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Prevalence, Practice Patterns and Evidence for Chronic Neck Pain

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Abstract

Objective—The primary objectives of this study were to estimate the prevalence of chronic neck pain in North Carolina, to describe health care use (providers, treatments and diagnostic testing) for chronic neck pain and to correlate health care use with current best evidence.

Methods—A cross-sectional, telephone survey of a representative sample of North Carolina households in 2006. Five thousand three hundred fifty seven households were contacted in 2006 to identify 141 non-institutionalized adults 21 years and older with chronic neck pain and no chronic low back pain. Subjects were interviewed about their health and health care use (i.e., provider, tests, and treatments). Patterns of health care use were compared to current systematic reviews.

Results—The estimated prevalence of chronic neck pain in 2006 among non-institutionalized individuals for the state of North Carolina was 2.2% (95% CI 1.7 – 2.6). Individuals with chronic neck pain were middle- aged (mean age 48.9 years and a majority were female (56%) and non-Hispanic White (81%). Subjects saw a mean of 5.21 (95% CI 4.8 – 5.6) provider types and had a mean of 21 visits. The types of treatments subjects reported varied with treatments such as electrotherapy stimulation (30.3%), corsets or braces (20.9%), massage (28.1%), ultrasound (27.3%), heat (57.0%) and cold (47.4%) having unclear or little benefit based on current best available reviews.

Conclusion—Based on current evidence for best practice, our findings indicate over utilization of diagnostic testing, narcotics and modalities, and the under utilization of effective treatments such as therapeutic exercise.

Keywords

neck pain; health care utilization; evidence-based practice; health services research

Neck pain is an important personal and societal burden,1 affecting 30% to 50% of adults in the general population in any given year2. Approximately 50%–85% of individuals with

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neck pain do not experience complete resolution of symptoms2 and some may go on to experience chronic, impairing pain. Twelve month prevalence estimates for activity-impairing neck pain range from 3.1% to 4.5% in the general population, depending upon the activity.3, 4 Like chronic low back pain (LBP), chronic neck pain is often unresponsive to treatment and costly in regard to direct and indirect costs.5 In cases related to work injury, neck pain may cause absenteeism as frequently as LBP.6, 7

Martin et al8 found that health care utilization and subsequent medical costs for spine conditions have increased steadily from 1997 – 2005 . Pharmaceutical expenditures per user increased 10.2% per year during this same time period. 9 Some of the increased costs may also be attributable to increased use of diagnostic imaging. From 1997 – 2006 there has been a steady increase in the utilization of imaging in the U.S (x-ray, computed tomography, ultrasound, nuclear and magnetic resonance imaging) with increases in MRI and CT imaging being the major drivers behind increases in spine-related imaging. 10

Martin et al8 also reported that the increases in health care utilization did not correlate with improvements in health. One explanation for this finding is that individuals with spine problems are receiving inappropriate/ineffective care. The literature on the treatment of low back pain suggests that clinicians do not always make treatment decisions consistent with current evidence and clinical guidelines. 11, 12

Little is known about health care use for the treatment of chronic neck pain and the extent to which care delivered follows current evidence. As such, we used data from a population-based survey of subjects with chronic impairing neck pain, without chronic LBP, along with available systematic reviews to achieve the following objectives: (1) describe healthcare use (providers, medications, treatments, diagnostic tests) for chronic neck pain and (2) compare current patterns of use to current best available evidence for care of the condition. This can be especially meaningful to identify areas of misuse (i.e., use of non-effective treatments), overuse (i.e., high utilization of minimally effective tests and treatments), and underuse (i.e., low utilization of effective tests and treatments).

Materials and Methods

Data for this study come from a population-based telephone survey of individuals with chronic LBP and neck pain in North Carolina. Results specific to individuals with chronic impairing LBP have been described elsewhere.12, 13 The focus of this study is on individuals with chronic impairing neck pain only who did not also have chronic impairing back pain.

