Key drivers of patient satisfaction in lumbar spine surgery

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OBJECTIVE The Patient Experience of Care, composed of 9 dimensions derived from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, is being used by the Centers for Medicare & Medicaid Services to adjust hospital reimbursement. Currently, there are minimal data on how scores on the constituent HCAHPS items impact the global dimension of satisfaction, the Overall Hospital Rating (OHR). The purpose of this study was to determine the key drivers of overall patient satisfaction in the setting of inpatient lumbar spine surgery.

METHODS Demographic and preoperative patient characteristics were obtained. Patients selecting a top-box score for OHR (a 9 or 10 of 10) were considered to be satisfied with their hospital experience. A baseline multivariable logistic regression model was then developed to analyze the association between patient characteristics and top-box OHR. Then, multivariable logistic regression models adjusting for patient-level covariates were used to determine the association between individual components of the HCAHPS survey and a top-box OHR.

RESULTS A total of 453 patients undergoing lumbar spine surgery were included, 80.1% of whom selected a top-box OHR. Diminishing overall health status (OR 0.63, 95% CI 0.43–0.91) was negatively associated with top-box OHR. After adjusting for potential confounders, the survey items that were associated with the greatest increased odds of selecting a top-box OHR were: staff always did everything they could to help with pain (OR 12.5, 95% CI 6.6–23.7), and nurses were always respectful (OR 11.0, 95% CI 5.3–22.6).

CONCLUSIONS Patient experience of care is increasingly being used to determine hospital and physician reimbursement. The present study analyzed the key drivers of patient experience among patients undergoing lumbar spine surgery and found several important associations. Patient overall health status was associated with top-box OHR. After adjusting for potential confounders, staff always doing everything they could to help with pain and nurses always being respectful were the strongest predictors of overall satisfaction in this population. These findings highlight opportunities for quality improvement efforts in the spine care setting.

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KEYWORDS patient satisfaction; lumbar spine surgery; HCAHPS; reimbursement; patient experience; back pain

IN 2011, the Centers for Medicare & Medicaid Services (CMS) established Hospital Value-Based Purchasing (HVBP), a new hospital reimbursement system designed to shift payment models away from the traditional fee-for-service system and toward rewarding health care quality. Under HVBP, CMS withholds 2% of reimbursement from all hospitals, which are then redistributed from low-performing to high-performing hospitals based on their total performance score (TPS).²⁷ Patient experience accounts for 25% of a hospital's TPS and is composed of 9

dimensions derived from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey. The percentage of patients who provide the highest possible HCAHPS response, termed a “top-box” response, for each dimension is used to calculate an institution's TPS.²⁴ As the patient experience of care begins to play a more substantial role in evaluating the quality of care, it is important to identify which elements of hospital experience are most strongly associated with a highly satisfying overall patient experience. The need to identify the

ABBREVIATIONS CMS = Centers for Medicare & Medicaid Services; HCAHPS = Hospital Consumer Assessment of Healthcare Providers and Systems; HVBP = Hospital Value-Based Purchasing; ICD-9 = *International Classification of Diseases, Ninth Revision*; OHR = Overall Hospital Rating; PDQ = Pain Disability Questionnaire; PHQ-9 = Patient Health Questionnaire 9; TPS = total performance score.

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determinants of patient satisfaction is particularly acute for common and costly procedures, which have the largest potential impact on hospital reimbursement.

The incidence and cost of lumbar spine surgery are increasing in the United States.^{4,8,22,25,28} For example, aggregate hospital charges for surgical treatment of lumbar stenosis has increased by 40% between 2002 and 2007, mostly attributed to the rising rate of complex fusions performed. Additionally, as the United States population continues to age, the prevalence of spinal stenosis, the most common indication for lumbar spine surgery in patients older than 65 years, is expected to rise 59% to 64 million elderly adults by the year 2025.⁸ In this context, there exists a need to determine how to most effectively deliver a satisfying patient experience of care for patients undergoing lumbar surgery.

