

SYMPTOMATIC OUTCOMES AND PERCEIVED SATISFACTION LEVELS OF CHIROPRACTIC PATIENTS WITH A PRIMARY DIAGNOSIS INVOLVING ACUTE NECK PAIN

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ABSTRACT

Objective: The aim of this study was to determine the extent to which a group of patients with acute neck pain managed with chiropractic manipulative therapy benefited from chiropractic care and the degree to which they were subsequently satisfied.

Methods: A two-part retrospective survey, each composed of 14 questions. One part was completed by practicing doctors of chiropractic concerning various aspects of their treatment for patients with former acute neck pain. In the second part, these same patients responded to a telephone survey to measure pre- and posttreatment pain levels and their level of satisfaction with the treatment they received. Chiropractic manipulative therapy was the primary independent variable, although other therapies were used, such as physical therapy, nutritional advice, and exercise.

Results: A total of 115 patients were contacted, of whom 94 became study participants, resulting in 60 women (64%) and 34 men. The mean age was 39.6 years (SD, 15.7). The mean number of visits was 24.5 (SD, 21.2). Pain levels improved significantly from a mean of 7.6 (median, 8.0) before treatment to 1.9 (median, 2.0) after treatment ($P < .0001$). The overall patient satisfaction rate was 94%.

Conclusion: Patients with acute neck pain involved in this study seemed to be satisfied with chiropractic treatment and reported reductions in associated pain levels and activity restrictions. However, because of the study's design and limitations, care must be taken before drawing firm conclusions from the data presented. (J Manipulative Physiol Ther 2006;29:288-296)

Key Indexing Terms: *Cervical Vertebrae; Neck Pain; Neck Injury; Chiropractic; Manipulation; Spinal*

Neck pain is widespread in the general population, affecting approximately 67% of adults in the United States at some point in their lives. Prevalence estimates range from 13% to 18%, with women being affected at a higher rate than men.^{1,2} Neck pain, along with other neuromusculoskeletal system (NMS) disorders, has an enormous impact on public health in relation to disabilities, medical expenses, and lost work productivity. For instance, in the Netherlands, NMS disorders are responsible for up to 26% of all functional disability.³

Millions of chiropractic manipulations are performed every year for neck pain in the United States.⁴⁻⁶ Yet, very little information is available in the medical or chiropractic literature related to the chiropractic treatment of neck pain. When specifically considering acute neck pain, little research has been published; consequently, reliable data are lacking.^{7,8} Available studies have shown benefit in relation to cervical manipulation for the treatment of tension and migraine headaches, nonspecific neck pain, and chronic whiplash syndrome.⁹⁻¹¹

Cassidy et al¹² carried out a randomized clinical trial that investigated whether a single cervical manipulation was more effective than mobilization in decreasing neck pain and increasing cervical range of motion. Although the study determined that manipulation was more effective than mobilization in decreasing neck pain and increasing cervical rotation, it had limited generalizability. It is difficult to determine how many of the subjects experienced acute neck pain because pain was present for less than 1 week in only 16 patients. Pain extended from 1 week to 6 months in 34 subjects, whereas the remaining 50 subjects had pain for more than 6 months. As a result, the sample size of acute subjects was less than 50, producing a statistical analysis

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with very low power. Furthermore, the patients only received one manipulation, which differs from typical chiropractic practice. Generally speaking, doctors of chiropractic (DCs) provide numerous manipulations in the course of treating a patient for an NMS condition.

A pilot study was recently carried out by Evans et al¹³ which dealt with acute or subacute neck pain of less than 12 weeks' duration. There was a total of 28 subjects involved, with 10 being randomly assigned to a manipulation group. The authors made no comparisons between groups because of small sizes; rather, the information was used in preparation for a complete randomized controlled trial in the future.

