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Research paper

Compliance and stages of change in multidisciplinary pain centers

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summary

Background: Treatments in multidisciplinary pain centers (MPCs) are multimodal and typically involve medical, pharmacological, psychological, and rehabilitative treatment objectives. The extent to which patients in pain centers comply with and progress through treatment is likely to affect treatment outcome.

Methods: The Cognitive Psychophysiological Treatment Clinical Rating Scales (CPTSCR) were developed by the authors to assess treatment compliance and stages of change across ten treatment objectives in MPCs. The CPTSCR scales were analyzed for inter-rater reliability, content validity, and convergent and discriminant validity with a sample of 66 patients receiving treatment in a multidisciplinary pain center.

Results: All of the CPTSCR scales appeared to have good inter-rater agreement among three psychotherapists. Patients' treatment compliance and improvements in stages of change were associated with improved treatment outcomes. Higher compliance levels and improvements in stage of change were associated with higher social skills and lack of avoidant and moody personality characteristics. These findings can assist clinicians in maximizing treatment outcome in MPCs by facilitating treatment compliance and helping patients progress through the various stages of readiness to change.

Key words: Pain centers; compliance; stage of change.

introduction

Multidisciplinary pain centers (MPCs), by definition, incorporate many modalities of treatment to assist persons suffering from chronic pain. While much literature has focused on treatment outcome in MPCs,[1] there has been little attention on factors associated with the actual *process* of improvement. The manner in which patients receiving MPC treatment progress through the treatment program is likely to affect the success of the program. The assessment of treatment compliance levels and readiness to change are two such variables that might help professionals understand how to better maximize MPC treatment success.

Treatment compliance in MPCs

Patients' compliance with their treatment regimen is an important factor in any clinical setting, but in a multidisciplinary pain management setting, compliance is especially important because of the many treatment regimens in which patients must engage. In one of the few studies quantifying treatment compliance in the pain management context, Lutz and colleagues examined the relationship between compliance and treatment outcome.[2]

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Compliance was rated as a general measure of compliance with all treatments within the pain management setting. Results indicated that compliance was significantly related to treatment outcome variables, such as pain levels, functional impairment, and analgesic use.

Treatment compliance is often defined as treatment completion. In a study examining demographic, psychological, and social predictors of treatment completions, chronic temporomandibular pain patients being treated in a behavioral medicine program were categorized as completing or failing to complete.[3] Significant predictors included the patients' perceived family reactions to their pain. Having families who were perceived to be less supportive and more irritated and upset during pain episodes was associated with having completed treatment. In other words, patients' *perceptions* of familial support were predictive of completion, and these perceptions could very well have been indicative of social conflicts within the family. Demographic variables, locus of control, depression, anxiety were not related to treatment completion.

Treatment compliance is often measured by patient self-report. In a study which examined the effects of verbal *vs.* written instruction on recall of treatment compliance, patients being treated at a behavioral medicine clinic were given verbally-administered and written behavioral homework assignments.[4] Patients were later tested on recall of prescribed behaviors and frequencies, and a self-report of adherence. Results indicated that patients reported higher recall and adherence to the written behavioral assignments as opposed to the verbally-administered assignments. Moreover, recall was significantly related to adherence in both the verbal and written conditions. These findings imply that memory of homework assignments affects whether the patient will actually perform the task; in addition, giving written instructions is more likely to result in treatment completion.

Personality traits have been found to be related to treatment compliance among persons with social phobia.[5] In one of the few studies examining the role of personality factors in treatment compliance, personality traits (as assessed by the MCMI-II) were analyzed in relation to homework completion and group therapy participation. Results indicated that avoidant personality traits were associated with lack of group treatment participation, and that paranoid personality traits were associated with lack of homework completion.

In a recent study by the authors, compliance was found to be a mediator between personality characteristics and treatment outcome in an MPC.[6] Those MPC patients who suppressed negative emotion and had passive/cooperative coping styles exhibited higher levels of treatment compliance. MPC patients who were aggressive and expressed negativity were less likely to comply with treatment. In turn, higher treatment compliance levels were associated with more improvements in functional capacity.

Stages of change in MPCs

Stages of change are theorized to be temporal dimensions of the behavioral change process.[7,8] The stages of change outlined by Prochaska and DiClemente[9] were adapted for MPCs and are summarized as follows:

Precontemplation: The stage at which people have no intention to change the behavior, or possibly even recognize a need to change the behavior.

