

CHIROPRACTIC CARE FOR LOW BACK PAIN AMONG VETERANS OF RECENT WARS RECEIVING VETERANS AFFAIRS PRIMARY CARE

Kelsey L. Corcoran, DC^{1,2}; Lori A. Bastian, MD, MPH^{1,2}; Eric C. DeRycke, MPH²; Cynthia A. Brandt, MD, MPH^{1,2}; Sally G. Haskell, MD^{1,2}; Anthony J. Lisi, DC^{1,2}

ABSTRACT

Objective: This study examines patient factors associated with the use of chiropractic services among Operations Enduring Freedom/Iraqi Freedom/New Dawn (OEF/OIF/OND) Veterans who sought primary care for low back pain (LBP).

Key Indexing Terms: Chiropractic; Veterans' Health, Low Back Pain.

Methods: This was a cross-sectional analysis of cohort of OEF/OIF/OND Veterans with ≥ 1 primary care visit associated with an ICD-9 code for LBP from 10/01/11 to 09/30/14 at Veterans Health Administration (VHA) facilities that offered on-station chiropractic services. Chiropractic service use was defined as ≥ 1 chiropractic visit associated with a LBP diagnosis within a year after a primary care visit for LBP. Patient factors, such as demographics, clinical characteristics, and mental health co-morbidities for both recipients of chiropractic care and nonrecipients were collected. Multivariate logistic regression analyses were used to compare patient factors between recipients of chiropractic care and nonrecipients.

Results: There were 72,810 OEF/OIF/OND Veterans with a primary care visit for LBP and 8.1% used chiropractic services. Compared to nonrecipients, Veterans who received chiropractic services were more likely to be female, white, under 35 years of age, and an officer during military service ($p < .05$). Chiropractic users were also more likely to have moderate to severe pain, a diagnosis of posttraumatic stress disorder, and a lower body mass index ($p < .001$).

Conclusion: This study outlines several patient factors associated with receiving VHA chiropractic services for

LBP among Veterans of recent wars. These results provide context relevant for further research and operational planning to optimize the care of this Veteran cohort. (*J Contemporary Chiropr* 2022;5:97-104)

INTRODUCTION

In the US alone, low back pain (LBP) is estimated to cost over \$100 billion per year, with the majority of those costs related to lost wages and productivity. (1) Globally, LBP is the number one cause of disability. (2) Current clinical practice guidelines for LBP recommend nonpharmacological therapies as frontline treatment considerations ahead of pharmacologic treatment. (3) While several nonpharmacological options for the treatment of LBP are evidence-based and guideline concordant, there are no clear strategies as to which option to select or which sequence of therapies may be best for a given patient. Thus, the decision is largely left to clinicians, with current recommendations that they include patients in a shared decision making approach. (3)

Many of the nonpharmacological treatments recommended by the guidelines are performed by chiropractors, including spinal manipulation, exercise, patient education, and massage. The Veterans Health Administration (VHA) has provided on-station multimodal chiropractic care at select facilities since 2004. (4) The VHA also endorses a shared-decision making model for musculoskeletal pain, where patients and clinicians agree upon an appropriate nonpharmacological treatment approach. (5)

The newest group of Veterans entering the VHA system are those from the conflicts in Iraq and Afghanistan named Operation Iraqi Freedom (OIF), Operation Enduring Freedom (OEF), and Operation New Dawn (OND). Among these Veterans, painful musculoskeletal diagnoses are the most common group of conditions with low back pain being the most common musculoskeletal complaint. (6-8) As the largest integrated hospital

¹ Yale University School of Medicine, New Haven, CT

² Pain Research, Informatics, Multimorbidities, and Education (PRIME) Center, VA Connecticut Healthcare System West Haven, CT

network in the US with chiropractic services, the VHA is an ideal setting to conduct a national investigation on the utilization of chiropractic services for LBP. LBP is the most common reason patients use chiropractic services in both the VHA and civilian population. (4,9) The aim of this study was to examine patient factors associated with the use of chiropractic services among Veterans of OEF/OIF/OND with LBP.

