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ORIGINAL ARTICLE

Assessment of back pain behaviors, attitudes, and beliefs of chiropractic research conference attendees after a biopsychosocial educational workshop

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ABSTRACT

Objective: The purpose of this study was to assess the behaviors, attitudes, and beliefs of attendees of a chiropractic research conference (which included chiropractic students, clinicians, researchers, and educators) toward chronic low back pain (CLBP) before and after a biopsychosocial (BPS)–based CLBP educational workshop.

Methods: This single-arm intervention study used the Health Care Providers' Pain and Relationship Scale (HC-PAIRS) and CLBP-related clinic vignettes to assess behaviors, attitudes, and beliefs toward CLBP before and after a single 90-minute educational workshop. The HC-PAIRS is a self-reporting questionnaire that consists of 15 items rated on a 7-point rating scale, with a higher score suggesting a belief that pain is linked to movement and that recommendations should be given to avoid physical activities.

Results: The pre-education intervention HC-PAIRS and vignettes were completed by 40 of 56 attendees. A total of 18 participants completed the posteducation intervention HC-PAIRS and CLBP-related clinical vignettes. Most of participants identified as full-time clinicians, employees of the United States Department of Veterans Affairs, and musculoskeletal/neuromusculoskeletal providers. The pre-education intervention HC-PAIRS mean score was 44.8 (SD 9.22), and the postscore was 39.5 (SD 6.49).

Conclusion: Findings suggest an immediate change in HC-PAIRS scores following a BPS-focused CLBP education intervention for a chiropractic audience. However, due to limitations related to sample size and target population, findings should be interpreted cautiously.

Key Indexing Terms: Chiropractic; Chronic Pain; Education; Low Back Pain

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INTRODUCTION

Chronic pain is typically defined as pain that has persisted between 3 and 6 months.[1,2] Chronic pain affects more than 30% of people worldwide.[3] In the United States alone, approximately 100 million adults are affected by chronic pain, with an estimated annual cost of $635 billion due to economic contributions from health care expenditures and lost productivity.[4] For several decades since at least the 1990s, musculoskeletal disorders, such as back pain, continue to be a leading cause of years lost to disability.[5,6] Furthermore, a study that collected data from 2005 to 2009 found that back complaints were one of the leading reasons patients sought medical attention.[7] Low-back pain (LBP) is a complicated condition with numerous contributors in terms of both pain and disability, such as "psychological factors, social factors, biophysical factors, comorbidities, and pain-processing mechanisms."[8] The biopsychosocial (BPS) model is an approach that aims to explain and address chronic LBP (CLBP) and disability from a multidimensional perspective integrating biological, psychological, and social factors.[9]

As explained by the BPS model, health care provider (HCP) attitudes and beliefs can influence the outcomes for CLBP.[9–11] Chiropractors are commonly used HCPs for the evaluation and treatment of LBP.[12] An estimated 35 million individuals in the United States and 4.5 million individuals in Canada receive chiropractic services annually.[13,14] Despite the level of utilization of chiropractic services, very few studies have investigated the relationship between chiropractors and their behaviors, beliefs, and attitudes toward CLPB.[15,16] The purpose of this study was to assess behaviors, attitudes, and beliefs of the attendees of a chiropractic research conference, which included chiropractors,

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chiropractic researchers, and chiropractic educators, toward CLBP before and after a BPS-based educational session on CLBP.

METHODS

This was a single-arm intervention study for which ethical approval was provided by the Parker University institutional review board (PUIRB-2021-17).

Sampling and Target Population

The target population of this study was chiropractors, chiropractic researchers, and chiropractic educators. For purposes of this study, chiropractors were defined as individuals currently enrolled in a doctor of chiropractic degree program or individuals who had graduated from a doctor of chiropractic degree program. Chiropractic researchers were defined as either early career scientists (within 5 years of terminal academic degree), independent scientists (5 years post-PhD), or clinician-scientists. Chiropractic educators were defined as administrators and educators affiliated with chiropractic degree programs.

An ideal and convenient study site was the Association of Chiropractic Colleges' 28th Educational Conference and Research Agenda Conference (ACC-RAC) that was hosted in San Diego, California, from July 24 to 26, 2022. This conference is known to attract attendees such as chiropractors, chiropractic researchers, and chiropractic degree program administrators and educators. During the ACC-RAC on July 25, 2022, an educational workshop on the BPS model and CLBP management was offered to ACC-RAC attendees. This educational workshop represents the education intervention for this study and is described in further detail below.