Chiropractic manipulative therapy (CMT) is not the only modality lacking validity in relation to neck pain treatment. The Philadelphia Panel investigated neck pain in general and determined that only 8 clinical trials met all of their selection criteria for the management of neck pain; although none of the trials that they included involved CMT. Moreover, only proprioceptive and therapeutic exercise for chronic neck pain showed clinical benefit for pain and function, and no studies supported any form of treatment of acute neck pain.¹⁴

The issue of patient satisfaction has been investigated mainly in relation to the treatment of chronic neck pain by spinal manipulation. Patients have generally been satisfied with spinal manipulative therapy in these studies, especially when it was combined with exercise.¹⁵⁻¹⁷ Patients most likely to seek treatment from DCs are those with lower back or neck pain,¹⁸ and there is evidence that CMT is safe and cost-effective for the treatment of these conditions.¹⁹ One large study revealed that 46% of patients presenting to DCs had lower back pain, 12.7% had neck pain, and the remaining patients had various complaints such as headaches, allergies, and sinus pain.²⁰ However, cervical CMT is performed during the course of 66% to 69% of chiropractic visits.²¹

The purpose of this study was to determine whether a group of patients with acute neck pain benefited from CMT and the extent to which they were satisfied with the treatment. Additional observational data are presented regarding several other variables that were collected from both the DCs and patients who participated in the study.

METHODS

Study Design

This was a descriptive study consisting of a single group of chiropractic patients. The study was retrospective survey, wherein the participants were asked to report how they felt before and after treatment. The dependent variables were pre- and posttreatment pain and disability levels, as well as reported overall patient satisfaction. The primary independent variable was CMT. However, additional therapies were typically used by the DCs, including physical therapy, nutritional advice, and exercise.

The study consisted of a two-part survey. The first part was completed by practicing DCs who answered a series of 14 questions about their treatment of sequentially presenting patients with acute neck pain. The information of interest was derived from a review of existing records of patients who had been treated 1 year previously. The second part of the survey involved the administration of a 14-question telephone survey to these same patients. Representatives, other than the DC, from each of the practitioners' offices conducted the survey.

Study Population

The population of interest consisted of chiropractic patients who had experienced an episode of acute neck pain 1 year previously among 7 chiropractic practices. The sampling frame was made up of readily accessible patient files that were in the possession of the participating DCs. The principal criterion required for patients to qualify for inclusion in the study was a history of acute neck pain that was treated by a DC 1 year earlier.

The population of chiropractic patients in the United States was previously reported by the American Chiropractic Association.²² According to their demographic data, chiropractic patients are 58% female and 42% male. More than 70% are between the ages of 17 and 64 years, with approximately 12% being 16 years or younger and 18% being 65 years or older.

Survey instruments were constructed to facilitate patient interviews and to gather information from the participating DCs. Questionnaires were constructed specifically for this study because there were no commonly available instruments that were considered capable of gathering the desired information in the setting of a telephone interview. The instruments were tested by 3 of the DCs to determine if there were any problems associated with administration. Each DC conducted 6 patient interviews, which were then evaluated. Several refinements of the interview process were necessary, but the instruments themselves were acceptable, and full-scale implementation of interviewing was carried out. Refinement of the interview process merely involved providing information about the best time of day to contact patients.

There were 14 DC offices that agreed to gather data for the study; however, only 7 followed through and provided the requested information. Several of the DCs indicated that qualifying acute neck pain patients were difficult to locate within their practices because they made up a minority of their total patient base. In addition, patients treated 1 year previously were sometimes difficult to locate.

Study Parameters

The dependent variables dealt with various aspects of pain perception and patient satisfaction. Pain perceptions

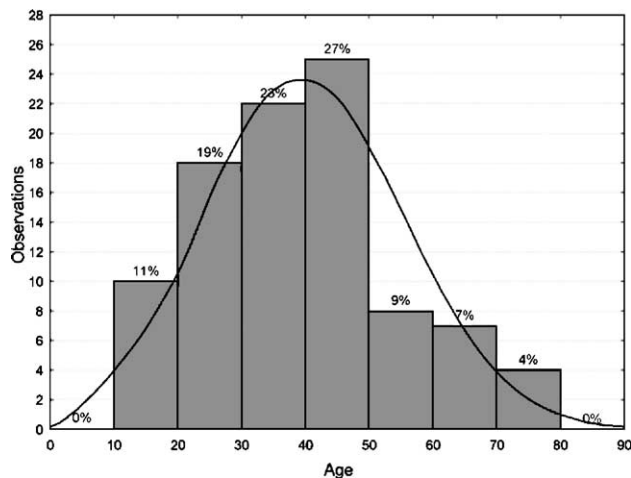


Fig 1. Histogram of the frequency of group age distributions corresponding to a normal curve.

data were as reported by the patients after they were briefly educated about the meanings of their responses. For instance, participating patients were instructed to report pain levels on an 11-point numeric scale ranging from 0 to 10. The respondents were informed that 0 meant that there was no pain and 10 was the worst pain imaginable. This same scale has previously been used by other chiropractic researchers.^{8,23} The most important independent variable was CMT, which may be dispensed to patients by any of several different techniques.²⁴ However, no attempt was made to identify which technique was used by the individual DCs.

