

Chiropractic Management for US Female Veterans With Low Back Pain: A Retrospective Study of Clinical Outcomes



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ABSTRACT

Objective: The purpose of this study was to determine if female US veterans had clinically significant improvement in low back pain after chiropractic management.

Methods: This is a retrospective chart review of 70 courses of care for female veterans with a chief complaint of low back pain who received chiropractic management through the VA Western New York Healthcare System in Buffalo, New York. A paired *t* test was used to compare baseline and discharge outcomes for the Back Bournemouth Questionnaire. The minimum clinically important difference was set as a 30% improvement in the outcome measure from baseline to discharge.

Results: The average patient was 44.8 years old, overweight (body mass index 29.1 kg/m²), and white (86%). The mean number of chiropractic treatments was 7.9. Statistical significance was found for the Back Bournemouth Questionnaire outcomes. The mean raw score improvement was 12.4 points ($P < .001$), representing a 27.3% change from baseline with 47% of courses of care meeting or exceeding the minimum clinically important difference.

Conclusion: For our sample of female veterans with low back pain, clinical outcomes from baseline to discharge improved under chiropractic care. Although further research is warranted, chiropractic care may be of value in contributing to the pain management needs of this unique patient population. (*J Manipulative Physiol Ther* 2017;40:573-579)

Key Indexing Terms: *Veterans; Low Back Pain; Chiropractic; Women's Health; Musculoskeletal Pain*

INTRODUCTION

Although female veterans have historically used Veterans Health Administration (VHA) medical services at low rates, they are becoming 1 of the fastest growing populations of VHA users.¹ Since 2000, female VHA users have more than doubled,² with 32% of female service

members currently enrolling in VHA services after military separation.³ Women currently comprise 14% of those enlisted within the Department of Defense services (Army, Navy, Air Force, Marine Corps, Coast Guard), 17% of new recruits, and 16% of active duty officers.³ Female veterans are younger,⁴⁻¹⁰ less likely to be married,⁵⁻⁹ more racially

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diverse,^{4,8} and more educated than their male counterparts.⁶⁻⁸ Female veteran VHA users also access VHA medical care more frequently than male veterans,^{4,7} have a higher outpatient cost per patient,⁴ seek evaluation at the Emergency Department more often,¹¹ and have a higher rate of service-connected (SC) disability greater than 50%,⁴ which entitles them to lifelong VHA care for their SC conditions.

Irrespective of sex, the majority of VHA patients experience pain.^{10,12} Painful musculoskeletal diagnoses are the most common ailments of all US veterans returning from Operation Iraqi Freedom and Operation Enduring Freedom,¹³ with the back being the most common location of pain.^{10,12} The rate of musculoskeletal diagnoses increases annually after military separation, and this rate is even faster for women.⁶ As a result, musculoskeletal conditions are the leading cause of morbidity for female veterans.⁴

Chiropractic management is 1 of the available conservative treatment options for veterans with painful musculoskeletal conditions. Research in the civilian population indicates that chiropractic care is an effective management strategy for low back pain (LBP).^{14,15} Currently 15.8% of VHA chiropractic patients are women,¹⁶ but little is known specifically about female veterans' outcomes under chiropractic management. Historically women have been underrepresented in Veterans Affairs (VA) research.¹⁷ To our knowledge, this is the first study of female veterans presenting to VHA chiropractic services.¹⁸ The objective of this retrospective study was to determine if female veterans had evident improvement for their LBP complaints after chiropractic management in a sample of VHA Medical Center patients. We hypothesized that there would be a clinically significant improvement to LBP after a trial of chiropractic care for these individuals.

METHODS

Design

This study was a retrospective chart review of a prospectively maintained quality assurance data set. This protocol was reviewed and approved before commencing the study through the VA Western New York Healthcare System Research and Development Committee and Institutional Review Board.

