

Measuring Success Rates of Nonsurgical Treatment in Veterans With Chronic Low Back Pain and Posttraumatic Stress Disorder: A Pilot Study

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This retrospective medical record review empirically measured the efficacy of “Back School”—a nonsurgical treatment for chronic low back pain—in 4 different groups of veterans.

C caused by exposure to trauma, posttraumatic stress disorder (PTSD) is a condition characterized by debilitating fear and anxiety. Of all the mental disorders that were diagnosed in 73,157 veterans following their service in Operation Enduring Freedom and/or Operation Iraqi Freedom (OEF/OIF), PTSD was the most common at 46%.¹ PTSD frequently occurs with other conditions, including chronic pain²⁻⁴; in fact, existing evidence suggests that individuals who have chronic pain may be particularly vulnerable to developing PTSD.⁵

Veterans in recent years are displaying alarmingly high rates of comorbid pain conditions and PTSD.^{6,7} Possi-

bly due to the stigma associated with receiving psychiatric care, many of these OEF/OIF veterans are presenting in pain clinics rather than mental health settings.⁸ Indeed, the prevalence of pain is high in OEF/OIF veterans⁹; musculoskeletal pain, specifically back pain, is cited most often.¹⁰

The experience of pain differs when PTSD is a comorbid condition in the general population^{2,5,11}; this observation is particularly true in the OEF/OIF veteran population.⁶ Clinical observation shows that individuals with PTSD often are challenged by psychologic barriers to pain treatment, and the literature suggests that pain-related fear and avoidance behavior may contribute to the development and maintenance of chronic pain.¹¹⁻¹³ More specifically, research suggests that a fear of movement/(re)injury, or kinesiophobia, predicts pain-related avoidance behavior (poor treatment compliance) and subsequent disability (poor outcome) in patients who have chronic pain.^{14,15}

Alternatively, it has been suggested that it is not the fear of pain,

but, rather, the beliefs and cognitions about performing certain movements, that motivates avoidance behavior.¹⁶ Patients with PTSD and chronic low back pain (CLBP) clinically appear to believe that pain is a signal of serious damage to the body, making them vulnerable to the effects of catastrophizing—“an exaggerated negative orientation toward actual or anticipated pain experiences”¹⁷—which is a major aspect of fear-avoidance models of chronic pain.^{18,19} PTSD is an anxiety disorder characterized by hypervigilance, re-experiencing, and avoidance.²⁰ These characteristics likely increase the patient’s susceptibility to such fears or cognitions about performing certain movements and, subsequently, hinder treatment. This probably is most true in patients whose pain is the result of trauma.

“Back School”—a program composed of patient education and lumbar stabilization exercises—is well established as the standard nonsurgical intervention for back pain. However, no studies have examined

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whether this intervention is effective in veterans who have CLBP and concomitant PTSD. This is particularly concerning in the OEF/OIF veteran population, given their differences in demographics and etiology.¹⁰ For example, the OEF/OIF veterans are younger, have a higher number of females, and have been more exposed to blast injuries than veterans of previous eras. Clinical observation suggests the need for change in how chronic pain is treated to meet the unique needs of this population, and there is a clear “need for empirical data regarding trauma-related pain care.”⁶⁹

Our pilot study sought to empirically measure the effectiveness of Back School in terms of compliance and perceived/self-reported disability in 4 groups of veterans with CLBP. We were particularly interested in evaluating its efficacy in OEF/OIF veterans who also had a clinically confirmed diagnosis of PTSD.

METHODS

Participants

We obtained approval from the local Institutional Review Board and the U.S. Army Medical Research and Materiel Command Headquarters Office of Research Protections, Human Research Protections Office. We retrospectively reviewed medical records of patients treated in an outpatient physical medicine and rehabilitation clinic from January 2006 through July 2007 to empirically examine the differential treatment outcomes of 4 groups of military veterans referred for Back School.

Patients were included in the study if they were a veteran receiving care in the VHA, were enrolled in Back School during the time period under study (January 2006 through July 2007), received a diagnosis of CLBP lasting 3 months or longer, and re-



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ceived documentation by a physiatrist that the spine was cleared for active therapies in Back School. It also was noted whether the included patient had a diagnosis of PTSD that was verified by a mental health provider.

Patients were excluded if they were currently enrolled in Back School. Patient data must have been collected retrospectively and, therefore, patients were excluded if they underwent Back School beyond 2007. Patients also were excluded if they had a diagnosis of acute low back pain (less than 3 months duration).

