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Original Research

Optimizing Total Hip and Knee Arthroplasty Among an Underserved Population: Lessons Learned From a Quality-Improvement Initiative

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ABSTRACT

Background: Under-represented minorities and those with noncommercial insurance have higher medical comorbidities and complications following elective total joint arthroplasty (TJA). In an effort to bridge this gap, our center implemented a preoperative optimization protocol for TJA in a Medicaid Clinic (Clinic). The purpose of this study is to assess the effectiveness of that protocol and highlight challenges associated with caring for this patient population.

Methods: This retrospective analysis included 117 patients undergoing TJA between January 2015 and January 2020. In 2015, the protocol was implemented as a mandatory practice prior to TJA. A contemporary control cohort from the private office was also analyzed. Patient demographics, American Society of Anesthesiologists score, and postoperative complications were collected.

Results: Within the clinic group, 52.5% (62) patients identified as Hispanic with 46.6% (55) Spanish-speaking as primary language, compared to 9.3% (11) and 8.5% (10) in the office group (P = .0001), respectively. Clinic group patients were significantly more likely to experience a complication compared to office patients (20 vs 7, respectively). There was no difference in complication or reoperation rate between clinic patients who underwent the optimization protocol and those who did not.

Conclusions: The findings from this study highlight the demographic and comorbidities profile of an underserved population, and report on results of a quality improvement initiative among that population, which failed to improve postoperative outcomes. These results underscore the need for further study in this population to improve outcomes and health equity.

Introduction

The rate of total joint arthroplasty (TJA) is projected to increase over the upcoming years, with rate for total knee arthroplasty (TKA) and total hip arthroplasty (THA) estimated to reach 1,222,988 and 719,364, respectively, by the year 2040 [1]. These numbers are further expected to increase to more than double by 2060 and reach 1,982,099 THA and 2,917,959 TKA [1]. While the procedures are considered tremendously successful in restoring function and alleviating pain in the setting of arthritic conditions of the hip and knee joints, variability in outcomes persists [2]. This reported variability, superimposed with the growing volume of the procedures, presents a valuable opportunity for substantial improvement. In the value-based care delivery era, improving quality and efficiency of the care episode presents common targets for healthcare systems and providers. More specifically, heightened focus has been placed on improving the outcomes and decreasing complications, while simultaneously minimizing waste and resource overutilization. As such, substantial efforts have been made on developing streamlined pathways to standardize the surgical care episode, aiming to improve value in care delivery. With the understanding that patient comorbidities constitute a major, and often modifiable, impact on postoperative outcomes, such pathways and protocols commonly incorporate perioperative

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optimization to some extent. Within these pathways, cutoffs based on specific risk scores are common practice [3].

Socioeconomic and racial disparities within healthcare, and among patients undergoing elective arthroplasty, remain a public health challenge. Multiple studies have identified factors such as lower-income brackets, insurance type, and geographical location to be associated with worse postoperative outcomes following TJA [4]. Similarly, socioeconomic status and insurance type are reported to correlate with access to TJA, with patients with lower-income, Medicaid insurance, and in urban location having lower utilization of the procedure [4]. In addition, minorities are reported to have higher rates of medical comorbidities including diabetes, dental comorbidities, anemia, and obesity, and are at higher risk of postoperative complications [5-7]. Given the higher rate of medical comorbidities potentially disqualifying this patient population via cutoffs for elective TJA, limiting access to the procedure by preset criteria could exacerbate the current racial and social healthcare disparities [5,8]. The implementation of a nurse-navigator role has been reported to facilitate the optimization process and described as a critical role in improving the overall outcomes from the TJA surgical care episode [9,10]. Such a role is intended to better guide patients through the process by providing care coordination and closing communication loopholes between the various providers and stakeholders. However, there remains a lack of in-depth understanding of the impact of such a role on outcomes following TJA among minorities in underserved communities.

Our urban tertiary care academic medical center implemented such a nurse navigator to assist underserved patients undergoing TJA beginning February 2015. This navigator was fluent in both English and Spanish. As a quality improvement initiative to improve access to care for the underserved groups, a preoperative checklist was created to help patients walk through the process and ensure that they were as optimized as possible prior to TJA in an effort to reduce complications. In the present study, we describe the process by which this initiative was implemented, the challenges associated with it, and provide guidance to other institutions and policymakers seeking to make similar changes.