Sample

The chiropractic clinic at VA Western New York Healthcare System served as the setting for this retrospective chart review. Charts were reviewed for a 7-year period from January 1, 2009, to December 31, 2015, and data were collected on all charts from 18- to 89-year-old female veterans presenting for chiropractic care with a chief complaint of LBP. Patients were excluded if they had received fewer than 2 treatments or if baseline or discharge

outcomes for both the Back Bournemouth Questionnaire (BBQ) and a Numeric Rating Scale (NRS) could not be obtained. To best allow for a reasonable measure of treatment response, patients were excluded if they had a low-level severity of complaint (<20% of the instrument) at baseline represented by a BBQ of <14 of 70 or an NRS pain severity of <2 of 10.

For veterans who presented for consultation at the clinic more than once during that 7-year period, data were collected from each individual trial of care initiated by a consultation as long as a minimum of 1 year had passed between the patient's last follow-up to the clinic and the next consultation. Of 70 consultations, 5 (7.1%) were included from individuals who had previously presented to chiropractic services for consultation with 2 to 4 years between consultations for these individuals.

Chiropractic Treatment Methods and Number of Treatments

The number of treatments provided was calculated by frequency counts. A typical course of care involved 1 treatment every 1 to 2 weeks with reevaluation and review of an updated outcome measure every fourth treatment or earlier if indicated. Care was delivered by 1 of 2 staff chiropractors with some contributions by supervised chiropractic students.

The type of manual therapy chosen was at the discretion of the provider and included spinal manipulative therapy (SMT), spinal mobilization, flexion-distraction therapy, and/or myofascial release. The treatment applied varied depending on the presentation of the individual patient, and that determination was made based on clinical judgment of the provider and patient preferences. For this study, *SMT* refers to a manipulative procedure involving the application of a high-velocity, low-amplitude thrust to the lumbar spine and/or sacroiliac joints.¹⁹ Spinal mobilization is a form of manually assisted passive motion involving repetitive joint oscillations typically at the end of joint play and without the application of a high-velocity, low-amplitude thrust.¹⁹ Flexion-distraction therapy is a gentle form of unloaded spinal manipulation involving traction components along with manual pressure applied to the low back of a patient in the prone position.¹⁹ Myofascial release, for the purposes of this paper, refers to manual pressure applied to various muscles in a static state or while undergoing passive lengthening. Patients also received instruction on stretches and therapeutic exercises appropriate to their presentation.

Data Sources

Age, race, body composition as measured by body mass index (BMI), and SC disability percentages were extracted from the patient's chart and added to the quality assurance data set reflecting information within the patient record at

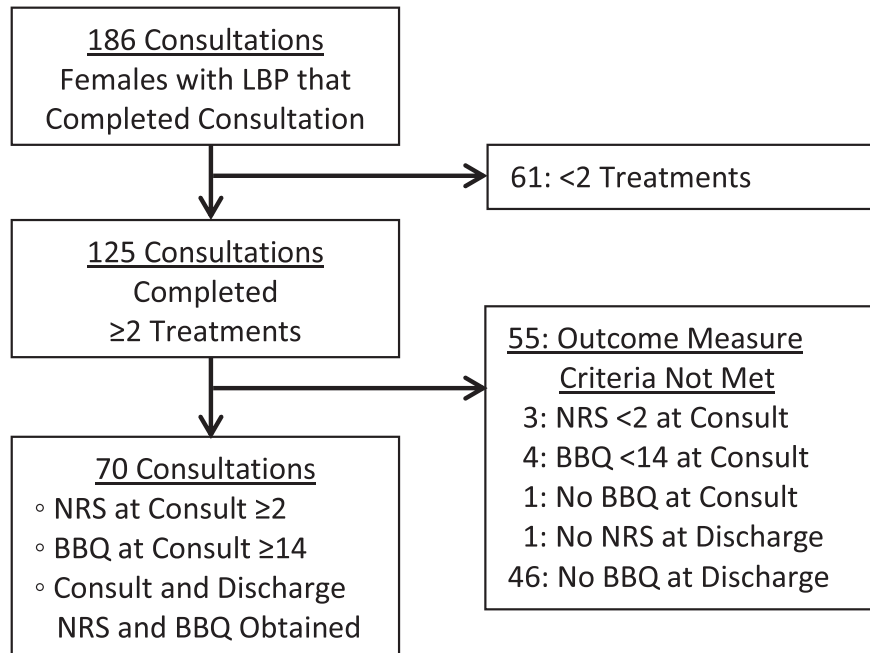


Fig 1. Clinical course of consultations for female veterans with LBP. BBQ, Back Bournemouth Questionnaire; LBP, low back pain; NRS, Numeric Rating Scale.

the date of consultation to chiropractic services. Service-connected disabilities are injuries or illnesses that are incurred or aggravated during active military service, for which veterans who separated or were discharged from the military under honorable circumstances may be eligible for compensation.²⁰ Data were added to the quality assurance data set by 1 of 2 investigators.