Intervention

Back School is composed of 2 parts. Back School I is an educational com-

ponent that introduces basic back anatomy and related musculature, correct body mechanics and postures, and simple back stretching and strengthening exercises. The class consists of a single 2-hour group session. Back School II, “Lumbar Stabilization Workshops,” contains fewer patients. It is an intermediate program consisting of lumbar stabilization exercises that are designed to train the abdominal muscles to control the position of the pelvis. Patients must have the flexibility to perform exercises and learn to bend from the hips instead of the lumbar spine. The exercises in this part of the program progress from easiest to more difficult postures (supine to prone to hands-

Table 1. Sample demographics in 4 groups of veterans

Characteristic	Overall (n = 318)	Group 1 ^a (n = 213)	Group 2 ^b (n = 59)	Group 3 ^c (n = 33)	Group 4 ^d (n = 13)	Test of significance
Age, mean (SD), y	55.86 (13.88)	59.44 (12.30)	58.99 (7.30)	33.62 (7.48)	39.35 (8.37)	<i>P</i> < .0001
Sex, No. (%)						
Male	304 (96)	209 (98)	58 (98)	25 (76)	12 (92)	<i>P</i> < .0001
Female	14 (4)	4 (2)	1 (2)	8 (24)	1 (8)	
Race, No. (%)						
Black	138 (46)	95 (47)	31 (57)	7 (23)	5 (42)	N/S
White	138 (46)	100 (49)	19 (35)	14 (47)	5 (42)	
Marital status, No. (%)						
Single	116 (37)	81 (38)	23 (39)	7 (21)	5 (38)	N/S
Divorced	95 (30)	66 (31)	9 (15)	15 (45)	5 (38)	
Married	77 (24)	46 (22)	19 (32)	10 (30)	2 (15)	

N/S = not significant.
^aGroup 1 = Non-Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) veterans without posttraumatic stress disorder (PTSD).
^bGroup 2 = Non-OEF/OIF veterans with PTSD.
^cGroup 3 = OEF/OIF veterans without PTSD.
^dGroup 4 = OEF/OIF veterans with PTSD.

and-knees to standing) and, finally, integrate functional activities of daily living. Only patients who are found physically capable of progressing to a more advanced exercise program are allowed to advance to Back School II. Patients must be able to perform exercises in a prone or hands-and-knees position, be motivated to learn, and be committed to eight 1-hour sessions over a 1-month period. As part of the clinical component, patients are routinely asked to complete a standard clinical Back School questionnaire before and after both Back School sessions.

Measures

Patient improvements were scored using 2 instruments. The visual numeric scale (VNS)—a standardized, reproducible scale that has been well documented in clinical research studies—consists of the numbers 0 to 10 written on paper for each patient to circle, with 0 indicating “no pain” and 10 indicating “worst pain.”²¹ The Back School questionnaires queried patients about self-perceived disabili-

ty (for example, sitting, walking) and also were used in our assessment. Paired *t* tests were performed. Outcome measurements also included compliance (attendance). Summary statistics, including mean, SD, and frequency distribution, were generated for the baseline demographic information to characterize the study’s participants. ANOVA was used to compare continuous variables between groups, and chi-square test or Fisher’s exact test was used to compare categorical variables. All tests were 2-sided, and *P* < .05 was considered statistically significant. If there was a statistically significant difference between the groups, subsequent analyses (that is, 2 sample *t* tests to compare continuous variables, and chi-square test or Fisher’s exact test to compare categorical variables) were performed to compare various pairwise groups or group combinations.

RESULTS

Data from an initial 321 subjects were gathered from the Back School log, dated January 2006 through July

2007. Three medical records contained no other information than a sign-in and were ineligible for inclusion. Subsequently, 318 records were divided into 4 groups based on the diagnosis of PTSD and OEF/OIF veteran status: Group 1 had non-OEF/OIF veterans without PTSD, Group 2 had non-OEF/OIF veterans with PTSD, Group 3 had OEF/OIF veterans without PTSD, and Group 4 had OEF/OIF veterans with PTSD.

