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Inpatient Versus Outpatient Hip and Knee Arthroplasty: Which Has Higher Patient Satisfaction?

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ABSTRACT

Background: More surgeons are offering patients the option of having adult reconstructive procedures performed as an outpatient at an ambulatory surgery center. However, it is unknown if these patients have higher or lower satisfaction with their care than patients having a traditional inpatient stay. The purpose of this study is to compare satisfaction between inpatients and outpatients undergoing hip or knee arthroplasty.

Methods: Portions of the Health Consumer Assessment of Healthcare Providers and Systems survey, the Friends and Family Test, and 8 additional questions were administered to 174 consecutive patients. There were 8 non-responders (95.4% response rate) leaving 102 who underwent inpatient and 64 who had outpatient surgery. Responses were stratified using the "boxes" scoring approach as recommended by Health Consumer Assessment of Healthcare Providers and Systems and analyzed with a chi-squared or Fischer's exact test where appropriate. Power analysis determined that 38 patients per group were needed to detect a 1-point difference in overall satisfaction between groups with 80% power and alpha of 0.05 considered significant.

Results: Outpatients responded with more top responses when asked about the staff's explanation of any medicines received (91.4% vs 77.5%, $P = .026$), the staff's assistance with their pain management (98.3% vs 88.0%, $P = .022$), the written health information they were given upon discharge (98.3% vs 90.1%, $P = .05$), and the courtesy and respect from the nurses (100.0% vs 92.2%, $P = .022$). Inpatients responded with more bottom responses when asked how prepared they felt for discharge home (8.9% vs 0.0%, $P = .014$). Top responses in overall satisfaction with the facility (87.1% vs 93.4%, $P = .204$) and overall experience (89.2% vs 95.2%, $P = .177$) were similar between inpatients and outpatients, respectively. Not surprisingly, inpatients were older (64.1 vs 59.2 years, $P = .001$), heavier (body mass index 32.7 vs 30.4, $P = .035$), and had higher Charlson comorbidity scores (2.6 vs 1.9, $P = .002$).

Conclusion: Although satisfaction was high in both groups, when differences were present they favored outpatient surgery in the ambulatory surgery center.

Patient satisfaction is an increasingly important variable when evaluating the delivery of healthcare today. The Centers for Medicare and Medicaid Services established the Hospital Value-Based Purchasing Program which incentivizes providers that provide high quality care. Under this model, a portion of payments are redistributed to the participating hospitals based on patient experience scores, derived from a validated survey, the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) [1,2].

Perhaps in part due to this direct link to reimbursement, there is a new interest in evaluating variables that determine patient satisfaction following arthroplasty procedures [3–6]. Furthermore, an increasing number of patients are having hip and knee arthroplasty performed on an outpatient basis [7]. Understanding how these variables affect patient experience is important to foster the physician-patient relationship and target clinical improvement.

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Table 1
HCAHPS Survey Responses.

