Patterns and Determinants of Multiple Provider Use in Patients with Acute Low Back Pain

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OBJECTIVE: To describe the patterns of provider use associated with an acute episode of nonspecific low back pain and their impact on cost.

METHODS: The analysis is based on a prospective cohort study of patients with acute low back pain followed until they recovered completely or to 6 months. Patients were followed after an initial visit to one of four provider types: private primary care physician, chiropractor, orthopedic surgeon, or HMO primary care physician. Follow-up interviews were conducted at baseline, 2, 4, 8, 12, and 24 weeks; 1,580 (97%) of the participants completed the 6-month follow-up.

MAIN RESULTS: Seventy-nine percent of patients saw only the initial provider who began their care for low back pain. Logistic regression revealed that duration of pain prior to initial visit, sciatica, higher Roland disability score, days to functional recovery, interval to complete recovery, referral by initial provider, disk attribution, satisfaction, and the type of index provider were significantly ($p < .05$) associated with seeking care from multiple provider types. Age, race, gender, and education were not significant. The adjusted proportions of multiple provider type use were 14% (95% confidence interval [CI] 11%, 17%) for the private primary care provider stratum; 19% (95% CI 16%, 23%) for the chiropractic stratum; 30% (95% CI 23%, 37%) for the orthopedic stratum; and 9% (95% CI 5%, 14%) for the HMO primary care physician stratum. Cost of seeing only the index provider was \$439 (95% CI \$404, \$475), and cost of seeing multiple provider types was \$1,137 (95% CI \$1,064, \$1,211) based on the adjusted model.

CONCLUSIONS: Use of multiple provider types, is associated with several factors, one of which is the initial provider type. The cost of such use is significant.

KEY WORDS: low back pain; health care utilization; cost; disability; chiropractors.

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Acute nonspecific low back pain is a ubiquitous and recurrent symptom complex for which patients seek the services of a health care provider. Patients with low back pain may seek care from an array of providers: pri-

mary care providers, surgeons, chiropractors, physical therapists, and massage therapists. The most commonly seen practitioners are primary care providers (seen by nearly 60% of all patients), followed by orthopedic surgeons (37%), and chiropractors (30%), with patients on occasion seeing multiple provider types.¹ Medical costs for the evaluation and treatment of low back pain are estimated to be nearly \$25 billion annually.²

Evidence indicates that neither time to functional recovery nor duration to complete recovery from pain is influenced by the provider type a patient initially sees for acute low back pain. However, there is a differential in cost and patient satisfaction among the initial providers seen, with orthopedic surgeons and chiropractors having both more costly outpatient episodes and higher patient satisfaction ratings than primary care providers.³

The relation between changes in providers, cost of medical care, and severity of disease has not been addressed frequently in the literature. In a 1974 population survey of individuals with a variety of complaints, approximately one half of those surveyed reported that they had changed doctors of their own volition in the past.⁴ If the rate of changing medical providers in patients with low back pain approximates this high percentage, the costs of treating low back pain may be elevated as a result. Considering that acute low back pain is one of the most common reasons for seeking care from a medical provider, and that the total costs of caring for patients with acute low back pain are already significant, we questioned the role that changing providers plays in adding to the cost.

The objectives of our analysis are to describe the patterns of provider use associated with an acute episode of nonspecific low back pain and to profile those individuals who sought care from multiple provider types. We also explore the impacts of changing provider types on costs of care and on expressed preferences for provider types during subsequent acute episodes of low back pain. Finally, we address whether patients initially seeking care from a primary care provider, either one who is part of a private group or one who is part of a group-model HMO, have different patterns of care seeking and resource utilization than those initially seeing a specialist.

METHODS

The data for the analysis are from a prospective cohort study completed in the state of North Carolina during 1992 and 1993 of the outcomes of care in patients with low back pain. The study followed a group of patients with acute low back pain for 6 months beginning at the time of their initial visit to a medical provider.

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Providers for the study were chosen randomly from a list of licensed practitioners within the state. Included in this study as the most commonly seen provider types for acute low back pain were primary care providers, defined as practitioners from family medicine, internal medicine, or general practice; chiropractors; orthopedic surgeons and neurosurgeons; and primary care providers in a non-profit group-model HMO. Providers were excluded if they practiced ambulatory care less than 50% of the time or if they did not see patients with acute low back pain except on referral. A total of 208 providers (74% of those invited) elected to participate: 87 private primary care providers, 64 chiropractors, 29 orthopedic surgeons, and 28 HMO primary care providers.³

The goal of the selection criteria was to find a study population who had "benign" nonspecific acute low back pain and had not sought previous medical care for their current episode of low back pain. Practitioners enrolled sequential patients who presented with a new episode of low back pain lasting less than 10 weeks, with no low back pain in the 2 months preceding the onset of the current episode. Patients were restricted to the ages of 20 to 75, and to those who had no history of back surgery (laminectomy, discectomy, or chymopapin treatment), no history of malignancy, no history of current pregnancy, no history of compression fracture, and to those who had not previously seen a health care provider for the current episode of back pain.

