

ORIGINAL RESEARCH ARTICLES

Patient-Centered Perspective on Treatment Outcomes in Chronic Pain

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Abstract

Objective. To define patient-determined success criteria for fibromyalgia and back pain treatment across four outcome domains: pain, fatigue, emotional distress, interference with daily activities.

Design. Retrospective correlational clinical sample design.

Setting. Tertiary care clinics at health science center.

Patients. 248 fibromyalgia patients and 52 back pain patients.

Interventions. N/A.

Outcome Measures. Patient Centered Outcomes Questionnaire, measures of usual pain intensity and pain unpleasantness.

Results. Overall, for treatment to be considered successful, fibromyalgia patients required pain levels of 3.30 (54% reduction), fatigue levels of 3.08 (60% reduction), distress levels of 2.49 (60% reduction), and interference levels of 2.67 (63% reduction). Comparatively, back pain patients required pain levels of 2.23 (58% reduction), fatigue levels of 2.29 (57% reduction), distress levels of 1.65 (67% reduc-

tion), and interference levels of 1.81 (68% reduction). Overall, both fibromyalgia and back pain patients did not expect to meet their criteria for success.

Conclusions. Results highlight the importance of assessing the patient's view of successful outcome. Both fibromyalgia and back pain patients appear to have stringent criteria for success that existing treatments are often unlikely to meet. Comparison across groups indicated fibromyalgia patients have higher usual levels of pain, fatigue, distress, and interference. Interestingly, fibromyalgia patients also require greater changes across domains in order to consider treatment successful, despite rating higher levels of pain, fatigue, distress, and interference as successful. Recognizing patients' success criteria and treatment expectations encourages discussion and development of individualized treatment goals, and wider implementation of individualized treatment for chronic-pain populations is encouraged.

Key Words. Treatment Outcome; Chronic Pain; Patient Satisfaction; Back Pain; Fibromyalgia

Introduction

Chronic pain is one of the most frequent, costly, and disabling medical conditions in the United States, often resulting in substantial impairments in occupational and social functioning. Epidemiological studies report that 15% of adults experience chronic pain [1]. The annual incidence of back pain of moderate intensity and duration was estimated at 10–15% among the adult population [2], with research suggesting a lifetime prevalence of significant back pain in 80% of adults [3]. Fibromyalgia is a condition involving widespread musculoskeletal pain, affecting approximately 2% of adults with chronic pain [4]. This condition is poorly understood, often leading to patients and providers being dissatisfied with treatment. Initial evidence suggested that a patient-centered treatment approach resulted in beneficial outcomes among fibromyalgia patients [5]. While pain is a prominent feature in fibromyalgia, patients often experience significant impairments in physical functioning and emotional distress [6], as well as decreased quality of life [7]. Similarly, back pain patients also experience impairments in mood and functioning (e.g., [8,9]), in addition to pain.

The lack of highly effective treatment strategies for chronic pain patients often frustrates these individuals and their

healthcare providers. Importantly, patient dissatisfaction may lead to more medical visits, more expensive and a greater number of tests, and the perception of the patient being “difficult” [5].

Traditionally, determinations about success criteria in chronic pain treatment have been made predominantly by healthcare providers. This “medical model” of treatment is often derived and driven via nomothetic statistical analyses, and does not provide much input for the incorporation of the patient’s perspective of successful outcome for any particular course of treatment.

However, adopting a patient-centered treatment model allows for much greater contributions by the patient to determine the success of the treatment [10]. Indeed, a large body of evidence demonstrates the importance of a collaborative relationship between healthcare providers and their patients [11]. Recent research has shown that a patient-centered model of treatment promotes greater satisfaction with healthcare, improves treatment compliance, and increases maintenance of patient–provider relationships [12–14].

Data suggest that treatment strategies are increasingly focusing on patient-derived success criteria. A patient-centered treatment approach was more effective than a provider-centered approach among a group of fibromyalgia patients [5]. Further, another study using the Patient Centered Outcomes Questionnaire, demonstrated that knowledge of chronic back pain patients’ extremely high treatment expectations resulted in improved communication with health care providers, leading to more realistic success criteria and use of these less stringent criteria in making judgments about treatment success [15].

Some limitations in the patient-centered outcome literature are noteworthy and are addressed by the present study. Little is known about what specific factors chronic pain patients consider important for successful treatment, and whether differences exist in these factors across different populations of pain patients. The present study was designed to describe and compare treatment success criteria from the patients’ perspective among fibromyalgia and back pain patients to address these limitations and increase knowledge of treatment success criteria across two populations of chronic pain patients.