The nationwide trends in lumbar spine surgery and current lack of knowledge in the literature regarding determinants of patient satisfaction with the lumbar spine surgery experience highlight a significant gap in the literature. Our study therefore aims to identify the individual components of patient experience that are most strongly associated with a highly satisfying overall hospital experience during lumbar spine surgery. In our study, a top-box response to the Overall Hospital Rating (OHR) component of the HCAHPS survey—the only dimension of the survey that assesses the overall experience and is used in HVB calculations—was used to measure the patients' overall experience in the hospital. These results will also highlight areas of patient care that hospitals and spine surgery departments might want to allocate resources toward in their quality improvement efforts.

Methods

Overview and Study Design

This is a retrospective study of HCAHPS surveys collected from patients who underwent lumbar spine surgery at a single tertiary hospital within an academic medical center between 2013 and 2015. Institutional review board approval was obtained prior to commencement of the study.

Study Population

HCAHPS surveys were queried from our patient experience database using *International Classification of Diseases, Ninth Revision* (ICD-9) diagnosis codes for degenerative lumbar spinal pathologies (Table 1). Initially, 495 HCAHPS surveys corresponding to patients who were hospitalized for a lumbar spine diagnosis were obtained. A total of 453 patients were found to have undergone either lumbar decompression or fusion during the inpatient stay that corresponded to their HCAHPS survey and were therefore included in our analysis.

A combination of retrospective chart review and our institution's Inpatient and Surgery Data Marts were used to obtain demographic and other patient characteristics, including age, sex, race, body mass index, median household income, history of lumbar spine surgery, and history of medical comorbidities. Since patient-specific income levels were unavailable, median household income was

TABLE 1. Coding system used to isolate potential spine surgery patients

Diagnosis	ICD-9 Code
Spondylolisthesis	738.40 or 756.12
Lumbar spondylolysis	756.11
Lumbar spondylosis	721.3 or 721.42
Lumbar degenerative disc disease	722.52
Lumbar spinal stenosis	724.02 or 724.03
Lumbar disc displacement	722.10

estimated using the patient's ZIP code. Additionally, prospectively collected quality-of-life data were queried from our institution's Knowledge Program database to evaluate the preoperative health status of our population. These health measures included the EQ-5D, Patient Health Questionnaire 9 (PHQ-9), and Pain Disability Questionnaire (PDQ). The EQ-5D assesses 5 dimensions of the health state and assigns a utility value anywhere between 0.0 (death) and 1.0 (perfect health).^{3,14} The PHQ-9 assesses for depression based on 9 *Diagnostic and Statistical Manual of Mental Disorders IV* criteria for major depressive disorder, with total scores ranging from 0 (not depressed) to 27 (severely depressed).^{18,19} The PDQ uses a 0–10 scale to evaluate how pain influences the ability to function across 15 categories. Total PDQ scores range from 0 (optimal function) to 150 (total disability).¹⁰

Outcome of Interest

The HCAHPS survey is administered to a random sample of inpatients after discharge and is composed of the following 9 dimensions used to calculate the Patient Experience of Care domain for a hospital: Communication with Nurses, Communication with Doctors, Responsiveness of Hospital Staff, Pain Management, Communication about Medicines, Discharge Information, Care Transition, Hospital Cleanliness and Quietness, and Overall Hospital Rating. Our analysis on key drivers of satisfaction included 23 individual items from the HCAHPS survey.

HCAHPS results are reported as the percentage of patients who selected a top-box response, the most positive response to HCAHPS survey items. Our primary outcome was assessment of one of the global dimensions: Overall Hospital Rating. The OHR uses a scale of 0–10, where 0 is the worst hospital possible and 10 is the best hospital possible. A score of 9 or 10 is considered a top-box hospital rating. Patients selecting a top-box response for OHR were considered to be satisfied with their hospital experience, while those selecting a middle- or bottom-box response were unsatisfied.