The outcome measure used to evaluate LBP was the BBQ, which is a validated 7-question multidimensional outcome measure based on a biopsychosocial model of pain.^{21,22} An 11-point NRS was also used within the course of patient care, but analysis focused on the BBQ, which incorporates a measure of pain severity as 1 of the 7 questions. With regard to the BBQ, baseline values were collected at consultation and collected again at the time of reevaluation and/or discharge. For the purposes of this study, the number of chiropractic treatments was determined and the final outcome measures were collected on either the date of formal discharge by chiropractic physician or from the last follow-up visit to the chiropractic clinic, which was within 2 months from the previous chiropractic appointment in the event that the patient self-discontinued care. Frequency counts and baseline and discharge outcome measures were verified by a third investigator using study criteria and comparing the quality assurance data set to the patients' electronic medical records. Any discrepancies found in the quality assurance data set were corrected using the data from the medical record.

Data Analysis

Demographics and clinical characteristics included descriptive statistics, such as mean and 95% confidence intervals for continuous variables and proportions for categorical variables. A paired *t* test was used to compare baseline and discharge outcome measures for the BBQ with statistical significance set at $P < .05$ using IBM SPSS Statistics for Windows, Version 22. Baseline, follow-up, and change scores for the BBQ were all assessed for normality, and these measures were found to be within acceptable limits as determined by both visual inspection and tests of skewness and kurtosis conducted in SPSS. Based on published accounts of an international consensus for a range of commonly used back pain outcome measures, the minimum clinically important difference (MCID) was considered a 30% change from baseline for the BBQ.²¹ The percentage of patients who reached or exceeded the MCID for the BBQ is reported. The standardized effect size (Cohen's *d*) was calculated by dividing the difference between mean discharge and baseline scores by the pooled standard deviation.

RESULTS

Of 125 consultations, 70 (56.0%) met the inclusion criteria for a course of care initiated, with a minimum of 2 treatments provided with appropriate baseline outcome measures (BBQ of ≥ 14 and NRS of ≥ 2) and completed

Table 1. Characteristics of Female Veterans With LBP at Chiropractic Services Consultation

Characteristic	n (%)
Age (mean: 44.8 ± 13.5)	
<25	3 (4)
25-44	30 (43)
45-64	33 (47)
>65	4 (6)
BMI (mean: 29.1 ± 6.3)	
<18.5	2 (3)
18.5-24.9	19 (27)
25.0-29.9	23 (33)
>30	26 (37)
% SC (mean: 43.3 ± 11.7)	
0	19 (27)
1-49	17 (24)
≥50	34 (49)

Mean value presented ± standard deviation.
BMI, body mass index; LBP, low back pain; SC, service connected.

discharge outcomes for both BBQ and NRS (Fig 1). For the purpose of this study, analysis was carried out for the sample (N = 70) with completed baseline and discharge measures for both BBQ and NRS.

Sample Characteristics

The average female veteran presenting to chiropractic services for consultation with LBP who met the inclusion criteria was 44.8 years old, overweight (BMI = 29.1), and white, with a 43.3% SC disability. Sixty (86%) consultations were from Caucasian women, 7 (10%) from African Americans, and 3 (4%) were of unknown race; there were no Hispanic/Latino or Asian veterans in this sample. Age, BMI, and SC disability for the study sample are presented in Table 1.

Clinical Outcomes

The mean number of treatments received was 7.9 (median 7, range 3-19). Average BBQ outcome measure change over a course of chiropractic care is presented in Table 2. There was a mean reduction in BBQ scores of 12.4 points (95% confidence interval 8.9-15.8; $t = 7.06$; $P < .001$) or 27.3%. Based on a generally accepted MCID of 30% for these or similar outcome measures, 33 of 70 courses of care (47%) reached or exceeded that threshold of improvement with respect to the BBQ.

