

COST MINIMIZATION ANALYSIS OF LOW BACK PAIN CLAIMS DATA FOR CHIROPRACTIC VS MEDICINE IN A MANAGED CARE ORGANIZATION

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ABSTRACT

Objective: A managed care organization (MCO) examined differences in allowed cost for managing low back pain by medical providers vs chiropractors in an integrated care environment. The purpose of this study is to provide a retrospective cost analysis of administrative data of chiropractic vs medical management of low back pain in a managed care setting.

Methods: All patients with a low back pain-related diagnosis presenting for health care from January 2004 to June 2004 who were insured by an MCO in northeast Wisconsin were tracked. The cumulative health care costs incurred by this MCO during the 2-year period from January 2004 to December 2005 related to these back pain diagnoses were collected.

Results: Allowed costs of chiropractic treatment were 12% greater than medical primary care and 60% less per case than other types of medical care combined, on a per-case basis: median cost of medical primary care was \$365.00, chiropractic care was \$417.00, and medical nonprimary care was \$669.00.

Conclusion: This study of an MCO's low back pain allowed costs may be better redirected to primary care or chiropractic, given equivalent levels of case complexity. This study suggests chiropractic management as less expensive compared with medical management of back pain when care extends beyond primary care. Primary care management alone is virtually indistinguishable from chiropractic management in terms of costs. (*J Manipulative Physiol Ther* 2009;32:734-739)

Key Indexing Terms: *Chiropractic; Low Back Pain; Cost Savings; Managed Care Program, Delivery of Health Care, Integrated*

Low back pain (LBP) is a highly prevalent condition in the United States, with approximately 80% of Americans experiencing at least one episode of back pain in their lifetime. The high prevalence of LBP makes it a leading reason for physician visits, hospitalization, and utilization of other health care services.¹ An efficient health care system should direct patients with LBP to the most cost-effective type of health care for their specific condition.

Other studies' methodologies have examined the differences in health care costs for patients treated with

chiropractic management vs medical management for lower back pain. In examining patterns in the costs of treating LBP, and similar to findings in previous studies, Luo et al² found that a small percentage of individuals with back pain accounted for a majority of the expenditures. Per capita expenditures were generally higher for individuals who were older, were female, were white, were insured, or had disk disorders. Data from the 2003 Medical Expenditure Panel Survey showed that outpatient and office-based medical provider visits accounted for 55.4% of the total costs for back problems. In the same survey, prescription drug costs comprised 11.3% of expenditures for back problems.

Chiropractic management of LBP differs from medical management in that it typically involves more in-office treatment, whereas medical management may be more complex and involve more prescription drugs, referrals to specialists and physical therapy, diagnostic imaging, and hospitalization.^{3,4} Direct payments to chiropractors for services rendered constituted more than 80% of treatment costs per episode, whereas payments to medical doctors constituted only 23% of treatment costs per episode.⁵

Nelson et al⁴ found that in employer groups whose plan included a chiropractic benefit, the use of surgery, plain film radiography, advanced imaging, and inpatient care was significantly reduced compared with employer groups who

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did not have a chiropractic benefit. They concluded that access to managed chiropractic care may reduce overall health care expenditures through several mechanisms: (1) positive risk selection; (2) substitution of chiropractic for traditional medical care, particularly for spine conditions; (3) more conservative, less invasive treatment profiles; and (4) lower health service costs associated with managed chiropractic access. In contrast, Shekelle et al⁶ found that the low chiropractic costs per visit, low imaging costs, and low hospital costs were offset by the relatively large number of chiropractic visits per episode.

In a review of insurance data claims, Stano⁷ looked at the total cost of episodes of care based on whether a chiropractor or medical physician was the first-contact provider. He found that insurance payments were substantially greater for medical physician-initiated cases, with most but not all of the cost difference being related to higher inpatient costs for such cases. In another review of insurance claims data, Legorretta et al⁸ found that access to managed chiropractic care may reduce overall health care expenditures.

Rather than trying to define and look at specific “episodes” of LBP as many past studies have done, this study examined total claims for procedures incurred over a 2-year period with a back pain diagnosis as the primary and/or secondary diagnosis. Because of the chronic recurrent nature of back pain, a “total” figure for back pain-related claims might be a better estimate of overall costs. This partially overcomes the difficulty in working with only an insurance database by extending the follow-up period to at least 18 months. Without clinical information, it is not possible to accurately separate out claims related to a specific discrete episode of back pain. Based on prior literature, the hypothesis was that patients seeking chiropractic management would have less health care costs incurred for LBP compared with those seeking medical management for their LBP problem. The purpose of this study is to provide a retrospective cost analysis of administrative data of chiropractic vs medical management of LBP in a managed care setting and integrated health care environment.