Attendance at this educational workshop was voluntary and not a required component of ACC-RAC attendance. ACC-RAC attendees who also went to this educational workshop were recruited to participate in this study. Potential participants were provided with an electronic written explanation of this study, an invitation to participate, and a written informed consent included. The invitation to participate, study description, and informed consent were accessed through attendees' mobile devices via a QR code provided by the workshop leaders (ALS, CJD, KAP). No IP addresses were recorded, and the responses were anonymous.

Demographic Data

Demographic data of the participants were collected immediately before and after the education intervention in conjunction with the Health Care Providers' Pain and Relationship Scale (HC-PAIRS) questionnaire and CLBP-related clinic vignettes. Demographics collected included sex, career role/level (chiropractor, student, full-time clinician, researcher/scientist, administrator, teaching faculty, other), current highest level of nonchiropractic education, years as a practicing chiropractor, location by state or non-US, description of chiropractic practice (if applicable), and practice perceptions.[17]

Survey Instrument

The HC-PAIRS was developed in 1995 to measure HCPs' attitudes and beliefs about chronic back pain.[11] The HC-PAIRS has been evaluated to have consistency with other similar measures.[18] In addition, the HC-PAIRS has been shown to have strong construct validity, internal consistency, and test-retest reliability.[18] Factor analysis by Rainville et al[11] found that HC-PAIRS measures 4 dimensions of attitudes and beliefs: functional expectations, social expectations, need for cure, and projected cognition.

Table 1 - Overview of Topics Included in the Education Intervention

Topic 1	Factors correlated with musculoskeletal pain
Topic 2	The affective pain mechanism
Topic 3	Connection between psychosocial factors and pain
Topic 4	Conscious psychosocial aspects of disabling musculoskeletal pain
Topic 5	Unconscious psychosocial aspects of disabling musculoskeletal pain
Topic 6	Psychosocial evaluation
Topic 7	Psychosocial management approaches

The HC-PAIRS is a self-reporting questionnaire that consists of 15 items rated on a 7-point rating scale ranging from 1 = *completely disagree* to 7 = *completely agree*. Each of the 15 items also includes a "prefer not to respond" option.[11] Scoring of the HC-PAIRS allows for a score ranging from 15 to 105 points.[11] Effectively, a higher HC-PAIRS score suggests a belief that pain is invariably linked to movement and activities and consequently advice on avoiding physical activities. A clinically meaningful difference in scores is considered to be approximately 1/2 of 1 standard deviation.[19] The HC-PAIRS score is occasionally reported as 13 items because Dutch therapists who conducted a study including a factor analysis found 13 items to be reliable and valid measures in comparison with the clinical vignettes.[20] The minimum and maximum score on the HC-PAIRS-13 is 13 and 91, respectively.

CLBP-Related Clinic Vignettes

Three CLBP-related clinic vignettes previously used in studies in conjunction with the HC-PAIRS were given to participants.[21] These vignettes are designed to explore HCPs' perceptions of the severity of the vignette's symptoms (1 = *very mild*, 5 = *extremely severe*), the severity of the pathology symptoms (1 = *no pathology*, 5 = *extremely severe*), and their recommendations for work (1 = *full-time, full-duty*; 5 = *remain out of work*) and activity levels (1 = *no limitations on activity*, 5 = *limit all physical activity*). Each vignette included a patient's symptoms, relevant physical findings, diagnostic test results, and previous treatment of patients who are out of work because of their LBP. The vignettes represented different degrees of severity, but none had evidence of structural damage or progressive neurologic compromise that would require surgery.

Recommendations suggested in the 3 CLBP-related clinic vignettes were classified as either "adequate," "neutral," or "inadequate," as done by Domenech et al.[19] Activity recommendations of "no physical activity limitation" or "avoid painful activities" and work recommendations of "work full-time at full duty" or "work full-time at moderate duty" were considered "adequate."

