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Perceived Pain and Satisfaction with Medical Rehabilitation after Hospital Discharge

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Abstract

Objective—To examine the association between pain and satisfaction with medical rehabilitation in patients with hip or knee replacement approximately 90 days after discharge from in-patient medical rehabilitation.

Design—A cross-sectional design.

Participants—The sample included 2,507 patients with hip or knee replacement using information from the IT HealthTrack medical outcome database.

Main outcome measure—Satisfaction with medical rehabilitation.

Results—The average age was 70.2 years, 66.5% were female, and 88.5% were non-Hispanic white. Pain scores were significantly and inversely associated with satisfaction with medical rehabilitation after adjustment for possible confounding factors. In patients with hip replacement each one-point increase in pain score was associated with a 10% decreased odds ratio of being satisfied with medical rehabilitation (OR 0.90, 95 % CI: 0.84, 0.96). In patients with knee replacement, each one-point increase in pain score was associated with a 9% decreased odds ratio (OR 0.91, 95% CI: 0.87, 0.96) of being satisfied with medical rehabilitation.

Conclusion—Our data indicate that postoperative pain from hip or knee replacement is associated with reduced satisfaction with medical rehabilitation. Better post-operative pain control may improve a patient's level of satisfaction.

Keywords

Patient satisfaction; Pain; Rehabilitation; joint replacement

Patient satisfaction is recognized as important to the field of medical rehabilitation. As a marker of quality of care,¹ patient satisfaction assesses program efficacy and the delivery of health care services, as well as providing information on the medical experience of the individual. Though most patients report high levels of satisfaction, those dissatisfied with their medical experience often fail to keep scheduled appointments, are more likely to change physicians, and are less likely to comply with medical treatments.²

The growing emphasis placed on patient satisfaction has made it vital to understand associated indicators from which these evaluations are based. Initially, research sought to establish relations with a broad range of patient sociodemographic characteristics including age, gender, ethnicity, and marital and socioeconomic status.³ The general conclusion from these studies was that sociodemographic characteristics were at best weak predictors of patient satisfaction. Subsequently, studies began to explore associations with clinical markers of recovery such as functional status.⁴ Functional status, which includes indicators of motor and cognitive ability, was found to have a strong and positive association with patient satisfaction.⁴ The finding that functional status was related to patient satisfaction was important as it gave providers of rehabilitation services an objective means to track and possibly improve patient satisfaction.

Another clinically important marker of recovery that may influence patient satisfaction is pain.^{5,6,7} Among patients undergoing surgical procedures, pain is one of the five most undesirable complications.⁸ Unrelieved pain can adversely affect the individual's ability to perform basic daily activities,⁹ as well as increase length of hospital stay and re-hospitalizations. The result may lead to increased health care costs and decreased patient satisfaction.

Because the most common surgical procedures in the United States are joint replacement surgeries,⁶ the current study was interested in examining the association between pain and satisfaction with medical rehabilitation among hip and knee replacement patients. We hypothesized that pain ratings would be inversely associated with satisfaction with medical rehabilitation.

Methods

Source of Data

Data were examined for 2,507 adult patients from the IT Health Track database for the year 2001. IT Health Track collects rehabilitation outcomes and follow-up information for 130 rehabilitation facilities across the United States. This database includes information clinically relevant to the subscribing hospitals and includes demographic factors, diagnoses (ICD codes), facility characteristics, discharge setting, functional status, length of hospital stay, and patient characteristics. Follow-up information is collected by nurses trained in telephone data collection methods. The interrater reliability and stability of the follow-up information has been established, with intraclass correlation coefficients (ICC) values ranging from 0.86 to 0.99.¹⁰ Detailed information regarding reliability and validity for the data collection process has been reported by Smith and colleagues.¹⁰

Study Population

The initial study sample included 2,599 persons with hip (CMS codes 8.5 – 8.52) or knee replacement (CMS code 8.6 – 8.62) who had complete information at admission to inpatient medical rehabilitation facilities. Of these, 2,507 (96.4 %) completed the follow-up assessment 80 – 180 days after discharge. Consent for research participation was obtained from patients at admission to the rehabilitation facility. The institutional review board of each participating rehabilitation facility granted approval of the data collection.