METHODS

Study Design/Population

This work is a cross-sectional analysis of VHA administrative data. The study population is the OEF/OIF/OND roster, provided to VHA by the Department of Defense Manpower Data Center's (DMDC) Contingency Tracking System. The roster is a list of Veterans who separated from OEF/OIF/OND military service and enrolled in VHA healthcare between 10/01/01 and 09/30/14. Our analyses included only Veterans with at least 1 primary care visit associated with an International Classification of Diseases, Ninth Revision (ICD-9) code for LBP from 10/01/11 to 09/30/14 at VHA facilities that offered on-station chiropractic services during that time. A complete list of ICD-9 diagnoses for LBP used in this study is included in Appendix 1. To qualify as a VHA facility that offered on-station chiropractic services, facilities were required to maintain a minimum of 300 unduplicated patient encounters occurring in chiropractic clinics in each fiscal year from 10/01/11 to 9/30/15, to account for the entire time frame in which the primary care visit associated with LBP could occur plus the additional year to observe chiropractic use. This threshold was set to ensure chiropractic services were adequately available on-station at VHA facilities for each year of the study. The study was approved by the institutional review board of the Veterans Affairs Connecticut Healthcare System.

Data Sources

The DMDC roster includes information on Veterans' sex, race/ethnicity, date of birth, date of last deployment, branch of service (Army, Navy, Air Force, or Marine Corps), component (National Guard, Reserve, or active duty), and rank (officer, including warrant officer, or enlisted). All roster data were current at the time of separation from military service. Data on eligible Veterans were linked to VHA administrative and clinical data contained within the Corporate Data Warehouse (CDW). These databases provide a record of inpatient and outpatient health care encounters including patient demographics, clinic visits, medication prescriptions, and other healthcare services.

Variable of Interest: Chiropractic Services Use

Chiropractic services use was defined as ≥ 1 chiropractic visit associated with a LBP diagnosis within +365 days from the primary care visit for LBP. The number of chiropractic visits within +365 days from the primary care visit for LBP was also collected.

Covariates

- **Demographics**

Demographic variables including age, sex, race/ethnicity (i.e., black, Hispanic, other/unknown, white), and education were also examined.

- **Military Rank**

Military rank from prior military service was categorized as Enlisted or Officer/Warrant.

- **Medication Use**

Opioid medications included formulations from the CN101 VHA drug class such as butorphanol, codeine, dihydrocodeine, fentanyl, hydrocodone, hydromorphone, levorphanol, meperidine, morphine, nalbuphine, opium, oxycodone, oxymorphone, pentazocine, propoxyphene, and tapentadol. Buprenorphine and methadone were excluded as they are predominantly used to treat opioid use disorder. While opioid use disorder is not the only reason these medications are prescribed, these medications were excluded to ensure that individuals being treated for opioid dependence were not included in the analyses. Data on prior chronic opioid use were collected and defined as receipt of opioid medications for > 90 days of the year preceding the primary care visit for LBP.

- **Mental Health Conditions**

The Agency for Healthcare Research and Quality's Clinical Classifications Software ICD-9 codes were used to identify mental health conditions. (10) We examined the following conditions based on their relatively high prevalence in Veteran populations and their frequent comorbidity with painful conditions: Major Depressive Disorder, Bipolar Disorder, Posttraumatic Stress Disorder (PTSD), Schizophrenia, and Substance Use Disorders, including alcohol or drug use. ICD-9 codes for mental health conditions were collected if they appeared at any time in the Veteran's VHA medical record.

- **Smoking**

Smoking status was determined using methodology from McGinnis *et al.* that uses EHR Health Factors Smoking data from clinical reminders. (11) Veterans were categorized as never, former, or current smokers using a comprehensive algorithm using key words (e.g., current

smoker, never smoker, tobacco counseling) found in text entries and results from clinical reminders in CDW (11). The most common smoking status was collected.

McGinnis found high agreement between EHR Health Factors smoking data and survey results (11).