Sampling Frame

The sampling for the 2006 back and neck pain survey in North Carolina has been described in detail elsewhere. 13 Briefly, a stratified random probability sample of North Carolina telephone numbers was obtained from the GENESYS Sampling System, 14 the sampling vendor for the study. Telephone numbers were chosen from 6 sampling strata, defined by the cross-classification of region of the state (mountains, piedmont and coastal) and concentration of African Americans in the population (high, ≥ 15.5% of the population; < 15.5% of the population). African Americans were over sampled to ensure adequate representation of this race among this population.

At each contacted household, one knowledgeable adult (>21 years of age) was asked to identify each adult in the household and to indicate whether s/he had a history of back and/or neck problems, in the past few years. Clarification on the definition of back and neck problems was provided by the interviewer, e.g., “Neck problems mean neck discomfort or

pain. Neck pain starts in the neck area; it may spread to the shoulder or arm". Individuals identified as having back and/or neck problems (i.e., back/neck pain candidates) were then interviewed to determine if the pain was chronic. In households with more than one back/neck pain candidate, one individual was randomly selected to be interviewed.

Subjects who were identified as having both back and neck problems were first asked about their LBP. If the individual had chronic LBP, s/he completed a detailed interview about their LBP. If the individual did not have chronic LBP s/he was then asked about their neck pain. If their pain was chronic and impairing, they completed a detailed interview about their neck pain. Chronic, impairing neck pain was defined as (1) pain and activity limitations nearly every day for the past 3 months or (2) greater than 24 episodes of pain in the previous year with each episode limiting activity for 1 day or more.

Sample

Five thousand three hundred fifty-seven households with one or more adults 21 years or older were contacted and 9,924 adults were rostered. The household response rate was 66% and was computed as the sum of households interviewed divided by the sum of eligible households plus an estimate of the proportion of households with unknown eligibility.15 This estimate of unknown eligibility takes into account households that if called an indeterminate number of times would be more likely to be eligible for questioning and yields a more conservative response rate than assuming that the non-respondents were ineligible for questioning.

Of the 5,357 households contacted, 3,276 households had one or more adults with a history of back and/or neck pain. Of the adults randomly selected from each household 2,809 were interviewed. From the 2,809 interviewed, 94 had no back or neck pain; 890 had a history of neck / back pain, but no pain in the past 12 months; 952 had acute back and/or acute neck pain; 732 had chronic impairing, LBP, and 141 subjects (our sample) had chronic impairing neck pain with or without acute back pain. The individual response rate was 86% and the overall response rate was 57% which is a product of the household response rate (66%) and the individual response rate (86%). Non-respondents were similar in age and race, relative to responders but non-responders were more likely to be male (x^2 test, $P < 0.001$).

Interview

Over the course of the 35 minute survey, respondents with chronic neck were pain were queried about their demographics, health, and health care use, ie., provider visits, treatments, and tests during the previous year. (Survey instrument available from researchers on request). Respondents were queried regarding symptoms (pain with a numerical pain scale), general health status (Medical Outcomes Study Short Form 12, presence of comorbidities)16 and functional status (Neck Disability Index)17. Respondents were also queried about whether they visited each of the following provider types: primary care physician, orthopedic surgeon, neurologic surgeon, doctor of chiropractic medicine, physical medicine and rehabilitation physician, anesthesiologist, neurologist, rheumatologist, psychiatrist, physical therapist, acupuncturist and other (eg, "Did you see an orthopedic surgeon, for your [back/neck] pain in the last year?"). If a provider was visited in the past year then the subject was asked about the number of visits (eg, "How many times did you see him/her for your [back/neck] pain in the last year?"). Pilot work by our group indicated that recall on the number of provider visits in the past year, when compared with chart abstraction, was good, with a correlation between the 2 measures of visit number of 0.83.12

