ORIGINAL ARTICLES

COST OF CARE FOR COMMON BACK PAIN CONDITIONS INITIATED WITH CHIROPRACTIC DOCTOR VS MEDICAL DOCTOR/DOCTOR OF OSTEOPATHY AS FIRST PHYSICIAN: EXPERIENCE OF ONE TENNESSEE-BASED GENERAL HEALTH INSURER

Richard L. Liliedahl, MD,[a] Michael D. Finch, PhD,[b] David V. Axene, FSA, FCA, MAAA,[a] and Christine M. Goertz, DC, PhD[c]

ABSTRACT

Objective: The primary aim of this study was to determine if there are differences in the cost of low back pain care when a patient is able to choose a course of treatment with a medical doctor (MD) versus a doctor of chiropractic (DC), given that his/her insurance provides equal access to both provider types.

Methods: A retrospective claims analysis was performed on Blue Cross Blue Shield of Tennessee's intermediate and large group fully insured population between October 1, 2004 and September 30, 2006. The insured study population had open access to MDs and DCs through self-referral without any limit to the number of visits or differences in co-pays to these 2 provider types. Our analysis was based on episodes of care for low back pain. An episode was defined as all reimbursed care delivered between the first and the last encounter with a health care provider for low back pain. A 60 day window without an encounter was treated as a new episode. We compared paid claims and risk adjusted costs between episodes of care initiated with an MD with those initiated with a DC.

Results: Paid costs for episodes of care initiated with a DC were almost 40% less than episodes initiated with an MD. Even after risk adjusting each patient's costs, we found that episodes of care initiated with a DC were 20% less expensive than episodes initiated with an MD.

Conclusions: Beneficiaries in our sampling frame had lower overall episode costs for treatment of low back pain if they initiated care with a DC, when compared to those who initiated care with an MD. (J Manipulative Physiol Ther 2010;33:640-643)

Key Indexing Terms: *Chiropractic; Medicine; Costs and Cost Analysis*

Low back pain (LBP) is well recognized as a significant public health problem. It has been estimated that 70% to 85% of Americans have back pain at some point in their lives.[1] Indeed, back pain is well established as one of the most common reasons for going to see a physician.[2,3] On the basis of the 2002 National Health Interview Survey, Deyo et al[4] report that about a quarter of the adult population reports LBP in any 3-month period and that LBP accounts for 2.3% of all physician visits. Druss and his colleagues[5] noted that back problems are one of the top 10 most costly conditions treated in the United States. According to the National Institute of Neurological Disorders and Stroke at National Institutes of Health, LBP treatment costs more than $50 billion per year. In addition, indirect costs for LBP have been estimated at between $7.4 billion and $19.8 billion per year, and the incremental medical care cost for LBP are estimated to be an additional $26 billion per year.[6,7]

Carey et al[8] recently conducted a survey to determine health care use patterns in patients with chronic LBP. They

[a] President & Consulting Actuary, Axene Health Partners, Winchester, Calif.

[b] Principal, Finch & King, Inc, Minneapolis, Minn.

[c] Vice Chancellor of Research and Health Policy, Palmer College of Chiropractic, Davenport, Iowa.

Submit requests for reprints to: Christine M. Goertz, DC, PhD, 300 Brady Street, Davenport, IA 52803
(e-mail: *Christine.goertz@palmer.edu*).

Paper submitted March 24, 2010; in revised form May 20, 2010; accepted June 8, 2010.

0161-4754/$36.00

Copyright © 2010 by National University of Health Sciences.

doi:10.1016/j.jmpt.2010.08.018

found high health care use in this group, with an average of 21 visits annually to an average of 2.7 provider types per year. Many of the tests and treatments used were not in line with evidence-based practice. The authors conclude that (1) care use for chronic LBP is very high, including high, advanced imaging use rates, narcotics, and physical treatments; (2) use of evidence-based treatments are low when compared with current best evidence; and (3) multiple treatments appear to be overused.