Outcome Measure

Patients were asked at follow-up interview to “please rate your overall satisfaction with the rehabilitation program”. Responses were coded using a 4-point ordinal scale (1 = very dissatisfied, 2 = somewhat dissatisfied, 3 = somewhat satisfied, and 4 = very satisfied). The statistical consistency of soliciting information on satisfaction with medical rehabilitation by telephone interview has been established.¹⁰ For analyses purposes, the satisfaction measure was used as a 4-level ordinal variable and as a dichotomized variable (satisfied and dissatisfied).

Main Independent Measure

Patients were asked at the follow-up interview to rate their current level of pain. Responses were coded using an 11-point scale ranging from no pain (score = 0) to worst pain possible (score = 10). The single-item measure of pain intensity is the most widely used rating scale in clinical studies. Huskisson¹¹ reported correlations ranging from 0.71 – 0.78 between analog pain scales and 4- and 5-point descriptive pain scales. Previous research has also established the psychometric properties of a 0 – 10 pain rating scale.¹² For analyses purposes, the pain score was used as a continuous variable (score = 0 – 10) and as a categorical variable (0, 1–3, 4–6, 7–9, and 10).

Covariates

Demographic covariates included: Age (continuous), gender ('0' = men and '1' = women), marital status ('1' = married and '0' = not married), and ethnicity ('0' = non-Hispanic white, '1' = non-Hispanic black, '2' Hispanic). Length of hospital stay was calculated as the total number of days the patient received in-patient medical rehabilitation. Functional status was assessed at the follow-up interview using the *Functional Independence Measure* (FIM instrument).¹³ The FIM instrument measures functional status using 18 questions covering six domains: self-care, sphincter control, mobility, locomotion, communication, and social cognition. The FIM includes two subscales: motor and cognitive. The motor subscale includes the first four domains (13 items), and the cognitive subscale includes communication and social cognition (5 items). The instrument is scored by using a seven-level rating, where the lowest possible score per item is 1 (most dependent) and the highest is 7 (most independent). The reliability, validity, and responsiveness of the FIM instrument have been widely investigated, and has consistently produced correlation and statistical values greater than 0.85.¹⁴

Statistical Analysis

The analysis examined demographic, length of hospital stay, and FIM scores for patients with hip or knee replacement using descriptive and univariate statistics for continuous variables and contingency tables for categorical variables. Chi-square statistics was used to examine associations between pain and satisfaction with medical rehabilitation separately for hip and knee replacement patients.

Cumulative logit models (i.e. ordered logit models) assessed the association between pain score and satisfaction with medical rehabilitation, adjusting for demographic factors, length of hospital stay, and FIM score. Each reported odds ratio (and 95% CIs) for the cumulative logit models is interpreted as the effect of pain on the odds of being in a higher patient satisfaction level rather than in a lower patient satisfaction level. Model assumptions for the cumulative logit models were tested and met. All analyses were performed using SAS - Version 9.0.¹⁵

Results

Table 1 presents demographic characteristics and health related factors of the sample. The mean age was 70.2 years (SD = 10.2, range = 40–100), 66.5% were female and 56.2% were married; the majority were non-Hispanic white (88.5), followed by non-Hispanic black (8.2), and Hispanic (3.3). The mean length of stay was 8.1 days (SD = 4.3, range 0–52), and the mean FIM score was 119.6 (SD = 7.4, range 42–126).

Table 2 shows the unadjusted association between categorical pain score and satisfaction with medical rehabilitation for hip and knee replacement patients. For both hip and knee replacement groups an inverse gradient of association was observed, where higher pain score was associated with lower satisfaction with medical rehabilitation. In patients who underwent hip replacement

and reported no pain, 59.1% were satisfied with their medical rehabilitation. In knee replacement patients the corresponding percentage was 47.6%. Conversely, among hip and knee replacement patients who reported the highest pain score, only 1% and 1.1%, respectively, reported being satisfied with their medical rehabilitation.