Respondents who indicated seeing one or more providers in the past year were specifically asked about diagnostic tests (CT, MRI, nerve conduction, etc.) and treatments (ultrasound,

spinal manipulation, massage, physical therapy, etc.) received in the past year. In order to improve accuracy of recall for the diagnostic tests the interviewer was provided with a verbal description of each particular test (eg, “CT scans are also called CAT scans or computerized tomography. It is a test where you slowly go through a large, donut shaped machine to take special x-rays of the [back/neck]?”). If the subject was unclear about the test, the interviewer provided the subject with more information. Although we did not specifically test the accuracy of subject recall of tests and treatments, we did pilot the survey instrument and found that subjects had little difficulty recognizing the names of tests and treatments. One possible reason for this is that many subjects with chronic pain have been exposed to the same tests and treatments multiple times over the duration of their problem.

Respondents were also asked about medication use in the past 30 days, because the accuracy of recall of medication use drops sharply as the “window” of recall extends beyond this time period. 18 Respondents were asked about over-the-counter and prescription drugs, including narcotics, muscle relaxants and depression medication. Common names for the medications were listed by the interviewer. Respondents who indicated taking a narcotic were asked about frequency of use (every day, as needed, occasionally).

Data Analysis

All analyses were conducted using the survey commands in Stata (version 9.2; StataCorp, College Station, Texas) which use the sampling weights and take into account the complex sampling design. This weighting also took into account the number of households that had more than one person with chronic neck pain. Prevalence estimates for chronic impairing neck pain were generated for the entire sample and for demographic subgroups. Descriptive statistics were generated to describe the health and health care use of the sample. Ninety-five percent confidence intervals were generated for all point estimates. For some analyses, sample strata were collapsed due to small cell sizes.

We used the systematic review conducted by the Bone and Joint Decade (BJD) 2000 – 2010 Task Force on Neck Pain and Its Associated Disorders: Noninvasive Interventions for Neck Pain 19 in addition to active Cochrane Collaboration systematic reviews to represent the current “best evidence” available to providers and patients for the diagnosis and treatment of chronic neck pain. The Bone and Joint Decade 2000–2010 Task Force on Treatment of Neck Pain: Noninvasive Interventions was published in 2008 to critically appraise and synthesize the literature from 1980 – 2006.19 From the BJD we use the efficacy or effectiveness studies which compared the primary intervention to placebo or sham, “usual care” or no care. We chose the BJD and Cochrane Reviews since they are relatively up-to-date and have been subjected to extensive peer review. To summarize the results of these two sources we use a “+” to indicate a clear positive effect of the intervention relative to the comparator or based upon the summary of the specific Cochrane Review. We denote unclear findings or reviews with positive and negative findings and inconclusive recommendations as “+/−“. For those interventions without active Cochrane Reviews or if the intervention was not specifically addressed in the BJD Review we use a “NR” for not reviewed. We also identify evidence that did not specifically include individuals with chronic neck pain participants (i.e., pain 3 months or greater).

Results

Of the 2,809 subjects interviewed, 141 reported they had chronic impairing neck pain only. Data on these individuals were used to generate the prevalence estimates and to describe the demographic and health-related characteristics of the sample. (Tables 1 and 2) Six of the individuals did not complete the entire survey. The analyses on use of providers, tests, and treatments, therefore, are based on a sample of 135.

Table 1. presents prevalence estimates for chronic impairing neck pain, stratified by gender, age, and race, for the state of North Carolina. Using the 9,924 adults rostered for this study the point prevalence of chronic impairing neck pain weighted to the population of North Carolina was 2.2% (95% CI 1.7 – 2.6) in 2006. Using this weighted estimate would result in an approximate 194,840 adults with chronic impairing neck pain in the state of North Carolina in 2006.

Demographic and health-related characteristics of the chronic impairing neck sample are reported in Table 2. The mean age of subjects was 48.9 years. A majority of the sample was female and non-Hispanic white. Over half of the sample had greater than a high school education. The mean pain score was 6.2 on a 0 to 10 point verbal pain scale, mean Neck Disability Index score was 31/50 (62%) with higher scores indicating greater disability, SF-12 physical component subscale score of 38.6 and mental component subscale score of 50.3. A majority of subjects (55.6%) reported having a history of depressed mood. On average the duration of chronic impairing neck pain was 6.9 (95% CI 5.4, 8.3) years.