Approximately 7% of the US population seeks care from doctors of chiropractic (DCs) annually, representing nearly 200 million patient visits.[9] A national survey of patterns and perceptions of care found that 20% of those reporting back or neck pain sought chiropractic care.[10] Surveys suggest that patients are highly satisfied with chiropractic care.[11,12] Of chiropractic patients, 61% report their care as being "very helpful," whereas 27% report the same for conventional medical care.[10]

Currently, we know much more about the use of chiropractic care than we do about the costs associated with that care. A study performed by Carey and his colleagues[13] found that chiropractic care for an episode of LBP was less expensive than an orthopedic specialist but more than a primary care provider. Cherkin et al[14] found similar costs per episode between physical therapists and chiropractors, whereas Lind et al[15] found that patients seeing only conventional providers had fewer visits and greater costs than patients seeing nonconventional providers or a mix of traditional and nontraditional providers.

We know relatively little regarding the effect of differences in medical management on the cost of an episode of care by different types of providers. In this study, we examine the effect of initiating care for LBP with a medical doctor (MD) or with a DC in a system that has removed the traditional constraints imposed by insurance companies on a patient's use of and access to chiropractic care. We chose LBP as the focus of study because it is a condition that is prevalent, costly, and is treated by both MDs and DCs. This study evaluated if there were differences in the cost for LBP care when a patient chooses a course of treatment with an MD vs a DC, given their insurance provides them with equal access to both provider types.

Methods

An actuarial review of the Blue Cross Blue Shield of Tennessee's general health plans claims between October 1, 2004, and September 30, 2006, was undertaken. The Human Protections Administrator at Palmer College of Chiropractic, Davenport, Iowa, decided that this project was exempt from ethics review, and therefore, this study was not required to undergo institutional review board review. The subjects for this study were members of Blue Cross Blue Shield of Tennessee's intermediate and large group fully insured population between October 1, 2004, and September 30, 2006. Coverage for this population included unrestricted access to primary and specialty providers of their choice and unlimited services, except for a 20-visit per year limit on physical therapy. There were no differences in this population for co-pays or deductibles based on provider type.

Selection of Subjects

On the basis of the previous literature[16] and recommendations made by the American Chiropractic association, we identified members with a claim for LBP based on the presence of one of the following *International Classification of Diseases, Ninth Edition*, codes anywhere on a paid claim:

722.** : Intervertebral disk disorders
724.** : Other and unspecified disorders of back
729.** : Other disorders of soft tissues
739.** : Nonallopathic lesions not elsewhere classified
846.** : Sprains and strains of sacroiliac region
847.** : Sprains and strains of other and unspecified parts of back

Of the 669 320 members during this period, 85 402 members meet these criteria.

Computing Episodes of Care

Episodes of care for LBP were constructed for each of these 85 402 members. A new episode of care always began with a Current Procedures Terminology (CPT) code for an originating office visit to either a medical physician or a doctor of osteopathy, chiropractic manipulation, or an emergency department visit. All episodes of care beginning with other than these 3 procedure categories were eliminated.

On the basis of the episode treatment group, developed by Symmetry (now Ingenix), we used a clean period of 60 days between professional services for LBP to define the beginning of a new episode. Periods with continuous drug therapy between professional visits of more than 60 days were considered to be one episode if the drug was the same and continued refills occurred.

Episodes beginning within 60 days of the end of the study period and all episodes with a claim in the last 2 months of the study period were eliminated to eliminate all members with an incomplete claims record.

Assignment of Costs

Total episode costs for each episode of LBP included the cost paid by the insurer for all services provided during the episode by the same and other providers. Paid costs also include all pharmaceuticals for these members from the

Table 1. *Comparison of episode cost by initial provider type*

		n	Mean	Standard error	% Difference
Allowed amount	DC	36 280	$755.65	$9.38	27.13%
	MD	66 158	$1037.04	$12.47	
Paid amount	DC	36 280	$452.23	$8.03	38.89%
	MD	66 158	$740.07	$10.73	

Table 2. *Comparison of risk-adjusted episode cost by initial provider type*

		n	Mean	Standard error	% Difference
Risk-adjusted paid amount	DC	36 280	$532.54	$9.56	19.45%
	MD	66 158	$661.10	$29.16	

narcotic, analgesic, nonsteroidal, and muscle relaxant group and were also included in the total cost of care for each episode.