METHODS

The data are from an insurance claims database of a private health maintenance organization (HMO) plan in Northeast Wisconsin that insures approximately 30 000 individuals. The study was reviewed and granted exclusion from an institutional review board by the University of Massachusetts–Amherst School of Public Health and the HMO providing the “deidentified” database information. All providers were reimbursed by a discounted fee for service. This HMO did not restrict chiropractic management on the basis of total visits, costs, or procedures during the study duration. The study population was health plan members continuously enrolled from January 1, 2004, to December 31, 2005, and had at least one visit with a medical provider or

Table 1. Twelve International Classification of Diseases, Ninth Revision, Clinical Modification lumbar and lower back pain-related codes used to include patients in the data set

Code	Description
722.10	Intervertebral disk disorder, displacement of thoracic or lumbar intervertebral disk without myelopathy
722.52	Intervertebral disk disorder, degeneration of thoracic, lumbar, or lumbosacral intervertebral disk
724.2	Lumbago, other and unspecified disorder of back
724.3	Sciatica, other and unspecified disorders of back
724.4	Lumbosacral radiculitis
724.5	Backache, unspecified
724.6	Disorders of sacrum
756.11	Congenital spondylolisthesis
738.4	Degenerative spondylolisthesis
839.2	Thoracic and lumbar vertebrae
846.0	Sprains and strains of the sacroiliac region, lumbosacral joint
847.2	Sprains and strains of the lumbar spine

chiropractor for a primary or secondary diagnosis of LBP and/or back-associated leg symptoms (Table 1) at some time between January 1, 2004, and June 30, 2004. A small number of patients who saw both types of providers during the initial 6-month period were excluded. The total study population included 896 members. Total direct costs allowed by the insurance company were then calculated for the 2-year period from January 2004 through December 2005. All procedures related to back pain diagnosis were included in calculation, such as imaging, hospital, physical therapy, and outpatient office charges. No data on medication costs were available, as the claims database used, as in other studies of claims data, cannot tie a diagnosis to pharmaceutical prescriptions.

The members’ costs were then categorized according to those who saw either a chiropractor or medical provider (family practice, internal medicine, pediatrics, obstetrics/gynecology, physical medicine, neurology, neurosurgery, sports medicine, or orthopedics) during the initial 6-month period. The range of ages in the population was between 5 and 83 years, with an average age of 43 years.

Data files were received from the insurance company in Microsoft Excel (Microsoft Inc, Redmond, Wash) with a unique identifier assigned to patients meeting the above criteria. The files contained service dates; specialty of providers rendering service and whether they were participating providers with the network; primary and, if applicable, secondary diagnosis on the claim; procedure codes; and birth date and sex of the patient, as well as allowed amount by the insurance company. The allowed amount for each case is a good proxy for total cost per case.

Analysis

Mean total cost of care for the selected diagnosis was computed for each patient according by provider type for the initial 6-month period: doctor of chiropractic only and medical doctor only. Rather than trying to define and observe specific episodes of LBP as past studies have done, this study

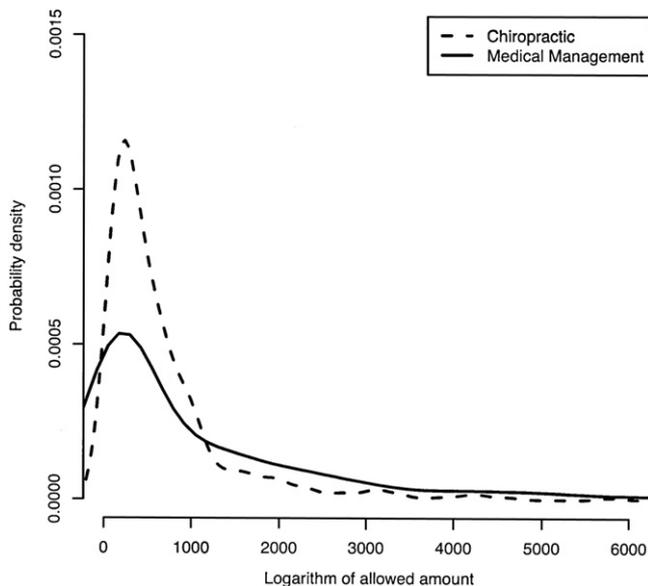


Fig 1. Distributions of medical and chiropractic allowed amounts.

