J Shoulder Elbow Surg (2021) 30, e165–e172

ELSEVIER

Journal of Shoulder and Elbow Surgery

www.elsevier.com/locate/ymse

Factors that influence inpatient satisfaction after shoulder arthroplasty

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Background: It is important to distinguish satisfaction regarding the outcome of care and satisfaction with the delivery of care. The Consumer Assessment of Healthcare Providers and Systems (CAHPS) surveys are modern assessments of hospitals and providers of delivery of care. The purpose of this study was to report inpatient satisfaction according to Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) and Clinician and Group Consumer Assessment of Healthcare Providers and Systems (CG-CAHPS) scores after shoulder arthroplasty and to determine factors that influence them, as well as their correlation with surgical expectations, pain perception, quality of life, surgical setting, and functional outcomes.

Methods: All patients scheduled for a shoulder arthroplasty were prospectively asked to complete a demographic and initial shoulder assessment form, a shoulder surgery expectations survey, a pain catastrophizing scale, the SF-12 (12-item Short Form) survey, and a resiliency form (Resilience Scale 11). Patient satisfaction was measured with the CG-CAHPS and HCAHPS surveys. Legacy forms, patient-specific factors, type of surgery performed, location of surgery, length of hospital stay, and discharge disposition were evaluated on their ability to predict these survey scores. Linear regression was used to calculate correlations and predictions of continuous variables, and logistic regression was used to compared the satisfied vs. unsatisfied cohorts.

Results: The average HCAHPS and CG-CAHPS satisfaction scores for the population were 74.7 ± 20.7 and 82.1 ± 19.4, respectively. Nonsmokers had a mean HCAHPS score of 77.7 ± 22.0, whereas current smokers reported a mean of 59.6 ± 5.2 ($P = .03$). Patients who were discharged home had a mean HCAHPS score of 77.3 ± 21.9, whereas those discharged to a skilled nursing facility reported a mean of 59.3 ± 6.6 ($P = .05$). These same groups also had significantly higher odds of being satisfied with the hospital. No significant differences or higher odds were seen for comparisons between overall CG-CAHPS satisfaction and any of the patient-specific factors tested. There was no significant correlation between age, length of stay, pain (pain catastrophizing scale), resiliency (Resilience Scale 11), expectations (shoulder surgery expectations survey), or function (SF-12) and both the HCAHPS and CG-CAHPS satisfaction scores.

Conclusion: Overall, 37 patients (74%) had CG-CAHPS scores that indicated satisfaction and 34 patients (68%) had HCAHPS scores that indicated satisfaction. Nonsmokers and patients discharged home after surgery report higher levels of inpatient hospital (HCAHPS) satisfaction after shoulder arthroplasty. Patients with high preoperative surgical expectations, pain perception, and resiliency are not generally more satisfied with the hospital or clinician. Preoperative diagnosis, location of surgery, and length of stay do not reliably impact satisfaction with the hospital or clinician. Inpatient HCAHPS and CG-CAHPS satisfaction does not correlate with legacy functional outcome measures and, therefore, may not be predictive of long-term functional outcomes.

Level of evidence: Level IV; Case Series; Treatment Study

Keywords: Shoulder arthroplasty; satisfaction; CAHPS; sports medicine; shoulder; outcomes

Institutional Review Board approval was received from the University of Cincinnati (no. 2015-6900).

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1058-2746/$ - see front matter
https://doi.org/10.1016/j.jse.2020.07.022

Shoulder arthroplasty is a commonly performed procedure for patients with glenohumeral arthritis. Total shoulder arthroplasty (TSA) and reverse TSA are among the most common shoulder reconstructive surgical procedures performed, and their utilization for various orthopedic conditions continues to increase.[8,21]

Along with the increase in shoulder arthroplasty procedures performed, patient-reported outcome measures (PROMs) and patient satisfaction have become increasingly popular in orthopedic clinical research.[15,32,34] Patient satisfaction is also becoming an important component of health care measurements and has recently been studied in the total knee arthroplasty literature.[7] Although treatment goals such as PROMs and clinical and radiographic findings are important in determining patient satisfaction, there are other contributing factors. For example, demographic factors such as sex,[42] age,[6,23] and profession,[6,23,36] as well as component placement and postoperative pain, have been shown to influence patient satisfaction after orthopedic procedures.[6,36]

