Editorial

Scratching the Surface: Itching for Evidence to Reduce Surgical Health Disparities in Total Shoulder Arthroplasty


Total shoulder arthroplasty (TSA) is an effective procedure to improve symptoms, function, and quality of life for patients with different clinical conditions that affect the shoulder[1,2]. TSA use has been increasing in the United States[3,4], but whether the short-term and longterm beneficial effects extend to all recipients is less clear. In this issue of *The Journal*, research by Singh and Cleveland[5] adds to the growing body of literature evaluating the link between socioeconomic status (including insurance and income status) and postsurgical outcomes in patients with TSA. In this study, the authors conclude that public insurance, such as Medicaid and Medicare, were independently associated with more healthcare use (e.g., length of hospitalization and discharge to rehabilitation facilities) and suboptimal clinical outcomes, whereas lower income status was associated with less healthcare use and fewer postsurgical complications after TSA. The findings run counter to their hypothesis.

The study offers clear advantages relative to previous research. First, the authors used the National Inpatient Sample (NIS), a nationally representative sample generalizable to all shoulder arthroplasties performed in the United States. This publicly available database with all-payer inpatient care data reduces the likelihood of selection bias that may occur in a single or multisite retrospective design[6]. The authors combined more than 15 years of data to further examine surgical complications including transfusion and revision associated with TSA, thus extending previous research using the same data source[7,8]. Most importantly, the NIS allowed the authors to evaluate the extent to which one of the key socioeconomic characteristics, the median household income, was associated with post-TSA outcomes. The availability of this variable allowed Singh and Cleveland to significantly add to the body of literature for TSA research, yet the study findings leave researchers and readers perplexed.

Despite the strengths of the national database, the current study's findings must be interpreted with caution, as others using the NIS have done previously[5,7,8]. The extent to which confounding by unmeasured factors could have been at play must be considered. Indeed, some important clinical characteristics of the study population were not included in the NIS. Obesity (e.g., body mass index > 40 kg/m^2) is associated with complications such as revision and infection among patients with TSA[9]. Also, clinical depression is not uncommon in patients who have undergone TSA and is considered a risk factor for perioperative outcomes[10]. Although Singh and Cleveland analytically adjusted for important covariates such as comorbidity status, important patient characteristics such as body weight and depression were not available. Whether residual confounding from unmeasured variables affected the observed associations remains unclear.

Contrary to their hypothesis, their findings suggest that lower income status was inversely associated with lengthy hospital stays (> 2 days), discharge to a rehabilitation facility, and in-hospital complications such as transfusion and revision. Sensitivity analyses were conducted that additionally adjusted for hospital location/teaching status, hospital bed size, and the hospital region because these factors have also been associated with the outcomes evaluated. Yet, the results of the sensitivity analyses only confirmed the primary findings, ruling out these alternative explanations for the observed associations. Although no prior research directly evaluated the link between income status and surgical outcomes after TSA, comparisons to research conducted on postsurgical outcomes in patients with knee arthroplasty may provide insights[11,12].

If sources of bias including residual confounding and selection bias were not major threats to the validity of the present study, how do we interpret these findings that ran counter to the logical hypotheses posited by Singh and Cleveland? That Medicare/Medicaid insurance beneficiaries were more likely to have higher healthcare use and worse post-TSA outcomes than privately insured patients gives pause for reflection. Considering insurance status as a

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sociopolitical construct[13] allows us to take into account several perspectives. What drives TSA outcomes is likely to be multifactorial and multilevel. Behavioral and contextual factors such as the individual's support systems (e.g., formal and informal caregivers), healthcare environment (e.g., co-pays for postsurgical physical therapy), and social norms may influence process and outcome measures associated with recovery from surgery[14]. Future investigations must identify individual barriers and limitations to accessing healthcare resources (e.g., concomitant medications use and/or cost) and address interpersonal areas such as family or social support. The extent to which caregivers face challenges in caring for functionally dependent care recipients warrants analysis. Consideration of these factors may shed light on potential mechanisms associated with postoperative outcomes and healthcare use for TSA patients.

The observed findings regarding discharge disposition were also contrary to their hypothesis. Family support and resources available may facilitate home discharge. The NIS lacked information that would have allowed the authors to examine the role of these factors in more detail. Inadequate postoperative management can lead to excessive discomfort, patient dissatisfaction, worse medical outcomes, and increased costs when patients go home without adequate support[15,16,17]. With the movement toward shorter hospital stays and increase in home discharge in patients with total joint arthroplasty (TJA)[18,19,20], studies have been conducted evaluating the interaction between shorter hospital stays in combination with home discharge and the relationship with postoperative outcomes including longterm complications and readmissions after primary TJA[21,22]. Yet the evidence regarding this interplay among patients with TSA is limited. Given the findings of the present study, research examining the extent to which these factors are associated with longterm medical outcomes may be worthwhile.

Using a national sample with more than 15 years of data, Singh and Cleveland report that insurance and income status are associated with healthcare use and in-hospital outcomes in patients receiving TSA. With the new evidence in hand, where do we go next? Understanding root causes of these "surgical health disparities" in postoperative outcomes and identifying remedies to reduce them is a research imperative for The National Institute on Minority Health and Health Disparities. Investigation of longterm medical outcomes in patients with TSA using different data sources is needed. It is time to go beyond documenting risks of important surgical outcomes and readmissions in patients with TSA by indicators of socioeconomic status. Using rigorous methodologies with patient-centered outcomes, studies are urgently needed of which modifiable factors may reduce disparities and which interventions work to reduce disparities. With results from such studies in hand, we may begin the implementation and diffusion of effective interventions to reduce disparities in patients undergoing TSA.

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