A Preliminary Study of Chiropractors' Beliefs About Biomedical and Biopsychosocial Pain: A Survey of University of Western States Alumni

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ABSTRACT

Objective: The purpose of this preliminary study was to investigate differences between doctors of chiropractic with respect to their preference for the biomedical or biopsychosocial attitude and belief models.

Methods: Alumni of the University of Western States doctor of chiropractic program were asked to complete an online survey that included the Pain Attitudes and Beliefs Scale for Physiotherapists. This scale yields a biomedical score (10-60 scale) and a biopsychosocial score (9-54 scale). These scores are reported for 5 participant characteristics: sex, country of residence (USA vs other), chiropractic program completed (University of Western States vs other), decade of graduation, and years in practice. Secondly, multiple linear regression was performed to evaluate the independent effects of participant characteristics on the 2 Pain Attitudes and Beliefs Scale for Physiotherapists scales.

Results: Of 3877 surveys, 233 were included in the analysis (response rate = 4.7%-7.4%). The mean biomedical scale score was 33.9 (standard deviation = 6.5), and the mean biopsychosocial scale score was 32.4 (standard deviation = 4.1). There was little variation in scores across the 5 participant characteristics ($P > .05$). Cronbach's α for the biomedical scale reached an acceptable level of internal consistency (0.74). In contrast, Cronbach's α for the biopsychosocial scale was 0.40.

Conclusion: This preliminary study found that in a sample of chiropractic program alumni of the University of Western States, there were no differences with respect to preference for the biomedical or biopsychosocial attitude and belief models. A better understanding requires a larger study comparing attitudes/beliefs with behavior in practice. (J Chiropr Med 2018;17:16-21)

Key Indexing Terms: Pain; Chiropractic; Attitude; Culture

INTRODUCTION

The biopsychosocial explanation of pain suggests that the pain experience is complex and is related to many biological, psychological, and social factors. It is one of the most widely accepted models for understanding and treating chronic pain.¹ Because pain is driven by these factors, it is important to consider aspects of the

doctor-patient encounter that might affect patient outcomes both positively and negatively. For example, it has been found that patient perception of the doctor-patient interaction can have positive effects comparable to those of spinal manipulation on low back pain.² It is also important to consider that attitudes and beliefs about pain held by the practitioner are strongly associated with the attitudes and beliefs about pain held by the patient.³ These attitudes and beliefs can influence negative patient outcomes by helping instill detrimental pain behaviors such as pain hypervigilance, pain avoidance, activity restriction, and reliance on passive treatments for pain relief; all such behaviors may contribute to the ongoing chronic pain cycle.⁴⁻⁷ There is moderate evidence that practitioners with a biomedical orientation (tissue damage causes pain) or elevated fear avoidance beliefs are more likely to advise patients to limit work and physical activities, and are less likely to adhere to treatment guidelines.³ Simply seeking care from a physical therapist with such beliefs can contribute to prolonged sick leave and delayed return to work.⁸

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Most research on the relationship between manual therapist and psychosocial factors influencing patient outcomes has been conducted with physical therapists. Given that the professions of chiropractic and physical therapy share similar treatment approaches, it is important to conduct this research on chiropractors as well. Doctors of chiropractic (DCs) have been reported to follow biopsychosocial guidelines when managing patients in pain.⁹ However, there have been no studies evaluating the association of behaviors with pain beliefs. Only 1 Australian study has evaluated pain beliefs in the chiropractic population.¹⁰

The purpose of this study was to collect preliminary data and inform the design of a future study on pain attitudes and beliefs of DCs in the United States. The long-term goal is to shed light on the association between beliefs and behaviors and their effects on clinical outcomes. For the current study, we also tested the hypotheses that there are independent effects of sex, country of residence, chiropractic program completed, and decade of graduation on biomedical and biopsychosocial beliefs.

METHODS

University of Western States (UWS) graduates were asked to complete an online survey that included a version of the Pain Attitudes and Beliefs Scale for Physiotherapists (PABS-PT) in addition to demographic information. Data were collected over a 3-month period in the fall of 2015 and the spring of 2016. Ethical approval was obtained from the UWS institutional review board (No. 0000851). All surveys were completed anonymously, and consent was implied by completing the survey.

Pain Attitudes and Beliefs Scale for Physiotherapists

Two versions of the PABS-PT were used in this study. The long version included all original 31 items developed by Ostelo et al,¹¹ as well as 5 items added by Houben et al⁷ and 14 demographic questions (50-question survey). After a lower than anticipated response rate, questions were removed from the survey. The new survey included the 19-item revised PABS-PT of Houben et al⁷ (Fig 1) and only 6 demographic questions (25-question survey). The survey was administered through FreeOnlineSurveys.com. Only the questions from the shortened survey were included in the analysis.