Question	HCAHPS Boxes	Inpatient	Outpatient	*P*-Value
How often did nurses treat you with courtesy and respect?	Top	94 (92.2%)	64 (100.0%)	**.022**
	Middle	8 (7.8%)	0 (0.0%)	.022
How often did nurses listen to you carefully?	Top	91 (89.2%)	61 (96.8%)	.078
	Middle	10 (9.8%)	2 (3.2%)	.111
	Bottom	1 (1.0%)	0 (0.0%)	.431
How often did nurses explain things in a way you could understand?	Top	94 (92.2%)	62 (96.9%)	.214
	Middle	6 (5.9%)	2 (3.1%)	.419
	Bottom	2 (2.0%)	0 (0.0%)	.260
How often did doctors treat you with courtesy and respect?	Top	91 (89.2%)	62 (96.9%)	.074
	Middle	9 (8.8%)	2 (3.1%)	.151
	Bottom	1 (1.0%)	0 (0.0%)	.427
How often did doctors listen to you carefully?	Top	85 (84.2%)	58 (90.6%)	.234
	Middle	14 (13.9%)	5 (7.8%)	.236
	Bottom	2 (2.0%)	1 (1.6%)	.845
How often did doctors explain things in a way you could understand?	Top	86 (86.0%)	59 (92.2%)	.227
	Middle	11 (11.0%)	4 (6.3%)	.303
	Bottom	3 (3.0%)	1 (1.6%)	.560
How often did you get help in getting to the bathroom or using a bedpan as soon as you wanted?	Top	81 (81.8%)	47 (95.9%)	**.018**
	Middle	15 (15.2%)	0 (0.0%)	.004
	Bottom	2 (2.0%)	2 (4.1%)	.467
After you pressed the call bell, how often did you get help as soon as you wanted?	Top	61 (61.0%)	26 (96.3%)	[a]
	Middle	33 (33.0%)	0 (0.0%)	[a]
	Bottom	6 (6.0%)	1 (3.7%)	[a]
How often was your pain well controlled?	Top	79 (77.5%)	52 (86.7%)	.150
	Middle	19 (18.6%)	6 (10.0%)	.142
	Bottom	3 (2.9%)	2 (3.3%)	.889
How often did the facility staff do everything they could to help you with your pain?	Top	88 (88.0%)	58 (98.3%)	**.022**
	Middle	9 (9.0%)	1 (1.7%)	.067
	Bottom	3 (3.0%)	0 (0.0%)	.179
Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?	Top	79 (77.5%)	53 (91.4%)	**.026**
	Middle	15 (14.7%)	5 (8.6%)	.263
	Bottom	8 (7.8%)	0 (0.0%)	.052
Before giving you any new medicine, how often did facility staff describe side effects in a way you could understand?	Top	58 (58.0%)	40 (69.0%)	.171
	Middle	23 (23.0%)	7 (12.1%)	.091
	Bottom	19 (19.0%)	11 (19.0%)	.996
How often were your room and bathroom kept clean?	Top	81 (81.0%)	41 (97.6%)	[a]
	Middle	12 (12.0%)	1 (2.4%)	[a]
	Bottom	7 (7.0%)	0 (0.0%)	[a]
How often was the area around your room quiet at night?	Top	71 (70.3%)	25 (92.6%)	[a]
	Middle	26 (25.7%)	2 (7.4%)	[a]
	Bottom	4 (4.0%)	0 (0.0%)	[a]
Did facility staff talk with you about whether you would have the help you needed when you left the hospital?	Top	93 (93.0%)	48 (92.3%)	.876
	Bottom	7 (7.0%)	4 (7.7%)	.876
Did you get information in writing about what symptoms or health problems to look out for after you left the facility?	Top	91 (90.1%)	57 (98.3%)	**.050**
	Bottom	10 (9.9%)	1 (1.7%)	.057
What number would you use to rate this facility?	Top	88 (87.1%)	57 (93.4%)	.204
	Middle	12 (11.9%)	4 (6.6%)	.271
	Bottom	1 (1.0%)	0 (0.0%)	.436

Data are presented as number (percent). Bold font signifies statistical significance.
HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems.
[a] Less than 75% response rate in the outpatient group.

To our knowledge, no study has directly compared patient satisfaction after hip or knee arthroplasty performed with a traditional inpatient stay compared to patients having the same procedures performed on an outpatient basis. In this context, the purpose of this study is to compare satisfaction of patients undergoing primary hip or knee arthroplasty in the inpatient hospital setting compared to outpatient surgery performed at an ambulatory surgery center (ASC). We hypothesize that patients in both settings will report high levels of satisfaction but do not expect any significant difference between the 2 groups.

Methods

We performed a prospective survey study on a consecutive series of patients undergoing primary hip and knee arthroplasty by a single surgeon between December 1, 2017 and March 31, 2018. Institutional review board approval was obtained and no outside funding was received. Patients were included in the study if they were undergoing a primary arthroplasty procedure either at an inpatient facility or at an ASC who voluntarily agreed to participate. Patients were deemed eligible for outpatient surgery if they were felt to be healthy (American Society of Anesthesiologists score of 2 or less) and had a social support system that was compatible with same-day discharge. As the 2 ASCs are approximately 30 and 60 miles from the inpatient hospital and 90 miles from each other, geographic proximity to their home was oftentimes a deciding factor in patient's facility choice. Each patient received a questionnaire in the mail with instructions to complete it on postoperative day 3. Patients were reminded to complete the survey during a routine postoperative phone call by clinical or research staff. Surveys were returned by mail or at the first postoperative visit.

Perioperative pain protocols were similar at all 3 centers where the procedures were performed with patients receiving

acetaminophen, celecoxib, pregabalin, and oxycodone preoperatively and a periarticular injection at the time of the surgical procedure. All patients undergoing total hip arthroplasty received a spinal anesthetic and those undergoing knee arthroplasty received an adductor canal block; however, patients undergoing surgery at the ASC had a general anesthetic, while patients at the inpatient facility had the adductor canal block combined with a spinal anesthetic. Standard discharge medications for all patients included acetaminophen, tramadol, meloxicam, gabapentin, and oxycodone.