Patient demographics

The mean age overall at participation in Back School was 55.86 years (SD, 13.88) with a significant difference between non-OEF/OIF veterans (Groups 1 and 2) and OEF/OIF veterans (Groups 3 and 4) (*P* < .001). Whereas males were the overall majority (96%), significantly more females (20%) comprised the OEF/OIF population (Groups 3 and 4) (*P* < .001). Of the 94% (299/318) that disclosed their race, most of the veterans were black (46%) or white (46%). There was no difference among groups in regard to race or marital status. Of the 96% that

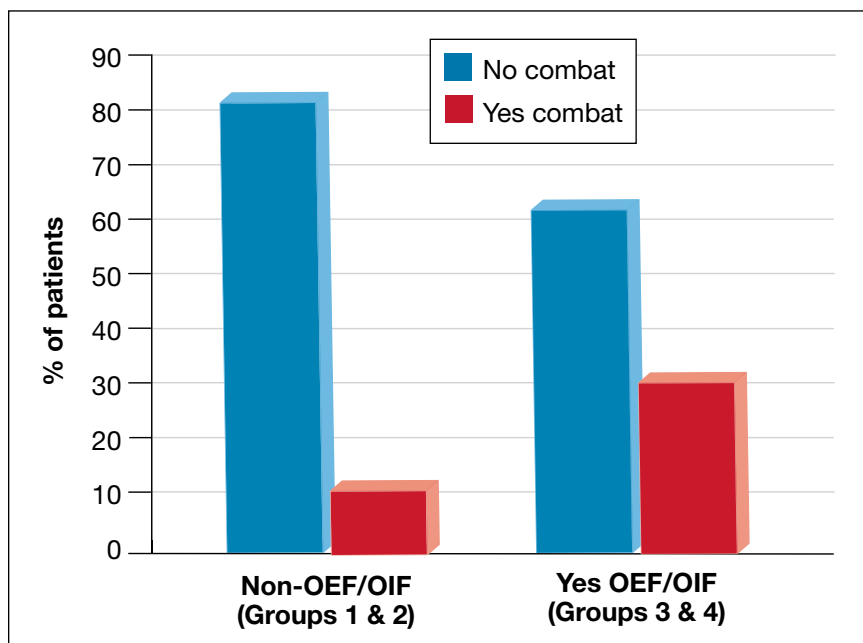


Figure 1. Reported combat exposure. OEF/OIF = Operation Enduring Freedom/Operation Iraqi Freedom.

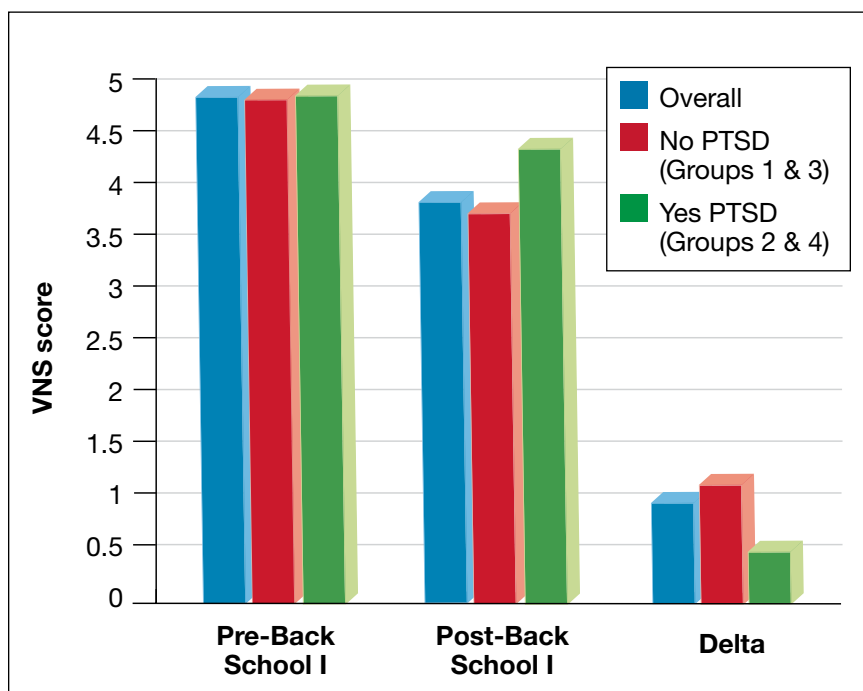


Figure 2. VNS values before and after completing Back School I. PTSD = posttraumatic stress disorder; VNS = visual numeric scale.

disclosed their marital status, the top 3 responses are included in Table 1. The majority of veterans who had PTSD served in the U.S. Army (65.28%; $P = .003$). Combat exposure was significantly increased in OEF/OIF veterans (Groups 3 and 4; 34.78%) vs non-OEF/OIF veterans (Groups 1 and 2; 14.7%) ($P = .002$) (Figure 1).