In light of these findings, it is important to distinguish satisfaction with the outcome of care, as described earlier, and satisfaction with the delivery of care.[9] The Consumer Assessment of Healthcare Providers and Systems (CAHPS) surveys developed by the Centers for Medicare & Medicaid Services evaluate patient experiences in a variety of health care environments.[3,4] The Clinician and Group Consumer Assessment of Healthcare Providers and Systems (CG-CAHPS) and Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys are examples that analyze provider-specific and facility-based care, respectively.[3,4] Some of these CAHPS surveys are directly tied to public reporting and reimbursement programs. This standardized approach allows for comparisons between hospitals and incentivizes reimbursements to facilities meeting satisfaction standards.[5]

As of 2017, 2% of federal reimbursement was linked to CAHPS surveys.[5] Preliminary studies on CAHPS data have begun, but analysis on orthopedic patients is limited.[10-14,37] To date, CAHPS scores after shoulder arthroplasty have not been studied. The lack of literature on the topic combined with its link with reimbursements suggests that identifying factors that influence CAHPS results is prudent for the orthopedic surgeon and hospital provider. The purpose of this study was to report inpatient satisfaction according to CAHPS scores after shoulder arthroplasty. A secondary purpose was to determine factors that influence inpatient satisfaction after shoulder arthroplasty and the correlation between surgical expectations, pain perception, quality of life, surgical setting, and PROMs and subjective satisfaction.

Methods

All patients scheduled for shoulder arthroplasty were eligible for the study. After patients provided consent for participation in the study, they were prospectively asked to complete an initial shoulder assessment form, a shoulder surgery expectations survey (SSES), a pain catastrophizing scale (PCS), the SF-12 (12-item Short Form) survey, and a resiliency form (Resilience Scale 11 [RS-11]) preoperatively. Patient characteristics comprising age, smoking status, body mass index, sex, and American Society of Anesthesiologists class were collected. All patients in this study received an interscalene block prior to the surgical procedure.

Eight HCAHPS domains were included in the analysis: (1) communication with doctors, (2) communication with nurses, (3) responsiveness of the staff, (4) pain management, (5) communication about medications, (6) discharge instructions, (7) cleanliness and quietness, and (8) overall rating of the hospital. In addition, 5 CG-CAHPS domains were included: (1) ability to obtain timely appointments, care, and information; (2) how well providers communicate with patients; (3) providers' use of information to coordinate patient care; (4) helpful, courteous, and respectful office staff; and (5) patient's rating of the provider. The top-box scoring system was used to convert categorical responses into binary variables for the first through fifth and eighth HCAHPS domains, whereas the binary responses to the sixth and seventh domains were maintained. A similar process was followed for the CG-CAHPS domains. Calculations were performed according to the Agency for Healthcare Research and Quality guidelines that state that the top-box score is the most positive score for a given item's response scale. The most positive score was assigned a value of 1, and all other scores were assigned values of 0. The binary values were then converted into satisfaction percentages for each domain of the CG-CAHPS and HCAHPS surveys and used to calculate one overall satisfaction score for each survey. After completion of prospective preoperative and postoperative assessment, all included patients were then retrospectively reviewed for the type of surgery performed (ie, TSA or reverse TSA), where the surgical procedure was performed, length of stay, and discharge disposition.

Statistical analysis

Descriptive statistics were calculated for continuous variables, and frequencies and percentages were calculated for categorical variables. An analysis of variance or the Student t test was used to evaluate whether differences between $\geq$2 groups were significant. Linear regression analysis was carried out to evaluate whether preoperative age, length of stay, and SF-12, PCS, SSES, and RS-11 scores could predict inpatient satisfaction scores. The relationship between HCAHPS and CG-CAHPS scores with various patient-specific factors and legacy PROMs was evaluated using Pearson correlation coefficients. The strength of the correlations was assessed by the following generally accepted scale: moderate, $r = 0.4$-0.59; strong, $r = 0.60$-0.79; and very strong, $r = 0.80$-1. Satisfied vs. unsatisfied groups were created by using a 33rd percentile threshold, as previously described in the literature.[1,2] Multivariable logistic regression analysis was then performed to evaluate the influence of patient-specific factors, surgical expectations, pain perception, resiliency, surgical setting, and PROMs on overall CG-CAHPS or HCAHPS satisfaction. The results include odds ratios, confidence intervals (CIs), and significance values. Significance was set at $P < .05$.