Methods

Participants

Participants in this study included 248 patients with fibromyalgia seen at the Rheumatology outpatient clinic of the University of Florida, and 52 patients with back pain seen at the Spine Care Center of the University of Florida, during their routine clinical care. These patient samples consisted of consecutively referred patients from 2003–2007. Data were collected retrospectively, with Institutional Review Board approval. All medical evaluations and diagnostic

determinations for the fibromyalgia patients were made by the Rheumatologist coinvestigator (RS) using the American College of Rheumatology 1990 criteria [16]. All medical evaluations for the back pain patients were made by the patients’ treating orthopedist coinvestigator (JA). The participants in the fibromyalgia group included 232 females and 16 males (a 14.5:1 female to male ratio), ranging in age from 18.15 years to 78.74 years ($M = 46.85$ years, $SD = 11.76$ years). The male to female ratio in the present sample is consistent with the literature, with 93.5% of patients being female [6]. The racial composition of the fibromyalgia sample is as follows: 86.7% Caucasian, 7.7% Black/African American, 2.0% Hispanic, and 0.4% Asian, 0.8% American Indian, 0.4% Pacific Islander, and 0.8% Multiracial. 1.2% of participants did not specify their race. The participants in the back pain group included 30 females and 22 males, ranging in age from 18 years to 71 years ($M = 46.12$ years, $SD = 15.56$ years). The racial composition of the sample is as follows: 84.6% Caucasian, 9.6% Black/African American, 3.8% Hispanic, and 1.9% Asian.

Procedure

Participants undergoing an initial evaluation completed self-report measures about their pain as part of their routine clinical care, as well as a patient-centered outcomes (PCO) questionnaire that asked about the levels of pain, fatigue, distress, and interference with daily activities that patients *usually* had, the levels they would consider *successful* after treatment, the levels they *desired* for each of these areas, the levels they *expected* following treatment, and how *important* it was that treatment address each of these areas. Analyses are based on this cross-sectional data, and all measures will be described in greater detail below.

Measures

Patient Centered Outcomes (PCO) Questionnaire

The PCO questionnaire is a self-report questionnaire, which assesses four domains relevant to chronic pain populations (pain, fatigue, distress, and interference) on an 11-point numerical rating scale (NRS) ranging from 0–10. The PCO Questionnaire asks patients to provide ratings of their usual levels of each of these four domains, as well as what levels they would consider to be a minimally successful treatment outcome, what levels they desire, and what levels they expect following treatment. Patients also provide ratings for how important it is for treatment to address each of these four domains. Instructions provided at the beginning of the PCO Questionnaire are as follows: “Many people experience pain, fatigue (i.e., feeling tired), emotional distress (e.g., worries, feeling sad), and interference with daily activities (e.g., not being able to work or do household chores) as a result of their medical condition. We would like to understand how you have been impacted in each of these areas. We would also like to learn more about what you want your treatment to do for you.” In a previous unpublished pilot study

acceptable test–retest reliability for the PCO questionnaire was found ($r = 0.84$ to $r = 0.90$, $P < 0.001$; for usual levels across the 4 domains). Concurrent validity for the PCO questionnaire with standardized measures of pain, mood, and disability has also been demonstrated [15]. Usual pain ratings from the PCO questionnaire are correlated with visual analog scale ratings of pain intensity ($r = 0.52$, $P < 0.001$); usual emotional distress levels from the PCO questionnaire are correlated with total scores from the Beck Depression Inventory [17] ($r = 0.65$, $P < 0.001$) and the Pain Anxiety Symptom Scale [18] ($r = 0.72$, $P < 0.001$); and usual interference levels from the PCO questionnaire are correlated with total scores from the Pain Disability Index [19] ($r = 0.75$, $P < 0.001$). Importance ratings from the PCO questionnaire have also been found to be useful for discriminating subgroups within a mixed group of chronic-pain patients [20]. Chronic pain populations are often considered to be relatively homogenous, and are treated accordingly. However, previous investigations using patient-centered outcomes criteria have suggested that there is heterogeneity among chronic pain populations, which is related to their treatment expectations and response (e.g., [5,20]).

Visual Analogue Scales (VAS) for Pain Ratings

Fibromyalgia patients completed the Medical College of Virginia (MCV) Pain Questionnaire [21], which consists of visual analogue scales (VAS) for pain, mood, and function dimensions, scored from 0 to 100. These dimensions include measures of the pain experience itself, including usual levels of pain intensity and pain unpleasantness during the preceding week (anchored at the right end by “the most intense pain imaginable” / “the most unpleasant sensation imaginable”). In addition, negative feelings associated with the pain experience (i.e., depression, anxiety, frustration, fear, and anger) are also rated, in reference to the previous week. Back pain patients also completed visual analogue scales (VAS) for pain intensity and pain unpleasantness, scored from 0–10, in reference to the previous week (anchored at the right end by “the most intense pain imaginable” / “the most unpleasant sensation imaginable”). Due to differences in the routine clinical practices in each clinic, there were slight differences in the measures completed by the fibromyalgia patients and back pain patients. Visual analogue scales have been demonstrated to yield ratio scale measurement of clinical pain that is both internally consistent and able to differentially assess pain intensity and pain unpleasantness [21,22]. These measures of pain were included in the present study to provide a comparison against which the ratings from the PCO questionnaire could be examined, in order to attest to the validity of the PCO ratings.