Pain/disability

There was no significant difference among veterans in their preintervention self-perceived pain assessment, with an overall mean VNS rating of 4.9, indicating a moderate level of pain. Most of the veterans (310/318, 97.48%) completed Back School I without a difference in attendance among groups. However, a significant improvement in VNS score ($P = .0024$) was found in those veterans without a diagnosis of PTSD (Groups 1 and 3) (Figure 2).

There was no difference among any of the groups in the self-reported ability to sit or walk following Back School I. Of those who continued on to Back School II (119/318; 37.5%), 113 had available data for review. There was a difference in attendance among groups, with 101 of 113 veterans (89.39%) completing Back School II. Interestingly, there was only a 50% completion rate in OEF/OIF veterans with PTSD (Group 4; $P = .049$) (Figure 3).

At baseline, the average pre-Back School II VNS score showed no difference among groups, and there was no significant difference in the change in self-perceived pain score following Back School II. However, there was a significant difference in self-reported function. The OEF/OIF veterans, regardless of PTSD status (Groups 3 and 4), demonstrated a smaller change in improvement with self-reported sitting postintervention ($P = .042$). Veterans with PTSD

(Groups 2 and 4) also showed a smaller change in improvement in self-reported ability to walk ($P = .033$) (Figures 4 and 5).

Additional analyses were performed to evaluate whether any significant differences existed between the group who completed Back School I and II vs the group who only completed Back School I. Baseline comparisons were made between those who completed Back School I and II ($n = 119$) and those who completed only Back School I ($n = 199$), with an attrition rate of 63.5%. There were no significant differences in demographics, including age ($P = .50$), sex ($P = .88$), marital status ($P = .07$), or service types ($P = .13$). In addition, baseline clinical presentation of pain (VNS, $P = .51$) and functional scores (sitting, $P = .53$; walking, $P = .71$) were not statistically significant.

DISCUSSION

Our study confirms that education received about one's condition in Back School I, by itself, improves self-perceived severity of pain in veterans who have CLBP but do not have PTSD. Whereas, veterans with PTSD had similar levels of perceived pain at baseline, this did not improve with education alone. As expected, education alone did not change self-perceived function across all groups.

OEF/OIF veterans with PTSD (Group 4) had a higher rate of non-compliance than the other groups. In those who did participate, there were gains in perceived functional improvement in non-OEF/OIF veterans (Groups 1 and 2) in regard to sitting.

Additionally, participation and compliance with the lumbar stabilization exercise program (Back School II) demonstrated gains in perceived functional improvement in those without PTSD (Groups 1 and 3) with respect to walking.

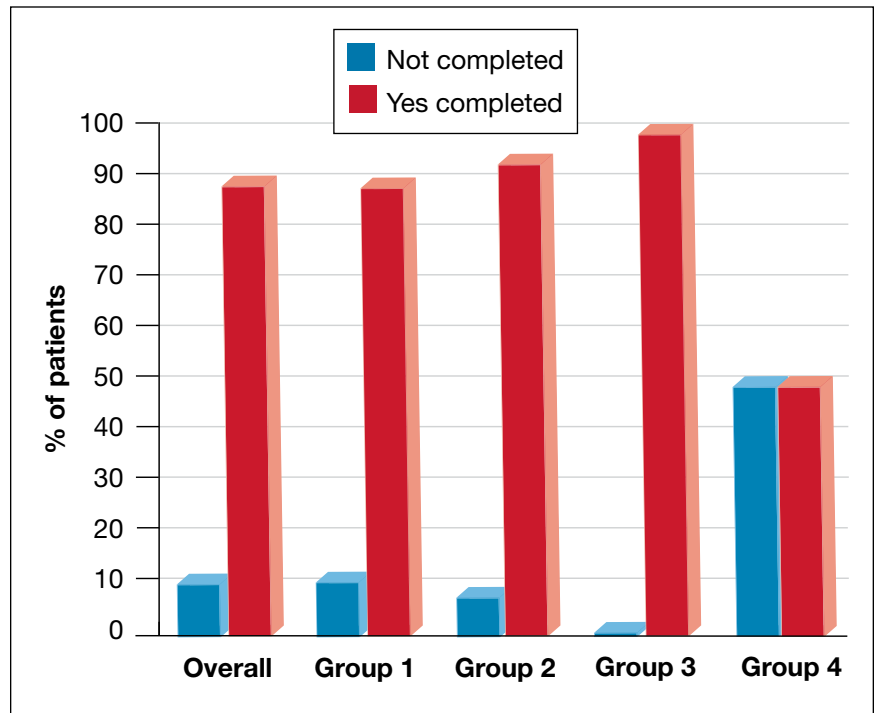


Figure 3. Back School II completion rates.