Subjectively reported pre- and posttreatment pain levels were the primary indicators of treatment outcome, with posttreatment pain being one of the study’s dependent variables. Percentage of improvement was estimated comparing pre- and posttreatment reported pain levels. Patient satisfaction was another of the study’s dependant variables. There were two questions on this topic; 1 asked for the DCs’ impression of how satisfied the patient was, and the other queried the patient directly. Another satisfaction-related patient question involved the likelihood that they would choose chiropractic care again if they had similar symptoms. This question was considered to be a suitable proxy for patient satisfaction because patients’ satisfaction levels should correlate positively with their probability of choosing the same care again. Patients who saw other providers were asked to choose which provider helped their condition the most. This question was also expected to reflect the extent of patient satisfaction.

Validity

The construct validity of this study partially depended upon the ability of the 11-point pain scale to replicate the patients’ pain levels accurately. This scale has been used by

other chiropractic researchers and was found to be more reliable than other measures of pain levels.²⁵ Specific instructions were provided to participants to minimize the negative effect associated with the relatively long interval between the interview and chiropractic treatment.

The degree of disability was another variable under study, the presence of which relied on the patients’ subjective responses answering the following question, “Did your neck pain restrict you in your activities before you started chiropractic treatment?” If the response was affirmative, the patient was asked to choose between 6 categories: (1) very minimal (able to do very heavy tasks); (2) minimal (able to do heavy tasks); (3) moderate (able to do only moderate tasks); (4) moderately severe (able to do only light tasks); (5) severe (able to do only very light tasks); or (6) very severe (I am practically restricted to my bed). These 6 categories were generally adapted from the section dealing with work activities found in the Neck Disability Index, which has previously been validated with regard to its use as a prospective instrument.²⁶ The patients’ descriptions of disability in the Neck Disability Index range from “I can do as much work as I want to” to “I can’t do any work at all.” Nevertheless, utility in this case is limited because patients were asked to recall disability factors that they had experienced more than 1 year previously.

Human Subjects

Human subjects were involved in this study only by way of a telephone interview. No direct personal contact or intervention of any kind was implemented. A cover letter and accompanying sheet of instructions for use by the interviewer was provided to the DCs along with the questionnaires. The interview instructions contained a portion that was read to each respondent, covering matters of confidentiality, informed consent, and the fact that there would be no prejudice if they chose not to participate in the study. By assuring confidentiality, the patients were most likely more candid, which mitigated some related potential biases.

RESULTS

Demographic Profiles of Participating Patients

A total of 115 patients were contacted and asked to be included in the survey. However, 20 of them declined to participate, and one case was not included because the patient was a 4-year-old child whose information was provided by the mother. This resulted in 94 respondents included in the final analysis. The group was composed of 60 women (64%) and 34 men. The mean age of the respondents was 39.6 years (SD, 15.7; 95% confidence interval [CI], 36.4-42.8), with the youngest person being 13 and the oldest, 80 years (Fig 1).

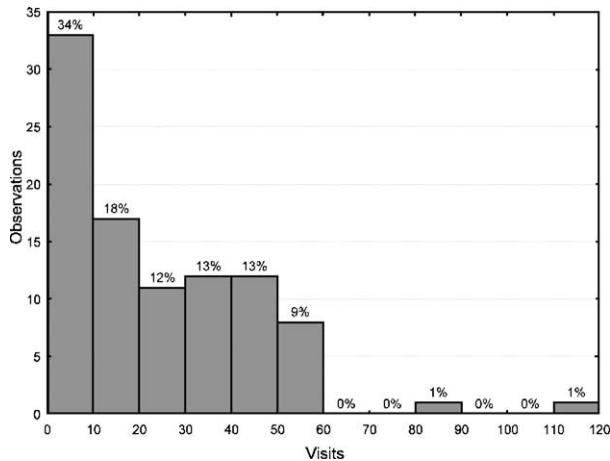


Fig 2. Histogram of the frequency distribution of the categories of total number of visits.