In addition to the HCAHPS survey responses, we obtained the admission and discharge dates corresponding to each survey and the survey response time. The survey response time was defined as the time elapsed between patient discharge and our institution's reception of the completed survey. Additionally, data on patient-reported overall health, mental health, and education level for each patient were obtained from their HCAHPS survey responses. Overall health and mental health are HCAHPS

survey questions based on a Likert scale, ranging from poor to excellent.

Statistical Analysis

Data were analyzed using IBM SPSS (version 25.0, IBM Corp.). Descriptive statistics summarizing preoperative patient characteristics were compared using chi-square tests for categorical variables, Student t-tests for normally distributed continuous variables, and Mann-Whitney U-tests for nonparametric variables.

A baseline multivariable logistic regression model was then developed to analyze the association between patient-level characteristics and overall satisfaction with the hospital experience. Patient characteristics with $p < 0.20$ were included in this baseline model, including overall health status, history of lumbar spine surgery, chronic renal failure, cancer, stroke, survey response time, length of hospital stay, and mental health status. Additionally, race was included in our statistical model as a clinically relevant covariate. Next, each of the 22 survey items were added to the baseline model individually, and we estimated a new statistical model for each survey item that adjusted the odds ratios for the clinically and statistically relevant patient-level covariates described above. This analysis allowed us to determine which components of the lumbar spine surgical inpatient experience are most strongly associated with high overall hospital satisfaction. Due to the high correlation between individual items on the HCAHPS survey, the inclusion of multiple HCAHPS items in a single model would have introduced problems of collinearity. The p values were adjusted using the Holm-Bonferroni method to control the family-wise error rate, thus limiting the probability of making a type I error.

Results

A total of 453 surveys from patients who underwent lumbar spine surgery were analyzed. Of these surveys, 80.1% recorded a top-box OHR, thus composing the satisfied group. The mean patient age ($\pm$ SD) in the satisfied group was 63.9 ± 10.9 years compared with 62.8 ± 12.3 years in the unsatisfied group ($p = 0.381$). In the satisfied group 57.6% of patients were male, compared with 52.2% in the unsatisfied group ($p = 0.359$). Furthermore, 93.0% of satisfied patients were white, compared with 96.7% of the unsatisfied patients ($p = 0.203$). The only patient characteristic that differed significantly between patients who were satisfied and those who were unsatisfied was patient-reported overall health status ($p = 0.031$). All other preoperative patient characteristics measured were similar between our 2 study groups. These results are presented in Table 2.

In our baseline multivariable logistic regression model, overall health status (OR 0.63, 95% CI 0.43–0.91) was the only variable found to be a significant predictor of overall satisfaction with the hospital experience (Table 3). Diminishing overall health status was observed to be a negative predictor of overall satisfaction. The individual survey items that were associated with the greatest increased odds of overall satisfaction were: hospital staff always did everything they could to help with pain (OR 12.5, 95% CI