Statistical Analyses

The Statistical Package for the Social Sciences (SPSS, version 15.0) was used for all statistical analyses. Descriptive statistics were computed for demographic and clinical variables across each chronic pain sample. Independent samples *t*-tests (for continuous variables) and chi-square

analyses (for categorical variables) were conducted to examine potential differences between fibromyalgia and back pain patients on demographic and clinical variables. Descriptive information was also computed for each of the PCO domains across the two chronic pain groups. Analyses of variance (ANOVAs) were conducted across groups to examine whether differences existed in usual levels, desired levels, expected levels, levels considered successful, and importance ratings across domains, as well as in the amount of change that was needed for treatment to be considered successful. Sex was included as a factor in the ANOVA analyses when it was found to be related to any of these dependent variables (sex was the only demographic or clinical variable found to differ between pain groups). A 2×2 repeated-measures ANOVA, with group and sex as between-subjects factors, was also conducted to assess differences between patients' expected outcome ratings and their success criteria across domains, as reported on the PCO. This analysis was examined across groups, and then with group membership in the model to determine whether there was any interaction between group membership and differences in individuals' ratings between their success criteria and their expected outcome ratings. Due to the number of analyses conducted, a statistical significance level was set to $P < 0.01$ in order to identify any significant findings.

Results

Demographic and clinical information for these two patient groups is presented in Table 1. Available information on age, sex, race, pain duration, education level, marital status, and work status were compared across the two pain groups. The only significant difference found between groups was for sex. This variable was included as a factor in subsequent PCO analyses, when sex was related to the PCO variable being examined. Descriptive information about fibromyalgia and back pain patients' ratings for usual levels, desired levels, expected levels, levels considered to be successful, and importance ratings for each of the four PCO domains (pain, fatigue, distress, and interference with daily activities) are provided in Table 2. Fibromyalgia patients reported a usual pain level of 7.23 NRS, usual level of fatigue of 7.75 NRS, usual level of distress of 6.21 NRS, and usual level of interference of 7.25 NRS. Back pain patients reported a usual pain level of 5.30 NRS, usual level of fatigue of 5.37 NRS, usual level of distress of 5.07 NRS, and usual level of interference of 5.74 NRS. Sex was found to be related to PCO usual levels of pain, fatigue, distress, and interference. Therefore, a series of 2×2 analyses of variance (ANOVAs), with group and sex as between-subjects factors, were conducted to examine differences in these variables across group. Results revealed a significant main effect for group for PCO usual levels of pain [$F(1,296) = 20.26$, $P < 0.001$], fatigue [$F(1,296) = 43.11$, $P < 0.001$], and interference [$F(1,296) = 14.48$, $P < 0.001$], but there was no significant difference between groups on usual levels of distress. There were no significant group \times sex interactions for PCO usual levels across domains (see Table 3).

Table 1 Demographic information for the 2 groups

	Fibromyalgia		Back Pain		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Age	46.85	11.76	46.12	15.56	0.32
Pain duration (months)	148.66	157.47	69.35	113.52	2.67*
Education (years)	13.59	2.10	14.13	3.58	-0.91
	%		%		χ^2
Sex					
	Female	93.5%	57.7%		49.96***
	Male	6.5%	42.3%		
Race					
	Caucasian	86.7%	84.6%		4.01
	Black/African-American	7.7%	9.6%		
	Asian	0.4%	1.9%		
	Hispanic	2.0%	3.8%		
	American Indian	0.8%	—		
	Pacific Islander	0.4%	—		
	Multiracial	0.8%	—		
Marital status					
	Single/Never married	2.4%	23.1%		5.21
	Married	8.9%	55.8%		
	Divorced	3.2%	15.4%		
	Widowed	0.4%	1.9%		
	Living with partner	—	3.8%		
	Separated	0.8%	—		
Work status					
	Full-time	6.9%	30.8%		5.25
	Part-time	2.8%	7.7%		
	Not employed	6.0%	61.5%		

* $P < 0.05$; *** $P < 0.001$.

One-way ANOVAs also demonstrated that the fibromyalgia patients reported significantly higher desired levels ($P < 0.01$ to $P < 0.001$, across all four domains), and significantly higher expected levels (following treatment) for pain and fatigue (both $P < 0.01$), compared to the back pain patients. Patients' reported expected levels for distress and interference did not differ between groups. Importance ratings did not differ between the two groups (sex was included as a factor in the analysis for PCO importance rating for fatigue; group \times sex interaction was also nonsignificant). Fibromyalgia patients also indicated significantly higher ratings for all four domains as "successful" following treatment, compared to the back pain patients, in ANOVA analyses. Sex was included as a factor in the analysis for PCO success rating for pain following treatment; however, the group \times sex interaction was nonsignificant. Thus, the fibromyalgia group demonstrated less stringent ratings for successful levels of pain, fatigue, distress, and interference following treatment. These comparisons are presented in Table 4.