Background information including age, gender, type of procedure, body mass index (BMI), short-form 12 (SF-12) scores, and Charlson Comorbidity Index (CCI) was obtained on all patients. Patient satisfaction was evaluated through multiple survey instruments. All patients received the HCAHPS survey (Table 1), which is a validated tool to measure inpatient satisfaction [2]. We then developed 8 additional questions to help address the overall patient experience (Table 2). Finally, we posed the National Health Service Friends and Family Test which asks if the patient would recommend their healthcare experience to a family or friend in need of similar treatment [8]; this survey tool is used across all healthcare settings in England to evaluate overall patient satisfaction.

Surveys were scored using the HCAHPS "Boxes" system with top-box (always; 9-10; extremely), middle-box (usually or sometimes; 7-8; likely, neither likely, or unlikely), and bottom-box groups (never; 6 or less; unlikely) signifying highest to lowest rating in descending order [9]. As the HCAHPS questions are geared toward inpatient hospital stays, several questions were not applicable to the ASC setting. Therefore, HCAHPS questions with less than 75% response rate among outpatients were excluded from analysis, but still reported (Table 1).

An a priori power analysis determined that 38 patients per group were needed to show a 1-point difference (0-10 scale) in the mean score in the overall satisfaction question, "What number would you use to rate your overall experience?" between groups with 80% power and alpha of 0.05 considered significant. Statistical analysis was completed with Stata 14.2 and included chi-squared or Fischer's exact tests for the "Boxes" scoring and chi-squared or Student's t-test for patient demographics.

Table 3
Patient Demographics, Procedure Type, and Preoperative Scores.

Variables	Inpatient	Outpatient	*P*-Value
Age (y)	64.1 (9.8)	59.2 (8.9)	.001
Body mass index	32.7 (7.5)	30.4 (5.6)	.035
SF-12 mental	53.5 (10.3)	56.4 (11.3)	.111
SF-12 physical	29.8 (8.5)	34.8 (8.9)	.001
Female	29 (28.4%)	37 (57.8%)	<.001
Male	73 (71.6%)	27 (42.2%)	
CCI-0	6 (5.9%)	5 (7.8%)	.002
CCI-1	13 (12.8%)	20 (31.3%)	
CCI-2	31 (30.4%)	27 (42.2%)	
CCI-3	25 (24.5%)	5 (7.8%)	
CCI-4	20 (19.6%)	5 (7.8%)	
CCI-5	5 (4.9%)	1 (1.6%)	
CCI-6	2 (2.0%)	1 (1.6%)	
BHR	0 (0.0%)	3 (4.7%)	.001
THA	28 (27.5%)	23 (35.9%)	
TKA	61 (59.8%)	21 (32.8%)	
UKA	13 (12.8%)	17 (26.5%)	
Home discharge	98 (96.1%)	64 (100%)	.161

Data are presented as mean (standard deviation) or number (percent).
SF-12, short-form 12; BHR, Birmingham hip resurfacing; CCI, Charlson Comorbidity Index; THA, total hip arthroplasty; TKA, total knee arthroplasty; UKA, unicompartmental knee arthroplasty.

Results

Of the 175 patients meeting inclusion criteria during the study period, 174 agreed to participate and were consented for the study. Eight patients did not respond (95.4% response rate), leading to a final sample of 102 inpatients and 64 outpatients. When comparing the demographics of each group, inpatients were older (64.1 vs 59.2 years, $P = .001$), heavier (BMI 32.7 vs 30.4, $P = .035$), had higher CCI (2.6 vs 1.9, $P = .002$), and had a higher proportion of males (71.6% vs 42.2%, $P < .001$) (Table 3). Outpatients had similar preoperative SF-

Table 2
NHS FFT and 8 Additional Questions.