The 19-item PABS-PT survey is a 2-factor survey and has been reported to have internal validity and responsiveness.⁷ The Biomedical Scale contains 10 items, which are scored on a 6-point Likert scale (1 = "totally disagree" to 6 = "totally agree") and summed to produce a score between 10 and 60 points. The Biopsychosocial Scale consists of 9 items and is summed to produce a score between 9 and 54. A high score on the Biomedical Scale indicates a belief in the relationship between pain and tissue damage. A high score on the

PABS questions: biomedical and biopsychosocial scales

Biomedical	Biopsychosocial
<ul style="list-style-type: none"> • Pain is a nociceptive stimulus, indicating tissue damage • Patients with back pain should preferably practice only pain free movements • Back pain indicates the presence of organic injury • If back pain increases in severity, I immediately adjust the intensity of my treatment accordingly • Pain reduction is a precondition for the restoration of normal functioning • If therapy does not result in a reduction in back pain, there is a high risk of severe restrictions in the long term • Increased pain indicates new tissue damage or the spread of existing damage • If patients complain of pain during exercise, I worry that damage is being caused • The severity of tissue damage determines the level of pain • In the long run, patients with back pain have a higher risk of developing spinal impairments 	<ul style="list-style-type: none"> • Mental stress can cause back pain even in the absence of tissue damage • The cause of back pain is unknown • A patient suffering from severe back pain will benefit from physical exercise • Functional limitations associated with back pain are the result of psychosocial factors • Therapy may have been successful even if pain remains • There is no effective treatment to eliminate back pain • Even if the pain has worsened, the intensity of the next treatment can be increased • Exercises that may be back straining should not be avoided during the treatment • Learning to cope with stress promotes recovery from back pain

Fig 1. Questions from PABS-PT: Biomedical and Biopsychosocial Scales. PABS, Pain Attitudes and Beliefs Scale; PABS-PT, Pain Attitudes and Beliefs Scale for Physiotherapists.

Biopsychosocial Scale indicates a belief in the influence of psychological, social, and behavioral factors.

Recruitment

Recruitment (Fig 2) was focused on the chiropractic alumni of 1 school, UWS, because of funding limitations and the preliminary nature of the study. Links to the surveys were published in the alumni newsletter, sent out digitally once each quarter and via print semiannually. The alumni office followed up by sending up to 2 reminder e-mails to those who had yet to open the survey link.

Survey links were also provided through a post on the Chiropractic Physicians of Oregon Listserv discussion group and from the CHP Group, a local preferred provider organization. Additionally, electronic devices were available for attendees at the UWS Homecoming Symposium.

Statistical Methods

Descriptive statistics (means and standard deviations) are reported for participant characteristics and tabulated for the

Fig 2. Survey flowchart.

Biomedical and Biopsychosocial scales of the PABS-PT for 5 participant characteristics: sex, country of residence (United States vs other), decade of graduation, years in practice, and chiropractic program completed (UWS vs other). The latter was added because of unanticipated completion of surveys from non-UWS graduates. Multiple linear regression was performed to test the independent effects of the 4 characteristics (independent variables) on each of the 2 PABS-PT scales (dependent variables). We constructed 1 model for each dependent variable separately. Number of years in practice was excluded because of collinearity concerns. Internal consistency of each of the 2 scales was evaluated with Cronbach's α .¹² Reliability was considered acceptable if α reached 0.70.¹³ All analysis was performed using SPSS Version 23 software (IBM, Armonk, New York). All hypothesis tests were performed at the .05 level of significance.

RESULTS

Of 3877 surveys distributed (Fig 2), 265 were returned and 233 were completed and included in the analysis. Recognizing that some alumni received a survey announcement from multiple sources, the response rate needed to be estimated as

follows. The UWS alumni response rate was between 4.7% (181/3823) and 7.4% (181/2452). The denominator, 3823, equals the total surveys sent minus the verified 54 respondents from other schools. The minimum response rate for non-alumni was 3.4% (49/1425), where 1425 equals the total surveys sent minus the verified 2452 UWS alumni.

Our overall response number was 265 (8.3%). Surveys were distributed electronically via e-mail to 2452 recipients. Of the 265 responses, 233 complete surveys (88%) were included in the analysis. Thirty-two surveys were excluded because of incomplete data on demographics and/or blank responses to either Biomedical or Biopsychosocial scale questions.