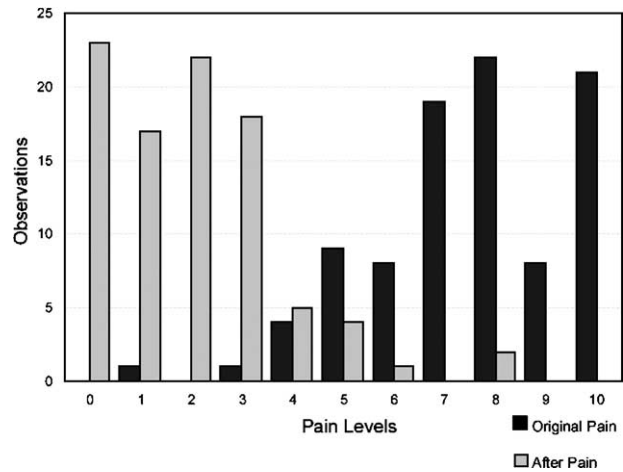


Fig 3. Bar graph comparing the frequency of patients' original pain with after pain.

Table 1. Descriptive statistics of total visits, comparing trauma with no-trauma cases

	Trauma	No-trauma
Valid n	55	39
Mean total visits	34.69	10.13
95% CI	28.97-40.41	6.82-13.43
Minimum	1	1
Maximum	117	57
SD	21.15	10.20

Patient Treatment Profiles

The total number of visits provided by DCs to individual patients in this study ranged from 1 to 117, with the mean number of visits being 24.5 (SD, 21.22; 95% CI 20.21-28.79). The treatment of one patient involved 117 visits. This extreme case was determined to be a significant outlier by the Extreme Studentized Deviate method ($z = 4.36, P < .05$). Subsequent removal of the outlying case from the analysis resulted in a slightly smaller value for mean visits (23.5; SD, 19.0). The most frequent category of visits was in the 1 to 10, and there were only two visits in categories above 50 to 60 (Fig 2). There was a considerable difference in the total number of visits patients received when comparing “trauma” with “no-trauma” cases, with trauma cases receiving significantly more (Table 1).

Most of the patients sought treatment of their acute neck pain after an injury, with 59% of the patients being involved in a prior traumatic event. Among the injured cases, the mechanism of trauma was described as an automobile crash in 84%, a fall in 5%, or other in 11%.

When considering treatment adherence, participating DCs reported that 65% of the patients completed their recommended treatment plans. There was a possibility that

the 35% of patients who did not adhere to their recommended treatment plan may have been dissatisfied. However, during the interview, 91% of this group indicated that they were either satisfied or very satisfied. This was only slightly lower than the overall group satisfaction rate of 93%. Of those who did not complete their treatment plans, 94% discontinued care of their own accord, whereas only 6% did so because they were referred to another provider.

Comparisons of Pain Levels

Pain levels improved from a mean of 7.5 (median, 8.0) for “original pain” (pain level before treatment), to 1.9 (median, 2.0) “after pain” (pain level immediately after treatment). “current pain” (pain level at the time of the patient interview) was 1.63 (median, 1.0), which changed very little in comparison with the pain level immediately after treatment. This may suggest that improvements achieved during treatment were long lasting.

The difference of the mean values of the original pain group minus the after pain group was 5.6, indicating that there was a notable shift in the frequencies of higher pain levels before treatment to lower pain levels after treatment that can be seen in Fig 3. To facilitate this comparison, a paired Wilcoxon signed rank test was carried out, which determined there was a statistically significant difference between the mean values ($Z = 8.28, P < .0001$).

Approximately 84% of the patients indicated that their neck pain restricted their activities before chiropractic treatment; with 3% of them specifying that the restriction was very minimal, 18% minimal, 23% moderate, 30% moderately severe, 21% severe, and 6% very severe. At the time of the interview, 25% indicated that they still had physical restrictions. Only 12% portrayed their physical restriction as moderately severe or greater at the time of the interview, although 57% did before treatment.