To examine the effect of the initial provider on the course of care and its subsequent cost, both an episode's allowed and paid costs were assigned to the episode's initial provider. For this analysis, we collapsed providers into 2 categories: MD and DC. All episodes originating with an emergency department visit were assigned to MD providers. Doctors of osteopathic medicine were also assigned to the MD category.

We also included allowed costs in the analysis to provide a baseline from which to judge the difference between the contracted rates, which depended heavily on benefit design (ie, co-pays and deductibles) and the actual paid claims.

Computation of Risk Scores

We specifically did not adjust episode costs for the patient's self-selection of an initial provider, as exploring this question was the primary object of this study. However, we did compute a risk score for each beneficiary using Symmetry Pharmacy Risk Groups (PRGs) to illuminate the effect of severity on episode costs. Symmetry PRGs use pharmacy claims, age, and sex to determine a severity or risk score for each member. All pharmacy claims for each beneficiary during the entire study period were used to assign a risk score to that beneficiary. We chose to use Symmetry PRGs because of its established predictive ability and industry acceptance.[17]

We used this tool to risk adjust our initial costs in the following manner:

- PRGs were applied to risk adjust each individual in totality (ie, all episodes for that individual). Thus, each individual had a common risk score applied to each of their episodes.
- Next, paid claims for each individual's episode were divided by the individual's risk score to produce a "risk-normalized cost" by episode. Thus, claims on individuals with more favorable risk scores were increased (ie, divided by a number less than 1.0). Claims on individuals with high-risk scores were decreased (ie, divided by a number greater than 1.0).

Results

Cost for episodes of care initiated with an MD or with a DC are shown below in Table 1.

We show both allowed and paid claims to give a fair assessment of the actual costs to the payer of the cost of care (paid claims) and the total cost of the care (allowed) that includes payments from third parties. In the case of episodes initiated with an MD, the difference between allowed and paid amounts is 71%, whereas for DCs, it is 60%. The difference between allowed and paid amounts is assumed to be covered by the beneficiary or some other third party. Because of unequal variances in the 2 distributions ($F = 713.317$, $P < .0001$ and $F = 743.228$, $P < .0001$, respectively), we tested for differences in mean allowed amounts as well as differences in the paid amounts using Satterthwaite's approximation of the standard t test.[18] Both allowed and paid amounts for episodes initiated with an MD and episodes initiated with a DC were significantly different ($t = -18.029$; $P = .000$; $t = -21.478$; $P = .000$).

In Table 2, we show the same data adjusted for each patient's disease burden using PRGs.

Again, because of unequal variances in the 2 distributions ($F = 20.123$; $P = .000$), we tested for differences in mean using Satterthwaite's approximation and again the differences were significant ($t = -04.189$; $P = .01$).[18]

Discussion

With both paid claims and allowed amount, we found statistically significant lower costs in episodes of care initiated with a DC as compared to an MD. In addition, we found that the risk-adjusted paid claims were also significantly lower for care initiated with a DC. In fact, about half the difference between the costs of care initiated with a DC vs an MD is due to risk selection. However, even with this self-selection effect based on risk, care initiated with a DC is still significantly, and sizeably, less for patients seeking care for the 6 *International Classification of Diseases, Ninth Edition*, low back-related disorders investigated in this study.

Although we treated these data as sample from a potential population of LBP patients, one can argue from the payer's view that this is indeed the population of LBP over the 2-year study period. This interpretation would lead us to consider not the statistical properties of the

sample but the savings to the payer for allowing DC-initiated episodes of care. In this instance, those savings would be more than $2.3 million per year (the difference in the actual cost for MD-initiated episodes and DC-initiated episodes).

Limitations

Several limitations are worth noting. First, these results are based on the experience of a single health insurer. The distribution of the type and number of providers in a geographic area is also known to affect the use of services. Also, treatment patterns for specific conditions differ by geography. Finally, this study does not address the mix of services provided, the cost of the individual services, or if chiropractic care is a substitute for conventional care. Further study looking at different aspects of cost across a variety of insurers and geographies are suggested.