Participant characteristics are summarized in Table 1. Males constituted the majority of respondents (58.9%). Most respondents (92.5%) resided in the United States at the time of the survey. Decade of graduation was highest between 1980 and 1989 (26.8%). The greatest proportion of DCs fell in the range of 0 to 10 years in practice (33.6%). Approximately 20% of surveys were returned by DCs who were not UWS alumni, and 3% did not respond to this question.

Table 2 breaks down the Biomedical and Biopsychosocial scales by practitioner characteristics. The mean Biomedical scale score was 33.9 (standard deviation = 6.5), and the mean Biopsychosocial scale score was 32.4 (standard deviation =

Table 1. Characteristics of Participants

Characteristic	N	Percentage
Sex		
Male	156	58.9
Female	95	35.8
No response provided	14	5.3
Chiropractic program completed		
University of Western States	203	76.6
Other	54	20.4
No response provided	8	3.0
Year graduated from DC program		
1970-1979	17	6.4
1980-1989	71	26.8
1990-1999	65	24.5
2000-2009	46	17.4
2010-Present	56	21.1
No response provided	10	3.8
Years in practice		
0-10	89	33.6
11-20	46	17.4
21-30	73	27.5
31-40	48	18.1
41-50	2	0.8
No response provided	7	2.6
Country		
United States	245	92.5
Other	20	7.5

DC, doctor of chiropractic.

Table 2. Biomedical and Biopsychosocial Scores by Participant Characteristics

Characteristic	Biomedical Score ^{a,b}	Biopsychosocial Score ^{b,c}
Sex		
Male	33.6 (6.7)	32.6 (4.1)
Female	34.6 (6.2)	31.7 (3.9)
No response provided	33.3 (7.2)	34.0 (4.6)
Chiropractic program completed		
University of Western States	33.6 (6.6)	32.5 (4.1)
Other	34.8 (6.3)	31.8 (4.1)
No response provided	38.0 (3.0)	33.3 (3.4)
Year graduated from DC program		
1970-1979	36.7 (6.1)	31.0 (3.9)
1980-1989	33.3 (7.1)	32.2 (4.1)
1990-1999	34.5 (6.6)	31.7 (4.2)
2000-2009	33.3 (6.5)	33.2 (3.7)
2010-Present	33.5 (5.5)	33.1 (3.7)
No response provided	36.0 (11.0)	32.4 (8.1)
Years in practice		
0-10	34.0 (5.8)	33.3 (3.5)
11-20	34.0 (6.4)	31.5 (4.3)
21-30	34.0 (6.8)	32.4 (4.0)
31+	33.6 (7.6)	31.3 (4.6)
No response provided	33.7 (8.1)	34.0 (3.4)
Country		
United States	33.8 (6.5)	32.5 (4.1)
Other	35.1 (6.1)	31.3 (3.8)
Total sample	33.9 (6.5)	32.4 (4.1)

DC, doctor of chiropractic.

^a Range: 10-60.

^b Mean (standard deviation).

^c Range: 9-54.

4.1). The means represent 46% and 52% of the maximum possible scores, respectively. Notable is the fact that there was very little variation in scores across sex, chiropractic program, years in practice, and country of residence. The regression analysis (Table 3) verified this observation, indicating that

participant characteristics were poorly associated with the 2 scales; in aggregate, the characteristics explained only about 1.5% of the variability in scale scores ($P > .05$). Cronbach's α for the Biomedical scale reached an acceptable level of internal consistency, 0.74. In contrast, Cronbach's α for the Biopsychosocial scale was only 0.40.

DISCUSSION

Using the PABS-PT, our study with UWS graduates statistically revealed no strong tendencies toward either a biomedical or a biopsychosocial attitude and belief system. Results are similar to those found for Australian chiropractors,¹⁰ primary care physicians,¹⁴ and manual therapists.¹⁵ Furthermore, our study found no influential participant characteristics that explained the variability in biomedical and biopsychosocial tendencies.

In contrast, Bishop et al⁵ reported that practitioners in the United Kingdom that identified as either chiropractors, physiotherapists, or McKenzie therapists hold a more biomedical philosophy of pain. Pincus et al¹⁶ found that chiropractors tend to teach pain hypervigilance and activity avoidance compared with physiotherapists and osteopaths in the United Kingdom. This may lead to the belief by the patient that there are underlying structural causes of pain. The authors found that both physiotherapists and osteopaths endorsed limiting the number of passive care treatments compared with chiropractors. There is speculation that there are inherent negative practice and patient outcome implications if attitudes and beliefs of practitioners reflect more of a biomedical model. These practitioners tend to hold fear-avoidance beliefs about back pain and, in return, go against back pain treatment guidelines by recommending patients eliminate work and physical activities. This approach strengthens the patients' beliefs about pain that can potentially have negative patient outcomes.^{3,17}