Material and methods

Quality improvement initiative

The initiative was conducted at an urban academic center in a specialty clinic (VC) that provides care exclusively for an underserved inner-city population. In January 2015, a nurse navigator was recruited and hired to the VC, as part of a hospital-funded QI initiative, to enhance optimization efforts for TJA candidates scheduled through that clinic. After being indicated for a primary TJA, patients visited the nurse navigator pre-operatively for surgical risk assessment. A risk stratification checklist that guided subsequent medical optimization efforts was created and utilized by the nurse navigator to guide patients through the process prior to scheduling a surgical date. The checklist (Fig. 1) assessed variables including body mass index (BMI), smoking status, opiate use, medical and surgical history, and laboratory results to calculate a complexity score for each patient. The nurse navigator used the complexity score to determine whether surgical scheduling may be completed or further medical optimization undertaken. For patients requiring further optimization, care coordination with other medical specialties (eg, primary care, cardiology, endocrinology) was provided by the navigator. Perioperative care, including preoperative and postoperative medications, intraoperative anesthesia and surgical protocols, and postoperative care pathways followed the common institutional standard arthroplasty care pathway. Patients visited the VC at least one time prior to surgery and followed up as per our institutional protocols.

Patient cohort selection

This retrospective analysis was approved by our institutional review board (IRB-AAAT5308). A review of patients who visited the VC and underwent subsequent THA or TKA between January 2015 and January 2020 was conducted. These dates were selected to provide a baseline group from the clinic prior to creation of the nurse navigator and the checklist to compare to outcomes following initiation of this protocol. All patients seen within the VC group were preoperative patients and were screened regardless of suspected risk factors or whether or not they had a primary care provider. Patients were not turned away from the QI group based on any comorbidity. Rather, all patients who were booked for TJA through the clinic while the nurse navigator was in effect were seen by the navigator.

An additional cohort of random patients scheduled through the surgeons' private offices and undergoing TJA during the same timeframe were included in this analysis as a control group. As such, the study population was divided into 3 groups: a private office control (Control-P) and 2 VC cohorts: one prior to (Control-VC) and one after implementation (QI-VC) of the nurse navigator role and checklist. Our nurse navigator was fluent in both English and Spanish. A total of 117 patients in the VC cohort were included with 39 patients in the QI-VC cohort (24 TKA, 15 THA) and a 2:1 matched control-VC cohort with 78 patients (48 TKA, 30 THA). A total of 117 patients from the private office were included in the Control-P group.

Preoperative variables of interest comprised of patient demographics including medical comorbidities (eg, chronic kidney disease, anemia, diabetes, and liver disease), race, ethnicity, American Society of Anesthesiologists (ASA) score, and BMI. Outcomes of interest for this study included postoperative complications, readmissions, and patient-reported outcomes (PROs). We utilized the Short Form Health Survey (SF-12) and Knee Society Score (KSS) PROs. These PRO measures were collected at the following time points: preoperative, 3 months postoperatively, and 1 year postoperatively.

Statistical analysis

Collected data were analyzed using a Student's *t*-test to identify differences between the 2 study groups demographics and complications. A Fisher exact test was utilized to compare dichotomous outcomes. All analyses were performed using SPSS, version 23 (IBM, Armonk, NY), and Microsoft Excel 2016 (Microsoft, Redmond, WA). Statistical significance was set a priori at $P < .05$.

Results

Demographics

The distribution of the demographic variables of the included population are detailed in Tables 1 and 2. In comparison to Control-P, the VC cohort was younger (average age 63 years compared to 68.1 years, $P = .001$) and with a higher BMI (31 vs 27.9 kg/m^2, $P < .0001$). In comparison to the Control-P group, there were no statistically significant difference in prevalence of diabetes mellitus (25.6% vs 15.4%, $P = .07$), chronic kidney disease (5.2% vs 4.3%, $P = .758$), liver disease (4.3% vs 2.6%, $P = .474$), or anemia (1.7% vs 4.3%, $P = .251$) among the VC population.