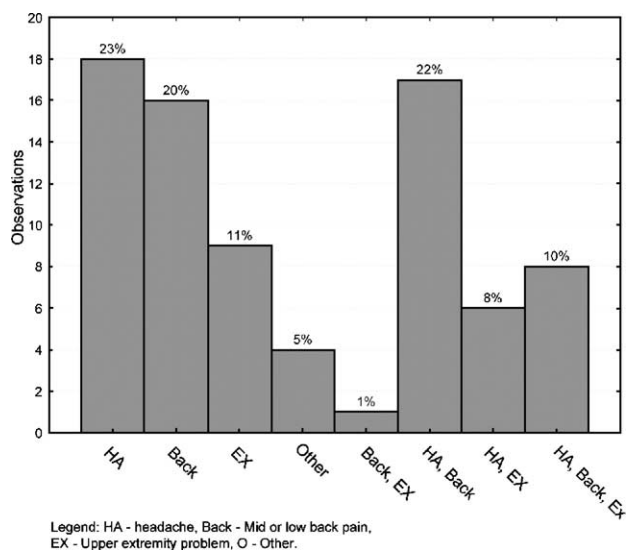


Fig 4. Histogram representing the frequency of accompanying conditions that were present in 82% of respondents.

Of the patients who still had restricted activities at the time of the interview, 20 (83%) of them were women and 4 were men. This was evident even if the percentage of women compared with men was 64% vs 36%, respectively. When observed vs expected values were compared using a χ^2 test, the finding that women had a higher proportion of activity restriction than men was statistically significant ($\chi^2 = 4.24, P = .0396$).

The group of patients who were still disabled because of their neck pain at the time of the interview was seen for an average of 41.9 visits (SD, 25.6), which was substantially more than the total group who received an average of 24.5 visits (SD, 21.2). The point biserial correlation coefficient relating total visits to disability at the time of the interview was $r = 0.48$, which points to a fairly strong relationship between these variables. This relationship may be related to disabled patients having prolonged symptoms, which required more visits for treatment.

Patients with a history of neck pain were expected to require more treatment than what was average for the group; however, these patients received an average of only 19.9 visits (SD, 16.7), which was nearly 20% less than the total group. They were also expected to be more likely to have residual disability, but only 26% of this subgroup indicated that they had activity limitations, as compared with 25% of the entire group.

When considering cases that involved injuries sustained in motor vehicle crashes, these patients received a mean of 46 (SD, 19.12) visits, ranging from a minimum value of 7 to a maximum 117 visits. Their original pain level was expected to have been higher because they required so much more treatment. However, the motor vehicle crash patients had a mean pain level of 7.5 (median, 8.0), which was exactly the same as that of the total group.

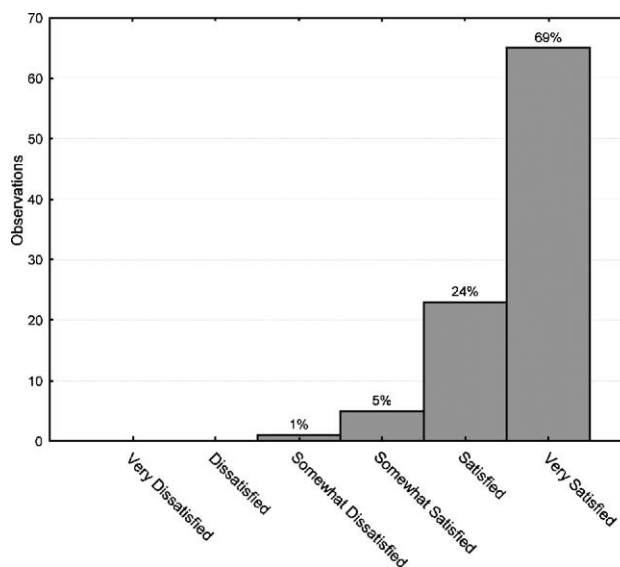


Fig 5. Histogram of the frequency distribution of patient satisfaction (as per patients).

An important consideration when comparing initial and follow-up pain levels in patients with acute neck pain is that the natural history of neck pain may be quite favorable. Accordingly, the patients involved in this study may have shown improvement, given the same period for recovery, without treatment or with an alternate intervention.

Treatment Modalities

Doctors of chiropractic used adjunctive treatment modalities in addition to CMT in 94% of the cases. Modalities that were used included physiological therapeutics (40%), exercise (13%), and various combinations of therapies for the remainder. A combination of physical therapy and exercise was popular (35%). No DCs used nutritional/herbal recommendations alone as an adjunctive treatment modality. The mean pain level of patients who did not receive adjunctive modalities was 7.2 (median, 7.0), which did not differ appreciably from that of the group in general (7.5; median, 8.0).

Accompanying Conditions Reported

Secondary conditions in addition to acute neck pain were reported in 82% of the patients. These conditions included headaches, mid or low back pain, upper extremity problems, and other problems. Various combinations of these complaints were observed because more than one selection was allowed for this question. The most common combination of accompanying conditions was headache, together with mid or low back pain (Fig 4).