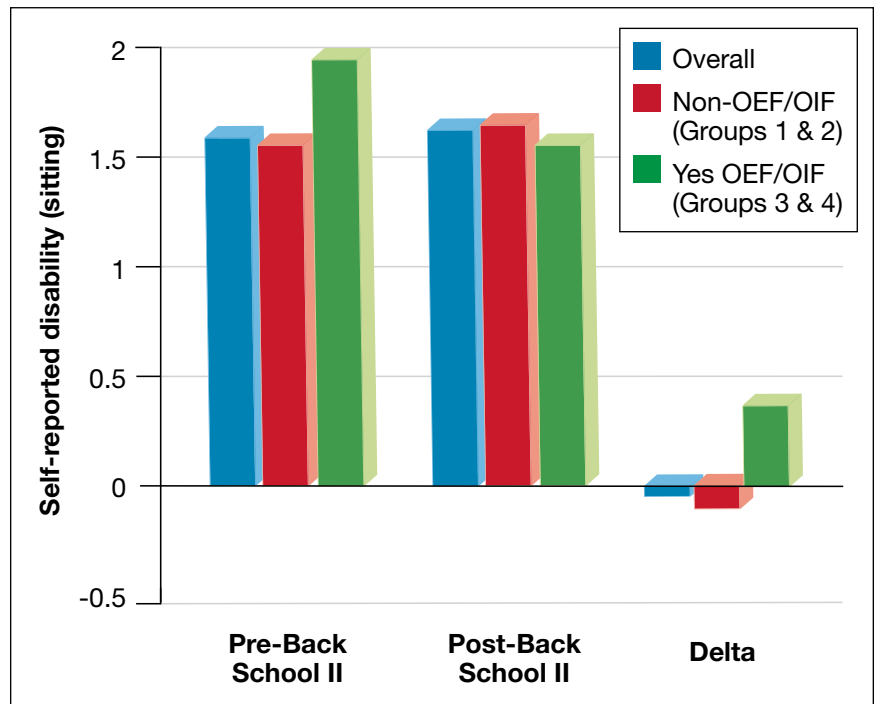


Figure 4. Self-reported disability (sitting) before and after completing Back School II. A negative delta indicates improved function. OEF/OIF = Operation Enduring Freedom/ Operation Iraqi Freedom.

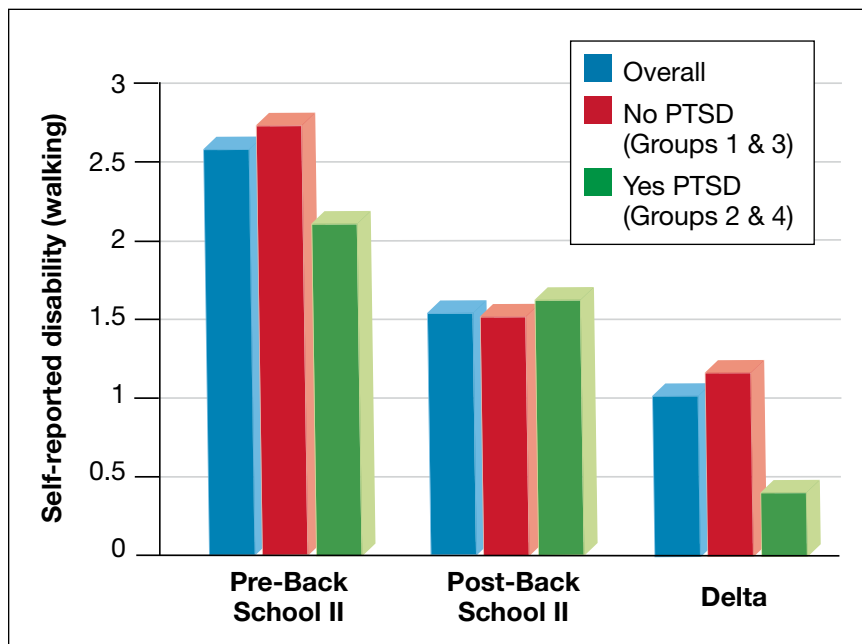


Figure 5. Self-reported disability (walking) before and after completing Back School II. A positive delta indicates improved function. PTSD = posttraumatic stress disorder.