At enrollment, the provider took a brief history and performed an abbreviated physical examination. The Survey Research Unit at the University of North Carolina contacted providers on a regular basis for a list of the participating patients who were then telephoned a median time of 7 days from their initial provider visit. The interviews were conducted at baseline and 24 weeks for all patients. For those with continuing back pain after entry into the study, the interval follow-up interviews were at 2, 4, 8, and 12 weeks. Because this was an observational study, providers were neither guided nor limited by study participation in their ability to obtain diagnostic tests, medications, or referrals for their patients.

We began our analysis by assessing the strength of bivariate associations between seeking care from multiple provider types and (1) initial disease characteristics; (2) indices relating to course of illness and treatment; (3) sociodemographic indices; (4) health service indices; (5) provider characteristics; (6) referral patterns; and (7) attribution of the cause of the low back pain. We divided the "seeking care from multiple provider types" variable into two categories: patients seeing only the initial provider type (the one who enrolled the patient into the study) and patients seeing another provider type along with the initial provider type. For example, a patient who initially saw a private primary care provider and subsequently saw an orthopedic surgeon is classified as "seeking care from multiple provider types." In distinction, when a patient went from one private primary care provider to a physical

therapist and then to another private primary care provider, we classified this as seeing only one provider type. Our questionnaire was not designed to distinguish whether the two visits to a private primary care provider were to the same provider or to two providers. Referral by the initial provider was based on an indication in the chart abstract that the index provider had sent the patient for care to another provider type.

In our analysis, we treat physical therapy as an ancillary source of care, seen in conjunction with one of the initial provider types. Therefore, referral rates of the four provider groups do not include referral to a physical therapist, and being seen by a physical therapist is thought to be equivalent to being seen by only the initial provider type. Physical therapists generally do not serve as initial providers in North Carolina. However, fees for physical therapy visits have been included in the total outpatient cost for the back pain episode whenever this resource was used.

We used multivariate logistic regression to assess which factors remained associated with seeking care from more than the initial provider type while controlling for the remaining variables. Adjusted proportions (percentages) of multiple provider use by initial provider type were calculated from the estimates of the logistic regression model.

We then assessed the effect of seeing multiple provider types on the costs of care, controlling for the variables of the logistic regression model.³ Outpatient costs were based on average statewide charges assigned by a large insurance carrier and were specialty-specific. Medication costs were based on the average wholesale price of a drug, plus a pharmacy cost of 40%.

All analyses were performed using Stata 4.0 statistical software.

RESULTS

Fifty percent of patients presenting with low back pain proved to be eligible for the study, with back pain lasting longer than 10 weeks and previous treatment for the current pain episode the most common reasons for exclusion. Eight percent of eligible patients declined to participate. Of 1,633 patients, 1,580 (97%) completed the 24-week interview.

Baseline Characteristics of Sample; Percentage Seeking Care from Multiple Provider Types

The majority of subjects saw only one type of provider for their low back pain episode (Table 1). The percentages of those seeing only their initial provider type ranged from a low of 66% in the orthopedic group to a high of 89% in the HMO stratum of subjects.

Initial provider type seen is related to use of multiple provider types. Those who saw an orthopedic surgeon initially went on to see other provider types in the highest percentages, while those who initially saw an HMO primary care physician did so in the lowest percentages.

Table 1. Baseline Characteristics of Sample, Including Percentage Seeking Care from One or More Providers*

Characteristic	Index Only	Index + More	p Value
Initial provider type, %			.000
Seeing private PCP	80	20	
Seeing chiropractor	77	23	
Seeing orthopedic surgeon	66	34	
Seeing HMO PCP	89	11	
Initial disease severity			
Pain to knee/below, %	19	39	.000
Baseline Roland score, (range 1–23; > 14 = sig. disability)	10.2	14.5	.025
Pain duration > 2 weeks at baseline, %	31	43	.000
Severity of pain (0 = low, 10 = high), mean	5.3	5.8	.718
History of LBP, %			
Ever been treated for LBP	49	45	.135
More than 5 LBP episodes in life	31	32	.117
Course of illness			
Time to subjective functional recovery, days	18.7	49.7	.000
Time of interview at which subject is completely free of pain, weeks	11	18	.024
Sociodemographic variables			
Age in years	41	41	.930
Male, %	48	45	.389
Post high school education, %	51	45	.057
Nonwhite, %	17	14	.16
Household income < \$20,000, %	29	39	.000
Without health insurance, %	8	13	.002
Health service indices			
Referred by initial provider (as noted on chart abstract), %	2	22	.000
Total practitioner visits (median), <i>n</i>	2	11	.000
Very satisfied with overall treatment, %	34	27	.000
Patient attribution of cause of LBP (subjects may cite more than one cause), %			
Muscular problem	64	59	.169
Disk problem	35	68	.000

*PCP indicates primary care physician; LBP, low back pain.

