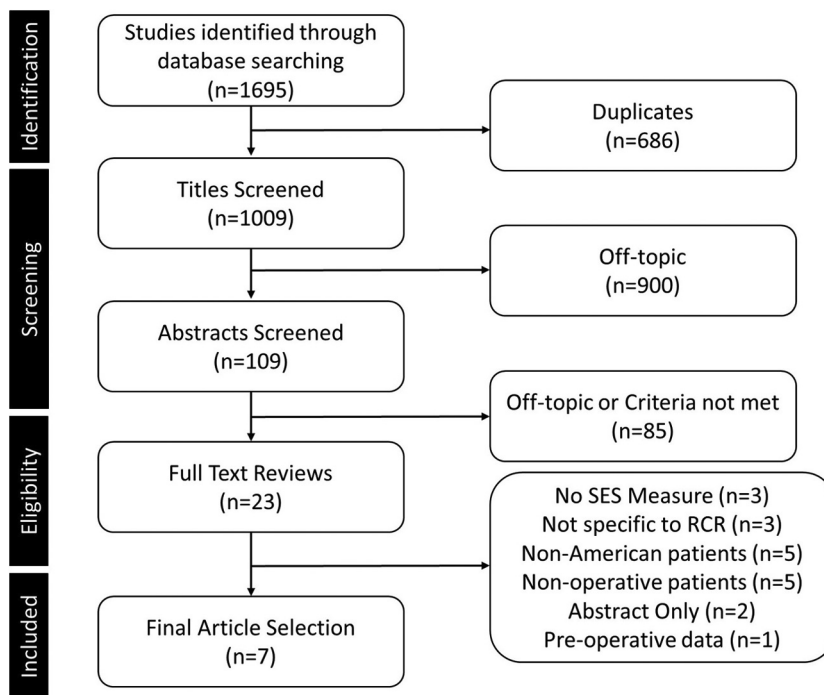


Figure 1 Flow chart of the identification of included studies. SES, socioeconomic status; RCR, rotator cuff repair.

to represent individual income; in addition, Li et al³⁰ recorded race and regional income. Jain et al²⁴ recorded the highest level of education. Specific outcome measures differed across these 3 studies. Sabesan et al⁴⁸ and Jain et al²⁴ utilized self-reported pain and functional evaluations, whereas Li et al³⁰ used hospital records.

Li et al³⁰ correlated low volume with poor outcomes. The authors noted that surgeon volume was previously shown to be inversely correlated with operative time, readmission rates, and cost, whereas facility volume is inversely correlated with revision rates, mortality rates, complication rates, and length of stay. In this study, they added that low-volume facilities and surgeons experienced higher readmission rates. Sabesan et al⁴⁸ found that non-Medicaid groups had a better average improvement in functional outcome scores. Although not statistically significant, the effect size calculations revealed small to large effects favoring the non-Medicaid patients. Medicaid patients had slightly worse improvement in range of motion, improving only in forward flexion, whereas non-Medicaid patients improved in forward flexion and abduction; neither cohort significantly improved in external

rotation. In aiming to determine predictors of pain and functional outcome scores for rotator cuff repair, Jain et al²⁴ found that the patient’s highest level of education did not have a significant impact on outcomes, even when assessed for interaction with follow-up duration (Table II).

Assessing cumulative risk of bias in this group of articles, 6 of 7 studies use insurance status as a proxy for income as a measure of SES. Of the SES measures defined by this review, occupation and employment were not used in any studies, and the highest level of education was only used in one study. Furthermore, selection bias is prevalent in at least 6 of 7 studies, as population pools are limited to regions and population types (ie, urban and age; Table II).

Discussion

This scoping literature review summarizes disparities in access to rotator cuff tear and associated outcomes for lower-SES patients. Although several reviews observe the impact of SES on orthopedic conditions, ours is the first to our knowledge to examine the impact

Table III
Risk of bias assessment.