A final analysis examined the degree of change required by fibromyalgia patients and back pain patients in each of

the four domains for patients to consider treatment successful; this was determined via the difference between participants' usual ratings for each domain and their ratings of what they would consider successful for each domain following treatment. Overall, for treatment to be considered successful, fibromyalgia patients required a pain level of 3.30 (54% reduction), a fatigue level of 3.08 (60% reduction), a distress level of 2.49 (60% reduction), and an interference level of 2.67 (63% reduction). By comparison, back pain patients required a pain level of 2.23 (58% reduction), a fatigue level of 2.29 (57% reduction), a distress level of 1.65 (67% reduction), and an interference level of 1.81 (68% reduction).

Results indicated that fibromyalgia patients required greater changes in pain (3.94 point reduction vs 3.07 point reduction in back pain patients), fatigue (4.67 point reduction vs 3.08 point reduction in back pain patients), distress (3.72 point reduction vs 3.41 point reduction in back pain patients), and interference with daily activities (4.57 point reduction vs 3.93 point reduction in back pain patients) in order to consider their treatment successful. However, a series of 2×2 ANOVAs, with group

Table 2 PCO questionnaire profiles for the 2 groups

	Fibromyalgia		Back Pain	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Usual levels				
Pain	7.23	1.89	5.30	2.63
Fatigue	7.75	1.82	5.37	2.91
Distress	6.21	2.64	5.07	3.52
Interference	7.25	2.26	5.74	2.97
Desired levels				
Pain	1.45	1.95	0.36	0.93
Fatigue	1.35	1.92	0.42	0.94
Distress	1.04	1.58	0.21	0.64
Interference	1.04	1.74	0.32	0.82
Expected levels				
Pain	3.64	2.18	2.53	1.59
Fatigue	3.58	2.25	2.44	2.12
Distress	2.89	2.23	2.32	2.39
Interference	3.22	2.29	2.57	2.23
Successful levels				
Pain	3.30	1.64	2.23	1.46
Fatigue	3.08	1.65	2.29	1.80
Distress	2.49	1.76	1.65	1.78
Interference	2.67	1.75	1.81	1.60
Importance levels				
Pain	8.96	1.70	9.07	2.04
Fatigue	8.58	1.67	8.17	3.03
Distress	7.16	2.61	7.40	3.69
Interference	8.31	1.93	8.11	3.08
Amount of Change Required				
Pain	3.94	2.00	3.07	1.97
Fatigue	4.67	2.06	3.08	2.34
Distress	3.72	2.49	3.41	3.10
Interference	4.57	2.43	3.93	2.72

and sex as between-subjects factors, indicated that these differences were not significant, with the exception of the changes in fatigue required between groups for treatment to be considered successful [$F(1,296) = 15.51, P < 0.001$]. None of the group \times sex interactions were significant in any of these ANOVA analyses. Figure 1 presents the PCO ratings for usual levels, levels required to be considered successful, and the amount of change required by back pain and fibromyalgia patients to consider treatment successful. The complete results of the ANOVA analyses examining the amount of change in PCO scores required to consider treatment successful across the two groups of patients are provided in Table 5.

Success Criteria vs Expected Outcomes

To assess whether patients expected to meet their success criteria, expected outcome ratings were compared with success criteria for each outcome domain (pain, fatigue, distress, interference). A series of repeated measures ANOVAs were conducted, first collapsed across groups and then with group and sex included as between-subjects factors in the model. Results revealed that, collapsed across groups, patients' expectations for treatment fall short of success criteria for pain [$F(1,294) = 8.37, P < 0.01$], fatigue [$F(1,294) = 13.65, P < 0.001$], distress [$F(1,294) = 16.71, P < 0.001$], and interference [$F(1,294) = 21.91, P < 0.001$]. When group membership and sex were added to the model to test for differences between success criteria and expected outcome across groups and sex, no significant interactions were seen across the four PCO domains. Table 2 shows the means and standard deviations of success and expected ratings for each chronic pain group.