Table 2 - Demographics

	Participants	
	Pre (*n* = 40)	**Post (*n* = 18)**
Role		
Chiropractic student	2	0
Full-time clinician	18	10
Early career scientist (within 5 y of terminal academic degree)	1	0
Independent scientist (5 y post-PhD)	1	0
Clinician-scientist	4	3
Administrator	4	2
Teaching faculty	8	2
Other (radiologist)	1	1
Highest nonchiropractic degree (mark all that apply)		
High school diploma	3	1
Bachelor's degree	16	7
Master's degree	7	2
Doctoral degree	15	8
Other	0	0
Location		
New England	0	2
Middle Atlantic	4	1
South	9	4
Midwest	6	2
Southwest	7	4
West	11	5
Non-USA	2	0
Chiropractic practice described		
Not applicable	9	3
Solo practice	3	0
Practice with multiple DCs (group practice)	4	0
Practice with multiple provides (multidisciplinary)	3	1
Worksite health center	1	1
Non-VA hospital-based practice	1	0
VA practice	18	13
Sex		
Female	15	9
Male	24	9
Practice perspective		
Broadest spectrum	4	5
Musculoskeletal/neuromusculoskeletal	26	11
General/biomechanical	5	2
Biomechanical/visceral	0	0
Vertebral subluxation as joint dysfunction	0	0
Vertebral subluxation as health expression	2	0

DC, doctors of chiropractic; VA, Veterans Affairs.

"Limit activities to moderate exertion" and "work light duty, full-time" were considered "neutral" recommendations, while "limit activities to light exertion" or "limit all physical activities" and "work part-time with light duty" or "remain out of work" were considered "inadequate" recommendations for activity and work, respectively.

Education Intervention

The participants attended a single 90-minute educational workshop session titled "Understanding and Addressing Psychosocial Factors in Chronic Low Back Pain." This educational workshop included a mix of lecture and breakout sessions. The content of the education was developed in collaboration by 2 of the authors (ALS. CJD) using the reference text *A World of Hurt: A Guide to Classifying Pain*,[22] with case examples modified from the CLBP-related clinic vignettes.[21] Topics included in this educational workshop are outlined in Table 1, and case examples are included in the Appendix A (online).

Data Collection

Data were collected via an online administration of the demographic questions, the HC-PAIRS and CLBP-related clinic vignette questionnaires via REDCap.[23,24] Participants

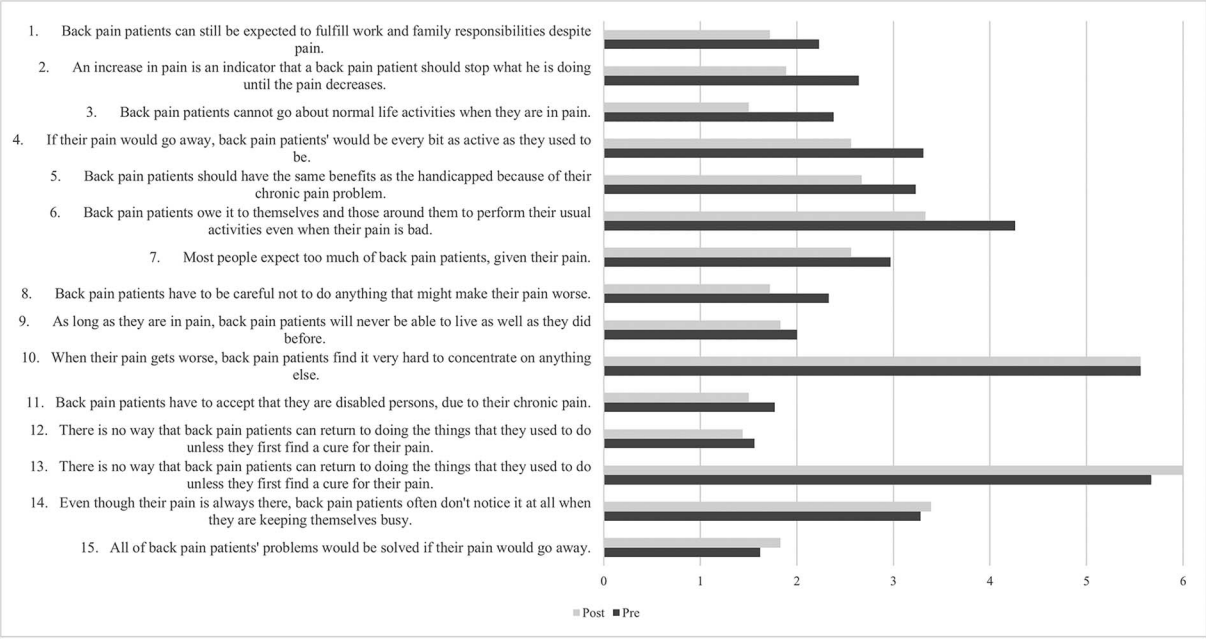

Figure 1 - Pre- and postscores for individual HC-PAIRS items.