Authors	Study design	Level of evidence	Selection		Comparability		Outcome		Quality	Comment	
			Representativeness of the sample (+)	Sample size (+)	Nonrespondents exposure (++)	Ascertainment of exposure (++)	Based on design and analysis (++)	Assessment of outcome (++)			Statistical test (+)
Rogers et al ⁴⁴	Cross-sectional	Level 4	+	+	+	+	++	+	5/10	Selection Bias: metropolitan, Medicaid expansion state	
Li et al ³⁰	Cross-sectional	Level 4	+	+	++	++	++	+	8/10	Large sample size	
Patterson et al ³⁹	Cross-sectional	Level 4	+	+	++	++	++	+	6/10	Selection bias: North Carolina	
Curry et al ¹²	Cross-sectional	Level 4	+	+	+	+	++	+	6/10	Selection bias: urban populations	
Authors	Study design	Level of evidence	Selection		Comparability		Outcome		Quality	Comment	
			Representativeness of the exposed cohort (+)	Selection of the nonexposed cohort (+)	Ascertainment of exposure (+)	Outcome not present before study (+)	Based on design and analysis (++)	Assessment of outcome (++)	Follow-up length (+)	Follow-up cohort (+)	
Sabesan et al ⁴⁸	Retrospective cohort	Level 3	+	+	+	+	+	+	7/9	Small cohort	
Jain et al ²⁴	Cohort	Level 2	+	+	+	+	+	*	5/9	30% dropout rate	
Chapman et al ⁸	Retrospective cohort	Level 3	+	+	+	+	++	+	9/9	Satisfactory Selection bias: narrow definition for RCT, Medicare only	

RCT, rotator cuff tear.
 Top: Newcastle Ottawa Scale adjusted for cross-sectional studies²⁹; excellent = 9-10, good = 7-8, satisfactory = 5-6, unacceptable = 1-4. Bottom: Newcastle Ottawa Scale for cohort studies⁶¹; excellent = 8-9, good = 6-7, satisfactory = 4-5, unacceptable = 1-3.

on cuff repair. Despite the known relationship between outcomes of orthopedic injuries and procedures and SES, only 7 of 1009 studies recorded measures relevant to assessing the relationship between SES and cuff repair. The included studies assessed SES by measures of low income, minority race, and low-level education; no study included measures of occupation or employment. Overall, both access to care and rotator cuff repair outcomes were worse for patients of low SES based on income and specific patient race and ethnicity.

It is important to underscore the close relationship between access and outcome for rotator cuff repair. In studies by Rogers et al⁴⁴ and Patterson et al³⁹ Medicaid patients experienced longer wait times for appointments for physical therapy and orthopedic consult, respectively. In addition, patients in the study by Curry et al¹² were offered fewer appointments for care. Although optimal timing for physical therapy is under debate,¹¹ several studies indicate that delays in rehabilitation prolong recovery in pain, range of motion, and functional scores.⁴⁶ This prolongation of disability should be considered in the total cost of cuff repair, which augments the burden of disease specifically in low-SES patients.³³ This increased burden may deter low-SES patients from future care.²⁷ Furthermore, cuff tears with delayed repair develop greater atrophy and fatty infiltration which may correlate to higher retear rates and poorer functional outcomes.^{17,20,49,60} Although many factors interact, this research adds to the inference that reduced access can reasonably lead to significant delays in care, thus worse outcomes.

Of the possible factors impacting the relationship between SES and health care, regional characteristics are noted in several studies. On a nationwide level, Curry et al¹² show that low-SES patients were more likely to be accepted for appointments within Medicaid expansion states. In addition, patients in the West had higher rates of acceptance, followed by the Midwest, the Northeast, and, finally, the South. Curry et al¹² also found that wait time difference for Medicaid patients is insignificant on a national average, although Rogers et al⁴⁴ find that wait times are longer for Medicaid patients in the greater Boston area, suggesting a high likelihood of local influences. Variability in findings such as these makes it difficult to apply conclusions locally and present as a challenge to future research. Providers should dynamically integrate this information with competent understanding of the unique influences in their practicing community. Aiming to compare urban and rural populations, Patterson et al⁴⁰ conducted a follow-up study in 2014. In this study, Medicaid acceptance rates were compared for cuff repair, acute flexor tendon laceration, and lumbar disc herniation patients, based on county population size. Physical therapy clinics in less populated, rural counties of North Carolina (ie, <250,000) were more likely to offer appointments to Medicaid patients than practices in more populated, urban counties (ie, >250,000). These findings imply that specifically urban, lower-SES patients may experience more difficulty in finding cuff repair care and may even be pushed to lower-volume hospitals, as seen in the study by Li et al.³⁰ Patterson et al³⁹ hypothesize that higher competition in populous areas motivates practices to accept fewer Medicaid patients, in favor of those with private insurance.