Within the VC cohort, the QI-VC group included 24 patients who underwent primary TKA and 15 underwent primary THA. Among this cohort, 34 of 39 (87.2%) patients were female, with an average age of 65 years, a BMI of 30.9 kg/m^2, and average ASA of 2. In the QI-VC cohort, 14 of 39 (35.6%) of patients had a diagnosis of diabetes mellitus**.** The Control-VC group comprised 78 patients among which 48 underwent primary TKA and 30 underwent primary THA. In this cohort, 67.9% (53 of 78) of patients were female, with an average age of 62.2 years, a BMI of 31.1 kg/m^2, average ASA of 2, and with 20.5% (16 of 78) of the population having diabetes mellitus and 6.3% (5 of 78) with chronic liver disease. Between the groups, 46.6% of the VC group were Spanish-speaking as primary language, compared to 9.3% (11) and 8.5% (10) in the control group (P = .0001), respectively. There was no statistically significant difference between the QI-VC and Control-VC groups with respect to age, BMI, ASA score, or comorbidities.

	0	1	2	3	Score
Age	☐ < 61	☐ 61–70	☐ 71–80	☐ > 80	
BMI	☐ 18–30	☐ < 18 or 30–35	☐ 35–40	☐ > 40*	
	Height:		Weight:		

*HARD STOP: Refer to Nutrition Clinic (646-317-4811)

	0	1	2	3	Score
Revision Surgery	☐ No	☐ Yes			
Tobacco Use	☐ None in ≥ 3 mo		☐ Yes, in past 3 mo*		

*HARD STOP: Refer to Tobacco Cessation Program (212-342-8588)

	0	1	2	3	Score
Diabetes	☐ None	☐ Well-Controlled	☐ Un-Controlled		

*HARD STOP: if A1c > 8, refer to endocrine/PCP to manage A1c ≤ 7.2

	0	1	2	3	Score
Narcotics Use in Past 30 Days	☐ Never	☐ Seldom (1-4 days)	☐ Occasionally (5–12 days)	☐ Frequently (>13 days)	

Opioid (doses in mg/day except where noted)	Current Dose	Conversion Factor	MME
Codeine		0.15	
Fentanyl transdermal (in mcg/hr)		2.4	
Hydrocodone		1	
Hydromorphone		4	
Methadone			
1-20 mg/day		4	
21-40 mg/day		8	
41-60 mg/day		10	
>=61-80 mg/day		12	
Morphine		1	
Oxycodone		1.5	
Oxymorphone		3	
		Total MME*	

*If MME/day > 40, notify inpatient pain service & anesthesiology prior to surgery

Have you ever been told that you have or have ever been treated for any of the following? Check all that apply:

☐ Depression ☐ Anxiety ☐ Bipolar Disorder ☐ Schizophrenia # Conditions

	Yes (1)	No (0)
Have you ever had a heart attack or cardiac bypass operation?		
Do you have stents in your heart? If yes, ask your surgeon to complete the *Stent Letter*		
Do you have high blood pressure?		
Have you been diagnosed with congestive heart failure?		
Do you have atrial fibrillation or atrial flutter?		
Have you ever had a stroke or surgery on your carotid arteries?		
Have you ever been told you had a Pulmonary Embolism, Deep Vein Thrombosis or Blood Clot?		
Cardiopulmonary Score:		

COMPLEXITY SCORE:

Page 2 Subtotal ____________ + Cardiopulmonary Score ____________ = ____________________

0-10	10-16	17+
Proceed to Surgical Scheduling	HOLD: Present at Indications Conference	HARD STOP.

Figure 1. Risk stratification checklist.

Table 1
Patient demographics.