TABLE 2. Population overview

Variable	Unsatisfied	Satisfied	p Value
No. of patients	90 (19.9)	363 (80.1)	
Mean age in yrs	62.8 $\pm$ 12.3	63.9 $\pm$ 10.9	0.381
Sex			0.359
Male	47/90 (52.2)	209/363 (57.6)	
Female	43/90 (47.8)	154/363 (42.4)	
Race			0.203
White	87/90 (96.7)	334/359 (93.0)	
Other	3/90 (3.3)	25/359 (7.0)	
Overall health			0.031*
Excellent	2/83 (2.4)	37/351 (10.5)	
Very good	27/83 (32.5)	137/351 (38.7)	
Good	37/83 (44.6)	142/351 (39.6)	
Fair	16/83 (19.3)	38/351 (10.5)	
Poor	1/83 (1.2)	2/351 (0.6)	
Mental health			0.095
Excellent	19/82 (23.2)	131/353 (37.1)	
Very good	40/82 (48.8)	129/353 (36.5)	
Good	16/82 (19.5)	72/353 (20.4)	
Fair	7/82 (8.5)	19/353 (5.4)	
Poor	0/82 (0.0)	2/353 (0.6)	
Education level			0.358
$\geq$ college	20/83 (23.5)	87/352 (24.9)	
College	19/83 (22.4)	63/352 (17.6)	
Some college	25/83 (30.6)	104/352 (29.1)	
High school	16/83 (20.0)	90/352 (26.1)	
Some high school	3/83 (3.5)	4/352 (1.1)	
8th grade	0/83 (0.0)	4/352 (1.1)	
Insurance status			0.734
Medicare	48/90 (53.3)	184/362 (50.8)	
Private	34/90 (37.8)	145/362 (40.1)	
Medicaid/self-pay	4/90 (4.4)	23/362 (6.4)	
Workers' compensation	4/90 (4.4)	10/362 (2.8)	
Admission route			0.709
Elective	89/90 (98.9)	357/363 (98.3)	
Emergency department	1/90 (1.1)	6/363 (1.7)	
Prior surgery	40/90 (44.4)	126/368 (34.7)	0.086
Primary diagnosis			0.656
Stenosis	41/90 (45.6)	154/363 (42.4)	
DDD or spondylosis	21/90 (23.3)	82/363 (22.6)	
Spondylolisthesis	17/90 (18.9)	60/363 (16.5)	
HNP	11/90 (12.2)	64/363 (17.6)	
Spondylolysis	0/90 (0.0)	3/363 (0.8)	
Comorbidities			
Cancer	22/78 (28.2)	69/337 (20.5)	0.137
Chronic renal failure	3/78 (3.8)	4/337 (1.2)	0.100

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TABLE 2. Population overview

Variable	Unsatisfied	Satisfied	p Value
Comorbidities (<i>continued</i>)			
Diabetes	19/78 (24.4)	72/337 (21.4)	0.565
Coronary artery disease	9/78 (11.5)	44/337 (13.1)	0.717
Hypertension	42/78 (53.8)	163/337 (48.4)	0.383
Stroke	5/78 (6.4)	13/337 (4.1)	0.319
Median BMI	30.0 (26.0–34.3)	29.0 (26.0–32.9)	0.436
Median income	\$54,647 (\$45,769–66,103)	\$53,780 (\$44,103–68,406)	0.797
Median length of hospital stay in days	3 (2–4)	3 (2–4)	0.120
Median survey response time in days	26 (17–37)	21 (16–35)	0.088
Mean EQ-5D score	0.551 ± 0.215	0.562 ± 0.206	0.687
Mean PHQ-9 score	7.74 ± 5.72	7.15 ± 5.76	0.416
Mean PDQ score	77.0 ± 28.3	73.4 ± 28.7	0.322

BMI = body mass index; DDD = degenerative disc disease; HNP = herniated nucleus pulposus.

Values are presented as the number of patients (%) unless stated otherwise. Mean values are presented as the mean ± SD. Median values are presented as the median (interquartile range).

* Statistically significant ($p < 0.05$).

6.6–23.7) and nurses were always courteous and respectful (OR 11.0, 95% CI 5.3–22.6). Additional survey items that were strongly associated with overall satisfaction included: nurses always listened carefully (OR 8.6, 95% CI 4.7–15.7), medication side effects were always explained (OR 8.4, 95% CI 3.5–19.9), personal and family preferences were always taken into account (OR 7.8, 95% CI 4.1–15.2), doctors were always courteous and respectful (OR 7.1, 95% CI 3.5–14.4), patient room and bathroom were always kept clean (OR 6.4, 95% CI 3.5–11.6), patient had a good understanding of what he/she was responsible for in managing health when leaving the hospital (OR 5.8, 95% CI 3.3–10.4), and pain was always well controlled (OR 5.7, 95% CI 3.1–10.6). These results and the remaining significant predictors of overall satisfaction are presented in Table 4.