Use of Providers and Diagnostic Tests

Of the 135 subjects with chronic impairing neck pain who completed the survey, 79.3% (95% CI 69.6, 86.5) had at least one provider visit for their neck problem in the prior year (i.e., were care seekers).(Table 2) Table 3 presents descriptive statistics on provider treatment visits and diagnostic test use for care seekers. Over 90 percent of care seekers saw one or more physician types. Seventy – two percent of care seekers reported visiting a primary care physician in the past year for their neck pain and one-quarter to one-third of subjects reported a visit to an orthopedic surgeon (31.6%), neurosurgeon (29.1%) or neurologist (22.8%).

Forty percent saw a chiropractor and 35.2% saw a physical therapist. Forty-one percent of subjects reported visiting one or more alternative care providers (i.e., chiropractor, acupuncturist, massage therapist) in the past year. Use of different provider types was common with individuals seeing an average of 5 (95% CI 4.79, 5.64) different provider types in the past year. The mean number of provider visits for subjects was high at 21 visits. Physical therapists and chiropractors had the highest mean number and range of visits per provider. On average, subjects reported approximately 17 visits to the physical therapist or chiropractor in the past year. Forty – five percent of subjects reported having plain radiographs in the past year. MRI and CT scan use were also prevalent in the past year at 30% and 24% respectively.

Use of Medications and Treatments

Table 4. presents descriptive data on subjects' use of different treatments. The majority of subjects with chronic impairing neck pain, 56.3% (95% CI 45.7 – 66.3), reported taking an over-the-counter non-steroidal anti-inflammatory. Twenty – nine percent of subjects reported taking strong narcotics (ms contin, Percocet, Vicodin, oxycotin, fentanyl patch, hydrocodone, oxycodone and methodone) while 23.1% (95% CI 15.0 – 33.7) reported taking weak narcotics (codeine, Tylenol #3, Darvon, Darvocet or propoxyphene) for chronic impairing neck pain. Another commonly used medication was muscle relaxants with almost one-third of the sample reporting use. Evidence on the effectiveness of medications in the treatment of chronic neck pain is quite limited with no definitive findings based on Cochrane reviews and BJD review.

The use of treatments among subjects with chronic impairing neck pain varied substantially. The most commonly used treatments were superficial heat, cold, exercise, massage and manipulation. Of these treatments, exercise and manipulation had moderate to good

evidence of effectiveness for patients with neck pain according to both of the systematic reviews referenced for this study. Treatments of heat, cold and massage were commonly used, however, had unclear or inconclusive results or were not reviewed. In addition, Work conditioning / hardening and acupuncture were the two treatments with the least frequent use, despite evidence to support their effectiveness.

Discussion

We found that the prevalence of chronic impairing neck pain was 2.2% (95% CI 1.7 – 2.6). To our knowledge, this is the first U.S. estimate of the prevalence of chronic impairing neck pain only in the general population. Our prevalence estimate is generally less than most previously reported prevalence estimates for neck pain (both acute and chronic) that range from 3.1% – 71%.3, 6, 20–23 Studies of neck pain relating to the general population show large variations in prevalence estimates.24 However, our findings do agree with findings from a study of 12 month prevalence estimates of impairing neck pain in the Hong Kong general population. This study reported a prevalence of 3.1% for neck pain that interfered with work and a prevalence of 4.5% for neck pain that interfered with social activity.3