• **Pain-Related Variables**

Veterans presenting to VHA clinics are screened for the presence and intensity of pain using a 0–10 numeric rating scale (NRS). Veterans are asked to “rate your current pain on a 0 (no pain) to 10 (worst pain imaginable)” scale, and the response is recorded in a data field in the electronic health record (EHR). We selected the highest pain intensity (within +/- 30 days of the primary care visit for LBP). Pain intensity was categorized as none to mild (0–3), moderate (4–6), or severe (7–10). (12)

• **Body Mass Index**

Body mass index (BMI, kg/m²) was extracted using the most recent height and weight recorded in the EHR.

Analysis

The associations between chiropractic services use and demographics/co-morbidities were examined among Veterans who were seen at primary care for a LBP diagnosis. Chi-square tests were run for categorical data; T-tests and Wilcoxon Rank Sum Test were used for continuous variables. Multivariate logistic regression analyses were used to examine the association of pain-related variables on use of chiropractic services, controlling for potential confounders such as age, sex, mental health diagnoses, smoking status, pain intensity, and BMI.

RESULTS

Forty-one VHA facilities met the inclusion criteria (Appendix 2). There were 72,810 OEF/OIF/OND Veterans with at least 1 primary care visit for LBP at those 41 facilities. The typical OEF/OIF/OND Veteran presenting with LBP to primary care was a white male under the age of 35 (Table 1).

Of Veterans who presented to primary care for LBP, 8.1% used chiropractic services for LBP management within the next year. The mean number of chiropractic visits per Veteran in that year was 3 (interquartile range 1-5). On average, chiropractic services were initiated 36 days after the index visit to primary care for LBP.

Compared to nonrecipients, Veterans who received chiropractic services were more likely to be female, white, under 35 years of age, and an officer during military service (p<0.05). [Table 1]. Chiropractic users were also more likely to have moderate to severe pain, a diagnosis of PTSD, and a lower BMI (p<0.001).

Table 1. Demographic and clinical characteristics of Veterans with LBP by chiropractic use

	Chiropractic N=5,894	No Chiropractic N=66,544	Total N=72,438	P Value
Age				
<35 years old	60.9	56.6	56.9	<.0001
≥35 years old	39.1	43.4	43.1	
Sex				
Female	13.9	11.1	11.3	<.0001
Male	86.4	88.9	88.7	
Race				
White	65.4	62.5	62.8	<.0001
Black	14.3	16.8	16.6	
Hispanic	14.0	14.2	14.2	
Other/Unknown	6.3	6.5	6.4	
Rank				
Enlisted	94	94.8	94.8	0.02
Officer/Warrant	6	5.2	5.2	
Education				
Highschool or Greater	98.7	98.7	98.7	0.84
Less than Highschool	1.3	1.3	1.3	
Comorbidities				
PTSD	55.1	51.3	51.6	<.0001
Major Depression	18.7	17.8	17.9	0.07
Bipolar Disorder	8.7	8.6	8.6	0.88
Schizophrenia	0.3	0.5	0.5	0.2
Drug Use Disorder	9.2	9.3	9.3	0.89
Alcohol Use Disorder	17.5	16.7	16.7	0.11
Clinical Characteristics				
Prior Chronic Opioid Prescriptions ^A	8.8	9.5	9.4	0.09
Smoking ^B				
Current	32.3	37.1	43.9	<.0001
Former	20.2	19.3	33.7	
Never	47.5	43.7	22.4	
Pain Severity (NRS) ^C				
None to Mild (0-3)	39.6	44.3	43.9	<.0001
Moderate (4-6)	36.5	33.5	33.7	
Severe (7-10)	23.9	22.5	22.4	
BMI ≥30 ^D	43.2	46.0	45.8	<.0001

LBP=low back pain PTSD=Posttraumatic Stress Disorder, NRS=numeric rating scale, BMI=body mass index

^A ≥90 days of opioid prescriptions within the year prior to the index primary care visit for LBP

^B Missing 6,292 (8.7%)

^C Missing 2,627 (3.6%)

^D Missing 641 (0.9%)

Several factors were associated with a higher likelihood of receiving chiropractic care, including female sex (odd ratio [OR] 1.26, 95% confidence interval [CI] 1.16-1.37), white race (OR 1.17, 95% CI 1.11-1.24), PTSD (OR 1.16, 95% CI 1.10-1.23) and moderate to severe pain (OR 1.11, 95% CI 1.15-1.29). Additional factors associated with a