Contemplation: The stage at which people recognize a need to change the behavior, and are seriously considering changing, but have not made the necessary commitment to change.

Action: The stage at which people are actively attempting to change their behavior.

Maintenance: The stage at which people are working to maintain their gains and to prevent relapse.

Persons' stages of change, such as precontemplation, contemplation, preparation, action, and maintenance, have been shown to predict success in smoking cessation,[9] weight loss,[10] and treating alcoholism.[11] The assessment of stages of change is becoming more common in the psychotherapy literature.[12] Research on stages of behavioral change in persons with addictive disorders has indicated that when treatment is suited toward the client's particular stage of change, outcomes were substantially better.[13]

In the research on treatment outcome in MPCs, however, stages of change have not been investigated as a potential predictor of treatment success. Little has been written on what criteria might constitute a certain stage of change in an MPC. Moreover, it is logical to assume that an individual patient might differ in their stage of change depending on the treatment objective. For example, a patient may be precontemplative in managing pain, but action-oriented in medication compliance. Such varying levels of stages of change in MPCs are, up to now, theoretical. No studies to date have reported stages of change assessments across treatment domains in chronic pain patients.

In summary, there has been little research on treatment compliance and stages of change in MPCs. In the research on compliance in other health care settings, there is mixed evidence that compliance is associated with treatment outcome, personality variables, and emotional distress. There is even less understanding of how patients in MPCs progress through stages of change during treatment. Therefore, the authors have developed a set of rating scales which measure the patients' stages of change and compliance across the following 10 objectives: Pain management, Relaxation, Emotional management, Activity management, Social restoration, Recreational restoration, Vocational restoration, Substance and prescription medication management, Weight management, and Autonomic nervous system management/Neuromuscular re-education. These 10 domains are common treatment objectives in MPC programs.[14] The purpose of this study was (1) to describe a sample of MPC patients' levels of stages of change in these 10 domains before and after treatment; (2) to describe the patients' levels of compliance ratings at treatment completion; (3) to examine the inter-rater reliability of three psychotherapists' compliance and stages of change ratings; and (4) to investigate the treatment outcome and personality correlates of compliance and stages of change among responders in the MPC setting.

method

Subjects

Participants were 66 outpatients who completed multidisciplinary treatment at a University pain clinic. All patients had been previously diagnosed with some sort of chronic pain syndrome of which medical etiologies had been identified. The most common pain disorders were myofascial pain associated with injuries (27%) and surgery (17%), followed by nerve entrapment (12%), headache/migraine (12%), fibromyalgia (12%), myofascial pain not associated with injury (6%), followed by neuropathy, temporo-mandibilar joint (TMJ) disorders, and arthritis (14.5%, collectively). This clinic was a tertiary setting, meaning that the patients in this sample had experienced recurrent intractable pain for more than 6 months, had limited success with traditional medical approaches, and were referred to this pain management

center for multidisciplinary evaluation and treatment. Patients reported experiencing pain most commonly in the low back, followed by mid back, head, shoulder, and neck. Eighty-seven percent of the participants reported experiencing pain in more than one site. Eighty-two percent of the sample reported experiencing pain for over one year, and 33% of those patients reported experiencing pain for over 5 years. Patients' average age was 45, with 19 males and 47 females. Exclusionary criteria were that participants should not be suffering from a terminal illness, nor would they be suffering from any severe neurological disorder (dementia, aphasia) that would complicate participation in the cognitive-behavioral treatment portions of the MPC treatment. It should be noted that all patients were considered 'responders' because as a whole, they significantly improved from pre- to post-treatment on every outcome variable measured (Note 1).

Measures

Cognitive psychophysiological therapy clinical stages of change and compliance rating scales (CPTSCR; see Appendix). These scales contain stage of change and treatment compliance ratings according to the following 10 objectives:

1. Pain management. This objective focuses on increasing patients' awareness of how cognitive, behavioral, and physiological factors affect their pain experience, symptom severity, and stress levels.
2. Relaxation. This objective focuses on training patients in effective relaxation skills. The patients are first taught to relax effectively during clinical visits; then they are taught to apply those relaxation abilities during everyday life.
3. Emotional management. The objective focuses on teaching patients cognitive-behavioral skills that improve negative moods associated with pain, usually involving depression, anger, and anxiety.
4. Activity management. This objective focuses on training patients to effectively use activity scheduling to increase activity and/or health-oriented behaviors limited by symptoms and pain.
5. Social restoration. This objective focuses on helping patients regain appropriate levels of social functioning.
6. Recreational restoration. This objective focuses on helping patients regain appropriate levels of recreational functioning.
7. Vocational restoration. This objective focuses on helping patients gain or regain employment, or regain appropriate levels of vocational functioning.
8. Substance and prescription medication management. This objective focuses on abstinence or reduced use of alcohol, tobacco, substances, and prescription medications.
9. Weight management. This objective focuses on helping the patient attain a healthy weight with collaborative input from the patient's doctors and other adjunctive services. Slow, steady weight loss secondary to calorie intake management, food selection, and increased activity is emphasized.
10. Autonomic nervous system management/Neuromuscular re-education. The autonomic nervous system management objective focuses on training the patient to maintain established criteria for psychophysiological relaxation during rest as well as during stressful experiences. The neuromuscular re-education objective focuses on training the patient to change surface EMG levels in order to reduce myofascial pain levels.[15,16]

Table I.
Clinical criteria for CPTSCR compliance and stages of change ratings

Compliance/Collaboration Ratings	
N: Needs improvement	Some serious complications involving non-compliance due to personality and/or psychosocial stressors/disincentives. Attendance < 75%, Compliance < 50%, Rapport may suffer.
S: Satisfactory	Working reasonably well with therapist, but showing some difficulties with applying CBT/CPT skills outside the session. Complying with homework, less than 50% of the time but attendance to sessions is consistent. Attendance > 75%, Compliance < 50%, Rapport may be impersonal.
G: Good	Attendance to sessions is consistent. Fifty to 75 percent of the time the patient is complying with collaboratively developed treatment plans, behavioral experiments, homework assignments, and/or CBT/CPT interventions. Attendance > 75%, Compliance > 50%, Rapport is personal and warm.
O: Outstanding	Working well to master the therapeutic objective. Compliance with collaborative treatment plan is greater than 75%. Attendance > 75%, Compliance > 75%, Rapport is warm and personal.
SD: Self-directed	Meets the therapeutic objective on their own, with no assistance, indicating mastery of therapeutic objective.
Stage of Change Ratings	
P: Precontemplation	Doesn't understand objective or believe in its possible benefit.
C/R: Contemplative/relapse/ recycling	Wants to change but is struggling with psychosocial complications that inhibit change or the maintenance of change toward a desired behavior health objective.
AS: Actively changing with support	Practicing the desired cognitive-behavioral objective, needs therapeutic or social support to maintain new cognitive-behavioral or cognitive-psychophysiological lifestyle.
SDA: Self-directed action	Independently practicing the cognitive-behavioral objective/lifestyle. Is demonstrating the ability to apply, adapt, and maintain desired cognitive-behavioral or cognitive-psychophysiological objective in novel or stressful situations.

When patients were rated for treatment compliance, these 10 objectives were rated on an ordinal scale: Needs Improvement (1 point), Satisfactory (2 points), Good (3 points), Outstanding (4 points), Self-Directed (5 points) or Not Applicable (Note 2). When patients were rated for stage of change, these objectives were rated on an ordinal scale: Precontemplative (1 point), Contemplative (2 points), Action with Support (3 points), or Self-Directed Action (4 points) (Note 2). Table I summarizes the clinical criteria associated with each of the compliance and stage of change ratings.

Millon Behavioral Health Inventory (MBHI). The Millon Behavioral Health Inventory (MBHI)[17] was designed to measure people's response to medical evaluation and treatment. The eight MBHI coping style scales (Introversive, Inhibited, Cooperative, Sociable, Confident, Forceful, Respectful, and Sensitive) were used in this study. The MBHI appears to be a valid and reliable instrument, with published reliabilities for the coping scales ranging from 0.77 to 0.88.[18]

Multidimensional Pain Inventory (MPI). The West Haven-Yale Multidimensional Pain Inventory (MPI)[19] is a comprehensive, psychometrically sound instrument which is composed of three sections with a total of 12 empirically derived scales. This study utilized eight of the 12 scales: Pain Severity, Life Interference, Life Control, Affective Distress, Support, Punishing Responses, Solicitious Responses, and Distracting Responses. The MPI is a reliable and valid instrument, with published subscale reliabilities ranging from 0.62 to 0.91.[20]