One reason our estimate varies from most studies is that our prevalence estimate represents subjects who reported the presence of chronic impairing neck pain without chronic impairing LBP, a common comorbidity and an independent risk factor for neck pain.25 The presence of LBP and neck pain is common in the normal working population with a reported prevalence as high as 32%.23 Individuals in our study who were identified as having back and neck problems were first asked about LBP and if the LBP was chronic and impairing, completed the LBP questionnaire. Due to the length of the questionnaire, we did not then ask these individuals about their neck pain. We asked about chronic LBP first because one of the primary aims of our study was to compare our LBP prevalence estimates to a study we had conducted 14 years earlier that focused on LBP only.13 A second reason our prevalence estimate may differ from others is that our definition of chronic neck pain may be different from others. We defined chronic neck pain based on duration (greater than 3 months) and activity limitation (impairing daily activities). Cross study comparisons of LBP prevalence also indicate varying estimates of prevalence for reasons similar to ours (i.e., different methods / definitions for identifying individuals).26

Use of providers, medications, and tests/treatments by individuals with chronic neck pain is high and varied. Of those subjects that reported chronic impairing neck pain, 79.3% sought care from any provider in the past year. On average, our subjects visited 5 different provider types in the past year, had a mean of 21 ambulatory care visits, received 1.6 diagnostic tests, and used a mean of 3.9 different treatments types. Many of these treatments do not represent best available evidence for the treatment of chronic neck pain. The evidence for therapeutic exercise for neck pain is good.27 However, only 53% of these subjects were prescribed therapeutic exercise instruction in the past year. More than one quarter of the sample received heat, spinal manipulation, ultrasound, and/or massage. All of these treatments have limited or unclear evidence of effectiveness. Forty-five percent of subjects received spinal radiographs in the past year with an average of 2 different sets of spinal radiographs per person. This seems to be inconsistent with diagnostic imaging clinical decision-making guidelines.28 One may also question the value of imaging techniques for subjects with an average duration of symptoms of 6.9 years, as this duration of symptoms may decrease the likelihood that findings would lead to clinically important inferences.

The Cochrane Reviews and the BJD included studies of interventions with participants that had varying durations of neck pain symptoms ranging from acute to chronic. The majority of reviews included subjects with symptoms lasting 3 months or more, the duration of

symptoms we used to identify subjects as chronic in our study. For the BJD, efficacy or effectiveness reviews for muscle relaxants, manipulation, exercise, ultrasound, acupuncture and massage included both acute and chronic neck pain subjects. All of the Cochrane Reviews cited in this study included subjects with symptoms of 3 months or greater.

The Bone and Joint Decade 2000 – 2010 Task Force on Neck Pain and Its Associated Disorders: Research Priorities recently recognized that among many research priorities, important questions remain about the effectiveness of commonly used interventions for neck pain.29 As a first step, our study used a population-based approach to understand the care seeking and intervention utilization patterns of individuals with chronic impairing neck pain. Comparing our findings with current systematic reviews indicate substantial “gaps” in evidence. Specifically, we were unable to find active current systematic reviews on commonly used interventions including heat, cold, and ultrasound. In addition, many of the commonly used interventions had unclear or inconclusive evidence on effectiveness. Furthermore, we were unable to find a synthesis of evidence for the effectiveness of interventions specific to chronic neck pain.

There has been a steady rise in prescription opioids by primary care physicians in the United States.30 Evidence on the effectiveness of medications for chronic neck pain is extremely limited. Though BJD and Cochrane reviews were inconclusive about medications for chronic neck pain, Chou and Huffman31 provide some support for the use of opioids for the treatment of acute and chronic LBP. Good evidence exists for the treatment of acute LBP with NSAID’s and skeletal muscle relaxants and tricyclic antidepressants for pain relief in chronic LBP.31 In the presence of radiculopathy, fair evidence exists that acetaminophen, opioids, tramadol, benzodiazepines and gabapentin are effective for pain relief.31 Medication selection is weighed for potential harms and benefits based on the influence of individual patient characteristics.31 Unfortunately, previous studies on risk-benefit are insufficient to reliably identify factors that can predict benefits or adverse effects.32 This is especially true with harms associated with chronic opioid therapy where studies have lacked statistical power or have not completed an appropriate duration of observation to evaluate long term effects.31, 32