Demographic variables	VC	Control-P	*P* value
Total patients	117	117	
Females	87 (74.3%)	74 (63.2%)	.0601
Mean age (y)	63	68.1	.001
Mean BMI	31	27.9	.0001
Race			
White	15	77	.0001
Black or African-American	28	13	.0098
Asian	1	6	.0554
Other	49	12	
Unknown/Declined	24	9	
Ethnicity			.0001
Hispanic	62	11	
Non-Hispanic	29	87	
Unknown/Declined	26	19	
Primary language			.0001
English	44	81	
Spanish	56	10	
Other	10	23	
Unknown/Declined	7	3	
Primary insurance			.0001
Medicare/Medicaid	99	2	
Medicare/Commercial	18	84	
Private	1	31	
ASA score			
I	0	4	.05
II	72	88	.1696
III	44	25	.0063
IV	1	0	.318

Complication rates

There were similar rates of reoperations within the VC cohort between the QI-VC and Control-VC patients (7.69% vs 5.13%, respectively, $P = .68$) as shown in Table 3. There were 3 patients within the QI-VC cohort who underwent reoperations for periprosthetic joint infection (n = 1), manipulation under anesthesia for stiffness (n = 1), and tibial aseptic loosening requiring revision surgery (n = 1). The Control-VC cohort included 4 patients who underwent reoperation for superficial wound infection (n = 1) and manipulation under anesthesia (n = 3). In addition to reoperations, patients in the QI-VC cohort experienced postoperative complications including wound drainage, superficial infection, and wound dehiscence. An elaboration on the details and rates of postoperative complications are shown in Table 4.

Patient-reported outcomes

The control group from the private office was significantly more likely than the VC group to fill out the KSS (46.2% vs 13.7%, $P < .0001$) preoperatively, and at 3 months and 1 year postoperatively (43.6% vs 12.0%, $P < .0001$ and 31.6% vs 7.7%, $P < .0001$, respectively). The same was true for the SF-12 preoperatively (98.3% vs 28.2%, $P < .0001$) and postoperatively (83.8% vs 24.8%, $P < .0001$ and 57.3% vs 14.5%, $P < .0001$, respectively). This is illustrated in Table 5. However, there was no difference in actual scores for either the KSS or SF-12 at any time. This is fully illustrated in Table 6.

Table 2
Patient demographics among the VC cohort.

Demographic variables	QI-VC	Control-VC	*P* value
Total Patients	39	78	
Females	34 (87.2%)	53 (67.9%)	.025
Mean age (years)	65.0	62.2	.274
Mean BMI	30.98	31.1	.932
ASA acore			
I	0	0	1.00
II	24	48	.894
III	15	29	.893
IV	0	1	.481

Discussion

Perioperative medical optimization has become the cornerstone in THA and TKA care delivery pathways. While such protocols have been extensively studied in the overall population, special focus on the impact of these interventions on the outcomes of underserved patients following TJA remains lacking. In this study, we note the VC cohort had a collective significantly higher risk of complications when compared to the Control-P group, and the difference in complications between the QI-VC and Control-VC was not significant. The findings from this study highlight that a traditional optimization pathway, comprised initial risk-stratification and redirecting high-risk TJA candidates to specialty-care providers for medical optimization did not appear to improve the incidence of postoperative complications among this specific patient cohort. Of the comorbidities assessed, few of them were reversible, including HgbA1c, preoperative anemia, which may have contributed to postoperative complications. It is possible that certain complications, that is, manipulation under anesthesia, may have had both a medical and psychosocial component. If a patient culturally experiences pain or postoperative management differently, their range of motion and progress may differ. As such, it is possible that there is a patient specific component to postoperative stiffness. This even further highlights the need for a culturally competent navigator who may be able to address concerns not specifically related to surgical technique. However, an isolated preoperative stratification offered very little in the way of improvement.

The findings in this study highlight the challenges of social and racial disparities in care delivery. The undeserved patient population was noted to have more medical comorbidities and a higher rate of postoperative complications. The higher complications rate is less likely to be the result of racial factors but rather a function of the higher rate of medical comorbidities among this population. In a national retrospective analysis, Wu et al. [11], assessed the impact of racial disparities on TKA location as outpatient or inpatient setting. The authors noted differences in comorbidities (ie, diabetes, chronic kidney disease, liver disease, or anemia) between the racial groups, with higher rates among the minorities compared to Caucasians. While initial analysis in their study revealed correlation between race and procedure location, further analysis noted underlying comorbidities to correlate with location of the procedure. Of note, the study was conducted using a national registry from data collected at high-volume centers, which could represent a skewed image of the national epidemiologic patterns. As previously stated, prior research has demonstrated complications are linked to racial and ethnic disparities. [12]

Many patients included in the study were missing PROs (WOMAC, SF-12, KSS) at the preoperative, 3-month, and 1-year time periods. These variables were challenging to collect due to the high rate of refusal or lack of response when asked to complete

Table 3
Comparison of reoperation rates in clinic patients.