Question	HCAHPS Boxes	Inpatient	Outpatient	*P*-Value
FFT: How likely are you to recommend our practice to friends and family if they needed similar treatment?	Top	89 (89.0%)	61 (95.3%)	.166
	Middle	12 (11.8%)	3 (4.8%)	.166
Did you have problems with nausea?	Top	65 (63.7%)	43 (68.3%)	.552
	Middle	22 (21.6%)	13 (20.6%)	.887
	Bottom	15 (14.7%)	7 (11.1%)	.509
When you think about your recent joint replacement surgery, how did you feel about the nursing care you received?	Top	94 (92.2%)	61 (98.4%)	.089
	Middle	8 (7.8%)	1 (1.6%)	.089
Please rate the anesthesia care you received	Top	95 (94.1%)	59 (93.7%)	.915
	Middle	2 (2.0%)	3 (4.8%)	.314
	Bottom	4 (4.0%)	1 (1.6%)	.390
When you think about your recent surgical procedure how would you rate the registration process (getting checked in) when you arrived at the facility?	Top	94 (92.2%)	57 (90.5%)	.707
	Middle	8 (7.8%)	5 (7.9%)	.983
	Bottom	0 (0.0%)	1 (1.6%)	.202
Please rate the cleanliness of the facility	Top	94 (92.2%)	60 (95.2%)	.441
	Middle	5 (4.9%)	2 (3.2%)	.593
	Bottom	2 (2.0%)	1 (1.6%)	.855
When you think about your recent joint replacement surgery, did you feel that the staff prepared you well for discharge to home?	Top	81 (79.4%)	55 (88.7%)	.125
	Middle	11 (10.8%)	7 (11.3%)	.920
	Bottom	9 (8.9%)	0 (0.0%)	**.014**
Did you feel that you were safe to go home at the time of discharge?	Top	95 (94.1%)	59 (93.7%)	.915
	Middle	3 (3.0%)	4 (6.3%)	.298
	Bottom	3 (3.0%)	0 (0.0%)	.167
What number would you use to rate your overall experience?	Top	91 (89.2%)	60 (95.2%)	.177
	Middle	8 (7.8%)	3 (4.8%)	.441
	Bottom	3 (2.9%)	0 (0.0%)	.170

Data are presented as number (percent). Bold font signifies statistical significance.
FFT, Friends and Family Test; NHS, National Health Service; HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems.

12 mental but higher physical scores (56.4 vs 53.5, $P = .111$ and 34.8 vs 29.8, $P = .001$, respectively). The composition of procedures was similar except for a significantly higher number of total knee arthroplasties (TKAs) performed at the inpatient hospital and a higher number of unicompartmental arthroplasties (UKAs) performed at the ASCs (Table 3).

The mean satisfaction score on the overall satisfaction question that states "What number would you use to rate your overall experience?" on a scale from 0 to 10 was 9.5 among the inpatients (95% confidence interval [CI] 9.4-9.7) and 9.7 among the outpatients (95% CI 9.6-9.9, $P = .110$). Both groups would similarly refer a family or friend to the same facility with "extreme likely" being reported in 89.0% of the inpatients and 95.2% of the outpatients ($P = .76$).

Outpatients responded with significantly more top responses for the following categories: the courtesy and respect from the nurses (100% vs 92.2%, $P = .022$), assistance getting to the bathroom or bedpan (95.9% vs 81.8%, $P = .018$), assistance with their pain management (98.3% vs 88.0%, $P = .022$), staff's explanation of any medicines received (91.4% vs 77.5%, $P = .026$), and information about concerning symptoms or health problems upon discharge (98.3% vs 90.1%, $P = .05$) (Tables 1 and 2). Inpatients responded with more bottom responses when asked how prepared they felt for discharge home (8.9% vs 0.0%, $P = .014$). Importantly, when inpatients and outpatients were asked if they felt safe to go home at the time of discharge, the responses between the groups were similar (Table 2).

Responses to pain management questions were correlated with responses to the overall satisfaction question. Patients who reported their pain as always well controlled reported higher mean overall satisfaction (9.7; 95% CI 9.6-9.9) compared to patients who reported that their pain was usually well controlled, with an overall mean satisfaction score of 9.1 (95% CI 8.8-9.4, $P < .001$). Patients who reported their pain as sometimes well controlled had a lower mean overall satisfaction score of 8.5 (95% CI 7.9-9.1, $P < .001$).

Age, BMI, CCI, gender, and case composition were considered as confounding factors to patient satisfaction questions and inpatient/outpatient status. Despite differences at baseline, there was only one survey question that had significant confounding factors. BMI and age were both significant to the question concerning assistance from nurses going to the bathroom such that older patients and those with a higher BMI were more likely to report that they were very satisfied with the help they received ($P = .019$ for age and $P = .042$ for BMI). Gender, CCI, and case composition did not affect the reported satisfaction in comparing this cohort.

Discussion

As the field of arthroplasty continues to advance, some surgeons now offer patients the option to have surgery at an ASC instead of an inpatient hospital. This approach requires a system in place to achieve adequate pain control and ensure the patient feels safe and prepared to go home in a shorter period of time. The Centers for Medicare and Medicaid Services now incentivizes providers with high patient satisfaction scores based on surveys such as HCAHPS. This changing landscape motivated us to perform a study using validated patient survey instruments to compare patient satisfaction following arthroplasty procedures at an inpatient hospital versus an ASC. Our study found that satisfaction rates were similar in both groups; however, when differences were identified they favored the ASC.