Many reasons could explain the disparity between treatments provided and best available evidence. Chronic impairing neck pain is a complex condition with multidimensional aspects. Subjects may have had high expectations of developing technology and continued to request diagnostic imaging in hopes of further answers to their chronic symptoms. Even some of the most effective interventions for neck pain may not provide relief for everyone. As such, **wi**th an average duration of 6.9 years, many subjects may have tried therapeutic exercise prior to the previous year without symptom relief. Providers may be turning to treatments with less support in the literature if evidence-based treatments are ineffective for their patients. Other provider reasons could be poor reimbursement of some treatments, lack of trained providers, ease of physical modality treatment administration, and decreased provider knowledge of best evidence.

There are several limitations to the current study. As noted earlier, our prevalence estimate is specific to individuals with chronic impairing neck pain and no chronic impairing LBP which resulted in our small sample specific to this population. Our study was also conducted in only one state. North Carolina, however, is characterized by a racially diverse population with a mixture of urban and rural areas.33 The cross sectional nature of the data collection also precludes any conclusions about causality. Because we did not directly assess the ability of subjects to accurately recall the use of tests and treatments, our estimates on these variables are potentially biased (i.e., too high or too low). Subjects may have forgotten tests and treatments in the past year, which is understandable given the high volume of care

sought by this sample. Recall of a test/treatment *not* received is less likely. Subjects' recall of the specific numbers of tests/treatments received may have also been subject to error, especially when considering treatments that were received frequently over the course of the year. Subjects could have easily underestimated or overestimated the number of tests/treatments received. Our pilot work assessing the correlation between recall of provider visits and chart review (r=0.83) as well as earlier work by our group on the agreement between X-ray test recall and chart review (Kappa = 0.71) provide some indirect support for the ability of our subjects to recall past health care use. A final limitation is the lack of systematic reviews to adequately assess the appropriateness of the practice patterns we identified for interventions specific to chronic neck pain.

Conclusion

High use of providers, tests and treatments was evident among a representative sample of individuals with chronic impairing neck pain. Several treatments were underutilized based on current evidence and some were overused. Despite high use of tests and treatments, the sample had high measures of disability.

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Table 1

Prevalence of Chronic Neck Pain in North Carolina in 2006 (n=9,924)*

Characteristic	Prevalence, % (95% CI)
Total	2.2 (1.7 – 2.6)
Sex	
Male	1.9 (1.3 – 2.5)
Female	2.4 (1.8 – 3.0)
Age, y	
21 – 34	1.1 (0.3 – 1.8)
35 – 44	2.9 (1.7 – 4.1)
45 – 54	2.6 (1.7 – 3.6)
55 – 64	3.6 (2.2 – 5.1)
65 and over	1.2 (0.6 – 1.8)
Race	
Non-Hispanic White	2.5 (2.0 – 3.1)
Non-Hispanic Black	1.1 (0.4 – 1.8)
Latino	2.0 (0.9 – 3.7)
Other	1.7 (0.2 – 3.3)

* Results represent weighted estimates for the state of North Carolina

Table 2

Demographic and Clinical Characteristics of 2006 Chronic Neck Pain Sample (n=141)