Use of multiple provider types (unadjusted) within the entire sample increased as the interval to complete recovery increased (Figure 1).

The presence of sciatica, increasing Roland disability score (a validated scale on low back pain disability),⁵ and duration of pain before the provider visit were significantly associated with multiple provider type use in bivariate analyses; severity of pain as assessed by the subject at the baseline interview and previous history of low back pain episodes was not. (As well, there was no relation between previous episodes of acute low back pain and the initial type of provider seen). The two characteristics of the length of the low back pain episode, time to functional recovery and interval to complete recovery from pain, showed a significant association with seeing multiple provider types. Of the sociodemographic variables (including age, race, gender, and education), only household income below \$20,000 and lack of health insurance were

associated with seeing more than the index provider type. Finally, of the health service indices, total number of practitioner visits and satisfaction with the results of overall treatment were significantly different between the two groups.

We defined referral as an explicit indication in the chart that the initial provider was referring the patient to another provider type. Referrals to physical therapists were not included in the referral rate as they are considered an auxiliary provider type in our analysis. Two percent of those who saw only their initial provider type had chart evidence of referral, whereas 22% of those who saw multiple provider types were referred. Stratifying referrals by provider types, the private primary care provider referred 8% (95% confidence intervals [CI] 6%, 10%) of the time; the chiropractor, 6% (95% CI 4%, 8%); the orthopedic surgeon, 5% (95% CI 2%, 10%); and the HMO primary care provider, 4% (95% CI 2%, 8%). These differences in referral rate among the provider types were not statistically significant.

FIGURE 1. Use of multiple provider types by interval to complete recovery ($n = 1,580$).

Subjects' perceptions of the putative cause of their low back pain were assessed by directly asking them what they thought was wrong with their backs. A prompt indicating that "bones, disks, and muscles" might be factors was included, but the patient was then allowed to answer in his or her own words. (Patients could and did list multiple reasons.) The attribution questions were included in the interview at which the subject reported being completely better or at the 6-month interview for those who did not recover completely. The two most common reasons given as the putative cause of the low back pain were "muscular problems" (63%) and "disk problems" (42%). In bivariate analyses back pain attributed to disk problems was significantly associated with seeking care from more than the index provider type, whereas muscular attributions of etiology were not associated with use of multiple provider types.

Logistic Regression Analysis

The dependent variable for the logistic regression was use of multiple provider types. The independent variables included duration of pain greater than 2 weeks at baseline interview; presence of sciatica at baseline; baseline Roland disability score, time to functional recovery; interval to complete recovery from pain; referral by the initial

provider; annual income greater than \$20,000; presence of health insurance; type of initial provider seen; attribution of back pain cause; and satisfaction with the results of overall treatment.

After controlling for the other variables, the most important factor in use of multiple provider types was referral by the initial provider. This was followed by the disease severity variables and the type of provider initially seen, with satisfaction and disk attribution completing the model. Income and health insurance were not statistically significant in the model.

The adjusted percentage of those who saw multiple provider types varied with the initial type of provider seen (Table 2). Subjects from the HMO primary care physician stratum were the least likely to see more than the index provider (9%; 95% CI 5%, 14%), while those in the orthopedic surgeon stratum were the most likely to have seen multiple provider types (30%; 95% CI 23%, 37%). This is the same pattern of use of multiple provider types initially found in the unadjusted data.

Cost of Changing Providers

We looked at the contribution of seeing more than one provider type to the total cost of outpatient care for the acute low back pain episode. (For a more detailed de-

Table 2. Care Seeking from Multiple Provider Types Based on Initial Provider Type*

Initial Provider Type	n	Adjusted Proportion	Confidence Intervals
Private PCP	625	0.14	0.11, 0.17
Chiropractor	586	0.19	0.16, 0.23
Orthopedic surgeon	174	0.30	0.23, 0.37
HMO PCP	195	0.09	0.05, 0.14

*Adjusted for duration of pain prior to initial visit, sciatica, Roland disability score, days to functional recovery, interval to complete recovery, referral by initial provider, disk attribution, and satisfaction. PCP indicates primary care physicians.

scription of how the costs were calculated, see Carey et al., 1995.³) Using the logistic regression model above, the adjusted mean cost was \$439 (95% CI \$404, \$475) for seeing only the index provider and \$1,137 (95% CI \$1,064, \$1,211) for seeing more than the initial provider type.