Table 2. Variables associated with chiropractic use

Odds Ratio Estimates			
Characteristic	Point Estimate	95% Wald confidence intervals	
Age ≥35 years old	0.84	0.79	0.89
Female	1.26	1.16	1.37
White	1.17	1.11	1.24
Current smoker	0.81	0.77	0.87
PTSD	1.16	1.10	1.23
Moderate to severe pain ^A	1.22	1.15	1.29
BMI ≥30	0.90	0.85	0.95
Prior chronic opioid prescription ^B	0.88	0.80	0.97

PTSD=Posttraumatic Stress Disorder, BMI=body mass index,

^A Numeric rating scale pain score of 4-10

^B ≥90 days of opioid prescriptions within the year prior to the index primary care visit for low back pain

change in likelihood of receiving chiropractic services are presented in Table 2.

DISCUSSION

Among our study sample of OEF/OIF/OND Veterans with LBP at facilities where chiropractic care was available, 8.1% received chiropractic services within 1 year. One study of Veterans with chronic musculoskeletal pain found that approximately 4% of those with low back pain would go on to receive on-station VHA chiropractic services, acupuncture or massage over a 3-year study period. (13) By limiting our study sample to Veterans at facilities with on-station chiropractic clinics, we may have a better understanding of what access to chiropractic services for LBP may look like if these services were more widely available in-house at VHA facilities. There are currently 176 VHA locations with on-station chiropractic clinics. (14) The VHA currently has 1,255 sites of care nationally, which includes medical centers and community-based outpatient clinics, with on-station chiropractic care only available at a fraction of those facilities. (15)

Among Veterans from all periods of service, chiropractic users tend to be younger and have a higher proportion of female users compared to the general VHA population. (4) In our study, where the sample was limited to Veterans of recent wars, female sex and being younger than 35 years of age was still associated with chiropractic use. Younger age is known to be a predictor of complementary and integrative health (CIH) use in the Veteran population. (16) Of all patients seeking chiropractic services worldwide, chiropractic patients are more likely to be female than male. (9) In the Veteran population,

women use CIH therapies more often than men. (16) While this general trend of women being more likely to use chiropractic services than men was seen in our study sample, we still saw that approximately 10% of women and 8% of men used chiropractic care for LBP.

In our sample, race/ethnicity was associated with chiropractic services use for LBP, with white race associated with a higher likelihood of chiropractic services use and Black race associated with lower likelihood. These trends are consistent with CIH in the Veteran population. (16) Among the general US population, individuals who used care consisting of chiropractic or osteopathic manipulation were more likely to be white than nonusers of manipulation based on 2012 National Health Interview Study data. (17)

A diagnosis of PTSD was associated with a higher likelihood of receiving chiropractic services. One study of OEF/OIF/OND Veteran who use chiropractic care found that over half of these Veterans had a diagnosis of PTSD. (18) Veterans with PTSD report higher pain severity and there is strong evidence that PTSD is associated with chronic pain. (19,20) Evidence show that the interaction between PTSD and pain predict increased the utilization of healthcare services, and that Veterans who have co-occurring pain and PTSD have higher healthcare utilization than Veterans with either PTSD or pain only. (21,22) The increased likelihood of Veterans with PTSD to initiate chiropractic care for their LBP is consistent with this trend of higher healthcare utilization.

Pain severity was associated with an increased likelihood of initiating chiropractic services. This association is consistent with evidence suggesting that more severe pain is associated with increased utilize of healthcare services. (23-25) Since multimodal chiropractic care includes many of the frontline treatments recommended for LBP and has also been recommended for increased uptake in VHA for musculoskeletal pain, it is logical that the increased healthcare utilization for individuals with higher pain scores may include visits to chiropractic services. (3,4)