Results

This study included 50 patients with an average age of 63.6 ± 10.4 years (range, 34.0-84.0 years). Men comprised 48.0% (24 of 50), and women comprised 52.0% (26 of 50). The mean preoperative SSES, PCS, SF-12, and RS-11 scores were 35.8 ± 11.1 (range, 19.0-63.0), 18.2 ± 15.0 (range, 0.0-49.0), 81.6 ± 15.9 (range, 48.1-113.2), and 61.7 ± 16.7 (range, 11.0-77.0), respectively. The average HCAHPS and CG-CAHPS satisfaction scores for the population were 74.7 ± 20.7 and 82.1 ± 19.4, respectively.

An analysis of variance was performed to evaluate any effect that differences in age, sex, preoperative diagnosis, location of surgery, and discharge disposition have on overall HCAHPS and CG-CAHPS satisfaction scores. We observed a significant difference when comparing overall HCAHPS satisfaction based on smoking status and discharge disposition. Nonsmokers had a mean HCAHPS satisfaction score of 77.7 ± 22.0, whereas current smokers reported a mean score of 59.6 ± 5.2 ($P = .03$). Patients who were discharged home had a mean HCAHPS satisfaction score of 77.3 ± 21.9, whereas those discharged to a skilled nursing facility (SNF) reported a mean score of 59.3 ± 6.6 ($P = .05$). Of the 6 patients discharged to an SNF, only 1 was a smoker. No significant differences were seen for comparisons between overall CG-CAHPS satisfaction and any of the patient-specific factors tested. Summaries of patient-specific factors are included in Tables I and II.

Table I Patient-specific factors and overall HCAHPS satisfaction

	n	Satisfaction, mean ± SD, %	*P* value
Age			.29
<65 yr	26	71.7 ± 22.1	
≥65 yr	24	77.7 ± 20.0	
BMI			.45
<30 kg/m^2	29	76.8 ± 20.0	
≥30 kg/m^2	21	71.9 ± 22.7	
Sex			.53
Male	24	72.8 ± 20.2	
Female	26	76.7 ± 22.5	
Smoking status			.03
Nonsmoker	42	77.7 ± 22.0	
Current smoker	8	59.6 ± 5.2	
Preoperative diagnosis			.81
RTC	18	77.6 ± 21.8	
OA	21	75.0 ± 19.8	
Revision surgery	6	67.7 ± 30.2	
Other	5	72.6 ± 17.7	
ASA score			.88
1	1	59.5[†]	
2	23	75.5 ± 25.2	
3	25	75.1 ± 18.2	
4	1	66.7[†]	
All shoulder surgical procedures			.74
TSA	21	76.0 ± 20.2	
RTSA	29	74.0 ± 22.4	
Location of surgery			.41
Level I	20	77.9 ± 20.1	
Level III	30	72.6 ± 21.3	
Length of stay			.97
1 d	33	74.7 ± 20.2	
>1 d	17	75.0 ± 23.9	
Location to which patient was discharged[*]			.05
Home or HWH	43	77.3 ± 21.9	
SNF	6	59.3 ± 6.6	

HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems; *SD*, standard deviation; *BMI*, body mass index; *RTC*, rotator cuff; *OA*, glenohumeral arthritis; *ASA*, American Society of Anesthesiologists; *TSA*, anatomic total shoulder arthroplasty; *RTSA*, reverse total shoulder arthroplasty; *HWH*, home with health care services; *SNF*, skilled nursing facility.

[*] One patient left against medical advice.

[†] SD not included for n = 1.