Reoperation	QI-VC	Control-VC	*P* Value
Any Reoperation	7	3	.197
Manipulation under anesthesia	4	1	.0236
Two-stage exchange arthroplasty	1	0	.158
Revision surgery	1	0	.158
I&D washout	1	2	1.00

Table 4
Comparison of postoperative complications in clinic and office patients.

Postoperative complications	VC	Control-P	*P* value
Total	20	7	.0077
Superficial wound dehiscence	3	3	1.00
Wound drainage	5	0	.0238
Stiffness requiring MUA	4	1	.1765
Greater trochanteric fracture	1	0	.318
Soft-tissue inflammation	1	0	.318
Increased valgus deformity	1	0	.318
Cellulitis	2	0	.157
Tendinitis	2	1	.563
Deep vein thrombosis	1	0	.318
Flexion contracture	0	1	.318
Postoperative hypotension requiring ICU	0	1	.318

ICU, intensive care unit; MUA, manipulation under anesthesia.

survey questionnaires and the loss to follow-up rate. Given the retrospective nature of the analysis, we were unable to collect responses to allow for accurate analysis in differences in PROs between the 2 cohorts. The notion of quality of life is among the most subjective concepts and is widely variable between patients from different cultural and societal backgrounds. While PRO measures were developed with aims to provide a subjective and objective representation of impact of care on quality of life, they largely fall short. Among quality-of-life-improving procedures, outcomes should not be strictly limited to specific blanket-metrics and should incorporate aspects that are specific to cultural and social background. In a systematic review of the literature assessing the measures for pain and function in patients with osteoarthritis, Saleh et al. [13] noted that current PRO measures remain suboptimal, and recommended development of tools that are valid, reliable, clinically practical, and culturally validated. Kulkarni et al. [14] delineated the activities of daily living among the Asian-Indian population and noted a need for development of ethnicity-specific PROs. Lyman et al. [15] developed and validated a culturally relevant version of the Knee Injury and Osteoarthritis Outcomes Survey for the Japanese population, and noted the need to incorporate cultural and geographically relevant variables. The current study notes an extremely low response rates to the PROs provided at our institution, which could be explained by either a lack of representation of such questionnaires of actual interests of the population and often a lack of manpower to acquire questionnaires.

These findings could be heightened with a potential contribution of a component of health literacy and language barriers. As noted, 46.6% of the VC group were Spanish-speaking as primary language, compared to 9.3% (11) and 8.5% (10) in the office groups ($P = .0001$), respectively. Language barriers and communication difficulties can certainly have an impact on outcomes. A study by Lawrence et al. [16] demonstrated this when looking at PROs following TJA in non-English-speaking patients. In a series of 3390 patients, they found that patients with a surgeon who spoke their primary language when receiving a THA had higher HOOS, JR scores at 1 year postoperatively and were more likely to be discharged home compared to those who required an interpreter ($P = .003$ and .013, respectively). Krupic et al. [17] evaluated the impact of immigrant background on the outcomes of THA in patients from Bosnia and Herzegovina. In the study, they evaluated differences in outcomes based on whether patients were operated on in their home country or in Sweden. They found that at 1 year, patients who underwent surgery in Sweden instead of their home country were significantly less satisfied ($P < .0005$) and had decreased scores in all areas of the EuroQul-5D ($P < .005$) apart from self-care, despite more severe pain preoperatively ($P < .0005$) [17].

Table 5
Participation in Short Form health survey (SF-12) and Knee Society score (KSS) patient-reported outcomes (PROs).