Comparisons with Self-Reported Pain Measures

Ratings of pain intensity and pain unpleasantness were computed for each of the chronic pain patient samples. Fibromyalgia patients completed a VAS for usual pain intensity and usual pain unpleasantness on the MCV Pain Questionnaire, which ranges from 0 to 100; similarly, back pain patient completed a VAS for average pain intensity and average pain unpleasantness, ranging from 0 to 10. Fibromyalgia patients reported a mean pain intensity of 60.79 ($SD = 21.39$) and a mean pain unpleasantness of 58.34 ($SD = 22.40$). Back pain patients reported a mean pain intensity of 4.64 ($SD = 3.10$) and a mean pain unpleasantness of 5.28 ($SD = 3.17$). After transforming the usual pain intensity and usual pain unpleasantness values across groups onto a common scale, a one-way ANOVA revealed significantly higher usual pain intensity ratings in the fibromyalgia group compared to the back pain group [$F(1,258) = 15.39, P < 0.001$]. Usual pain unpleasantness ratings were not significantly different across groups. Importantly, the higher ratings for usual levels of pain intensity reported by the fibromyalgia patients, compared to the back pain patients, is consistent with the usual pain ratings reported on the PCO questionnaire. Additionally, large correlations were found between fibromyalgia patients' VAS pain ratings and PCO usual ratings of pain ($r = 0.64$ to $0.67, P < 0.001$), and between back pain patients VAS pain ratings and PCO usual ratings of pain ($r = 0.73$ to $0.78, P < 0.001$). These correlations are provided in Table 6.

Discussion

Consistent with previous research, the current findings highlight the importance of assessing what patients consider to be successful treatment outcomes. The current sample of fibromyalgia patients required reductions of 3.94 points in pain, 4.67 points in fatigue, 3.72 points in distress, and 4.57 (10-point maximum) points in interference in order to consider treatment successful. The

Table 3 Analyses of variance (ANOVAs) for PCO usual ratings across pain groups with sex as a factor

Dependent Variable	df Between	df Error	SS Between	SS Error	MS Between	MS Error	F
PCO usual pain							
Group	1	296	82.76	1,208.84	82.76	4.08	20.26***
Sex	1	296	22.45	1,208.84	22.45	4.08	5.50**
Group × sex	1	296	1.76	1,208.84	1.76	4.08	0.43
PCO usual fatigue							
Group	1	296	177.11	1,216.11	177.11	4.11	43.11***
Sex	1	296	17.29	1,216.11	17.29	4.11	4.21**
Group × sex	1	296	20.53	1,216.11	20.53	4.11	5.00**
PCO usual distress							
Group	1	296	25.48	2,313.90	25.48	7.82	3.26*
Sex	1	296	36.37	2,313.90	36.37	7.82	4.65**
Group × sex	1	296	5.89	2,313.90	5.89	7.82	0.75
PCO usual interference							
Group	1	296	82.38	1,684.21	82.38	5.69	14.48***
Sex	1	296	8.77	1,684.21	8.77	5.69	1.54
Group × sex	1	296	19.23	1,684.21	19.23	5.69	3.38*

* $P < 0.10$; ** $P < 0.05$; *** $P < 0.001$.

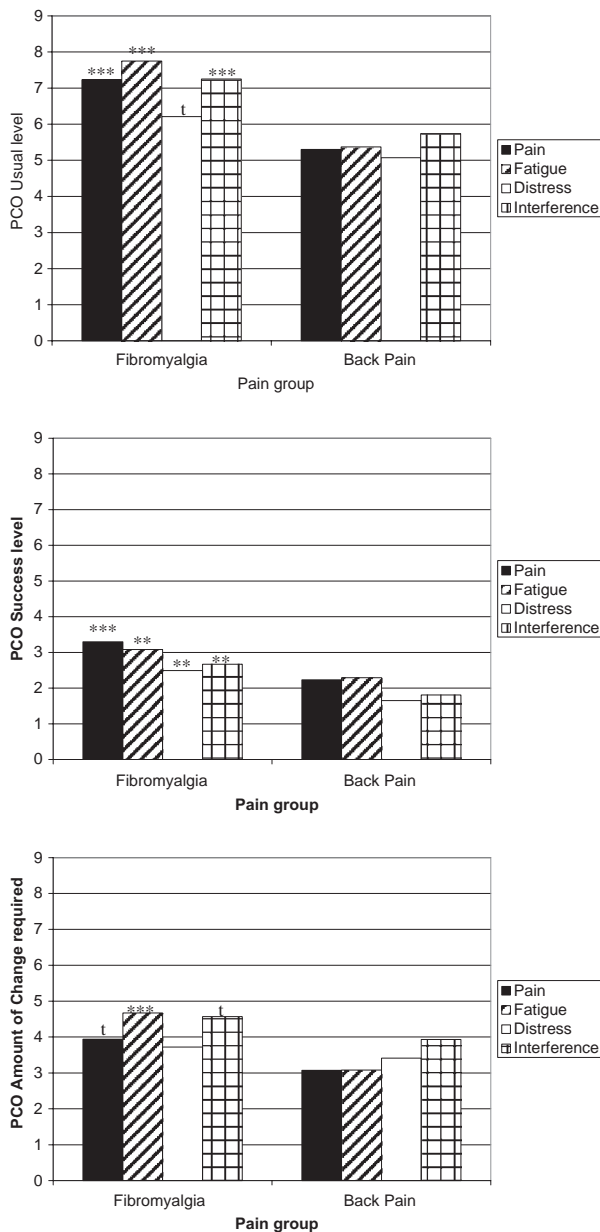
current sample of back pain patients required reductions of 3.07 points in pain, 3.08 in fatigue, 3.41 in distress, and 3.93 in interference in order to consider treatment successful. These patient-centered definitions of success

demonstrate the very high expectations of chronic pain patients related to their medical treatments, but also indicated that fibromyalgia patients require larger reductions in usual levels of pain, fatigue, distress, and interference in