Table II Patient-specific factors and overall CG-CAHPS satisfaction

	n	Satisfaction, mean ± SD, %	*P* value
Age			.26
<65 yr	26	85.0 ± 17.5	
>65 yr	24	78.8 ± 21.4	
BMI			.88
<30 kg/m^2	29	82.5 ± 19.4	
>30 kg/m^2	21	81.6 ± 19.8	
Sex			.27
Male	24	78.9 ± 21.9	
Female	26	85.1 ± 16.7	
Smoking status			.13
Nonsmoker	42	83.9 ± 19.3	
Current smoker	8	72.6 ± 18.3	
Preoperative diagnosis			.85
RTC	18	83.1 ± 20.7	
OA	21	81.7 ± 19.5	
Revision surgery	6	74.4 ± 20.3	
Other	5	87.8 ± 16.7	
ASA score			.16
1	1	40.0[†]	
2	23	83.6 ± 18.4	
3	25	82.0 ± 19.4	
4	1	93.3[†]	
All shoulder surgical procedures			.90
TSA	21	82.5 ± 19.5	
RTSA	29	81.8 ± 19.7	
Location of surgery			.31
Level I	20	78.7 ± 22.3	
Level III	30	84.4 ± 17.2	
Length of stay			.79
1 d	33	82.7 ± 19.3	
>1 d	17	81.1 ± 20.2	
Location to which patient was discharged[*]			.89
Home or HWH	43	81.6 ± 19.6	
SNF	6	82.8 ± 19.8	

CG-CAHPS, Clinician and Group Consumer Assessment of Healthcare Providers and Systems; *SD*, standard deviation; *BMI*, body mass index; *RTC*, rotator cuff; *OA*, glenohumeral arthritis; *ASA*, American Society of Anesthesiologists; *TSA*, anatomic total shoulder arthroplasty; *RTSA*, reverse total shoulder arthroplasty; *HWH*, home with health care services; *SNF*, skilled nursing facility.

[*] One patient left against medical advice.

[†] SD not included for n = 1.

Table III Correlation between overall HCAHPS satisfaction and patient-specific factors

	Mean ± SD	Correlation with satisfaction	*P* value
Age	63.6 ± 10.4 yr	<−0.01	.97
Length of stay	1.5 ± 1.1 d	−0.09	.55
PCS score	18.2 ± 15.0	−0.04	.78
RS-11 score	61.7 ± 16.7	0.01	.95
SSES score	35.8 ± 11.1	0.06	.69
SF-12 score	81.6 ± 15.9	0.21	.18

HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems; *SD*, standard deviation; *PCS*, pain catastrophizing scale; *RS-11*, Resilience Scale 11; *SSES*, shoulder surgery expectations survey; *SF-12*, 12-item Short Form.

Table IV Correlation between overall cg-CAHPS satisfaction and patient-specific factors

	Mean ± SD	Correlation with satisfaction	*P* value
Age	63.6 ± 10.4 yr	−0.17	.24
Length of stay	1.5 ± 1.1 d	−0.15	.30
PCS score	18.2 ± 15.0	0.06	.73
RS-11 score	61.7 ± 16.7	0.06	.71
SSES score	35.8 ± 11.1	−0.15	.34
SF-12 score	81.6 ± 15.9	−0.28	.07

CG-CAHPS, Clinician and Group Consumer Assessment of Healthcare Providers and Systems; *SD*, standard deviation; *PCS*, pain catastrophizing scale; *RS-11*, Resilience Scale 11; *SSES*, shoulder surgery expectations survey; *SF-12*, 12-item Short Form.

Pearson correlation coefficients were calculated to determine the relationship between satisfaction scores and various legacy PROMs, as well as patient-specific factors. There was no significant correlation between age, length of stay, pain (PCS score), resiliency (RS-11 score), expectations (SSES score), or function (SF-12 score) and both the HCAHPS and CG-CAHPS satisfaction scores. Summaries of the correlations are included in Tables III and IV.