completed the HC-PAIRS and CLBP-related clinic vignettes immediately before and after the education intervention on personal devices with access through a QR code, web address, or hyperlink. Attendees of the workshop were prompted to complete the posteducation intervention HC-PAIRS and CLBP-related clinic vignette questionnaires if they had completed the pre-education intervention HC-PAIRS and CLBP-related clinic vignette questionnaires. Data are stored at Parker University on a secure server located behind firewalls and with a password-protected login. The data will be kept for 5 years after the publication of this article.

Statistical Analysis

Descriptive statistics were calculated for demographic data. Mean and standard deviation were calculated for pre-education and posteducation intervention HC-PAIRS item response and overall scores. The change in item score by subtracting pre-education intervention scores from the posteducation intervention scores was also calculated. Overall scores with missing data for any item were not calculated. Additional analysis was done for the 13-item variation of HC-PAIRS (as suggested by Houben et al[20]) and 4-factor analysis. Similar descriptive statistics were performed for each of the CLBP-related clinic vignettes for the categories of activities and work.[19] Analysis was performed with STATA 14.2 (StataCorp LLC, College Station, TX).

RESULTS

Fifty-six individuals attended the workshop session with the study's education intervention. The pre-education intervention HC-PAIRS and CLBP-related clinic vignette questionnaires were completed in their entirety by 40 participants. Of those, 18 participants completed the posteducation intervention HC-PAIRS and CLBP-related clinic vignette questionnaires in their entirety. Although there is no way to know for sure the reason for such a high attrition rate, survey fatigue is a likely factor, as completing both the HC-PAIRS and CLBP-related clinic vignette questionnaires for a second time, especially in a conference setting where attendees' time is limited by the scheduled nature of presentations, may not have been desired by participants. Table 2 displays the demographic characteristics for both pre- and posteducation intervention participants. From these demographic data, most participants were full-time clinicians, Veterans Affairs employees, and identified as musculoskeletal/neuromusculoskeletal providers.

The pre-education intervention HC-PAIRS 15-item mean score was 44.8 (SD 9.22), and the posteducation intervention HC-PAIRS 15-item score was 39.5 (SD 6.49). Figure 1 displays the pre- and postscores of the individual HC-PAIRS items. Most mean scores for postintervention HC-PAIRS questionnaire items were lower compared with the mean scores for the preintervention HC-PAIRS questionnaire items. A total of 3 postintervention HC-PAIRS questionnaire items had a higher mean score (item 13, item 14, and item 15) compared with the preintervention HC-PAIRS questionnaire item mean scores. Only 1 postintervention HC-PAIRS questionnaire item had the same mean score compared with the mean preintervention score (item 10). Table 3 displays the overall HC-PAIRS 15- and 13-item scores and the scores associated with each of the 4 factors.

The results of activity and work recommendations connected to the CLBP-related clinic vignettes are shown in Figure 2. Overall, the average responses of adequate recommendations for both work and activity increased following the education intervention (Table 3). The average responses to symptoms and pathology connected to the CLBP-related clinic vignettes also increased following the education intervention (Table 3).

Table 3 - Pre- and Posteducation Intervention HC-PAIRS and CLBP-Related Clinic Vignette Scores by Individual Factor Domains, Mean (SD)