DEMOGRAPHICS	**Percentage (%) or Mean**	**(95% CI)**
Age (y)	48.9	(46.0 – 51.7)
21 – 34	13.6%	(7.6 – 23.1)
35 – 44	25.1%	(17.7 – 34.3)
45 – 54	24.8%	(17.6 – 33.8)
55 – 64	25.0%	(17.7 – 34.2)
65 and over	11.5%	(7.0 – 18.2)
Female	56.6%	(46.8 – 65.9)
Race		
Non-Hispanic White	81.3%	(72.5 – 87.7)
Non-Hispanic Black	9.6%	(5.8 – 15.6)
Latino	2.9%	(0.9 – 9.5)
Other	6.2%	(2.5 – 14.8)
Education		
<HS education	8.1%	(3.6 – 17.1)
HS education	29.5%	(21.1 – 39.7)
Some college	33.1%	(24.5 – 43.1)
College education	29.2%	(20.8 – 39.4)
INSURANCE, EMPLOYMENT, LITIGATION		
Insurance†		
Private	72.5%	(62.6 – 80.6)
Medicare	17.7%	(11.8 – 25.7)
Medicaid	7.3%	(3.5 – 14.8)
Worker’s Compensation	10.1%	(5.7 – 17.5)
Disability (SSDI/Private)	1.6%	(0.6 – 4.4)
No Insurance	12.6%	(7.0 – 21.6)
Employment		
Employed in past year	63.3%	(52.9 – 72.6)
Employed in past 90 days	50.3%	(40.1 – 60.6)
Currently employed	55.2%	(44.8 – 65.1)
CLINICAL		
Health Status		
Excellent	9.3%	(5.0 – 16.8)
Very Good	27.0%	(18.7 – 37.3)
Good	46.5%	(36.5 – 56.8)
Fair	11.1%	(6.8 – 17.6)

DEMOGRAPHICS	Percentage (%) or Mean	(95% CI)
Poor	6.0%	(2.9 – 12.1)
SF-12		
Physical Component	38.6	(36.7 – 40.5)
Mental Component	50.3	(48.0 – 52.5)
Disease-Specific Health		
Neck Disability Index	31.5	(28.9 – 34.1)
Pain Intensity‡		
Currently	4.8	(4.3 – 5.3)
In past 3 months	6.2	(5.7 – 6.6)
Extremity Pain	65.2%	(55.8 – 73.6)
Extremity Weakness	55.7%	(45.9 – 65.2)
History of Depressed Mood	55.6%	(45.3 – 65.5)
Duration of current episode§(y)	6.9	(5.3 – 8.3)
Saw Provider in Past Year	79.3%	(70.8 – 87.8)

*Adults 21 and over;

†Categories not mutually exclusive;

‡Measured on a 0–10 scale;

§n=113 for neck pain.

¶Strata collapsed to 1

Table 3

Utilization of Provider Type and Diagnostic Test Use in Past Year by Care Seekers for Chronic Neck Pain in 2006 (n=113).

PROVIDER TYPE	**% Who Saw Provider (95% CI)**	**Mean Visits (95% CI)* [Min – Max]**
Primary Care Physician	71.9% (62.1 – 80.0)	3.4 (2.4 – 4.5) [1 – 30]
Orthopedic Surgeon	31.6% (22.6 – 42.2)	5.2 (1.3 – 9.3) [1 – 40]
Neurosurgeon	29.1% (20.5 – 39.6)	3.0 (1.88 – 4.2) [1–12]
Neurologist	22.8% (14.9 – 33.3)	3.1 (1.7 – 4.5) [1 – 20]
Rheumatologist	3.2% (1.1 – 8.9)	3.1 (1.2 – 5.1) [2 – 5]
Anesthesiologist†	13.3% (7.6 – 22.4)	2.9 (1.5 – 4.4) [1 – 12]
Physiatrist	13.4% (7.5 – 22.8)	6.5 (0.3 – 12.8) [1 – 24]
Physical Therapist	35.2% (25.7 – 46.0)	17.2 (7.7 – 26.8) [1 – 100]
Chiropractor	40.4% (30.3 – 51.5)	16.5 (9.0 – 23.9) [1 – 150]
Psychologist or Psychiatrist	3.9% (1.3 – 10.7)	4.1 (2.5 – 8.3) [2 – 5]
Acupuncturist†	3.9% (1.4 – 10.3)	7.9 (0.18 – 16.0) [2 – 18]
Massage Therapist	28.1% (19.3 – 39.0)	8.4 (4.7 – 12.1) [1 – 50]
Pain Clinic	11.4% (6.2 – 19.9)	3.8 (1.6 – 6.0) [1 – 12]
Saw MD	91.7% (84.3 – 95.8)	7.7 (5.3 – 10.1) [1 – 52]
Saw alternative care provider	41.4% (31.2 – 52.3)	N/A
Mean # Providers Seen [Min - Max]	5.2 (4.8 – 5.6) [1 – 12]	N/A
Mean # Provider visits	20.8 (14.5 – 27.0)	
% Who Saw > 3 providers	77.4 (68.3 – 84.5)	
Diagnostic Tests	**% Who Received (95% CI)**	**Mean Number* (95% CI)**
Radiographs	45.1 (34.5 – 56.1)	2.3 (1.7 – 2.9)
CT	24.0 (15.6 – 35.1)	1.3 (1.1 – 1.6)
MRI	30.2 (21.2 – 41.0)	1.4 (1.1 – 1.7)
Myelogram/Discogram	7.4 (3.5 – 15.3)	1.0 (Unable to estimate)
Nerve Conduction	17.7 (8.7 – 32.6)	1.2 (0.7 – 1.7)
Mean number of tests1	1.58 (1.4 – 1.8)	N/A