Table 4 Analyses of variance (ANOVAs) for PCO ratings across pain groups, including sex as a factor when correlated with the dependent variable

Dependent Variable	df Between	df Error	SS Between	SS Error	MS Between	MS Error	F
PCO desired pain	1	298	51.62	987.09	51.62	3.31	15.58***
PCO desired fatigue	1	298	36.68	954.87	36.68	3.20	11.45**
PCO desired distress	1	298	29.53	640.27	29.53	2.15	13.74***
PCO desired interference	1	298	22.47	777.61	22.47	2.61	8.61**
PCO expected pain	1	295	50.46	1,290.27	50.46	4.37	11.54**
PCO expected fatigue	1	295	53.35	1,463.20	53.35	4.96	10.76**
PCO expected distress	1	295	13.33	1,502.69	13.33	5.09	2.62
PCO expected interference	1	295	17.31	1,530.30	17.31	5.19	3.34*
PCO success pain							
Group	1	296	33.18	771.34	33.18	2.61	12.73***
Sex	1	296	0.64	771.34	0.64	2.61	0.25
Group × sex	1	296	0.78	771.34	0.78	2.61	0.30
PCO success fatigue	1	298	26.98	840.06	26.98	2.82	9.57**
PCO success distress	1	298	29.90	923.73	29.90	3.10	9.65**
PCO success interference	1	296	31.97	880.91	31.97	2.98	10.74**
PCO importance pain	1	297	0.47	923.68	0.47	3.11	0.15
PCO importance fatigue							
Group	1	295	7.68	1,122.47	7.68	3.81	2.02
Sex	1	295	12.04	1,122.47	12.04	3.81	3.16*
Group × sex	1	295	13.65	1,122.47	13.65	3.81	3.59*
PCO importance distress	1	297	2.45	2,369.06	2.45	7.98	0.31
PCO importance interference	1	297	1.67	1,391.87	1.67	4.69	0.36

* $P < 0.10$; ** $P < 0.01$; *** $P < 0.001$.



† $p < .10$; ** $p < .01$; *** $p < .001$

Figure 1 PCO ratings for usual levels, success levels, and amount of change required for the 2 pain groups.

order to consider their treatment a success. This is consistent with findings from a mixed sample of chronic pain patients [20], where reductions of 3.35–4.30 points across domains, and findings from a group of spine pain patients, where reductions of 32.8–43.1 points (using a PCO questionnaire with a 101-point scale) across domains [15], were required for treatment to be considered successful. Our data also support the contention that patients may require larger changes across group multiple domains than pre-

viously believed, in order to consider their treatment successful. Patients with fibromyalgia identified reductions across domains in the range of 54–63% as clinically meaningful and patients with back pain identified reductions of 57–68% across domains as clinically meaningful. These reductions are approximately twice the amount proposed in prior research [23].

Fibromyalgia patients required significantly larger reductions in fatigue, compared to back-pain patients, in order to consider treatment successful. Fibromyalgia patients also reported larger reductions in pain, distress, and interference in order to consider treatment successful, although these differences did not reach the level of statistical significance set in this study. This pattern of findings may be due in part to the higher usual ratings, across all domains, reported by fibromyalgia patients. However, compared to the back-pain patients, fibromyalgia patients also identified less stringent success criteria across all domains. The differential reduction specific to fatigue identified by fibromyalgia patients, in order for treatment to be successful, may be due to the high levels of reported fatigue common to this condition. Thus, patients may experience fibromyalgia as particularly impairing, due to this fatigue; this could impact other areas of their lives and may be reflected in the larger, though non-significant, reductions in pain, distress, and interference reported in order to consider treatment successful. Also, as fibromyalgia predominantly affects women, this differential reduction specific to fatigue required for successful treatment may be related to differential gender-roles and the impact on fibromyalgia on different gender-role activities.

Back pain and fibromyalgia patients required reductions ranging from 3.08–4.67/10 in fatigue, distress, and interference in order to consider treatment successful, compared to pain reductions of 3.07 and 3.94. This underscores a need to adopt treatment approaches that address the multidimensional nature of the pain experience and patients' expectancies for improvements across multiple domains (i.e., pain, fatigue, distress, and functioning) in order to consider treatment successful. Treatments that neglect these other important areas of concern to patients and focus solely on pain reduction, may contribute to treatment dissatisfaction and reports of continued disability. Thus, not treating or under-treating areas identified as important by patients, may be related to poorer outcomes and patient dissatisfaction.