Patient reported outcomes	VC3 group (n = 117)	Office group (n = 117)	*P* Value
KSS			
Preoperative	16 (13.7%)	54 (46.2%)	<.0001
3-mo postoperative	14 (12.0%)	51 (43.6%)	<.0001
1-y postoperative	9 (7.7%)	37 (31.6%)	<.0001
SF-12 (Both Components)			
Preoperative	33 (28.2%)	115 (98.3%)	<.0001
3-mo postoperative	29 (24.8%)	98 (83.8%)	<.0001
1-y postoperative	17 (14.5%)	67 (57.3%)	<.0001

Table 6
Patient-reported outcome scores between groups.

Patient reported outcomes	VC3 group (n = 117)	Office group (n = 117)	*P* value
KSS, mean			
Preoperative (SD)	51.9 (18.7)	58.9 (21.9)	.13
3-mon postoperative (SD)	66.1 (19.5)	71.9 (22.3)	.19
1-y postoperative (SD)	87.8 (10.9)	76.1 (23.3)	.082
SF-12 Physical, mean			
Preoperative (SD)	38.4 (8.4)	40.7 (7.1)	.064
3-mo postoperative (SD)	45.8 (9.4)	48.3 (5.6)	.054
1-y postoperative (SD)	48.7 (6.2)	46.8 (6.7)	.15
SF-12 Mental			
Preoperative (SD)	48.7 (5.3)	48.5 (5.9)	.43
3-mo postoperative (SD)	46.5 (6.9)	44.3 (7.2)	.082
1-y postoperative (SD)	47.2 (6.7)	47.2 (4.9)	.5

SD, standard deviation.

These studies highlight the importance of language barriers and cultural differences when taking care of immigrant patients who, in all cases in this study, emigrated from a country in which English is not the primary language, but now live in the United States permanently. More work must be done to improve these outcomes. While PROs are available in both English and Spanish at our institution, it is entirely possible that those that helped to gather responses from patients were not fluent in the patient's primary language. As such, this may have contributed to a lack of responses. In the future, every effort should be made to ensure patients are contacted directly by those who speak the patient's primary language and, if not possible, that an interpreter is used. As such, it is critical to further assess culturally relevant impact of care delivery among TJA recipients in this underserved population, and design PROs and perioperative education protocols geared to take into account these aspects.

The experience from this QI initiative highlights that instituting a risk stratification program to act as a hard stop, without supplementing with a proper optimization and extensive patient education pathway, is not effective in improving quality of care delivery. While arthroplasty literature is abundant in studies stressing the importance of perioperative optimization and patient-specific risk stratification tools, a comprehensive well-rounded system remains lacking. A common pathway reported in the literature includes involving primary care providers, and other specialists, in the optimization process. While patients were directed toward their providers, and were supposedly "optimized," they still had high complications despite the "hard stops." Despite the wide use of the notion of "optimization" in the literature, real life common practice still implies a "clearance" process during which a patient is assigned a risk score prior to surgical intervention. While this in isolation is insufficient, an effective and inclusive risk stratification system remains essential as a cornerstone to allow achieving well-rounded, holistic optimization. These scoring systems should not be used to aimlessly delay or deny surgery, such as denying TJA for patients above a specific BMI, but rather guide interventions to improve high-risk variables to acceptable values which seeks to perform personalized optimization with specific parameters (eg, HgbA1c, BMI). As such, and in addition to medical and demographic variables, systems should take into account sociocultural factors that could substantially impact outcomes.