Discussion

Linking value-based incentive payments to the Patient Experience of Care domain exemplifies the emphasis that CMS places on patient satisfaction as an important component of quality of care. Not only are HCAHPS results used in determining hospital reimbursement, but also the results have been publicly reported since 2008. Making this information available to every potential patient creates incentives for hospitals to improve their quality of care and increases the transparency of the care provided. As the patient perception of care begins to play a more

TABLE 3. Baseline multivariable logistic regression model predicting a top-box OHR

Variable	OR (95% CI)	p Value
Overall health	0.625 (0.428–0.911)	0.015*
Prior lumbar spine surgery	0.589 (0.344–1.008)	0.054
History of chronic renal failure	0.199 (0.036–1.100)	0.064
White race	0.185 (0.023–1.481)	0.112
History of cancer	0.685 (0.370–1.268)	0.229
Length of hospital stay	1.047 (0.918–1.193)	0.494
Survey response time	0.998 (0.982–1.015)	0.855
Mental health	0.970 (0.696–1.352)	0.858

* Statistically significant ($p < 0.05$).

influential role in valuing health care, it is important to understand which patient factors and constituent HCAHPS survey components predict high overall satisfaction, as measured by the HCAHPS survey.

With the increasing prevalence and cost of spine surgery in the United States,^{4,8,25,28} there exists a need to determine how to most effectively deliver a satisfying patient experience of care. Providing a satisfying inpatient experience may be under direct control of the hospital and its staff, and can therefore become a guaranteed positive outcome of spine surgery from the patient perspective, especially once the key drivers of satisfaction are elucidated. This is especially critical because, on the contrary, surgical outcomes are sometimes uncertain in spine surgery.²¹ Our study therefore analyzed HCAHPS responses from lumbar spine surgery patients to determine the most influential predictors of overall satisfaction in this population. We found that the 2 strongest predictors of overall satisfaction were the patient perception that the staff always did everything they could to help with pain, and that nurses were always respectful and courteous.

The HCAHPS component with the greatest odds of predicting overall satisfaction was whether the patient perceived the hospital staff to be doing everything they could to help with pain (OR 12.5, $p < 0.001$). Interestingly, staff effort to control pain was more strongly associated with patient satisfaction than whether the pain was actually controlled (OR 5.7, $p < 0.001$). Similarly, in a surgical population of 4349 patients, Hanna et al.¹¹ found that the odds of a patient being satisfied were 4.9 times greater if pain was controlled and 9.9 times greater if the staff performance was appropriate. Additionally, Iannuzzi et al. studied surgical patients and found that the perception of providers addressing pain control outranked actual pain control in terms of impact on global patient satisfaction.¹³ Our results add to the growing body of evidence to suggest that a meaningful attempt at controlling a patient's pain in a surgical setting is more important to patients than actually controlling the pain.

Pain management programs that focus on patient-provider communication may succeed in helping patients better understand how hospital staff is working to minimize pain. In a national survey of 250 adults who underwent surgery, Apfelbaum et al.¹ found that only two-thirds of patients were spoken to by a health care professional about