Taken together, these findings not only highlight the importance of determining what patients are conceptualizing as a "successful" treatment outcome, but also the need to address any unrealistic expectations, in order to ensure effective communication about the changes that are feasible following treatment. It appears that both fibromyalgia patients and back pain patients are relatively pessimistic about treatment, since they do not expect treatment to meet their success criteria. Identifying patients' expectations and success criteria at the outset of treatment provides an avenue for providers to address unrealistic expectations, discuss areas that patients feel are impor-

Table 5 Analyses of variance (ANOVAs) for PCO change ratings across pain groups with sex as a factor

Dependent Variable	df Between	df Error	SS Between	SS Error	MS Between	MS Error	F
Change in PCO pain required							
Group	1	296	11.14	1,169.83	11.14	3.95	2.82*
Sex	1	296	15.49	1,169.83	15.49	3.95	3.92**
Group × sex	1	296	0.20	1,169.83	0.20	3.95	0.05
Change in PCO fatigue required							
Group	1	296	67.94	1,296.42	67.94	4.38	15.51***
Sex	1	296	23.81	1,296.42	23.81	4.38	5.44**
Group × sex	1	296	10.58	1,296.42	10.58	4.38	2.42
Change in PCO distress required							
Group	1	296	1.30	1,984.61	1.30	6.71	0.19
Sex	1	296	33.29	1,984.61	33.29	6.71	4.97**
Group × sex	1	296	9.92	1,984.61	9.92	6.71	1.48
Change in PCO interference required							
Group	1	294	18.97	1,784.35	18.97	6.07	3.13*
Sex	1	294	19.54	1,784.35	19.54	6.07	3.22*
Group × sex	1	294	25.85	1,784.35	25.85	6.07	4.26**

* $P < 0.10$; ** $P < 0.05$; *** $P < 0.001$.

tant to address in treatment, and to promote communication about treatment options and realistic expectations for outcomes. Information from the PCO could facilitate referrals to providers for specific treatment addressing mood or other issues if desired or warranted. It could also guide treatment efforts, such as suggesting physical therapy if high ratings of interference or pain appear to be secondary to deconditioning, or arguing against prescribing medications with high overdose potential in patients endorsing high levels of distress without any treatment for this. Additionally, if complete pain relief is an unrealistic treatment outcome, then use of acceptance-based (i.e., ACT/acceptance and commitment therapy) approaches for pain management may provide a useful treatment option for patients and providers.

These results also provide additional, ecologically valid evidence that it is important for clinicians and researchers to incorporate patient-centered definitions of success into their procedures in order to prevent overestimating the effectiveness of their interventions. Of note, the present sample of fibromyalgia patients identified success target scores in the range of 2.49/10 to 3.30/10 and the present sample of back pain patients identified

success target scores in the range of 1.65/10 to 2.29/10, consistent with Robinson and colleagues' (2005) findings that patients with chronic pain do not require a complete absence of symptoms in order to consider treatment successful [20]. Thus, eliciting patients' goals for treatment will facilitate the identification of any potentially unrealistic goals and enable providers to educate patients about realistic expectations regarding treatment outcomes. This can help to prevent patient dissatisfaction with unrealistic treatment expectations, and can also establish effective patterns of communication between patients and providers from the outset of treatment.

Due to the cross-sectional nature of the analysis, several limitations of this design should be noted. Detailed information about any prior treatment these patients may have received was unavailable; it is therefore beyond the scope of this article to examine the impact that prior treatment success or failure may have on PCOQ ratings. We were also unable to examine PCOQ ratings throughout the course of treatment, and therefore cannot determine if patients adjust their ratings in response to treatment strategies. Future research employing longitudinal data would be valuable to identify whether fibromyalgia and back pain

Table 6 Correlation between VAS pain ratings and PCO ratings for usual pain in each pain group

	Fibromyalgia		Back Pain	
	VAS pain Intensity	VAS Pain Unpleasantness	VAS pain Intensity	VAS Pain Unpleasantness
PCO usual pain	0.668***	0.641***	0.781***	0.725***

*** $P < 0.001$.

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patients change their PCOQ ratings across treatment, and how changes in PCOQ ratings may affect patients' views concerning treatment outcomes. Furthermore, as the PCOQ remains a new questionnaire, additional research is needed to examine its psychometric properties, and to determine whether patient ratings of success fluctuate with symptom severity, or remain consistent over time.