By use of the aforementioned method to evaluate overall CAHPS satisfaction, there were 34 satisfied and 16 unsatisfied patients according to the HCAHPS score and 37 satisfied and 13 unsatisfied patients according to the CG-CAHPS score. Multivariable logistic regression analysis was used to evaluate the impact that various predictor variables have on this satisfaction in the presence of more than predictor variable. The odds ratio of patients

Table V Multivariable logistic regression associations between predictors and inpatient satisfaction

	HCAHPS		CG-CAHPS	
	OR (95% CI)	*P* value	OR (95% CI)	*P* value
Age	0.99 (0.90-1.07)	.73	0.95 (0.87-1.03)	.12
BMI				
<30 kg/m^2 (reference)	—	—	—	—
>30 kg/m^2	1.06 (0.18-6.42)	.94	0.37 (0.07-1.93)	.24
Sex				
Male (reference)	—	—	—	—
Female	4.0 (0.50-32.18)	.19	4.47 (0.67-29.70)	.12
Smoking status				
Nonsmoker (reference)	—	—	—	—
Current smoker	0.01 (<0.01 to 1.05)	.05	0.14 (0.01-1.86)	.13
Preoperative diagnosis				
RTC	0.48 (0.02-13.84)	.67	0.87 (0.05-16.40)	.93
OA	2.48 (0.07-85.29)	.62	0.42 (0.01-36.39)	.71
Revision surgery	0.12 (<0.01 to 4.80)	.26	0.07 (<0.01 to 1.80)	.11
Other (reference)	—	—	—	—
All shoulder surgical procedures				
TSA (reference)	—	—	—	—
RTSA	3.78 (0.12-120.85)	.45	0.31 (0.01-16.54)	.56
Location of surgery				
Level I (reference)	—	—	—	—
Level III	0.29 (0.04-2.22)	.23	0.38 (0.07-2.04)	.26
Length of stay				
1 d (reference)	—	—	—	—
>1 d	1.28 (0.19-8.55)	.80	0.64 (0.12-3.30)	.59
Location to which patient was discharged				
Home or HWH	—	—	—	—
SNF	0.02 (<0.01 to 0.75)	.03	4.35 (0.27-69.34)	.30

HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems; *CG-CAHPS*, Clinician and Group Consumer Assessment of Healthcare Providers and Systems; *OR*, odds ratio; *CI*, confidence interval; *BMI*, body mass index; *RTC*, rotator cuff; *OA*, glenohumeral arthritis; *TSA*, anatomic total shoulder arthroplasty; *RTSA*, reverse total shoulder arthroplasty; *HWH*, home with health care services; *SNF*, skilled nursing facility.

discharged home vs. those discharged to an SNF having a satisfactory HCAHPS result was 0.02 (95% CI, <0.01 to 0.57; $P = .03$). In addition, the odds ratio of smokers vs. nonsmokers being satisfied according to the HCAHPS survey was 0.01 (95% CI, <0.01 to 1.05; $P = .05$). None of the variables tested provided a statistically significant odds ratio for satisfaction according to the CG-CAHPS score. Odds ratios for each variable and the effect on HCAHPS or CG-CAHPS satisfaction are included in Table V.

Discussion

Patient satisfaction is becoming an important component of health care measurements. The HCAHPS and CG-CAHPS surveys have recently become the gold-standard and preferred form of reporting patient satisfaction of the Centers for Medicare & Medicaid Services. This trend is relevant for orthopedic surgeons because CAHPS scores are incorporated into financial reimbursement. Therefore, understanding what may or may not affect satisfaction at a provider and hospital level is significant. This study is the first of its kind to report and evaluate predictors of HCAHPS and CG-CAHPS satisfaction scores in shoulder arthroplasty patients.