Conclusions

This study provides a unique opportunity to evaluate an insured population with open access (including identical co-pays and deductibles) and an unlimited number of visits to providers via self-referral. Our results support a growing body of evidence that chiropractic treatment of low back pain is less expensive than traditional medical care. We found that episode cost of care for LBP initiated with a DC is less expensive than care initiated through an MD. Paid costs for episodes of care initiated with a DC were almost 40% less than episodes initiated with an MD. Even after risk adjusting each patient's costs, we found that episodes of care initiated with a DC are 20% less expensive than episodes initiated with an MD. Our results suggest that insurance companies that restrict access to chiropractic care for LBP may, inadvertently, be paying more for care than they would if they removed these restrictions.

Practical Applications

- For low back pain, care initiated with a chiropractor (DC) is less costly than care initiated through a Medical Doctor (MD). Paid costs for episodes of care initiated with a DC are almost 40% less then episodes initiated with an MD.
- Even after risk adjusting each patient's costs we found that episodes of care initiated with a DC are 20% less expensive than episodes initiated with an MD.

Funding Sources and Potential Conflicts of Interest

The authors reported no conflicts of interest were reported for this study. This study was funded by the American Chiropractic Association.

References

1. Furlan AD, Brosseau L, Imamura M, et al. Massage for low-back pain: a systematic review within the framework of the Cochrane Collaboration Back Review Group. Spine 2002;27: 1896-910.
2. Deyo RA, Weinstein JN. Low back pain. N Engl J Med 2001; 344:363-70.
3. Luo X, Pietrobon R, Sun SX, et al. Estimates and patterns of direct health care expenditures among individuals with back pain in the United States. Spine 2004;29:79-86.
4. Deyo RA, Mirza SK, Martin BI. Back pain prevalence and visit rates: estimates from U.S. national surveys, 2002. Spine 2006;31:2724-7.
5. Druss BG, Marcus SC, Olfson M, Pincus HA. The most expensive medical conditions in america. Health Aff 2002;21: 105-11.
6. Stewart WF, Ricci JA, Chee E, Morganstein D, Lipton R. Lost productive time and cost due to common pain conditions in the US workforce. JAMA 2003;290:2443-54.
7. Ricci JA, Stewart WF, Chee E, Leotta C, Foley K, Hochberg MC. Back pain exacerbations and lost productive time costs in United States workers. Spine 2006;31:3052-60.
8. Carey TS, Freburger JK, Holmes GM, et al. A long way to go: practice patterns and evidence in chronic low back pain care. Spine 2009;34:718-24.
9. Barnes PM, Bloom B, Nahin RL. Complementary and alternative medicine use among adults and children: United States, 2007. Natl Health Stat Report 2009:1-23.
10. Pengel HM, Maher CG, Refshauge KM. Systematic review of conservative interventions for subacute low back pain. Clin Rehabil 2002;16:811-20.
11. Ferreira ML, Ferreira PH, Latimer J, Herbert R, Maher CG. Does spinal manipulative therapy help people with chronic low back pain? Aust J Physiother 2002;48:277-84.
12. Furlan AD, Clarke J, Esmail R, Sinclair S, Irvin E, Bombardier C. A critical review of reviews on the treatment of chronic low back pain. Spine 2001;26:E155-62.
13. Carey TS, Garrett J, Jackman A, et al. Low back pain among patients seen by primary care practitioners, chiropractors, and orthopedic surgeons. The North Carolina Back Pain Project. N Engl J Med 1995;333:913-7.
14. Cherkin DC, Deyo RA, Battie M, et al. Comparison of physical therapy, chiropractic manipulation, and provision of an educational booklet for the treatment of patients with low back pain. N Engl J Med 1998;339:1021-9.
15. Lind BK, Lafferty WE, Tyree PT, Sherman KJ, Deyo RA, Cherkin DC. The role of alternative medical providers for the outpatient treatment of insured patients with back pain. Spine 2005;30:1454-9.
16. Grieves B, Menke JM, Pursel KJ. Cost minimization analysis of low back pain claims data for chiropractic vs medicine in a managed care organization. J Manipulative Physiol Ther 2009;32:734-9.
17. Winkleman R, Mehmud S. A comparative analysis of claims-based tools for health risk assessment. Society of Actuaries 2007:1-70.
18. Satterthwaite FE. An approximate distribution of estimates of variance components. Biom Bull 1946;2:110-4.