Both obesity and current smoking were associated with a decreased likelihood of initiation of chiropractic services of LBP. This is interesting because several studies in the Veteran population have demonstrated that both obesity and smoking are associated with musculoskeletal conditions and higher pain intensities. (26-28) A lack of knowledge about chiropractic care could be responsible for this trend. In general, medical doctors and the public report knowing little about chiropractic care unless they have been personally exposed to the healthcare discipline. (29,30) Doctors tend to refer to chiropractic clinics that specialize in sports injuries and rehabilitation more than other types of chiropractic clinics. (31) Chiropractors

are increasingly involved in athletic medical teams, including high profile positions in organizations such as the National Football League and Olympics. (32,33) It is possible PCPs and/or Veterans themselves may think a consultation to chiropractic services is more appropriate for individuals that they consider physically active and healthy. Neither obesity nor current smoking is a contraindication to chiropractic care, and one study found that obesity had no impact on LBP outcomes following a course of chiropractic care at one VHA medical center. (34,35) However, a study of pain and disability outcomes with chiropractic care in the civilian population did find an association between less effective treatment outcomes and obesity. (36)

Prior chronic opioid use was also associated with a lower likelihood of initiating chiropractic care for LBP. While current clinical practice guidelines for low back pain and the Centers for Disease Control Guidelines for prescribing opioids for chronic pain are clear in their recommendation to trial nonopioid treatments first, many questions still remain about the use of chiropractic care for individuals already on long-term opioid therapy, including the effectiveness, possible role in an opioid taper, and the most effective sequencing of chiropractic care with other nonopioid therapies. (3,37) A prior study of Veterans of recent wars that used VHA chiropractic services have found that 31.3% receive opioid prescriptions +/- 90 days of an initial chiropractic visit. (38) While our study results highlight a lower likelihood of chiropractic services use for chronic opioid users, one VHA facility that implemented a stepped care model of pain management for Veterans on long-term opioid therapy found that over a 4-year study period, referrals to chiropractic services increased. (39) This same study highlighted that PCPs often had difficulty deciding which specialty service to refer their patients to for additional pain management options. (39) While many questions still remain about chiropractic care for individuals receiving opioid therapy, there is increasing evidence that chiropractic care is inversely associated with opioid receipt for patients with LBP. (40-44)

Our results add to the existing literature by focusing on the most common reason for chiropractic services consultation in VHA and assessing the relationship between patient factors and chiropractic services use after a PCP visit for LBP. While multimodal chiropractic care in VHA contains multiple guideline concordant therapies for treating LBP, it is still unclear which patients may benefit most from receiving chiropractic care over other guideline-concordant frontline nonpharmacological interventions. (3) However, certain patient characteristics were associated with increased likelihood of receiving chiropractic services. Further research is needed to better understand if these trends are consistent for other

nonpharmacological treatments for LBP, or if they are unique to chiropractic care in VA.

Limitations

There are several limitations to our findings. Veterans from recent wars included for analysis had to have at least one visit to VHA primary care associated with an ICD-9 code for LBP. These results may not be generalizable to civilian populations, Veterans who do not receive their medical care at VHA and Veterans from other periods of service. This study is a cross-sectional examination, and it is inappropriate to make any claims about causation from the variables studied. Use of chiropractic services in the VHA is much lower than in civilian and Department of Defense populations, and it is possible that chiropractic use was influenced by facility factors associated with chiropractic access, which were not studied here. (30,45) The pain intensity analyzed was a one-time collection of highest pain score within +/- 30 days of the PCP visit for LBP; therefore, the precise pain scores associated with the LBP complaint may not be represented if the Veteran had other pain complaints in that time frame. This pain score may also not be reflective of the Veteran's pain on the days of chiropractic visits for LBP. The BMI analyzed was calculated from Veterans' most recent height and weight entries and may not reflect their BMI during the time of their LBP.

CONCLUSION

Nearly 1 in 10 Veterans of recent wars presenting to VHA primary care with LBP received chiropractic care within 1 year. Factors associated with an increased likelihood of chiropractic services use included female sex, white race, moderate to severe pain intensity, and a diagnosis of PTSD. Current smoking, obesity and prior chronic opioid prescriptions were associated with a decreased likelihood of chiropractic services use. Recognition of these factors is important for better understanding trends of use of VHA chiropractic services for LBP.

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