Current biopsychosocial guidelines recommend patient reassurance, managing fear-avoidance beliefs, promoting

Table 3. Linear Regression Models^a

Characteristic	Biomedical Score		Biopsychosocial Score	
	B	CI	B	CI
Constant	34.4	31.5, 37.3	31.7	29.9, 33.6
Sex (male – female)	–0.8	–2.5, 2.9	0.8	–0.3, 1.9
Chiropractic program completed (other than University of Western States)	0.3	–1.8, 2.3	–0.04	–1.3, 1.2
Decade of graduation	–0.2	–0.9, 0.4	0.2	–0.2, 0.6
Country (other than United States)	0.5	–2.7, 3.7	–0.2	–2.2, 1.8

B, regression coefficient; CI, 95% confidence interval.

^a Biomedical and Biopsychosocial scores were regressed on 4 participant characteristics. B values and CIs are provided. For the 3 dichotomous variables, the regression coefficient gives the mean difference between groups adjusted for the other variables in the model.

patient self-management, discouraging bed rest, encouraging patient to stay active doing ordinary activities, refraining from reliance on back-specific exercises, and using spinal manipulation.⁹ Considering studies indicating that DCs hold more biomedical beliefs and attitudes, it is counterintuitive that DCs adhere better to clinical practice guidelines than physical therapists and medical doctors for the management of acute and subacute low back pain.⁹ Reasons for contrary attitudes and beliefs with practice guideline adherence may be attributed to slowly improving continuing educational opportunities that promote these behaviors.^{17,18} Another reason might be coming from health care organizations that hold DCs accountable for patient management and require that they treat according to biopsychosocial guidelines. Adhering to biopsychosocial guidelines is an important practice behavior that leads to positive patient outcomes. Because of the strong influence that practitioners have on patients, it is important to create consistency between attitudes and beliefs about pain with actual practice behaviors (adherence to evidence-informed biopsychosocial guidelines).

As found by Innes et al,¹⁰ our study indicates that additional work is required to raise the internal consistency of the Pain Attitudes and Beliefs Scale Biopsychosocial scale to an acceptable level. This can be accomplished by increasing the number of items (eg, determined by the Spearman-Brown prediction formula) and/or increasing the homogeneity (correlation) between the items in the scale.^{19,20}

Limitations and Future Studies

One limitation of this study was the low response rate (4.7%-7.4%). This compromised the generalizability to the population of UWS DCs, even though Holbrook et al²¹ found evidence that although lower survey response rates decreased demographic representativeness within the range of variables examined, it did not do so by much.²¹ A 2008 meta-analysis of 45 studies found that the response rates for Web surveys were on average 11% lower than those of other survey models.²² The low response rate may have been caused, in part, by the absence of mailed alternative/backup surveys and compensation to participants for their time; the necessary funds were unavailable. In addition, the UWS Alumni Office could only send the survey to alumni willing to receive emails/newsletters. This also compromised the generalizability of results to UWS alumni to some degree. Despite the fact that biomedical and biopsychosocial scores were comparable among graduates of UWS and other schools, it cannot be concluded that our study accurately reflects the attitudes and beliefs of US DCs. Furthermore, the PABS-PT has not been fully validated for DCs, so systematic error in scale scores cannot be ruled out. However, the biomedical and psychosocial constructs are well established, and we believe the instrument has face and content validity for chiropractic.

Future studies should consider ensuring receipt of the survey, incentivizing response, and conducting a nation-

wide survey from a representative sample of US DCs. This may require a joint study with other chiropractic institutions and the use of better survey software. A larger study should also attempt to correlate practice behaviors with pain beliefs because the appropriateness of the PABS-PT for DCs must also be investigated.

CONCLUSION

This preliminary study did not reveal a preference between biomedical and biopsychosocial beliefs about pain in a small group of DCs, predominantly graduates of UWS. Our tentative findings were consistent with previous studies of Australian chiropractors and other practitioners. Neutrality with respect to these attitudes and belief models was in contrast with the biopsychosocial behavior that has been exhibited by DCs. Verification is required in a larger, high-quality survey from a representative sample of US DCs. A better understanding of the psychosocial effects on patient outcomes requires a larger study comparing attitudes/beliefs with behavior in practice.

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No funding sources or conflicts of interest were reported for this study.

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Practical Applications

- In this small, preliminary study, the group of chiropractors surveyed did not exhibit a strong tendency toward either a biomedical or biopsychosocial pain belief system.
- Future research should focus on correlating pain attitudes and beliefs with practice behaviors.

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