DISCUSSION

The improvement in BBQ scores was statistically significant ($P < .001$), but the 27.3% average score improvement fell short of the MCID of 30% for all courses of care for female veterans meeting inclusion criteria. This

cutoff may be considered especially robust in relation to the chronicity, comorbidities, disability, and overall illness burden of the veteran population. Veteran patients carry twice the illness burden of civilian ambulatory patients.²³ This is consistent with some of the characteristics of our study sample, who were on average overweight with a 43.3% SC disability. Obesity is associated with comorbidities and disability in the chronic pain population, and individuals with disability status are known to have an increase in all-cause mortality rates.^{24,25}

For a multitude of reasons, including the time between military separation and entry into the VHA health care system, the vast majority of VHA patients are referred to chiropractic services for chronic pain conditions. Even small improvements that occur with chiropractic care may be of clinical interest in chronic pain patients with a high number of comorbid factors. Dworkin et al²⁶ published a consensus statement regarding interpreting the clinical importance of treatment outcomes in chronic pain clinical trials. The authors proposed that changes from baseline of 10% to 20% represent minimally important changes, ≥30% represent moderate clinically important differences, and ≥50% represent substantial improvements.²⁶ Therefore, what is clinically meaningful cannot be determined in the absence of context and outcomes need to be interpreted in relation to the sample characteristics, case complexity, nature of the presenting complaint, treatment cost, and risk of the interventions applied. Although we went with a more robust 30% MCID, adopting an MCID of 10% to 20% for this study may have been reasonable, and the percentage of courses of care achieving clinically significant improvement would have increased to 72.9% for BBQ using that lower MCID threshold. Although mean outcome measure changes for the sample did not meet the MCID of 30%, the effect size for mean improvement in BBQ scores was large (Cohen's $d = 0.86$).²⁷

Research on clinical outcomes with chiropractic management for LBP among veterans is limited. A randomized controlled trial of older veterans (≥65 years old) with LBP by Dougherty et al²⁸ reported no significant differences in outcomes between SMT and a sham intervention, with both groups improving to a similar degree, suggesting perhaps a nonspecific therapeutic effect of the clinical encounter.²⁸ Another randomized controlled trial by Dougherty et al²⁹ compared SMT with active exercise therapy for chronic LBP in a sample including veterans and reported no significant difference between the groups in response to treatment, with both groups improving over the study period. A retrospective chart review by Dunn et al³⁰ reported that chiropractic management in a study sample that was predominantly male (92.4%) led to clinically and statistically significant improvement for veterans with LBP, with a MCID set at 30% for both NRS and BBQ scores.³⁰ A case series by Lisi³¹ evaluated commonly employed chiropractic interventions, including SMT, for 31 veterans

Table 2. Changes in Outcome Measure From Baseline to Discharge

Outcome Measure	Baseline	Discharge	Raw Score Improvement	Percentage Improvement	<i>t</i>	<i>P</i>	Cohen's <i>d</i>
BBQ	43.1	30.7	12.4 (8.9-15.9)	27.3	7.06	<.001	0.86

Values are presented as mean (95% confidence interval).

BBQ, Back Bournemouth Questionnaire.

presenting with a variety of musculoskeletal complaints, including 48% with LBP with or without leg pain, with outcomes reflective of a mean raw score reduction of 2.7 points on the NRS. To our knowledge, no study has evaluated the efficacy of chiropractic management specifically for the female veteran population.