Relation between continuous pain score and satisfaction with medical rehabilitation was then assessed for all patients using cumulative logit models. We first tested four interactions: pain by marital status, pain by age, pain by ethnicity, and pain by gender on satisfaction with medical rehabilitation. All interactions were non-significant. Table 3 shows the main effect of pain on satisfaction with medical rehabilitation with and without adjustment for demographic characteristics and health related factors. In Model 1 (unadjusted), higher pain score was significantly associated with an 11% decreased odds of being satisfied with medical rehabilitation (OR 0.89; 95% CI: 0.86, 0.93). In Model 2, with the addition of age, gender, marital status, and ethnicity the associated odds ratio between pain score and satisfaction with medical rehabilitation was similar to Model 1 (OR 0.89; 95% CI: 0.85, 0.92). In Model 3, after further adding length of hospital stay and FIM score to the analysis, higher pain score remained a significant independent predictor of satisfaction with medical rehabilitation (OR 0.91, 95% CI 0.87, 0.95). With the exception of FIM score (1.02; 95% CI: 1.01, 1.04), all other covariates in Model 3 showed a non-significant association with satisfaction with medical rehabilitation.

Model 3 was re-analyzed for the two replacement groups - hip and knee (Table 4). In patients with hip replacement, each one-point increase in pain score was associated with a 10% (OR 0.90, 95% CI 0.84, 0.94) decreased odds of being satisfied with medical rehabilitation. In patients with knee replacement, each one-point increase in pain ratings was associated with a 9% (OR 0.91, 95% CI 0.87, 0.96) decreased odds of being satisfied with medical rehabilitation. Other significant predictors for the hip replacement group included being married (OR 0.64; 95% CI 0.42, 0.98) and FIM score (OR 1.03; 95% CI: 1.00, 1.05). FIM score (OR 1.03; 95% CI: 1.01, 1.05) was also significantly associated with satisfaction with medical rehabilitation in the knee replacement group.

Discussion

The current study assessed the association between pain score and satisfaction with medical rehabilitation in patients with hip or knee replacement approximately 90 days after discharge from in-patient medical rehabilitation. To increase the clinical applicability of our findings, we used the Centers for Medicare and Medicaid Services (CMS) impairment codes to identify patients with hip or knee replacement (codes 8.6–8.62 and 8.5–8.52). Our results showed an inverse association between pain score and satisfaction with medical rehabilitation. Each one point increase in pain score significantly reduced the likelihood of being satisfied with medical rehabilitation for hip and knee replacement patients; though, those with knee replacement reported less satisfaction with medical rehabilitation than those with hip replacement. This finding was similar to other studies where patients who underwent knee replacement surgery reported more pain than those who underwent hip replacement surgery.⁶ The finding indicating pain as a significant predictor of satisfaction with medical rehabilitation was also in agreement with other studies that found pain intensity to independently predict patient satisfaction in post-surgical patients.⁵

Limited studies have explored associations between pain and patient satisfaction with medical rehabilitation.^{16,17} Commonly, studies have focused on satisfaction with analgesic treatments, where pain intensity has consistently shown an inverse association with measures of satisfaction.^{5,6,18,19} As a result, research began to explore physician's views regarding pain management including concerns about long-term drug dependency, delays in obtaining analgesic prescriptions, and lack of adequate assessment and treatment of pain.²⁰

Investigations began to document discrepancies in pain assessments between patients and clinicians indicating clinicians frequent under-reporting on the severity of patient's pain.^{5,21} The disparity in assessments between patients and clinicians has placed added importance on the patient's subjective evaluations and judgments of well-being.

The current study contributes to the satisfaction literature by showing a significant linkage between a common medical complication (pain) and an important health outcome (patient satisfaction). Our results are further strengthened by the large sample size and the use of CMS diagnostic codes. An important limitation of the study, however, is the cross-sectional design, where a causal connection among the key variables of interest cannot be assumed. However, it is likely that pain ratings precede feelings of satisfaction, though this needs to be confirmed through longitudinal analyses. The use of a single-item satisfaction measure is another limitation of the study. Criticisms of single-item measures include a lack of discriminatory power beyond a general attitude toward medical services. Nonetheless, meta-analytic reviews of studies on satisfaction with medical rehabilitation, have found single-item measures useful, yielding similar results as multidimensional measures.² A similar concern is the use of a single-item measure of pain (intensity). Although a single-item-scale on pain does not allow for the discrimination of types of pain, visual analog scales of pain provide robust, reproducible methods of expressing pain severity, and are known to correlate well with other measures of pain.¹⁴

Joint replacement surgeries were first performed about four decades ago and today are considered one of the most important surgical advances of this century.²² More than 172,000 hip and knee replacement surgeries are performed each year in the United States at a cost of 3.2 billion dollars.²³ As the projected number of persons aged 65 and older increases from 35 million in 2000 to 79 million by 2050,²⁴ the prevalence of hip and knee replacement surgeries will also likely increase. Given the growing emphasis on patient-centered health outcome, providers of rehabilitation services need to view pain management as a vital component of health care delivery.