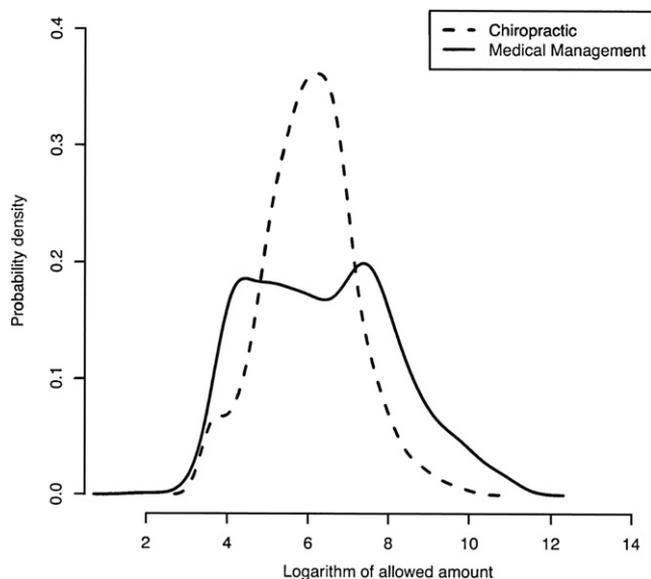


Fig 2. Distributions of logarithms of medical and chiropractic allowed amounts.

examined total claims data for procedures incurred over a 2-year period with a back pain diagnosis as the primary or secondary diagnosis. Because of the chronic recurrent nature of back pain, a total figure for back pain-related claims might be a better estimate of overall costs. Without clinical information, it is not possible to accurately separate claims defined by discrete episodes.

Age and sex characteristics were tested against allowed costs and membership in each treatment group. Because medical cost data are usually skewed positively and distributed by γ parameters,⁹ both nonparametric analyses and bootstrapped estimates of standard errors around the group medians were used for cross-validation of findings and to elucidate some of the complexities.

RESULTS

Chiropractic Vs All Medical Treatments

Ages ranged from 5 to 84 years. Average ages were 41.7 years for chiropractic group and 43.4 years for all medical groups, a nonsignificant difference of 1.7 years ($P = .086$). Male to female ratios were comparable for both general classes, with 54.9% female (267/486) for medical patients and 50.6% (207/409) female for chiropractic patients. Age was slightly correlated to the log of allowed costs ($r = 0.15$) and expected increase in all medical expenses with age.

Three chiropractic cases had 0 allowed amounts and were omitted from analysis. There were 64 patients who were treated with both medical and chiropractic care. The mean allowed costs were \$5554 per case. Because there was no practical way to determine which portion of those costs was from chiropractic or medical management, cases receiving

both kinds of treatments groups were excluded from analysis. The average (arithmetic mean) chiropractic cost per case was \$851; for all forms of medical care, it was \$2784, a difference of \$1933 per case.

Dispersion of allowed costs was greater for patients under medical care (SD = \$7236) than for chiropractic patients (SD = \$1625). All-medical costs per case were significantly more variable, as tested by Fisher test for heterogeneity: $F = 19.09$, $df = 892, 406$, $P < .001$, a comparison of costs between the conditions.

Medians are less sensitive to outliers than are mean values and thus are estimates of expected allowed costs for each group. Medians were \$576 for medical management vs \$417 for chiropractic management, 27.6% less per case. A Kruskal-Wallis nonparametric 1-way analysis of variance comparing chiropractic to all allopathic medical providers combined indicated that chiropractic had significantly lower costs ($\chi^2 = 9.781$, $df = 1$, $P = .0018$). Chiropractic allowed costs per case were ranked on average 520, whereas the all-medical mean ranked 577.

Probability density functions were produced for graphic analysis and to gain insight into the medical and chiropractic distributions, as shown in Figure 1. The horizontal axis was truncated to \$6000 for a better visualization. To further improve visual inspection, natural logarithms of allowed costs were plotted in Figure 2. A bimodal distribution for medical allowed costs was observed, with one peak of medical services less and the other more than chiropractic.

Graphic Analysis

The bimodal distribution in Figure 2 suggested that medical providers might be treating 2 classes of back pain