TABLE 4. Individual HCAHPS items and their association with top-box OHR

Survey Item Response	Top-Box Overall Rating	
	Adjusted OR (95% CI)	Adjusted p Value
The hospital staff always did everything they could to help you with your pain	12.47 (6.56–23.70)	<0.001*
Nurses always treated you with courtesy and respect	10.97 (5.34–22.56)	<0.001*
Nurses always listened carefully to you	8.61 (4.74–15.65)	<0.001*
Before giving you any new medicine, hospital staff always described possible side effects in a way you could understand	8.39 (3.53–19.91)	<0.001*
Staff took your preferences and those of your family into account in deciding what your health care needs would be	7.84 (4.06–15.15)	<0.001*
Doctors always treated you with courtesy and respect	7.08 (3.49–14.39)	<0.001*
Your room and bathroom were always kept clean	6.38 (3.52–11.57)	<0.001*
You had a good understanding of the things you were responsible for in managing your health	5.84 (3.27–10.43)	<0.001*
Your pain was always well controlled	5.72 (3.10–10.56)	<0.001*
You always got help in getting to the bathroom or using a bedpan as soon as you wanted it	5.52 (2.85–10.72)	<0.001*
Doctors always listened carefully to you	5.49 (2.93–10.27)	<0.001*
Doctors always explained things in a way you could understand	5.01 (2.73–9.18)	<0.001*
The area around your room was always quiet at night	4.25 (2.33–7.75)	<0.001*
Nurses always explained things in a way you could understand	4.17 (2.32–7.49)	<0.001*
Before giving you any new medicine, hospital staff always told you what the medicine was for	3.51 (1.79–6.89)	<0.001*
After you pressed the call button, you always got help as soon as you wanted it	3.20 (1.81–5.66)	<0.001*
You clearly understood the purpose for taking each of your medications	2.65 (1.53–4.58)	0.001*
Patient needed help from staff in using bathroom/bedpan	0.47 (0.24–0.90)	0.024*
You got information in writing about what symptoms or health problems to look out for after you left the hospital	2.94 (1.07–8.13)	0.037*
Hospital staff talked with you about whether you would have the help you needed when you left the hospital	2.57 (0.92–7.20)	0.073
You needed pain medication during your hospital stay	0.34 (0.34–3.40)	0.358
After leaving the hospital, you went directly to your own home	1.41 (0.66–3.01)	0.377

* Statistically significant ($p < 0.05$).

their pain. If, as the current results suggest, communication improves inpatient pain management, then it is possible that patient satisfaction can improve without fueling an increased utilization of opioid analgesic medications. Furthermore, DuPree et al.⁹ demonstrated that improving patient satisfaction with pain management was possible by implementing the Six Sigma DMAIC (Define, Measure, Analyze, Improve, and Control) methodology.

A major concern of using HCAHPS to gauge the quality of hospital care is that patients may not have the knowledge to accurately judge the appropriateness of medical services being provided. This concern is especially pertinent to the Pain Management dimension of HCAHPS, where in response to widespread concerns over opioid analgesic misuse, CMS is finalizing the removal of the Pain Management dimension from the HVB calculations beginning in fiscal year 2018.⁶ Despite their removal from HVB calculations, the strong association between pain management and overall satisfaction seen in our study will persist. As such, effective pain management will continue to be reflected in CMS's reimbursement calculations, albeit indirectly. Further research is required to understand how prescribing patterns influence HCAHPS scores.

Perceiving nurses as always courteous and respectful was the second strongest predictor of top-box OHR in our population, with an odds ratio of 11.0 ($p < 0.001$). The

importance of nursing care as it relates to patient satisfaction has been observed in several prior studies.^{13,16,20} In a retrospective study analyzing 978 HCAHPS responses in a multispecialty surgical department, Iannuzzi et al.¹³ found that patients who perceived their nurses as always being respectful were most likely to have experienced top-box OHR. Furthermore, in a cross-sectional study on HCAHPS responses at 430 hospitals, Kutney-Lee et al.²⁰ found that better nurse work environments, including high nurse-to-patient ratios, were associated with better patient experience and higher HCAHPS scores. In a prospective study by Kennedy et al.,¹⁶ implementing nurse manager rounding, postdischarge phone follow-up, and improved discharge teaching skills in a 28-bed surgical unit in a hospital improved patient satisfaction steadily over the 18-month duration of the study. Another study found that nurses responding to cues from patients in cancer care was independently related to their satisfaction.²⁶ Similar quality improvement efforts might also improve patient satisfaction among lumbar spine surgery patients, given that our results suggest that nursing care is a significant component of the overall patient experience for patients undergoing lumbar spine surgery.