*conditional on at least one provider visit;

†Strata collapsed due to sample size,

Table 4

Comparative analysis of common interventions for neck pain compared to the utilization of careseekers (n=113) in our study.

Treatment	Use, Percent (95% CI)	No. Treatments Received Mean (95% CI)	Efficacy or Effectiveness Studies in the BJD19	Cochrane
MEDICATIONS[1]				
NSAIDS (OTC)	56.3 (45.7 –66.3)	N/A	NR	+/−34
Weak Narcotics	23.1 (15.0 – 33.7)	N/A	NR	+/−34
Strong Narcotics	28.8 (20.0 – 39.5)	N/A	NR	+/− 34
Muscle Relaxants	31.5 (22.4 – 42.4)	N/A	+/−	+/− 34
PHYSICAL TREATMENTS[2]				
Traction	17.7 (10.7 – 27.7)	Not Asked	+/−*	+/−35
Corset or brace	20.9 (12.7 – 32.4)	Not Asked	NR	NR
Used TENS Unit	21.8 (13.9 – 32.6)	Not Asked	+/−*	+/−36
Spinal Manipulation	36.8 (27.13 – 47.6)	12.7 (6.7 – 18.7)	+/−	+37
Injection†	18.6 (11.7 – 28.2)	2.4 (1.5 – 3.3)	NR	+34
Rehabilitation conditioning / work hardening program	2.7 (0.78 – 8.7)	Not Asked	NR	+38
Prescribed exercise	52.6 (42.2 – 62.8)	N/A	+	+27
Electro stimulation during visit	30.3 (21.1 – 41.4)	20.8 (8.8 – 32.8)	NR	+/−36
Heat	57.0 (46.2 – 67.1)	23.2 (13.9 – 32.6)	+/−*	NR
Cold	47.7 (36.9 – 58.7)	20.7 (9.6 – 31.7)	+/−*	NR
Ultrasound	27.3 (18.6 – 38.1)	9.2 (4.2 – 14.3)	+/−	NR
Acupuncture†	3.9 (1.4 – 10.4)	7.9 (0.18 – 16.0)	+	+39
Therapeutic Massage	28.1 (19.3 – 39.0)	8.4 (4.7 – 12.1)	+/−	+/−40
Mean number of total treatments‡	15.6 (10.9 – 20.4)	N/A	N/A	N/A
Mean number of different treatment types	N/A	3.9 (3.3 – 4.5)	N/A	N/A

[1] In past 30 days

[2] In past year

* denotes those reviews that did not include subjects with symptoms 3 months or greater;

† Strata collapsed due to small cell sizes

‡ conditional on receiving one treatment

"+" indicates efficacy for the intervention; "+/−" indicates discrepancies or results unclear in the evidence for the intervention, "NR" indicates no active review available, "Not Asked" – question of mean number of treatments not asked in the survey, "N/A" indicates not applicable.