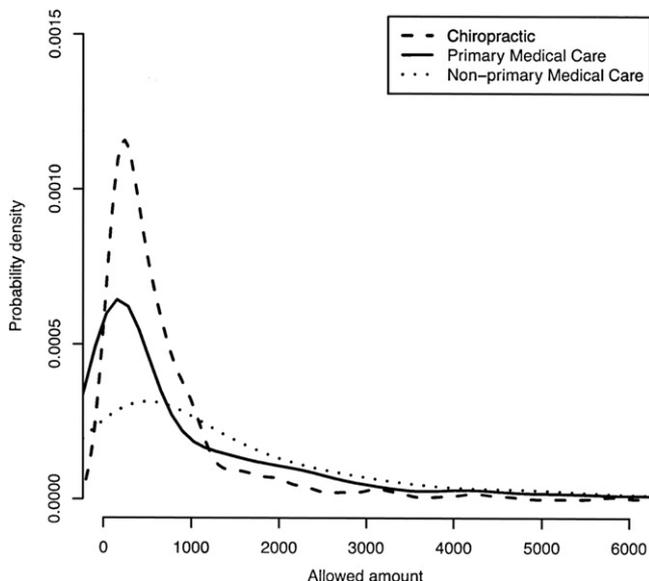


Fig 3. Distributions of raw medical and chiropractic allowed amounts.

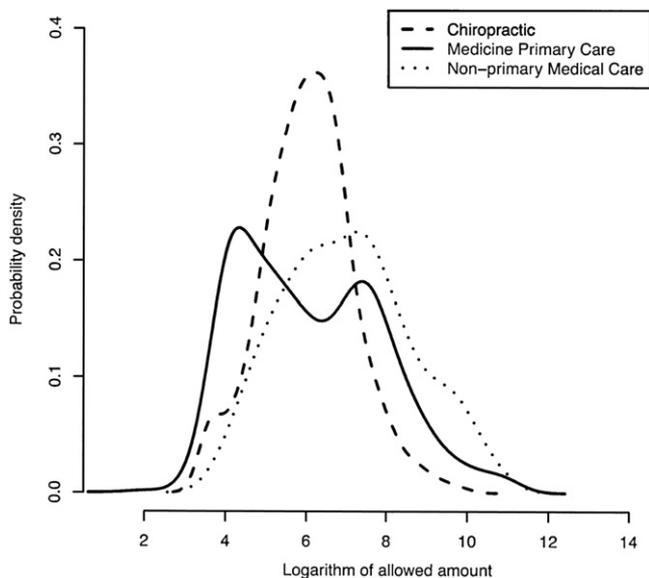


Fig 4. Distributions of logarithms of medical and chiropractic allowed amounts.

or simply funnel patients into 2 categories of allowed charges for treatment. Other studies¹⁰ have suggested that medical primary care is the least costly approach to back pain. In either condition, primary medical expenses are expected to be minimal.

Primary care (family practice, internal medicine, and pediatrics) cases were then sorted out from the rest of medical care (specialty medical care) to ascertain their role in the wider dispersion of medical costs. Findings are graphically represented in Figure 3. Logarithms of the

Table 2. Characteristics of each provider group

	Chiropractor group	Medical doctor group
No. of patients	411	486
Mean age (SD) in years	41.7 (13.0)	43.3 (14.9)
Maximum allowed	\$19 634	\$61 792
Allowed amount, mean (SD)	\$851 (\$1620)	\$2871 (\$7099)
Allowed amount, median	\$417	\$576
95% Confidence interval	\$693-\$1009	\$2339-\$3404
99% Confidence interval	\$643-\$1059	\$2170-\$3572

same data in Figure 4 show 3 distinct peaks of allowed costs. Primary medical care had the lowest cost per case, chiropractic was next highest, and specialty medical care was the highest cost.

Kruskal-Wallis analysis of variance of the 3 levels of treatment grouping (primary medical, nonprimary medical, and chiropractic) was also significant ($\chi^2 = 57.01$, $df = 2$, $P < .001$). Table 2 shows that the bootstrapped (samples = 5000) median cost of primary care was lowest among the 3 categories of care, as inferred from Figure 4. Median primary care medicine charges were \$365 per case (95% confidence interval, \$273-\$457), chiropractic was \$ 417 (95% confidence interval, \$363-\$567), and nonprimary care medicine was \$669 (95% confidence interval, \$510- \$828) per case. Chiropractic costs were closer to primary care medicine, with a mean difference of \$70 less per case for primary care cases (95% confidence interval of the difference, -\$86 to \$189); the overlap of the 2 systems' allowed costs included zero, so the null hypothesis of no difference could not be rejected. Chiropractic costs were \$252 less on a per-case basis as compared with nonprimary care medicine (95% confidence interval of the per-case difference, -\$442 to -\$62), a practical and significant difference.

DISCUSSION AND LIMITATIONS

Despite a volume of research over the past quarter century, the question of cost-effectiveness of chiropractic relative to medical care for LBP remains unclear.¹¹ This study sought to examine one aspect of this important question by reviewing administrative cost data. Although ranked chiropractic cost mean values were significantly lower on average when compared with all kinds of medical back pain management, chiropractic was slightly more expensive than primary medical care. Our findings show that the comparative effectiveness of low back management is complex. Our supplemental graphic analysis could be interpreted to mean that conventional medicine treats more serious or more complex back cases, given the greater variance of medical costs.

