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Higher Patient Expectations Predict Higher Patient-Reported Outcomes, But Not Satisfaction, in Total Knee Arthroplasty Patients: A Prospective Multicenter Study

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ABSTRACT

Background: The relationship between patient expectations, patient-reported outcomes (PROs), and satisfaction in total knee arthroplasty (TKA) patients is not well understood.

Methods: We prospectively evaluated patients who underwent primary TKA at 4 institutions. Demographics were collected. Preoperatively, patients completed the Hospital for Special Surgery Knee Replacement Expectations Survey (HSS-KRES), SF-12, UCLA activity, and Knee Disability and Osteoarthritis Score. At 6 months and 1 year postoperatively, patients completed the Hospital for Special Surgery Knee Replacement Fulfillment of Expectations Survey (HSS-KRFES), a satisfaction survey, and PROs. Step-wise multivariate regression models were created.

Results: Eighty-three patients were enrolled. At 6 months and 1 year postoperatively, the follow-up rate was 84.3% and 92.7%, respectively. No demographics or preoperative PROs were predictive of HSS-KRES. Preoperative HSS-KRES did not predict postoperative satisfaction, but higher HSS-KRES predicted higher HSS-KRFES at 1 year, greater improvement in UCLA activity at 6 months and 1 year, and SF-12 Physical Composite Scale and Knee Disability and Osteoarthritis Score at 6 months. Higher HSS-KRFES predicted higher satisfaction at 6 months and 1 year.

Conclusion: In TKA patients, preoperative expectations are not influenced by patient demographics or preoperative function. Higher preoperative expectations predict greater postoperative improvement in PROs and fulfillment of expectations. These findings highlight the importance of preoperative patient expectations on postoperative outcome.

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Total knee arthroplasty (TKA) is one of the most commonly performed orthopedic procedures in the United States, with over 620,00 TKAs in 2009 [1]. More recently, literature evaluating the outcomes of this procedure has focused on patient-reported outcomes (PROs). Successful TKA outcomes have been linked to both

system factors, such as volume and physician experience, as well as patient factors, including socioeconomic status, medical comorbidities, and preoperative patient expectations [2–4].

Patient expectations prior to elective TKA can be categorized in the domains of pain relief, functional improvement, and improvement in psychosocial well-being [5–8]. Expectations are an important consideration for patients in their decision to undergo elective surgery [5]. In TKA patients, preoperative expectations have been shown to be overly optimistic, with unrealistic expectations regarding postoperative pain, function, and recovery [9,10].

The relationship between preoperative functional status and preoperative expectations in TKA is unclear, with some studies showing no relationship between the two [7,11], and other studies

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suggesting that patients with better baseline functional status are more likely to have higher expectations of TKA [3,4,6]. This relationship is of particular importance: while it is possible that patients with more disability preoperatively may have larger postoperative improvement, patients with a higher functional status preoperatively are more likely to have a higher functional status postoperatively in absolute terms [12].

The relationship among preoperative expectations, postoperative PROs, and patient satisfaction is also a topic of debate. The dominant model in health outcomes literature posits that minimizing the discord between patient expectations and the actual result is a key determinant of patient satisfaction [13,14]. However, other models claim that higher expectations are associated with better outcomes and satisfaction, suggesting a beneficial effect of optimism or placebo [15,16].

There are very few prior studies examining these relationships. The majority did not use a validated expectations tool. In addition, most were performed outside the United States; prior studies have shown substantial differences in expectations across countries, especially as it relates to functional outcome expectations following total joint arthroplasty (TJA) [4].

The purpose of this study to characterize the relationships between (1) preoperative PROs and preoperative expectations, (2) preoperative expectations and postoperative PROs, and (3) preoperative expectations and postoperative fulfillment of expectations and satisfaction. We hypothesized that higher preoperative patient expectations would lead to higher postoperative PROs, fulfillment of expectations, and satisfaction. We prospectively analyzed these relationships using a comprehensive, validated preoperative survey, the Hospital for Special Surgery Knee Replacement Expectations Survey (HSS-KRES) [5].