	Pre (n = 40)	Post (n =18)	Difference
HC-PAIRS 15-item average	2.98 (0.614)	2.63 (0.433)	0.35
Total score HC-PAIRS 15	44.82 (9.216)	39.50 (6.492)	5.32
Functional expectations/factor 1 item average	2.44 (0.782)	1.94 (0.541)	0.50
Social expectations/factor 2 item average	2.81 (0.685)	2.53 (0.691)	0.28
Need for cure/factor 3 item average	2.32 (0.993)	2.07 (0.882)	0.25
Projected cognition/factor 4 item average	5.62 (0.730)	5.78 (0.624)	+0.16
HC-PAIRS-13 item average	2.57 (0.709)	2.15 (0.513)	0.42
Total score HC-PAIRS 13	33.43 (9.218)	27.94 (6.664)	5.49
CLBP-Related Clinic Vignettes			
1: 40-y-old male construction worker with a 3-year history of severe back pain			
Symptoms [1, Very Mild | 2, Mild | 3, Moderate | 4, Severe | 5, Extremely Severe]	3.94 (0.600)	3.41 (0.712)	0.53
Pathology [1, Not From Spinal Pathology | 2, Mild | 3, Moderate | 4, Severe | 5, Extremely Severe]	2.55 (1.175)	1.88 (0.993)	0.67
Activities [1, Not Limit Any Activities | 2, Avoid Only Painful Activities | 3, Limit Activities to Moderate Exertion | 4, Limit Activities to Light Exertion | 5, Limit All Physical Activities]	1.88 (0.927)	1.88 (1.054)	0
Work [1, Work Full-Time, Full Duty | 2, Work Moderate Duty, Full-Time | 3, Work Light Duty, Full-Time | 4, Work Light Duty, Part-Time | 5, Remain out of Work]	2.69 (1.030)	2.63 (1.025)	0.06
2: 42-y-old female secretary with a 4-y history of mild low-back pain			
Symptoms	2.27 (0.574)	1.88 (0.332)	0.39
Pathology	1.88 (0.485)	1.53 (0.514)	0.35
Activities	1.64 (0.929)	1.12 (0.332)	0.52
Work	1.64 (0.962)	1.38 (0.806)	0.26
3: 37-y-old male factory foreman complaining of right radiating low-back pain			
Symptoms	3.09 (0.530)	2.76 (0.562)	0.33
Pathology	2.34 (0.745)	2.00 (0.707)	0.34
Activities	2.22 (1.008)	1.59 (0.870)	0.63
Work	2.16 (1.036)	1.94 (0.929)	0.22
Activities, n (%)			
Adequate	70 (71.4)	41 (80.4)	9.0
Neutral	21 (21.4)	9 (17.6)	
Not adequate	7 (7.1)	1 (2.0)	5.1
Work recommendations, n (%)			
Adequate	64 (66.7)	35 (72.9)	6.2
Neutral	17 (17.7)	7 (14.6)	
Not adequate	15 (15.6)	6 (1.3)	14.3

DISCUSSION

In this single-arm intervention study conducted at a national chiropractic academic and research-focused conference, the authors found an improvement in HC-PAIRS scores and CLBP-related clinic vignette recommendations after a BPS-based education intervention on CLBP. The decrease of 5.32 points in HC-PAIRS scores following the education intervention was not assessed for statistical significance but could be considered a clinically meaningful improvement.[19] Consistent with our hypothesis, participants' posteducation intervention HC-PAIRS and CLBP-related clinic vignette scores were more closely aligned with a BPS model for CLBP. This suggests that a brief education session focused on the BPS model and CLBP may be beneficial in enhancing the understanding of CLBP through a BPS lens in a chiropractic stakeholder audience.

To date, there is a paucity of literature assessing behaviors, attitudes, and beliefs toward CLBP of chiropractors. In a cross-sectional study, Briggs et al[25] investigated the beliefs and clinical recommendations toward LBP using the Back Pain Beliefs Questionnaire as well as the HC-PAIRS. The study population included 602 first-year students in chiropractic, medicine, occupation therapy, pharmacy, and physiotherapy disciplines.[25] Findings of this study showed that chiropractic and physiotherapy students more often reported guideline-consistent recommendations when compared with students in other health care professions.

Our results are also consistent with prior studies that have explored the change in HC-PAIRS scores of HCPs and health professions students following a brief education intervention.[19,26–38] These studies have found improvements in HC-PAIRS scores after either a BPS-based,[19,26,27,30] a pain neuroscience–based,[32,33,36–38] and other pain-based education interventions[29,31,34,35] in physical therapy students,[19,29,31,38] other health care students or trainees,[29,36] and health care professionals.[26,27,30,31,33–35,37] However, a 2016 study by