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Clinical messages

- Postoperative pain after hip or knee replacement is a determinant of patient satisfaction.
- Pain management needs to be an integral component of rehabilitation programs.

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Table 1

Demographic and clinical data for the total sample and by replacement group.

Clinical or Demographic Variable	Total Sample	Hip Sample	Knee Sample
<i>n</i>	2,507	961	1,546
Age, Mean (SD)	70.2 (10.2)	70.5 (10.9)	70.0 (9.8)
Sex, (%)			
Male	838 (33.4)	348 (36.2)	490 (31.7)
Female	1,669 (66.6)	613 (63.8)	1,056 (68.3)
Marital Status, (%)			
Not married	1,099 (43.8)	443 (46.1)	656 (42.4)
Married	1,408 (56.2)	518 (53.9)	890 (57.6)
Ethnicity, (%)			
non-Hispanic White	2,217 (88.4)	862 (89.7)	1,355 (87.7)
non-Hispanic Black	207 (8.3)	74 (7.7)	133 (8.6)
Hispanic	83 (3.3)	25 (2.6)	58 (3.7)
Pain, Mean (SD)	2.1 (2.6)	1.8 (2.6)	2.2 (2.7)
Length of Stay, Mean (SD)	8.1 (4.3)	8.4 (4.3)	7.8 (4.3)
FIM, Mean (SD) [*]	119.6 (7.4)	118.5 (8.4)	120.5 (6.6)

* FIM: Functional Independence Measure

Table 2

Level of pain and satisfaction with medical rehabilitation by hip and knee replacement.

Pain	Satisfied with medical rehabilitation	
	Hip replacement ^a n (%)	Knee replacement ^b n (%)
0	545 (59.1)	700 (47.6)
1-3	163 (17.7)	366 (24.9)
4-6	138 (15.0)	277 (18.8)
7-9	67 (7.2)	111 (7.6)
10	9 (1.0)	16 (1.1)

^a $\chi^2 = 10.85, p < 0.028.$

^b $\chi^2 = 15.82, p < 0.003.$

Table 3

Cumulative logit models assessing the association between pain score and satisfaction for patients with lower extremity joint replacement (n = 2,507).

Clinical or Demographic Variable	Satisfaction with medical rehabilitation		
	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)
Pain (0 – 10)	0.89 (0.86, 0.93)	0.89 (0.85, 0.92)	0.91 (0.87, 0.95)
Age (continuous)		0.99 (0.98, 1.00)	1.00 (0.98, 1.01)
Female (vs. male)		0.80 (0.62, 1.03)	0.82 (0.64, 1.06)
Married (vs. Not married)		0.84 (0.66, 1.07)	0.82 (0.64, 1.05)
Ethnicity (White vs. non-White)		1.22 (0.91, 1.62)	1.32 (0.98, 1.78)
Length of Stay (0 – 52)			1.01 (0.98, 1.04)
FIM* (42 – 126)			1.02 (1.01, 1.04)

* FIM: Functional Independence Measure

Table 4

Cumulative logit models assessing the association between pain score and satisfaction for persons with hip and knee replacement.

Clinical or Demographic Variable	Satisfaction with medical rehabilitation	
	Hip replacement (n = 961) OR (95% CI)	Knee replacement (n = 1,546) OR (95% CI)
Pain (0 – 10)	0.90 (0.84, 0.96)	0.91 (0.87, 0.96)
Age (continuous)	1.00 (0.98, 1.02)	0.99 (0.98, 1.01)
Female (vs. male)	0.90 (0.59, 1.38)	0.76 (0.55, 1.06)
Married (vs. Not married)	0.64 (0.42, 0.98)	0.94 (0.70, 1.27)
Non-Hispanic White (vs. Other)	1.19 (0.70, 2.02)	1.42 (0.98, 2.04)
Length of Stay (0 – 52)	1.02 (0.97, 1.08)	1.00 (0.97, 1.03)
FIM* (18 – 123)	1.03 (1.00, 1.05)	1.03 (1.01, 1.05)

* FIM: Functional Independence Measure