The VHA uses the joint clinical practice guidelines from the American College of Physicians and the American Pain Society, which recommend that for patients with acute, subacute, or chronic LBP who fail to improve with self-care options, clinicians should consider the addition of non-pharmacologic therapy with proven benefits, including spinal manipulation.³² Within the published literature, there is strong evidence that SMT is similar in effect to a combination of medical care with exercise instruction for the management of mixed but predominantly chronic LBP.^{14,15} There is also moderate evidence that SMT is superior to general practice medical care and similar to physical therapy in both the short and long term. Further, there is moderate evidence that flexion-distraction therapy is superior to exercise in the short term and similar in the long term.^{14,15} Given the evidence for efficacy and the estimated very low risk of serious adverse events, SMT and spinal mobilization are considered to be viable treatment options for patients with chronic LBP.^{14,15} Although the mean improvement of female veterans in this study failed to meet the MCID of an average 30% improvement from baseline, 47% of the courses of care included in this study did result in a 30% or greater improvement from baseline with regard to the BBQ. Given the limited risks of chiropractic management and the complexity of the sample population, chiropractic care may be a valuable treatment option for many female veterans suffering with LBP.

Approximately 45% of all female veterans have been diagnosed with a mental health condition, with posttraumatic stress disorder (PTSD) and depression being the most prevalent.⁴ In the veteran population, individuals with both chronic pain and PTSD³³ or depression¹⁰ tend to report pain that is more severe. A prior retrospective chart review from this clinic by Dunn et al³⁴ found that of veteran patients undergoing chiropractic management for neck or LBP, those with PTSD experienced significantly lower levels of improvement than those without PTSD on self-reported outcome measures for neck and low back disability.³⁴ It was outside the scope and design of this study to evaluate outcomes relative to mental health conditions for our study sample, but the prevalence of mental health conditions within the female veteran

population and the potential impact that may have on pain management warrant further investigation.

Limitations and Future Studies

Limitations include those inherent to the nature of retrospective design, including a lack of control for other variables that may have positively or negatively affected treatment response during the courses of treatment. Although treatments were generally provided at a frequency of once every 1 to 2 weeks, with BBQ being collected after every 4 treatments, variations in that frequency and the duration of care occurred and could have influenced clinical outcomes. There was no patient follow-up beyond the completion of the course of treatment, so the long-term response to care is not known. Although there were 186 consultations, only 125 resulted in a course of care with a minimum of 2 treatments. Analysis was based on 70 of those 125 (56.0%) courses of care meeting inclusion criteria. A large number of patients were excluded because of a lack of discharge BBQ outcomes (46 of 125) representing patients who were lost to follow-up or discharged before a formal reevaluation including the BBQ. There are many potential factors that may contribute to patients not completing a course of care as planned. For female veterans in particular, surveys have identified that transportation, access to childcare, and inconvenient appointment times are barriers to receiving on-station VHA care.³⁵ The generalizability of these findings is further narrowed by the unique characteristics of the study sample and the nature of retrospective study design. The data were collected at only 1 location and thus are limited to this site. Further and larger studies should be performed combining other VA locations. Published evidence suggests that SMT and spinal mobilization are at least as effective as other commonly used interventions.^{14,15} Further research is warranted; chiropractic care may be of value in contributing to the pain management needs of this unique patient population.

CONCLUSION

In this retrospective study, female veterans with LBP experienced improvement after a course of chiropractic care. The short-term outcomes were statistically significant and approached, but fell below, a threshold of MCID established at 30% from baseline. With increasing numbers of female veterans using VHA health care services and the

prevalence of musculoskeletal complaints among this population, providing effective means of addressing LBP is important.

FUNDING SOURCES AND CONFLICTS OF INTEREST

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CONTRIBUTORSHIP INFORMATION

Concept development (provided idea for the research): K.L.C., A.S.D.

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Supervision (provided oversight, responsible for organization and implementation, writing of the manuscript): K.L.C., A.S.D.

Data collection/processing (responsible for experiments, patient management, organization, or reporting data): K.L.C., A.S.D., L.R.F.

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Literature search (performed the literature search): K.L.C., A.S.D.

Writing (responsible for writing a substantive part of the manuscript): K.L.C., A.S.D.

Critical review (revised manuscript for intellectual content, this does not relate to spelling and grammar checking): K.L.C., A.S.D., L.R.F., G.P.B.

Practical Applications

- Clinical outcomes in regard to the BBQ were statistically significant and approached but fell short of clinical significance.
- Chiropractic care may be a valuable treatment approach to consider for female veterans with LBP given the safety of SMT and spinal mobilization and the potential for relief.

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