Research involving patient-centered outcomes has demonstrated a substantial benefit to incorporating patients' perspective into treatment evaluations [5,13,14]. This study contributes additional data supporting the importance of using patient-centered success criteria when working with patients who have chronic pain conditions. Communication with patients about their definitions for treatment success has the potential to help patients prioritize their goals, make informed choices, and maintain realistic expectations about their treatment. A thorough understanding of the patient perspective is necessary to guide healthcare providers in clinical decision-making and promote better relationships with their patients. The results, regardless of type of chronic pain condition, also highlight the potential importance of assessing patient expectations for treatment success. It is highly likely that patients whose expectations significantly exceed likely treatment outcomes will be disappointed with results and with their care. Assessing these expectations during initial evaluations, and prior to the initiation of treatment, may contribute to better outcomes and more satisfied patients.

Recognizing the heterogeneity within chronic-pain patient groups is consistent with a patient-centered model of treatment; it also encourages discussion and development of individualized treatment goals relevant to a particular patient. While the benefits of such patient-centered approaches are well known, wider implementation of such treatment approaches are needed in order to maximize these benefits to the patient, the provider, and the health-care system.

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References

- 1 Verhaak PF, Kerssens JJ, Dekker J, Sorbi MJ, Bensing JM. Prevalence of chronic benign pain disorder among adults: A review of the literature. *Pain* 1998;77(3):231–9.
- 2 Andersson GB. Epidemiological features of chronic low-back pain. *Lancet* 1999;354(9178):581–5.
- 3 Lanes TC, Gauron EF, Spratt KF, et al. Long-term follow-up of patients with chronic back pain treated in a multidisciplinary rehabilitation program. *Spine* 1995;20(7):801–6.
- 4 Robinson RL, Jones ML. In search of pharmaco-economic evaluations for fibromyalgia treatments: A review. *Expert Opin Pharmacother* 2006;7(8):1027–39.
- 5 Alamo MM, Moral RR, Perula de Torres LA. Evaluation of a patient-centred approach in generalized musculoskeletal chronic pain/fibromyalgia patients in primary care. *Patient Educ Couns* 2002;48(1):23–31.
- 6 Wolfe F. Fibromyalgia. *Rheum Dis Clin North Am* 1990;16(3):681–98.
- 7 Nampiaparampil DE, Shmerling RH. A review of fibromyalgia. *Am J Manag Care* 2004;10(11 Pt 1):794–800.
- 8 Gallagher RM, Verma S. Managing pain and comorbid depression: A public health challenge. *Semin Clin Neuropsychiatry* 1999;4(3):203–20.
- 9 Verma S, Gallagher RM. The psychopharmacologic treatment of depression and anxiety in the context of chronic pain. *Curr Pain Headache Rep* 2002;6(1):30–9.
- 10 Laine C, Davidoff F. Patient-centered medicine. A professional evolution. *JAMA* 1996;275(2):152–6.
- 11 Hall JA, Roter DL, Katz NR. Meta-analysis of correlates of provider behavior in medical encounters. *Med Care* 1988;26(7):657–75.
- 12 Hirsh AT, Atchison JW, Berger JJ, et al. Patient satisfaction with treatment for chronic pain: Predictors and relationship to compliance. *Clin J Pain* 2005;21(4):302–10.
- 13 Fischer D, Stewart AL, Bloch DA, et al. Capturing the patient's view of change as a clinical outcome measure. *JAMA* 1999;282(12):1157–62.
- 14 Masi AT, White KP, Pilcher JJ. Person-centered approach to care, teaching, and research in fibromyalgia syndrome: Justification from biopsychosocial perspectives in populations. *Semin Arthritis Rheum* 2002;32(2):71–93.
- 15 Brown JL, Edwards PS, Atchison JW, et al. Defining patient-centered, multidimensional success criteria for treatment of chronic spine pain. *Pain Med* 2008;9(7):851–62.
- 16 Wolfe F, Smythe HA, Yunus MB, et al. The American College of Rheumatology 1990 Criteria for the Classi-

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- fication of Fibromyalgia. Report of the Multicenter Criteria Committee. *Arthritis Rheum* 1990;33(2):160–72.
- 17 Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry* 1961;4:561–71.
 - 18 McCracken LM, Zayfert C, Gross RT. The Pain Anxiety Symptoms Scale: Development and validation of a scale to measure fear of pain. *Pain* 1992;50(1):67–73.
 - 19 Pollard CA. Preliminary validity study of the pain disability index. *Percept Mot Skills* 1984;59(3):974.
 - 20 Robinson ME, Brown JL, George SZ, et al. Multidimensional success criteria and expectations for treatment of chronic pain: The patient perspective. *Pain Med* 2005;6(5):336–45.
 - 21 Price DD, Bush FM, Long S, Harkins SW. A comparison of pain measurement characteristics of mechanical visual analogue and simple numerical rating scales. *Pain* 1994;56(2):217–26.
 - 22 Price DD, Harkins SW, Baker C. Sensory-affective relationships among different types of clinical and experimental pain. *Pain* 1987;28(3):297–307.
 - 23 Farrar JT, Portenoy RK, Berlin JA, Kinman JL, Strom BL. Defining the clinically important difference in pain outcome measures. *Pain* 2000;88(3):287–94.