

Expectations, Outcomes, and Medical Costs in Patients with Low Back Pain Referred to Physical Therapy

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ABSTRACT

To describe treatment expectations among patients referred to physical therapy (PT) for low back pain (LBP) and to examine the relationship among expectations, outcomes, and medical care costs, 111 patients referred to PT for LBP within a managed care environment were studied in a prospective cohort study. Both χ^2 and Student's *t* tests, as well as one-way analyses of variance, were used to assess bivariate differences in expectations, outcomes, and medical costs. A backward-stepping multivariate regression algorithm was used to assess the role of expectations, controlling for patient characteristics on (1) the change in patient-reported improvement between admission and discharge, and (2) annual medical expenditures. Patients' treatment expectations, pain levels, and functional levels were measured at the initial PT visit. Pain and functional status were also measured at PT discharge. Medical care expenditures were compiled for the 12 months following PT referral. Patients with the highest level of expectations reported the greatest level of improvement at PT discharge and had the lowest 12-month average medical care expenditures. Conversely, patients with the lowest level of expectations reported the lowest level of improvement and had the highest 12-month average medical expenditures. LBP patients' expectations about treatment were associated with outcomes, and additionally predictive of medical care expenditures. We found that among LBP patients referred to PT, patients with the highest expectation level at baseline reported the greatest improvement and the lowest medical care expenditures.

INTRODUCTION

USUALLY A BENIGN and self-limiting condition, low back pain (LBP) is extremely prevalent and one of the foremost reasons for physician visits in the United States.¹ Management of LBP drives a significant amount of medical resource utilization, and medical costs for its treatment have been estimated to be nearly \$25 billion annually.² Initial visits for

LBP are generally to a primary care physician (PCP),^{1,3} and frequently result in referral to physical therapy (PT).⁴ Understanding which patients are most likely to benefit from PT is essential to ensuring the appropriate use of limited health care resources.

In addition to a patient's symptoms, physical examination findings, and imaging results, there are other factors thought to be predictive of medical resource utilization (including re-

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ferral to PT) and related costs. These factors can include practice setting, secondary gain issues (i.e., worker's compensation, litigation, etc.), provider type, and patient expectations about treatment.⁵

This paper examines the role of patient expectations on patient-reported outcomes and medical costs in patients referred to PT in a managed care environment. Understanding the relationship of expectations, care outcomes, and subsequent costs may help future patients with LBP and their health care providers as they consider treatment options.

SUBJECTS AND METHODS

During the first 6 months of 1999, patients 18–65 years old were prospectively recruited in the PT department affiliated with a multispecialty group practice. Patients were excluded if they had cauda equina syndrome, developmental spinal deformities, were pregnant, non-English-speaking, or had severe comorbid conditions that kept them from participating. All patients were referred from primary care and were physician-diagnosed with a back condition. In this study patients could present with a back condition and exhibit back pain only, back and leg pain, or leg pain only. To ensure we had complete information on medical resource utilization, we limited the study cohort to those who were continuously enrolled in an affiliated managed care organization for the 12 months following initial treatment (i.e., the study year). The resultant sample included 111 patients.

Patient demographic characteristics, back and radicular symptoms, pain, therapist evaluation, and functional status were obtained at the patient's initial PT visit. The primary measure of pain and functional distress was the North American Spine Society's (NASS) pain and function instrument for the lumbar spine.⁶ The NASS scale was administered as a paper-and-pencil survey on machine-scannable response forms. Responses for individual items took the form of six discrete possibilities scored from 1, the least pain or disability, through 6. A combined score was then computed yielding scores from 0, no pain and/or disability diffi-

culties, to 100. The NASS instrument has been used in similar populations, and it has been shown to have acceptable psychometric properties.⁷ The NASS scale was completed upon referral to PT and discharge from PT. The change in NASS score, from the patient's initial visit to discharge, is the main outcome variable in our analyses.

At their initial PT visit patients were also asked to rank, on a scale from 1 to 5 (where 1 = not at all likely and 5 = extremely likely), the results they expected from their treatment in five domains: (1) relief from symptoms (pain, stiffness, swelling, numbness, weakness); (2) to do more everyday household or yard activities; (3) to sleep more comfortably; (4) to go back to my usual job; and (5) to exercise and do recreational activities. The five items were combined into an expectations scale and scored from 0 to 100, where 0 represented the lowest level of combined expectations and 100 the highest.

Automated medical group administrative records were used to compile data on each patient's comorbid condition(s). This was done by searching computerized encounter databases to identify International Classification of Disease, 9th revision, Clinical Modification (ICD-9-CM) codes associated with each patient's hospitalizations and outpatient visits during the study year. These data were used to construct the Deyo adaptation of the Charlson Comorbidity Index.⁸

In addition to ICD-9-CM codes, we also searched computerized encounter and claims databases to identify all medical care received between the patient's initial PT visit and the subsequent 12 months. We used institutional ratios of costs to charges to estimate associated costs. Thus, reported costs represent those incurred by a medical group at risk for externally provided services. All reported dollar amounts are in 1999 dollars.