Procedures

During their evaluation at the pain center, all 66 patients completed an informed consent form, the MBHI, and the MPI. Upon treatment completion, the psychotherapists rated patients' treatment compliance using the CPTSCR. A randomly selected subset of this sample ($n = 32$) was selected for the interrater portion of this study. Thus, 32 patients were rated by all three psychotherapists for stages of change and treatment compliance using the CPTSCR. Chart reviews were conducted by the psychotherapists in order to rate each patient's stage of change at the time of the first treatment visit, and each patient's stage of change and compliance level at the last treatment visit. All treatment outcome data were withheld from the patients' chart during the ratings. The psychotherapists rated patients' stage of change and compliance by reading the clinic's multidisciplinary written evaluation, followed by the detailed progress notes submitted by all clinic staff.

The clinic's multidisciplinary pain management approach involved pharmacotherapy as well as individual cognitive-psychophysiological therapy, which is essentially cognitive-behavioral therapy that incorporates biofeedback and relaxation training. Pharmacotherapy, provided on a monthly basis by attending anesthesiologists, involved medication-monitoring, analgesic prescription, and (when necessary) pain-relieving injections. Cognitive psychophysiological therapy was provided by three trained and licensed psychotherapists.

results

Descriptive statistics for the CPTSCR, including the pre-treatment stages of change ratings and the post-treatment stages of change ratings are shown in Tables II and III, respectively. The average compliance rating was 3.85, indicating that on average, patients complied with treatment at a level of 'Good' or better. The average ratings for stage of change at post-treatment

Table II.
Descriptive statistics for the MPC compliance scale

MPC compliance scale	Mean ($n = 66$)	SD
Pain management	4.07	0.80
Relaxation	3.99	0.81
Emotional management	3.58	0.91
Activity management	3.70	0.95
Social restoration	3.51	0.99
Recreational restoration	3.48	1.04
Vocational restoration	4.41	1.76
Medication management	3.90	0.96
Weight management	4.42	2.71
ANS/neuromuscular re-education	3.58	0.82
Average compliance rating	3.85	0.69

was above a 3, indicating that on average, patients' stage of change was 'Action With Support' or 'Self-Directed Action'.

Table III below lists the median inter-rater agreement among three psychotherapists who rated 32 patients on their compliance across the 10 treatment domains. The inter-rater agreement ranged from $r = 0.71$ to 0.95, suggesting that compliance ratings were fairly consistent between raters. As shown in Table III, the inter-rater agreement among the psychotherapists who rated the 32 patients on stage of change at pre- and post-treatment ranged between $r = 0.62$ and 0.93, averaging around 0.81. Likewise, kappa coefficients ranged from $\kappa = 0.69$ for Medication Management to $\kappa = 0.90$ for Weight Management, indicating good agreement among psychotherapists.

At pre-treatment, patients were rated primarily as being in either a Precontemplative or Contemplative stage of change (see Table V). At post-treatment, patients were rated primarily as being either in the Action with Support or Self-Directed Action stage (Table V). When patients' stage of change was analyzed as a continuous variable, all 10 objectives exhibited significant improvement from pre- to post-treatment. Each one-way repeated measures ANOVA comparing the stage of change ratings from pre- to post-treatment exceeded the critical value of $F(1, 61)_{0.99} = 7.08$ ($p < 0.01$; see Table IV).

The CPTSCR stage of change and compliance ratings were reduced into composite variables in order to ease the interpretability of the correlational analyses in the following section. A residualized improvement score for stage of change was created by regressing patients' post-treatment stage of change rating on their pre-treatment stage of change rating (for each of the 10 objectives). Subsequently, one composite stage of change score was computed by entering the 10 residualized change scores into principal components analysis. Thus, a positive change score is indicative of improvement. Residualized treatment outcome scores were also created by regressing each MPI post-treatment scale score on the MPI pre-treatment scale score. Here, negative numbers indicate improvement. Subsequently, these 'change' scores were

Table III.
Median inter-rater agreement for CPTSCR compliance and stages of change ratings