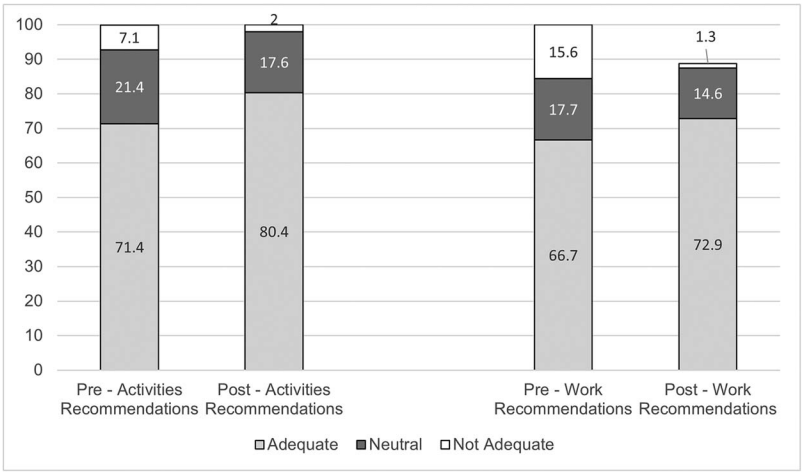

Figure 2 - Percentage of adequate activities and work recommendations for the chronic low-back pain–related clinic vignettes.

Cox et al[28] was conducted with 1st-year physical therapy students and showed findings contrary to our results. Findings from this study revealed an increase in knowledge of pain but no effect on attitudes and beliefs on treating chronic pain following an abbreviated therapeutic neuroscience educational session.

Our study suggests that the behaviors, beliefs, and attitudes of chiropractors can be immediately influenced after a single education intervention. Given the widespread burden of CLBP[3–6] and the commonality of chiropractic utilization for CLBP,[12–14] it is critical that chiropractors hold a contemporary understanding of CLBP. The importance of chiropractors' understanding of CLBP is demonstrated by patient outcomes associated with HCPs' behaviors, attitudes, and beliefs of CLBP.[9–11] Chiropractic care has a long history that includes a BPS-oriented model of care.[39] However, our findings showing a change in HC-PAIRS and CLBP-related clinic vignette scores after a BPS-focused educational workshop reinforces that greater recognition of the BPS model within chiropractic is needed. Further research is needed to confirm chiropractors' attitudes and beliefs about chronic pain. Additional research is also needed to explore the potential that BPS-oriented pain education interventions may have on chiropractors' attitudes, beliefs, and behaviors on chronic pain in the short term and long term.

Limitations

Although 40 of 56 attendees participated in the initial pre-education intervention HC-PAIRS and CLBP-related clinic vignette questionnaires (83% participation rate), only 18 participants completed the posteducation HC-PAIRS and CLBP-related clinic vignette questionnaires. Posteducation intervention participation may have been negatively affected by the length of the HC-PAIRS questionnaire and time required for attendees to read and complete the instrument. Because the questionnaires were performed immediately after the education intervention, there is also risk of recall bias. In addition, there was no long-term follow-up of HC-PAIRS and CLBP-related clinic vignette questionnaires. Therefore, any change in behaviors, attitudes, and beliefs may not be lasting nor affect patient interactions or clinical outcomes. In addition, the population targeted was quite diverse, in part by design and because of the nature of convenience sampling. Unfortunately, because of the aforementioned high attrition rate, any meaningful subgroup analysis was not possible. Thus, the generalized results from this sample population may not necessarily reflect the broader practicing profession of chiropractors. Furthermore, there is likely an inherent bias based on those who chose to attend this conference based on the nature of their work (ie, clinical vs nonclinical). This potential bias may limit the validity of any extrapolation of our findings across the profession as a whole. Overall, the population of this study was highly representative of chiropractors employed at Veterans Affairs health care systems who tend to have hospital-based training, have experience in educating health care trainees, and are academically involved.[40] Therefore, we speculate that there may have been a ceiling effect for improvement, as many participants could have already been knowledgeable in understanding a BPS model for CLBP.

CONCLUSION

This study was a single-arm education intervention that was conducted at a national chiropractic academic and research-focused conference. Findings of this study suggest an immediate change in HC-PAIRS and CLBP-related clinic vignette scores following a BPS-focused education session regarding CLBP for this chiropractic audience. However, due to limitations related to sample size and target population, findings should be interpreted cautiously. Further research investigating the effect of BPS-focused education interventions for CLBP may have on chiropractors' behavior, attitudes, and beliefs is warranted.

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The authors have no conflicts of interest to declare relevant to this work.

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