A troubling reason for distinct domains with escalating medical costs must include the ever-growing practice standards of diagnosis and care endemic required by each

medical specialty to stay competitive and legal. Rather than reducing and replacing old technology, modern medical innovations have to conform to a myriad of rules, regulations, and mandatory standards, such that outcome is only of secondary importance. More testing, technology, and imaging may not improve patient and population welfare for dollars spent, may not improve medical decision-making, but almost certainly increase costs of care, chronicity, adverse effects, and dependency on more medicine. Health care inefficiencies can be glimpsed in “local area variations” of care costs reported by Wennberg et al.¹²⁻¹⁴ Quite simply, where there are more back surgeons, there are many more back surgeries.¹⁵ Back or spine care is an extremely complex, disabling, and highly personal entity susceptible to physician-induced demand.¹⁶⁻¹⁸ In some, perhaps most, cases, less back care is better. The question remains: how do we best match the patient’s condition with just the right amount of treatment? For the expensive back pain problem, the crucial issue is to not delay necessary care, but also not to give too much care, either. Based upon the findings in this study, better initial triage of low back cases may possibly help reduce the costs of LBP management in the health care system overall. Without data to confirm comparability of medical and chiropractic effectiveness, we can only note that in this sample, chiropractic management is less variable and costs less on a per-case basis than nonprimary medical care. Chiropractic assumed a cost position between primary care and medical specialties in this study.

A limitation of this study was that patient data were taken from a cross sectional 6-month period and then used a follow-up time of 18 months, rather than an episode creation method used in many of the past studies. Thus, instead of identifying the initial (first-contact) provider, this study considered what type of provider the patient saw during the initial 6-month period, either a chiropractor or a medical provider.¹⁹

Limitations of this study include the fact that the design did not account for patients who may have seen a chiropractor or medical provider for back problems before January 2004. However, the impact of such a bias is minimal given the number of chiropractic patients who continued treatment after the study and the number of medical patients who were also treated before the study time frame and who continued treatment afterward. We would recommend that future trials either estimate or control for this as a potential source of bias.

Administrative database analyses have strengths and weaknesses with respect to randomized controlled trials.²⁰ A major limitation with an insurance database for this study is that clinical details are unavailable regarding patient outcomes such as pain, disability level, or satisfaction with care for the 2 groups. As such, we could not adjust for care severity and analyze for cost-effectiveness. Perhaps the greatest threat to validity is selection bias. Without random assignment, patients selecting chiropractic may be different from those seeking medical care, and vice versa.

Because data on medication costs were unavailable, the claims database cannot be used to tie a diagnosis to

pharmaceutical prescriptions or as an indicator of severity. Medication may add significant costs to the medical care groups and less so to the chiropractic group, further increasing the mean difference in costs between the 2 groups. For an accurate perspective, it is important to attempt to include and aggregate all direct treatment costs, a shortcoming of many of the previous cost comparisons of chiropractic and medical care for LBP.²¹

Any apparent cost savings with chiropractic care may in part reflect the lower level of reimbursement of chiropractors relative to medical providers.²² Regarding study costs of chiropractic care, other researchers have stated that “it would be more accurate to analyze actual costs of care as opposed to charges” because of the differences in reimbursement.²³ That is why in the current study actual costs (total reimbursement to providers) were chosen as the outcome measure. On the other hand, lower-cost methods for treating LBP are a timely issue that might favorably impact health care costs. Other authors have observed similar cost utilization reduction results.²⁴ Only effectiveness measures could settle the issue of whether the chiropractic system reduces unnecessary medical tests and procedures, or only adds to medical complexity, uncertainty, and costs.

CONCLUSION

In summary, this study suggests chiropractic management as less expensive compared with medical management of back pain when care extends beyond primary care. Primary care management alone is virtually indistinguishable from chiropractic management in terms of costs.

Practical Applications

- Consistent with previous literature, this study is suggesting that the medical management of LBP may be more costly than chiropractic management.
- Whereas median allowed costs for chiropractic management were \$417, nonprimary care medical management was \$669, a significant difference of \$252.
- Medical primary care of LBP is quite competitive with chiropractic care, although long-term effectiveness of either should be ascertained in a longitudinal study.
- Future studies should include severity of condition at presentation, outcomes, and patient satisfaction to evaluate cost-effectiveness.

FUNDING SOURCES AND POTENTIAL CONFLICTS OF INTEREST

No funding sources or conflicts of interest were reported for this study.

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