Patients with accompanying conditions required more treatment than those with only acute neck pain. Mean total visits were 26.8 (SD, 22.0) for the former and 13.9 (SD, 13.3) for the latter. Mean levels of patient satisfaction were

Table 2. Comparisons of overall data of DCs who took part in the study

DC no.	1	2	3	4	5	6	7
Valid n	13	5	6	24	11	20	15
Age: mean (SD)	36.8 (13.9)	32.4 (11.5)	38.0 (17.8)	30.2 (11.9)	44.1(13.1)	50.1 (16.5)	42.9 (15.1)
Men (%)	46	40	50	17	55	50	20
Female (%)	54	60	50	83	45	50	80
Visits: mean (SD)	31 (10.3)	37.6 (10.3)	11.5 (16.7)	43.0 (24.6)	5.5 (3.7)	22.6 (16.4)	6.6 (5.9)
Finished treatment (%)	85	60	17	92	55	60	40
Trauma (%)	100	100	67	75	36	35	27
Satisfaction—DC ^a	5.2	5.4	4.8	5.1	5.2	4.9	6
Satisfaction—patient ^a	5.4	5.2	5.3	5.6	5.9	5.8	5.7
Referred (%)	31	60	0	63	0	30	13
Pain level initially ^b	6.8	7.6	6.4	7.5	7.7	9	6.7
Pain after treatment ^b	0.85	1.8	1.4	2.3	1.1	2.3	2.5
Pain (current) ^b	0.7	1.2	2.0	2.4	1.4	2	1.3
Disability (current) (%)	8	40	0	54	0	30	13
Likely to return (%) ^c	69	80	50	83	100	95	100

^a Mean patient satisfaction on a scale from 1 to 6, with 1 being “very dissatisfied” and 6 being “very satisfied,” as perceived by physician (DC) and patient.
^b Mean pain level on a scale of 0 to 10, with 0 being “no pain” and 10 “the worst pain imaginable.”
^c How likely the patient is to choose chiropractic care again for another episode of neck pain. Percentages indicate “very likely” or “definitely would.”

very close for these subgroups—at 5.8 (median, 6.0) and 5.6 (median, 6.0), respectively.

Patient Satisfaction

The current study found that 70% of patients indicated that they were “very satisfied” with their care and 24% were “satisfied,” as depicted in Fig 5. A 6-point satisfaction scale was used: 1, very dissatisfied; 2, dissatisfied; 3, somewhat dissatisfied; 4, somewhat satisfied; 5, satisfied; and 6, very satisfied (Fig 5). There was a fairly strong positive correlation between patients’ satisfaction levels and their likelihood of choosing the same care again if they experienced similar symptoms in the future (Spearman $r_s = 0.49$, $P < .05$). The scale used to denote the patients’ likelihood of returning for the same care was as follows: 1, not likely; 2, somewhat likely; 3, very likely; and 4, definitely would.

Approximately 32% of the patients were referred to other providers for either comanagement or replacement care. Of those patients who were referred, 15 (50% of total referrals) were to massage therapists; 11 (37% of total referrals) were to medical doctors; and 4 other referrals (12% of the total) were sent to a mixture of other providers including medical doctors, massage therapists, and physical therapists and one, to an acupuncturist. Other DCs, osteopathic doctors, and naturopathic doctors were not referred to at all. When asked which provider helped patients the most, 83% chose the original DC.

Relationships of Variables

An odds ratio (OR) was calculated to see if there was an increased likelihood of developing chronic pain after cervical spine trauma within the study population. The following OR expresses the odds of developing chronic pain after an episode of acute neck pain in those with a history of trauma,

compared with acute neck pain with no history of trauma. The OR was 2.16 (95% CI, 0.86-5.43), which, because the CI includes 1, is not statistically significant. This indicates that there is little support from the current data that persons with acute neck pain and a history of trauma as compared with patients with acute neck pain with no history of trauma are any more likely to develop chronic pain.

χ^2 Analysis was performed to determine whether a correlation between sex and the probability of developing chronic pain after cervical spine injury existed among this population. The calculated χ^2 was 1.92 ($P = .166$). Accordingly, there was not enough statistical significance to make any assumptions regarding this suspected relationship.