The results of this study demonstrate that significant differences were found when overall HCAHPS satisfaction was compared based on smoking status and discharge disposition. Specifically, nonsmokers and patients discharged home reported higher overall HCAHPS satisfaction with their inpatient experience after shoulder arthroplasty. Simultaneously, no significant differences were observed for comparisons between overall CG-CAHPS satisfaction and any of the patient-specific factors tested. Odds ratios generated through logistic regression demonstrated that smokers were much less likely to have overall satisfactory HCAHPS and CG-CAHPS scores. Similarly, patients with discharge plans to an SNF rather than home were less likely to be grouped into the satisfied HCAHPS group. Although no studies have reported these scores in shoulder arthroplasty patients, a similar finding was observed for HCAHPS scores based on discharge disposition in total knee arthroplasty patients.[41] The disparity in results between the HCAHPS and CG-CAHPS scores suggests that inpatient satisfaction in smokers and patients not discharged home may be attributable to the global delivery of a hospital system vs. delivery of care by any one individual. Therefore, inpatient satisfaction in smokers and patients discharged to an SNF may be improved by developing consistencies in communication among all providers, pain management, medications, and discharge information.

There are preliminary studies on evaluating satisfaction according to length of hospital stay.[18,24,31,33] Mistry et al[33] reported a negative correlation between length of stay and the HCAHPS satisfaction score in total hip arthroplasty patients ($r = –0.22$). Other studies in total hip and knee arthroplasty have found similar results.[37,41] Li et al[24] discovered that a shorter length of stay was correlated with higher HCAHPS satisfaction with discharge information in patients evaluated in the emergency department. Although the findings in our study may not be significant, the direction of correlation in both HCAHPS and CG-CAHPS scores matches that in studies with larger sample sizes.[37,41]

Other notable findings in our study include the effect that preoperative expectations, resiliency, quality of life, and pain perception have on postoperative inpatient satisfaction. The effect of preoperative expectations on postoperative outcomes and satisfaction has been studied in the orthopedic literature[16,17,19,20,26,29,30,35,39,40,43,44]; however, the methodology and surgical population in this study are different. Many of the previous studies did not evaluate the effect of preoperative expectations on postoperative satisfaction,[17,39,40,43,44] and in those that did, mixed results were reported.[16,19,20,29,30,35] None of these studies evaluated satisfaction using the modern CAHPS measurements. In our study, surgical expectations did not correlate with CG-CAHPS or HCAHPS scores, and we hypothesize that expectations may be more closely tied to personal patient goals than to institutional experiences. In addition, functional outcome measures did not correlate with CAHPS measures, which have been shown to be impacted by attitude and judgment properties such as resiliency, quality of life, and pain perception.[22,25,27,28,38] No legacy PROMs had significant or strong correlations with either HCAHPS or CG-CAHPS satisfaction scores. On the basis of this information, we hypothesize that CAHPS scores are not effective in predicting long-term functional or perceived outcomes of implant surgery.

Strengths and limitations

This study has a number of strengths. Because all the procedures were performed by a single surgeon, the surgical technique and postoperative rehabilitation protocols were standardized, allowing us to control for confounding variables. In addition, the prospective design of this study allowed for more consistent documentation of data endpoints. Furthermore, in previous studies on the HCAHPS or CG-CAHPS surveys in shoulder arthroplasty patients, these surveys have not been correlated with legacy PROMs.

This study also has a number of limitations. Given that all the patients were seen by 1 surgeon at a single institution, the results from this sample may not be generalizable to the greater population. The policy at this institution is that patients who leave the hospital to smoke are considered to be discharged. This could have lowered the scores in the cohort of smokers. In addition, using the top-box scoring system may yield lower scores than using aver-

ages[2] and conceal relationships between patient-specific factors or legacy PROMs and individual domains.

Conclusion

Overall, 37 patients (74%) had CG-CAHPS scores that indicated satisfaction and 34 patients (68%) had HCAHPS scores that indicated satisfaction. Nonsmokers and patients discharged home after surgery report higher levels of inpatient hospital (HCAHPS) satisfaction after shoulder arthroplasty. Patients with high preoperative surgical expectations, pain perception, and resiliency are not generally more satisfied with the hospital or clinician. Preoperative diagnosis, location of surgery, and length of stay do not reliably impact satisfaction with the hospital or clinician. Inpatient HCAHPS and CG-CAHPS satisfaction does not correlate with legacy functional outcome measures and, therefore, may not be predictive of long-term functional outcomes.

Disclaimer

The authors, their immediate families, and any research foundations with which they are affiliated have not received any financial payments or other benefits from any commercial entity related to the subject of this article.

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