Statistical analyses

Statistical analyses were carried out using a commercial software package (SPSS, Inc., Chicago, IL). Both χ^2 and Student's *t* tests, as well as one-way analyses of variance, were used to assess bivariate differences in expectations, outcomes, and medical costs. Regression

analysis was used to assess the role of expectations, controlling for patient characteristics, on (1) the change in patient-reported improvement between admission and discharge from PT and (2) annual medical expenditures. The following variables were included in the multivariate models: initial NASS score, worker's compensation status, age, gender, race, acuity, symptom location, and the Charlson Comorbidity Index. A backward-stepping algorithm was used, and variables were retained if their *p* values were at least at the 5% level.

RESULTS

Patients' baseline characteristics are reported in Table 1. Over two-thirds of sample members were women, 48% were white, and the mean age was 46 years, ranging from 19 to 64 years. Only 7.2% percent of the patients were receiving, applied for, or planning to apply for worker's compensation.

The majority of patients demonstrated both low back and radicular symptoms and on average had their symptoms for 3–6 months upon referral to PT. Patients reported an average expectation score of 77 (range 0–95). The average patient-reported pain and function score was 46 (range 5–100). The average Charlson index

TABLE 2. AVERAGE IMPROVEMENT IN PAIN AND FUNCTION (NASS SCALE) AND MEDICAL CARE COSTS BY LEVEL OF PATIENT EXPECTATIONS

<i>Expectations</i>	<i>Annual medical care costs</i>	<i>Improvement in pain and function</i>
High	\$2,409.00	34.11
Medium	\$2,868.00	23.37
Low	\$6,813.00	16.35
<i>p</i> value	0.03	<0.01

was 0.53 and ranged from 0 to 6. The Charlson index was significantly different (*p* = 0.01) by patient expectations. Patients with the lowest expectations had a Charlson score 6.9 times larger than those with the highest expectations, 0.15 and 1.04, respectively. Such low Charlson scores depict a relatively healthy patient population.

As illustrated in Table 2, patients with the highest level of expectations reported the greatest level of improvement at discharge from PT and had the lowest 12-month average medical care costs. Conversely, patients with the lowest level of expectations reported the lowest level of improvement and had the highest 12-month average medical costs.

Multivariate model findings confirmed that patients with the lowest expectations had less improvement ($\beta = -14.20, p < 0.01$) and higher total medical costs ($\beta = 6,495.49, p < 0.01$) compared with patients with high expectations. Initial pain and function score ($\beta = 0.433, p < 0.01$), having symptoms for less than 3 weeks ($\beta = 16.42, p < 0.01$), and minority race ($\beta = -12.01, p = 0.01$) were also significant in predicting improvement as measured with the NASS scale.

DISCUSSION

As with past work that has shown expectations predictive of outcomes^{9,10} we found that LBP patients' expectations about treatment were associated with outcomes, and additionally with subsequent medical care expenditures: Among LBP patients referred to PT, we found patients with the highest expectation level at baseline reported the greatest average

TABLE 1. BASELINE CHARACTERISTICS

<i>Characteristics</i>	<i>Value</i>	<i>SD</i>
Demographics		
Age (mean, years)	45.7	11.00
Sex (% male)	37.0	0.48
Race (% white)	47.8	0.49
Compensation (%) ¹	7.2	0.26
Acuity		
<3 weeks (%)	22.5	0.42
3 weeks–6 months (%)	51.0	0.50
>6 months (%)	26.5	0.44
Symptoms		
Back pain only (%)	39.6	0.49
Leg pain only (%)	8.5	0.28
Back and leg pain (%)	51.9	0.50
Pain and function scale (mean)	46.2	21.30
Expectations scale (mean)	77.2	22.00
Charlson score	0.53	1.00

¹Worker's compensation, disability, and/or Social Security payments.

improvement and incurred the lowest medical care costs. Additionally, we found that patients with the lowest expectations also had the highest Charlson scores and patients with the highest expectation scores had the lowest Charlson scores.

We can only speculate as to why these results occur and if there is an opportunity to improve outcomes and lower medical care expenditures by influencing patient treatment expectations. One possibility is that a patient's expectation about treatment reflects a tendency to be generally optimistic. Higher levels of optimism may, therefore, result in patients reporting better treatment outcomes and result in lower health care utilization. Consequently, simple efforts to raise the level of expectations for a specific treatment is unlikely to affect an individual's level of optimism and have little effect on outcomes and/or costs. Another possibility is that patients' post-treatment outcomes reflect a self-fulfilling prophecy. If this is the case, raising patients' expectations to a higher (realistic) level will improve outcomes and reduce medical resource utilization. More research is needed to determine if altering patients' expectations about treatment can result in improved outcomes and affect medical expenditures.

When interpreting our results, several limitations apply. Our outcome measures are self-reported. It is possible that patients reported outcome assessments to be consistent with their initial expectations. Also, in this observational study, we were able to identify associations, but these associations are not necessarily causal. As this study used a convenience sample of patients referred to PT from one medical group, findings may not be generalizable to other settings and patients. However, the results are consistent with other studies evaluating the relationship between expectations and outcomes. Finally, although we used multivariate techniques to control for potential confounding factors, there may be confounding factors, such as job satisfaction, that affect outcomes and costs and were not available for model inclusion.

Despite these limitations, our results demonstrate that patients with higher expectations have better outcomes and lower future medical care costs. Therefore, ascertaining a patient's expectation level prior to referral to PT may

help PCPs and therapists identify patients most likely to benefit from therapy.

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