Methods

Study Design

This is a prospective observational study conducted at 4 institutions in the United States. Prior to initiation, each site obtained approval from its Institutional Review Board. We enrolled patients from May 2014 to June 2015. Inclusion criteria included patients undergoing primary TKA and age >18 years. Exclusion criteria included prior history of TJA, bilateral procedures, and non-English speaking patients. We excluded prior TJA history, as we believed that this prior experience could influence/bias the expectations of the current TJA. A prestudy power analysis was performed which determined that 70 patients would need to be included in the study for a power of 80%.

Data Collection

Patient demographics including age, gender, race, employment status, education level, body mass index, and American Society of Anesthesiologists (ASA) classification score were collected and recorded. Prior to surgery, but after the initial consultation with the treating surgeon, patients completed the Short Form-12, version 2 (SF-12v2), the University of California, Los Angeles (UCLA) activity score, the Knee and Osteoarthritis Outcome Score (KOOS) [17], and the HSS Knee Replacement Expectations Survey (HSS-KRES). The HSS-KRES is a well-validated expectations survey with 17 questions, graded on a 5-point Likert scale [5]. The final HSS-HRES score is reported as a number from 0 to 100, with 100 being the highest expectation. At 6 months and 1 year postoperatively, patients completed the SF-12v2, the UCLA activity score, the KOOS, and the Hospital for Special Surgery Knee Replacement Fulfillment of Expectations Survey (HSS-KRFES) [18]. The HSS-KRFES is adopted

from the HSS-HRES, with each question asking to what extent each expectation was fulfilled on a 4-point scale. The final HSS-KRFES score is reported as a number from 0 to 100, with 100 being complete fulfillment of expectations. Additionally, patients completed a short, validated 4 question satisfaction survey [19].

Data Analysis

Descriptive statistics were calculated as means and standard deviations for continuous variables and counts and percentages for discrete variables. Preoperative patient expectations were ranked by the average score. Step-wise multivariate linear regression models were created to predict expectations based on demographics and preoperative PROs, and to predict postoperative fulfillment of expectations and satisfaction based on preoperative expectations. First, univariate regression analyses were performed between each independent variable and the primary outcome measure (HSS-KRES, HSS-KRFES, satisfaction, change in UCLA activity score, SF-12 Physical Composite Scale [PCS] and Mental Composite Scale [MCS], and KOOS). Predictors with a *P*-value of <.20 were included in the multivariate model.

To further analyze the impact of expectations on the change in PROs, we first defined the minimal clinically important difference (MCID) as one half of the standard deviation in the change of the PRO from preoperatively to postoperatively [20,21]. The MCID is the smallest difference that patients perceive to be beneficial, and achieving the MCID is one way of determining a successful outcome [22]. To analyze each PRO, we separated patients into 2 groups based on whether or not they achieved the MCID. We then performed a Student's *t*-test to compare preoperative HSS-KRES scores between the 2 groups.

Statistical analysis was performed using Stata version 13.1 (StataCorp, College Station, TX).

Results

Eighty-three patients were enrolled. At 6 months and 1 year postoperatively, the follow-up rate was 84.3% and 92.7%, respectively. The average age was 69.7 ± 9.0 years. Fifty-five percent of the patients were female and 45% were male. Education levels were as follows: 0% 8th grade or less, 1.2% some high school, 12.8% high school degree, 24.4% some college, 23.1% college degree, and 38.4% postgraduate degree. The average body mass index was 29.9 ± 5.4 kg/m². Thirty-nine percent of the patients were working, and 61% were not working at the time of surgery. ASA scores were as follows: 2.4% ASA I, 68.3% ASA II, 28.3% ASA III, and 0% ASA 4. In total, 89.2% of the patients were Caucasian. Additional demographic data are presented in Table 1.

All PRO measures significantly improved at both time points (data not shown).

Preoperative Expectations

The most important expectations cited by patients were improvement in ability to walk and improvement in ability to go downstairs. The least important expectations cited were in the ability to be employed for monetary reimbursement and improvement in sexual activity (Fig. 1). Average HSS-KRES was 76.6 ± 18.0 .

In the univariate analysis, none of the demographics nor preoperative PRO variables were predictive of HSS-KRES (data not shown). As there were no significant predictors, a multivariate model was not created. Race was excluded from the analysis as there was no sufficient distribution across races.

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