A relationship was suspected between age and the number of visits provided because older persons may require more visits because they have a prolonged rate of healing. Opposite to what was expected, a negative correlation was discovered. Older persons actually received less total visits than younger patients, although the correlation coefficient was considered to be weak ($r = -0.29$).

DC Treatment Profiles

Table 2 provides a summary of treatment profiles of the participating DCs. There was a great deal of variation in the number of cases seen by each DC in the study, with one DC only providing 5 cases, as compared with another who supplied 25. Patient satisfaction levels were fairly consistent between DCs, but mean visits varied from 5.5 to 41.6. Patient adherence to treatment recommendations was also inconsistent, with only 17% finishing care for one DC and 88% for another. The DC with the highest adherence rate also had the highest mean number of visits. Current patient disability was not consistent between DCs, with two having none of their patients disabled at the interview and one with 52%.

When specifically considering DCs with the highest total visits (DC nos. 2 and 4) as compared with the lowest (DC numbers 5 and 7), several things were apparent regarding patients who received fewer visits: (1) they were more satisfied with their care, (2) their improvements regarding pain levels before and after treatment were comparable with those with higher visits, (3) they were more likely to choose chiropractic again in the future if they noticed the same problem, and (4) they were much less likely to report continuing disability. These observations may be related to a higher proportion of trauma cases among patients receiving more visits, and trauma cases may require more treatment.

DISCUSSION

This study, representing data from 94 patients who attended a total of 2303 chiropractic office visits, showed that the treatment for patients with acute neck pain by chiropractic methods may be beneficial. Participating patients, for the most part, indicated that they noticed less pain and disability after treatment. They also indicated that they were satisfied with the care that they received, and most of them would choose similar care for an episode of the same condition in the future.

Patient Satisfaction

The overall patient satisfaction level was determined to be 94% when including all patients who reported that they were either satisfied or very satisfied with their care. This level was better than anticipated because it was higher than previous reports. Although there are no studies available for direct comparison that have reported satisfaction levels regarding the treatment of acute neck pain by CMT, Wolsko et al²⁷ reported that chiropractic was rated as “very helpful” by 61% of those respondents who received treatment of back or neck pain. In addition, Jordan et al¹⁷ reported “good” satisfaction with chiropractic manipulative treatment in a group of patients with chronic neck pain.

Treatment adherence may be another indicator of how satisfied patients were with the care they received, although this supposition has not been investigated. The rationale for this statement is that if patients are satisfied with the treatment they receive, they will be more likely to follow through and complete their treatment plan. If not, they may decide to try another method of treatment and discontinue care. Generally speaking, treatment adherence was fair in this study, given that nearly two thirds of the patients completed their treatment plan.

Pain Reduction

In the study’s group of acute patients, mean neck pain levels before treatment were nearly 4 times greater than they were at the completion of treatment. Furthermore, after at

least 1 year since the patients’ initial visit, the study yielded mean pain reductions of 5.6 points. In comparison, a study by Hurwitz et al⁸ reported mean reductions of average neck pain on a mixed group composed of acute, subacute, or chronic chiropractic patients, also using an 11-point scale. At follow-up 6 months after the initial visit, there was a two-point reduction of pain. Another mixed group study by Cassidy et al²⁸ reported improvement of neck pain before and after CMT using the 101-point numerical rating (NRS-101) scale. They indicated that before treatment mean, NRS-101 scores were 43.7, compared with 31.1 after treatment. Because the NRS-101 scale is a progressive numerical scaling method from 1 to 100, this measurement would approximate a 1.3-point reduction on the 11-point scale. However, treatment only involved one CMT to the neck, and pain levels were ascertained immediately after treatment.

Reduction of Disability

There were reductions in disability recorded during the study that were statistically significant. Approximately 84% of the patients related that their activities were restricted before chiropractic treatment because of their neck pain, whereas only 25% still had activity restrictions at the time of the interview. Furthermore, 57% of those with physical restrictions described their disabilities as moderately severe or greater before treatment, whereas at the time of the interview, just 12% did. No studies have addressed the issue of disability reduction regarding a group exclusively composed of patients with acute neck pain. For comparison, however, Hurwitz et al⁸ used the Neck Disability Index, which uses a point scale of 0 to 50 to evaluate a mixed group of neck pain patients. The researchers noted a decrease of more than 6 points at 6-month follow-up. In a study of CMT and chronic neck pain, Jordan et al¹⁷ rated disability using a scale with a maximal point score of 30. Self-reported disability showed improvements that showed approximately a 50% reduction. This compares to more than a 50% reduction in this current study.

