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The Relationship Between Hospital Payer Mix and Volume Growth in Total Joint Arthroplasty: A 12-Year Analysis

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ABSTRACT

Background: Hospital reimbursement for Medicare/Medicaid/self-pay patients has not kept pace with rising expenses, and even well run efficient organizations struggle to maintain a positive margin on these cases. Therefore, hospitals rely on commercially insured patients to remain economically viable. However, hospitals located in areas with a high Medicare/Medicaid/uninsured population cannot depend on a favorable payer mix for financial sustainability.

Methods: Using the Statewide Planning and Research Cooperative System database, total joint arthroplasties (TJAs) in New York from 2000 to 2012 were identified. Hospitals were divided into quartiles by volume, with quartile 1 representing the lowest volume hospitals. TJA cases were stratified by primary payer type, and the percentage of each primary payer type was calculated and compared among quartiles.

Results: The highest number of hospitals performing TJAs was 207 in 2000, and the least number of hospitals was in 2012, with only 178 hospitals performing TJA. Despite the decrease in the number of hospitals, the total number of joint arthroplasties increased from 33,036 in 2000 to 62,104 in 2012.

Conclusions: Our study demonstrates that higher volume hospitals tended to have a more favorable payer mix (less Medicare/Medicaid/self-pay patients). This inequity widened over the 12-year study period. This trend has ethical implications for lower socioeconomic status patients as high-volume centers tend to have superior outcomes compared with low-volume centers. In addition, the lower volume high Medicare/Medicaid/self-pay hospitals are more susceptible to the Center for Medicare and Medicaid Services quality penalties making their economic viability even more tenuous potentially leading to access of care problems for these patients.

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Our aging population, combined with our increasing expectations of sustaining joint motion and function, has resulted in an increasing demand for total joint arthroplasty (TJA) [1]. In addition, through Medicare and Medicaid expansion, the Affordable Care Act has increased health care access to millions of Americans [2]. Owing to these factors, total hip arthroplasty and total knee arthroplasty are projected to increase by 174% and 673% by 2030, respectively [3]. However, Medicare and Medicaid TJA hospital reimbursement have not kept pace with the increase in implant costs and overall hospital expenses, thus making it increasingly

difficult for hospitals with a high Medicare and Medicaid payer mix to offer high-quality TJAs and still remain financially viable [4, 5].

The cost burden of TJAs and the resulting complications they generate have risen at an unsustainable rate. In an attempt to control these costs, the payers of health care have transitioned to more cost efficient payment methods such as pay for performance and bundled payments, limiting the profitability of TJA [6–9]. In addition, the Center for Medicare and Medicaid Services, as well as other insurers, has begun to encourage patients to receive care at hospitals deemed centers of excellence (CEs) for specific procedures, such as TJA [10]. This is due to improved outcomes with increased surgeon and hospital volume [11, 12]. In some instances, such as bariatric surgery, the Center for Medicare and Medicaid Services will only approve surgery at a designated CE [13]. Socioeconomically disadvantaged patients frequently find it difficult to travel to CE creating an access problem for these patients. Because the outcomes of TJA are generally better at the CEs, there exists a potential of quality disparity for these poorer patients.

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Our study used the New York State–Statewide Planning and Research Cooperative System (SPARCS) database to compare TJA volume and payer mix among hospitals in New York State. Using Medicaid and self-pay (uninsured) as a surrogate for low socioeconomic status [14, 15], we compared the payer mix between low-volume TJA hospitals and high-volume TJA CEs. Our hypothesis is that the volume growth for hospitals with a high percentage of lower socioeconomic patients will be less than for those with a more favorable payer mix. If low-volume hospitals (LVHs) are responsible for the majority of lower socioeconomic patients, this will pose challenges for those patients to receive proper orthopedic care, as well as for hospitals to economically sustain TJAs.

Methods

We obtained data using the SPARCS database. The SPARCS database is a comprehensive data reporting system by the New York State Department of Health that collects patient characteristics, diagnoses, treatments, services, and charges for every hospital discharge in the state. TJA cases were identified using *International Classification of Diseases, Ninth Revision, Clinical Modification* codes corresponding to total hip arthroplasty and total knee arthroplasty between the years 2000 and 2012. All hospitals with at least 1 TJA recorded were also identified, and case data were sorted by hospital where the procedure was performed. In addition to procedure type, the primary payer type was recorded for each case.

We divided hospitals into volume-based quartiles, with the first quartile representing the lowest TJA volume hospitals and the fourth quartile representing the highest TJA volume hospitals. Cases from each individual hospital were then stratified by primary payer type (Medicaid, Medicare, self-pay, commercial insurance, and other federal and nonfederal programs). For each hospital, the distribution of payer type was calculated as a percentage of total TJA cases. Medicare, Medicaid, and self-pay were also calculated together because of the lower reimbursement payments compared to other, private insurance payer types.