What is striking about the groups overall, however, is that only 37% of Back School I participants went on to Back School II. There is an additional “silent majority” (63%) of those who have not been surveyed, which makes the self-reported functional gains from Back School II difficult to generalize. Whereas, the additional analyses demonstrated a baseline clinical similarity between groups, it may be expected that those who did not complete Back School II (that is, those lost to attrition) may have had similar results.

Study benefits

Our study’s results have the potential to enhance existing knowledge of what contributes to poor treatment outcome in OEF/OIF veterans who have CLBP. Three main areas to address in order to remove barriers to treatment include (1) increasing compliance; (2) treating the negative effects of PTSD and its components (for example, anxiety, fear, kinesio-

phobia, catastrophizing), which may be interfering with function; and (3) acknowledging and addressing the effects of recent trauma in returning OEF/OIF veterans.

The clinically and statistically significant self-reported functional gains from Back School II, as found in our study, reinforce the need for a more nuanced approach to treating CLBP in individuals recently exposed to trauma—especially those who have CLBP and concomitant PTSD.

Study limitations

Our study had potential weaknesses due to its retrospective design. Conversely, our study’s design allowed for a historical perspective of those who already have been treated with a standardized intervention for CLBP. Nonetheless, our small sample size increased the potential for a Type II error, namely compliance, to occur. Furthermore, only those patients with a clinically confirmed diagnosis of PTSD were classified as hav-

ing PTSD in our study. As a result, the symptoms associated with PTSD may have been underrecognized in recently returning OEF/OIF veterans. In addition, participants in Back School II may not be representative of all patients with CLBP. However, as the number of returning veterans increases because of ongoing military conflict, so does the potential for a future cohort clinical study that can address larger sample sizes for comparison. Of further benefit is the opportunity to increase retention rates in those progressing from Back School I to Back School II, thus making a future study population more generalizable.

Other nonsurgical interventions for back pain include patient education sheets, home exercise programs, topical modalities (heat/ice), topical creams, oral medications (non-steroidal anti-inflammatory drugs [NSAIDs]), chiropractic manipulation, and interventional spinal procedures. These were not controlled for in our retrospective analysis. However, Back School I is a single 2-hour session. Results, including compliance, in this single session should not be affected significantly by these additional interventions. Results of Back School II, however, may have been affected as it takes place over a 4-week period. Significant pain relief from manipulation, topical or oral analgesics (including opioid medication), and interventional spinal procedures may significantly improve compliance with an exercise program. On the other hand, significant pain relief may increase attrition from an exercise program by removing a motivating factor for seeking treatment. One of the challenges of a retrospective analysis is the inability to control for these factors. Other interventions, including opioids and NSAIDs, may be controlled in future studies, or at

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least noted as possible confounding factors. Future study design also may include randomization into groups in order to equally distribute potential effects among groups.

Future directions

Future research should include a prospective study with complementary clinical interventions that can potentially address barriers to treatment. Our study's results suggest that compliance issues might be approached by addressing the symptoms of PTSD and recent trauma, and by having 1 or more standardized clinical interventions available to veterans with CLBP and PTSD.

Effective wellness interventions that promote healing and focus on the integration of mind and body after combat exposure, in addition to interventions aimed at decreasing the overall levels of disability in OEF/OIF veterans with CLBP and PTSD, must be developed. A prospective trial would be advantageous to have standardized outcome measures and to explore complementary options. Future studies also should incorporate a validated research instrument to evaluate function, such as the Roland-Morris scale or Oswestry Disability Index.

Overall, information gathered from our pilot study potentially will enhance awareness of the need for an innovative, multidisciplinary approach to treating CLBP in veterans who have PTSD, which, eventually, can be empirically tested through clinical trial research.

CONCLUSION

Education alone, such as that provided in Back School I, may have a positive impact on perceived pain in patients who have CLBP. However, a concomitant diagnosis of PTSD may have a negative influence on

self-reported function, outcomes of pain, and compliance with prescribed therapeutic exercise for CLBP. This is especially true for OEF/OIF veterans recently returning from deployment, who deserve the best possible care. ●

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