Choice of Provider for the Next Episode of Low Back Pain

Although significantly lower percentages of those subjects who had seen multiple provider types remained loyal to their initial provider type, most subjects indicated that they would go to the same type of provider for the next episode of low back pain as they had seen for the current episode. There was little difference in subjects' preference to remain with the same provider type for future episodes when the data were stratified by initial provider type. Less than 1% of all the subjects indicated that they would not see any health care provider for their next episode of low back pain.

DISCUSSION

The patterns of providers seen for a disease process may depend on factors relating to the patient, the provider, and to the system under which both operate. We analyzed the utilization of multiple provider types by patients with acute nonspecific low back pain. The prospective cohort study from which the data were derived allowed us to follow a group of patients with a relatively homogenous disease process from the inception of their care until the end of their disease process, or, if they were not completely recovered, for a duration of 6 months. From this initial point in their low back pain episode we had an overall view of their patterns of care and of the factors involved in their subsequent movement from the initial provider type they saw to other provider types.

Our analysis has some limitations. The questions used to look into the pattern of providers seen between interviews addressed types of providers seen for the low

back pain episode since the previous interview; therefore, we were limited to addressing changes in provider type rather than changes in individual providers. Although the questions specifically asked the subjects about providers they had seen for the current low back pain episode, subjects may have reported seeing a primary care provider for low back pain even if they had initially seen that provider for another main complaint. Although this may bias the results toward higher use of multiple provider types in the chiropractic and orthopedic strata, we do not believe this bias contributes significantly to the higher proportion of multiple provider use in these two strata. The referral rate we used in the analysis was based on chart abstract data. It may underestimate the true referral rate, which may include verbal referrals by the initial provider type. In addition, both satisfaction and attribution were measured at the end of the back pain episode. As a consequence, they reflect the sum total of a patient's perceptions about his or her back pain episode.

Only 21% of the patients in our study saw more than one provider type for their low back pain episode. Although referral from the initial provider is the factor most closely associated with a patient seeing multiple provider types in our logistic regression model, 79% of those who saw more than their initial provider type were *not* referred. Patient-initiated change in provider type accounts for a large percentage of multiple provider type use. How is such a decision to see another provider type made by a patient? Interestingly, although sociodemographic variables such as insurance status and income were significantly associated with use of multiple provider types in bivariate analyses, they did not remain so after adjusting for the other factors in the logistic regression. Age, gender, race and education were not significant even in bivariate analyses. The flow of patients from their initial provider type to other provider types increased as their duration to recovery, either functional or complete, increased. Forty percent of the patients in the study had not fully recovered from their low back pain within 3 months, demonstrating low-level, long-term impairment. The patients responded to continuing pain by changing provider types: whereas only 12% of those who had recovered by 3 months saw multiple provider types, 54% of those not recovered by 3 months did so. Seeking further care, whether it is on referral by a provider or on self-referral, may be an appropriate response to lack of improvement.

Our analysis suggests that systems with gatekeepers may limit utilization of medical care by limiting the use of specialists.^{6,7} The HMO primary care providers in our study were from a group-model HMO in which the primary care provider served as a gatekeeper. The patients who initially saw such a provider went on to see multiple providers types in the lowest proportions, even after we controlled for the other factors associated with multiple provider use. Of note, those patients in the HMO group had outcomes similar to those of the patients who had seen orthopedic surgeons, chiropractors, and private pri-

mary care providers.³ Another possible reason for the lower rate of specialist care in those who had initially seen an HMO primary care physician may be that subjects with fewer comorbid conditions tend to seek out care initially from primary care providers, rather than specialists. Such patients may have less inclination to see multiple provider types.

Why should patients initially seeing an orthopedic surgeon be more likely to seek care from multiple provider types? Referral rates do not explain this phenomenon as orthopedic surgeons' referral rates were similar to those of the other provider groups. Taking into account the high self-efficacy and patient satisfaction of orthopedic surgeons in our study,⁸ one would think that their patients would be the least likely of the patients with allopathic providers to seek care from other sources. As the traditional role of orthopedic surgeons is surgical intervention, many orthopedic surgeons may implicitly or explicitly communicate the lack of medical alternatives available to them in helping their patients recover from the symptoms associated with nonspecific acute low back pain. The patient may then restart the care-seeking process with a primary care provider, chiropractor, or other provider type.

The significant association of patient-initiated use of multiple provider types with the lack of symptomatic improvement reflects our inability to offer these patients an effective way to manage their low back pain, especially as it becomes chronic. Future efforts in meeting the needs of this group may benefit from educating both patients and providers on the natural history of low back pain, as well as coordinating care among the provider types. A systematic approach that targets patients with low back pain lasting longer than 3 months, the pathophysiology of which

is often different from that of acute low back pain, may reduce redundancy in services utilized, minimize adverse outcomes from unnecessary procedures, and promote education and self-care.

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