Medicaid reimbursement is mentioned in three articles as a contributing factor to reduced access to cuff repair care for low-SES patients. Li et al³⁰ directly blame low reimbursement rates for reduced access to high-volume surgeons among Medicaid patients. Patterson et al³⁹ note that although Medicaid reimbursement rates have a direct correlation with reduced access, the magnitude of this effect may differ depending on a state's unique reimbursement rate. Both articles suggest that raising reimbursement rates for cuff repair will improve access to care. Curry

et al¹² agree with this sentiment but also call attention to unique mechanisms by which Medicaid patients are restricted. In Virginia and Oklahoma, for example, Medicaid was only accepted at hospitals and not outpatient physical therapy clinics. In addition, in Maine and Washington, physical therapy practices stated that they were limited to only two Medicaid patients per practice at a time. While these restrictions likely stem from low reimbursement rates, other methods, such as eliminating state-by-state Medicaid differences,⁷ may exist to improve suboptimal access.

Postulating the reason for worse cuff repair outcomes among low-SES patients appears to pose a greater challenge. Li et al³⁰ provide some possible explanation, demonstrating that these patients are directed to low-volume surgeons and facilities, which empirically deliver worse outcomes by increased readmission and complication rates. Several others also find that low-SES patients frequent low-volume hospitals for total joint arthroplasties because of restricted referral networks.^{19,55} Despite these findings, the true degree of effect on outcomes appears unclear. Sabesan et al⁴⁸ find that functional outcomes are worse for low-SES patients; however, Jain et al²⁴ do not find significant disparity when the highest education level is used as the measure. This variance highlights the reality that health care disparity is a complex problem, not easily explained by small-scale studies. Elements of SES likely have effects both individually and in combination. The multidimensional nature of SES must be appreciated as a dynamic influence, but doing so is marred by challenges.^{22,52} One of these challenges has been attaining precise and reliable measures on various population levels.⁵²

The small group of eligible articles in this review is a product of this challenge. Health records have been historically limited in recording data pertaining to social determinants of health.³ However, developments in electronic and personal health records are making information, such as SES determinants, more attainable.^{3,43} Electronic records are showing benefit to clinical outcomes and goals in population health.^{3,6,26} The hope is that as the capabilities and use of electronic health records expand in magnitude, so can the research toward understanding socioeconomic determinants of orthopedic care. While SES may be commonly neglected in investigating the quality of care for cuff repair, indicated by the few articles in this review, increasing amounts of data via electronic health records should be cause for integrating and exploring these data in future research.

This review on cuff repair access and outcomes joins others in highlighting SES-related disparities for common orthopedic conditions. Ezomo et al¹⁶ utilized a national database to examine racial and ethnic disparities in total hip arthroplasty. In over 150,000 cases, African Americans and Hispanics were more likely to experience longer postoperative length of stays and higher rates of adverse events. A systematic review by Goodman et al²¹ found that African Americans undergoing total knee arthroplasty experienced worse postoperative pain, function, satisfaction, and quality of life than Caucasian patients. Another review by Truong et al⁵⁷ indicated low SES as a relevant predictor of reduced function after distal radius fracture. With these consistent findings, it is clear that suboptimal care persists as a result of SES disparity. Although race is a commonly cited measure in orthopedic studies,⁵⁰ several SES factors likely have an influence and should be considered, both collectively and individually, in future studies.

This study has several limitations. First, while we sought to examine all defined SES factors, insurance status as a proxy for income was the predominant measure of the reviewed studies. We acknowledge that this omits a large population within the low-SES community as nearly 11% of Americans are uninsured, most of which are low-income and minority people.⁵⁶ Second, certain measures of race and ethnicity are commonly measured and may

not be noted in a study title and abstract. Thus, articles of this nature may have not been discovered in our search. Our search adequately captured articles in which SES measures were highlighted for clinical relevance. Finally, SES is a fluid term and may be presented with several definitions and measures that differ from that used in this review. Our definition is reliable as we used two large governing bodies, the American Psychologic Association and the US Department of Justice, to determine appropriate measures of SES.^{1,4}

Conclusion

The results of this scoping review demonstrate that patients of low SES face reduced access to cuff repair care and worse associated outcomes. The present research limits specific conclusions about the influence of SES on cuff repair, although it demands further investigation.

Disclaimers

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