Women had a higher proportion of activity restriction than men, which was determined to be statistically significant. This finding is similar to what has been apparent in outcome studies of automobile crash-related neck injuries. In effect, women sustained long-term consequences more often than men after whiplash injuries.²⁹

Total Visits

When comparing trauma with no-trauma cases, Trauma cases received more than 3 times as many visits. This difference may be related to tissue damage that often accompanies trauma, which, many times, heals imperfectly.³⁰ In addition, patients with this type of problem may have ensuing long-term pain and physical impairment,²⁹ which further shows that trauma complicates the recovery of acute neck pain.

There was a wide discrepancy between the mean number of visits provided among participating DCs. The DC with the highest mean number of patient visits actually exceeded that of the DC with the lowest number by more than 7 times, although there were no significant differences in patient satisfaction, pain reduction, or disability levels associated with the higher number of visits rendered. Consequently, further investigation is certainly warranted on this topic in the future to determine what the optimal number of visits might actually be.

Suggested Future Research

Every year, in the United States, there are nearly 200 million chiropractic visits involving cervical CMT. Yet, there is little support for its use in the treatment of acute neck pain. Furthermore, studies that have been supportive of the treatment of acute neck pain using CMT have been methodologically weak in relation to small sample sizes and dissimilarities with typical chiropractic practice. Because of these deficiencies, further research is needed to confirm the hypotheses that were addressed in this article. The fundamental methods used in this current study would likely serve as an appropriate model for future research design. However, using a larger group that is selected using randomization techniques would yield less-biased data. A prospective study that compares cervical CMT with a control or alternate therapy group would also be advantageous. Statistical comparisons of the groups could then be carried out regarding patient satisfaction and pain levels.

Limitations

There were several potential biases in this study that may limit its validity. Bias may have been present related to the fact that patients were selected from a limited number of chiropractic practices located in San Diego, Calif; Fayetteville, Ark; Pocatello, Idaho; and Salt Lake City, Utah. These patients may have been different from those seeking care from other practices, especially in diverse geographical locations. On the other hand, the population included in this study was based on a more diverse geographic area than many others, tending to enhance its validity.

The interviewers were from DCs' offices that were known to the respondents. The instructions given to the DCs for selecting interviewers specified that they should be, "...staff or another representative from your office." Consequently, acquiescence or prestige bias³¹ could have been a factor because the respondents may have attempted to please the interviewers from the DCs' offices. This potential bias was addressed during the patient interview instructions, which informed the respondents that their answers would be held in the strictest confidence, even from their DC.

Nonrespondent bias was very likely to have been a factor with regard to patients who refused to participate in the

study. Nonresponding persons may have had different treatment outcomes and levels of satisfaction from those that did respond. However, the response rate was very favorable at approximately 82%.

The fundamental design of the study, which used a retrospective survey, was an important limitation that restricted generalizability. There was also a considerable potential for recall bias because of the extended length of time between the interview and chiropractic treatment. As a result, the patients may have related an inaccurate history of events in relation to flawed memory. An attempt was made to control recall bias, however, by providing thorough patient instructions. Patients were asked to recall pain levels that they had experienced more than 1 year previously; however, the 11-point pain scale that was used has not been validated for retrospective use. This limitation likely reduced the validity of the instrument in this situation.

The data recorded in this study were not the result of random sampling; rather, it was from a convenience sample, which may have resulted in data that were not representative of the population under study. On the other hand, the cases were taken in sequential order from each of the DCs' practices, and no preferential selection was involved. This effort should ameliorate some of the negative effects associated with nonrandom sampling. In addition, there was no control group involved, and no comparisons were made to other forms of treatment (ie, physical therapy or standard medical care). Because of these limitations, this research has a good chance of being biased in relation to its possibly unreliable data. Nonetheless, this study should provide direction for future research on this topic.

CONCLUSION

Based on this study, it appears that these patients were satisfied with the treatment of their acute neck pain by CMT; they reported significant reductions in associated pain levels and comparatively less activity restrictions after treatment. However, because of the study's design, as well as the previously mentioned limitations, care must be taken when drawing any conclusions from the data that were presented. This study was of a preliminary nature, and coupled with the fact that there is a general lack of data regarding the relationship between acute neck pain and CMT, more research is needed in this area and appropriate studies should be conducted.

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