Ensuring that patients are safe and feel prepared for discharge is critical, especially in the accelerated discharge pathways found at ASCs. Although both inpatients and outpatients reported a similar number of top responses for questions pertaining to discharge, the outpatients felt they more commonly got information for what symptoms to look out for after discharge (98.3% vs 90.1%, $P = .05$). The inpatient group had an 8.9% bottom response rate when asked if they felt the staff made them feel prepared for discharge versus zero bottom responses in the outpatient group ($P = .014$). In our practice, all patients are required to attend a preoperative teaching session to educate them and prepare them for what to expect following surgery. However, our results demonstrate that the inpatient staff could improve care by taking more time to review postoperative instructions and concerning symptoms that require further evaluation.

The results of our study demonstrate that pain control is a significant contributor to overall satisfaction, as patients who felt like pain was "always well controlled" reported higher overall satisfaction (9.7 of 10) compared to patients who reported that their pain was "usually well controlled" (9.1, $P < .001$) and those whose pain was "sometimes well controlled" (8.5, $P < .001$). In a retrospective review of patient Press Ganey scores between men and women following total hip arthroplasty, Delanois et al [8] reported that for men, pain management was the most influential factor for predicting overall satisfaction ($P = .021$). Our data support these findings as pain management was correlated with overall satisfaction; however, we did not find any significant difference between genders concerning pain management ($P = .42$) with the sample size we studied.

A study by Peres-da-Silva et al [9] looked at HCAHPS scores following inpatient knee arthroplasty, and found that male respondents reported higher overall satisfaction than female respondents (77.8% vs 74.1%, $P = .034$). However, Delanois et al [8] found no association with HCAHPS scores and gender. In our study, the inpatient group had a higher proportion of males (71.6% vs 42.2%), but we did not find gender to confound with HCAHP scores ($P = .336$). Peres-da-Silva et al also found no difference between HCAHPS scores after TKA compared to UKA (75.9% vs 74.2%, $P = .856$) which is important as in our study there were more TKA done at the inpatient facility and more UKA done at the ASC. Regression analysis in our data demonstrated that surgical procedure did not have any significant confounding effect on any survey question. Finally, Peres-da-Silva et al also reported a negative correlation between length of stay and satisfaction, which has also been shown in another study by Mistry et al to similarly affect satisfaction scores in patients following total hip arthroplasty [9,10]. The finding of lower satisfaction scores as the length of hospital stay increases may account for some of the inferior scores seen among inpatient respondents in our study, but we are unable to determine any causal relationship in our data.

Several limitations should be considered when analyzing the results of this study. First, there is inherently some selection bias among the inpatient and outpatient groups. Although some of the inpatients may be candidates for outpatient surgery, others have comorbidities that require inpatient care; as noted above the increased length of stay may lead to lower satisfaction scores [9,10]. As expected, the inpatient cohort was older, slightly heavier, and had higher CCI scores; unexpectedly, there was also a difference in gender profile (Table 3). However, Mistry et al [10] did not show any correlation between age, BMI, and American Society of Anesthesiology scores and Press Ganey satisfaction scores following total hip arthroplasty, and Delanois et al [8] found no difference in satisfaction after total hip arthroplasty based on gender. We found no difference in our data with regression analysis except for older patients ($P = .024$) and higher BMI patients ($P = .042$) reporting better assistance with going to the bathroom and getting the help that they needed. Race and

ethnicity may also influence satisfaction scores but this study was not powered to evaluate any differences. Furthermore, all patients in this study underwent arthroplasty procedure at 1 inpatient hospital and one of the 2 ASCs, and hence our results may not be generalizable to other facilities. Recall bias was minimized by asking patients to respond to the survey soon after discharge but recall bias and the patients' ability to accurately reflect on and report their experience are always a potential limitation of a study of this design. Finally, although we were appropriately powered for what we felt was a meaningful difference in scores, our study populations were relatively small and there were fewer patients in the outpatient group, and a higher number of patients could have increased the chance that one or more patients were dissatisfied with their experience.

Conclusion

Although patients in both settings reported high overall satisfaction after hip and knee arthroplasty procedures, patients who had surgery at an ASC were more satisfied in the areas of nursing staff, pain management, and preparedness for discharge. This suggests that lower extremity arthroplasty procedures can be performed with equivalent or better patient satisfaction when compared to a traditional inpatient hospital stay.

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