Doctor communication was also a statistically significant predictor for all 3 measures evaluated by HCAHPS: doctor respect, doctor listening, and doctor explanations.

Results reported by Iannuzzi et al.¹³ regarding patients treated in a multispecialty surgical department further support this association between doctor communication and overall satisfaction. In a quality improvement effort, Boissy et al. conducted a study analyzing 3488 physicians in a large, multispecialty medical center to determine the effect of relationship-centered communication skills training on HCAHPS scores.⁵ The authors found that HCAHPS scores improved significantly following the communication skills training. Notably, improvements were similar for surgeons and nonsurgeons. Therefore, system-wide communication training programs involving spine surgeons have the potential to improve HCAHPS scores and offer a reasonable opportunity to realize a return on investment for quality improvement efforts.

While pain management and patient-provider communication were the strongest predictors of overall satisfaction, always keeping the patient's room and bathroom clean was also a strong predictor of satisfaction in our population, with an odds ratio of 6.4 ($p < 0.001$). Therefore, greater attentiveness by hospital staff to cleanliness of the bedroom and bathroom may be an effective means of improving patient satisfaction among patients undergoing lumbar spine surgery. Based on the results of the present study, attentiveness of hospital staff to these issues may lead to more satisfying care for lumbar spine surgery patients.

Although no spine care pathway was implemented at our institution during the time of our study, purported benefits of integrated care pathways include improved collaboration, professionalism, effectiveness of care, physician-patient communication, and patient satisfaction.^{7,15,17,23} However, criticism has been made regarding the focus of care pathways on cost reduction over quality improvement,² and a previous study analyzing a total knee arthroplasty population demonstrated no association between care pathways and patient satisfaction.¹² Moving forward, it will be interesting to monitor how increasing standardization of care impacts the patient experience.

Limitations and Strengths

This study is limited by its observational and retrospective nature. Additionally, these data reflect patient experience measured at a single institution, thus potentially limiting the generalizability of these findings. Furthermore, since a unique multivariable logistic regression model was created for each individual survey question, relative comparison between the odds ratios is limited. Importantly, our primary outcome was only one of the 9 dimensions of the patient experience captured by the HCAHPS questionnaire that are used in calculating a hospital's TPS for the HVBP program. However, we felt that OHR was the most appropriate outcome to study because it is the only global dimension measured on HCAHPS that is used for HVBP calculations. As such, we believed that the overall rating of the hospital was the best measure of overall satisfaction with the hospital experience, especially since the other 8 dimensions focus on specific components of care (i.e., nursing communication). Finally, our patient population consisted of patients undergoing either lumbar decompression or fusion, so it is possible that procedure-specific

variables led to differential experiences in the hospital experience that were not captured in this study. Despite these limitations, the present study is the first to quantify the association between each patient experience dimension and overall satisfaction among the inpatient lumbar spine surgery population.

Conclusions

Under HVBP, the patient experience of care is increasingly being used to determine hospital and physician reimbursement. The present study analyzed the key drivers of patient satisfaction with their overall hospital experience among patients undergoing lumbar spine surgery and found several important associations. Patient-reported overall health status was independently associated with top-box OHR. Regarding individual elements of the patient experience, hospital staff always doing everything they could to help with pain and nurses always being respectful were the strongest predictors of overall satisfaction in this population. These findings highlight opportunities for quality improvement in the setting of lumbar spine surgery.

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Conception and design: Levin, Steinmetz. Acquisition of data: Levin, Winkelman. Analysis and interpretation of data: Levin, Winkelman, Tanenbaum. Drafting the article: Levin, Winkelman, Tanenbaum, Benzel. Critically revising the article: all authors. Reviewed submitted version of manuscript: Levin, Winkelman, Tanenbaum, Mroz, Steinmetz. Approved the final version of the manuscript on behalf of all authors: Levin. Statistical analysis: Levin. Administrative/technical/material support: Benzel, Mroz, Steinmetz. Study supervision: Benzel, Mroz, Steinmetz.

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