There has been a recent push for the implementation of patient-specific reimbursement models to avoid any unintended limitation to access-to-care that could ensue from an outcome-based reimbursement system, especially among minorities and patients with higher risk of complications [18,19]. Proponents of such models argue that, within the current system, surgeons would limit offering procedures to patients with risk-factors known to be associated with a higher rate of complication or suboptimal outcomes. Such an approach by surgeons, labeled as “cherry-picking” healthier patients and “lemon-dropping” those with a worse risk-profile, poses devastating unintended consequences that could substantially worsen racial and social disparities. With the higher rate of comorbidities, minorities and underserved communities are potentially at increased risk of such measures. In the current study, we note the number of patients that would meet the “hard stop” between the groups was higher among the underserved population, which signals a potential impact on access to care. Zalikha et al. [8], in a recent analysis of a national registry, compared demographics and comorbidities among TJA recipients at high-volume centers to low-volume centers. The authors noted that patients at low-volume centers had a higher number of comorbidities associated with worse postoperative outcomes, and were disproportionally African-American and Hispanic. In the setting of a push toward centralization of TJA to higher-volume centers, delaying surgical intervention through risk-stratification that is not supported by robust, proven, and efficient perioperative optimization protocols could lead to problematic limitations to access-to-care. Such limitations could represent the unintended effect of quality improvement; the TJA candidate struggling with activities of daily living and perceiving delay of surgery for optimization at these high-volume centers as denial of care, could possibly seek care at low-volume centers that are not as well-equipped to handle the risk-profile.

Limitations

The current study represents a retrospective analysis and a report on a QI project, and hence presents limitations mostly related to the design and nature of the study. The population in this study constitutes a small cohort that is somewhat representative of a population treated at a tertiary academic center, and hence could present limited generalizability. While less likely to be generalizable to the overall population, the cohort is likely representative of an underserved population in a major city. The analysis in this study is weakened by the lack of long-term follow-up with multiple missing PRO outcomes. This finding could be more representative of the population’s inherent compliance with the care pathway and follow-up visit and deserves further assessment in future studies. The perception of a questionnaire that is not representative of the patient’s needs or complaints could impact the response rates to the PRO measure, highlighting the importance of development of culturally appropriate metrics. As mentioned previously as well, while PROs are available at our institution in English and Spanish, the language of the person collecting the PRO is not guaranteed to share primary language with the patient, which may impact willingness and understanding to complete PROs. Each patient’s specific education level was not categorized; however, this may have also impacted willingness to and comfort with completing PROs. Additionally, this study is underpowered to achieve an 80% power. Due to the unsuccessful nature of the checklist, it was abandoned and, as such, enrollment could not continue.

Nonetheless, this study adds to the current body of literature by providing insight on a less-researched population that is not represented in studies assessing the general pool of TJA recipients. The findings from the current study allow for an educated discussion with this patient population prior to undergoing TJA, to highlight the higher perioperative risk and better inform patient discussions. Additionally, the results presented shed light on a population that is at heightened risk of complications and suboptimal outcomes and should spark interest in developing care pathways and protocols to address the shortcomings of the current care-delivery system.

Conclusions

The findings from this study highlight the demographic and comorbidities profile of an underserved inner-city population and report on results of a QI initiative among that population. The intervention designed to risk stratify patients preoperatively and assist in providing needed medical optimization prior to surgical intervention in underserved high-risk patients failed at improving postoperative outcomes. In this article, we highlight the special requirements of an inner-city underserved population and the failure of standard optimization pathways and protocols in improving outcomes following TJA among this population. An in-depth understanding of population-specific factors remains widely lacking, which includes demographic, medical, social, and psychological variables. Ultimately, the development of a population-specific personalized risk-stratification system is needed and would guide outcomes-based reimbursement models to account for historic outcomes of the specific population to which a patient belongs. Such a system should account for sociocultural patient-specific factors that are often overlooked in the assessment of care-delivery. As such, future work should focus on better delineating the disparities in access to care in this underserved population and highlight the culturally relevant outcomes for TJA.

Conflicts of interest

The authors declare there are no conflicts of interest.

For full disclosure statements refer to https://doi.org/10.1016/j.artd.2024.101443.

CRediT authorship contribution statement

Mouhanad M. El-Othmani: Writing – review & editing, Writing – original draft, Visualization, Methodology. **Kyle McCormick:** Writing – review & editing, Writing – original draft, Formal analysis. **Winnie Xu:** Writing – review & editing, Writing – original draft, Project administration. **Thomas Hickernell:** Project administration, Methodology, Data curation, Conceptualization. **Nana O. Sarpong:** Writing – review & editing, Supervision. **Wakenda Tyler:** Writing – review & editing, Supervision, Resources, Conceptualization. **Carl L. Herndon:** Writing – review & editing, Supervision, Methodology, Data curation, Conceptualization.

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