Results

A total of 2452 hospital data points were included over 13 years (2000–2012). The highest number of hospitals performing TJAs was 207 in 2000, and the least number of hospitals was in 2012, with only 178 hospitals performing TJA. Despite the decrease in the number of hospitals, the total number of joint arthroplasties increased from 33,036 in 2000 to 62,104 in 2012. The average volume of TJAs by quartile ranged from 16.7 and 24.9 in 2000 and 2012, respectively, for the lowest volume hospitals (first quartile) to 415.1 and 979.2 in 2000 and 2012, respectively, for the highest volume hospitals (fourth quartile).

The average percentage of Medicaid as the primary payer of TJA in the first quartile was 9.7%, compared with 2.2% in the fourth quartile, which was a significant decrease ($P < .05$; Fig. 1). The decrease in Medicaid percentage was also significant in quartiles 2 and 3, 6.8% and 3.2%, respectively, when compared to the first quartile. Self-pay percentages can be seen in Figure 2. The average percentage of self-pay in the first quartile was 2.6%, significantly more than the 0.7% seen in the fourth quartile ($P < .05$). Figure 3 shows the average percentage of Medicare as the primary payer of TJAs. Medicare was the most common payer type throughout the study period (2000–2012), averaging 55.3% over the 13 years, among all quartiles, although Medicare's share differed from 57.8% in the first quartile to 51.5% in the fourth quartile, which was significant ($P < .05$). Combining Medicaid, Medicare, and self-pay, shown in Figure 4, the payer share was 69.0% in the first quartile,

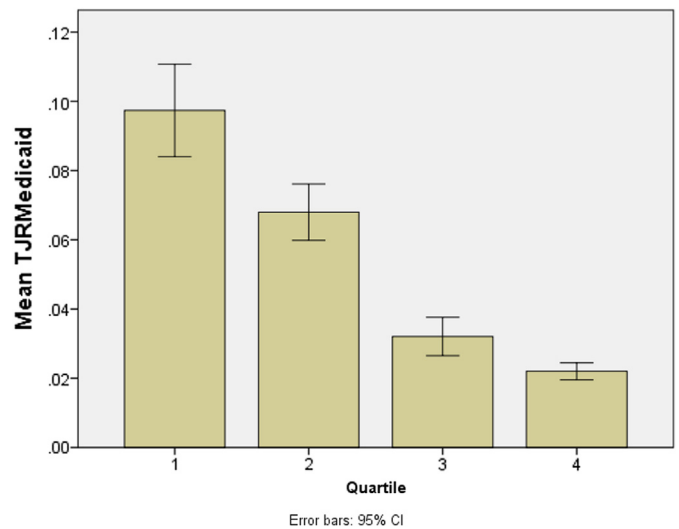


Fig. 1. Medicaid payer mix vs hospital volume quartile. CI, confidence interval; TJR, total joint replacement.

64.7% in the second, 59.6% in the third, and 55.0% in the fourth quartile. There was significance between all quartiles ($P < .05$).

Discussion

Our study demonstrates the effect of individual hospital TJA payer mix and volume on TJA volume change over a 12-year period for New York State hospitals. We found that the lowest volume hospitals had a great percentage of Medicare, Medicaid, and self-pay patients and that these hospitals experienced a slower rate of volume growth than their higher volume counterparts. This volume-based payer mix disparity is most pronounced when looking at Medicaid and self-pay patients, which we used as a surrogate to represent the low-socioeconomic patient population.

Hospitals and surgeons that perform lower volumes of TJA have worse postoperative outcomes than their higher volume counterparts [16, 17]. In addition, the low socioeconomic patient population served by these hospitals has been independently shown to present with more advanced disease, have a worse preoperative risk factor profile, and have worse overall TJA outcomes, regardless

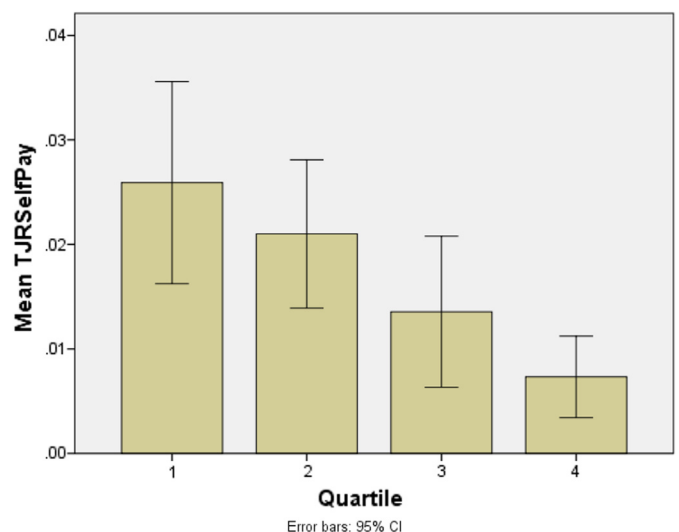


Fig. 2. Self-pay payer mix vs hospital volume quartile.

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