Treatment objective	Compliance	Stage of change rating pre-treatment	Stage of change rating post-treatment
	r	*r*	*r*
Pain/symptom management	0.71	0.83	0.73
Relaxation	0.81	0.87	0.89
Emotional management	0.86	0.91	0.81
Activity management	0.79	0.83	0.80
Social restoration	0.80	0.78	0.80
Recreational restoration	0.94	0.62	0.87
Vocational restoration	0.73	0.82	0.67
Medication management	0.79	0.82	0.76
Weight management	0.95	0.85	0.93
ANS/neuromuscular training	0.88	0.74	0.79

Table IV.
Descriptive statistics for stages of change ratings at pre- and post-treatment

	Rater 1				Rater 2				Rater 3			
	Pre-Tx		Post-Tx		Pre-Tx		Post-Tx		Pre-Tx		Post-Tx	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pain management	1.59	0.61	3.44	0.5	1.59	0.61	3.53	0.51	1.59	0.61	3.56	0.56
Relaxation	1.47	0.57	3.38	0.55	1.53	0.62	3.31	0.59	1.5	0.51	3.38	0.49
Emotional management	1.78	0.71	3.22	0.49	1.72	0.73	3.22	0.61	1.75	0.67	3.09	0.53
Activity management	1.91	0.64	3.28	0.58	1.81	0.78	3.25	0.62	1.75	0.72	3.22	0.49
Social restoration	1.72	0.63	3.19	0.54	1.75	0.67	3.19	0.59	1.63	0.55	3.19	0.64
Recreational restoration	1.75	0.51	3.19	0.59	1.72	0.63	3.13	0.66	1.66	0.48	3.09	0.78
Vocational restoration	2.04	0.91	3.42	0.58	1.83	0.87	3.42	0.65	1.96	0.91	3.25	0.61
Medication management	2.46	0.95	3.54	0.58	2.31	1.09	3.54	0.58	2.17	0.92	3.58	0.58
Weight management	1.6	0.51	2.87	0.92	1.73	0.46	2.8	0.86	1.67	0.49	2.73	0.96
ANS/ neuromuscular re-education	1.47	0.57	3.28	0.58	1.53	0.62	3.22	0.61	1.44	0.56	3.22	0.71
Average	1.77	0.26	3.3	0.3	1.74	0.31	3.27	0.31	1.69	0.28	3.25	0.29

Table V.
Frequencies of patients in each stage of change at pre- and post-treatment

Treatment objective	Pre-treatment				Post-treatment			
	P	C/R	AS	SDA	P	C/R	AS	SDA
	n	*n*	*n*	*n*	*n*	*n*	*n*	*n*
Pain management	15	15	2	0	0	0	18	14
Relaxation	18	15	2	0	0	1	18	13
Emotional management	11	18	2	1	0	1	23	8
Activity management	8	19	5	0	0	2	19	11
Social restoration	12	17	3	0	0	2	22	8
Recreational restoration	9	22	1	0	0	3	20	9
Vocational restoration	6	14	1	3	0	1	12	11
Medication management	4	10	8	4	0	1	10	15
Weight management	6	9	15	0	0	7	3	5
ANS/neuromuscular re-education	18	13	1	0	0	2	19	11

P = Precontemplative; C/R = Contemplative/Relapse; AS = Action with Support; SDA = Self-Directed Action.

correlated in order to investigate the relationship between improvement in stage of change with treatment outcome. As shown in Table VI, patients' improvements in stage of change were significantly correlated with their *improvements* in Life Control ($r = 0.50$, $p < 0.001$). Moreover, patients' improvements in stage of change were significantly correlated with their *reductions* in Affective Distress and Punishing Responses ($r = -0.43$ and -0.32, respectively).

Likewise, patients' composite compliance rating (generated from principal components analysis) was correlated with the MPI scale residualized change scores. As shown in Table VI, patients' compliance levels were significantly correlated with their *improvements* in Life Control and Distracting Responses ($r = 0.52$ and 0.43, respectively). Patients' compliance levels were signif-

Table VI.
Correlations between improvement in stages of change, compliance rating, and MPI scale improvement

	Average improvement in stage of change	Average compliance rating
MPI I Scale Δ	−0.08	−0.22
MPI PS Scale Δ	0.01	−0.02
MPI LC Scale Δ	0.50*	0.52*
MPI AD Scale Δ	−0.43*	−0.40*
MPI S Scale Δ	0.14	0.10
MPI PR Scale Δ	−0.32*	−0.41*
MPI SR Scale Δ	0.16	0.29
MPI DR Scale Δ	0.18	0.43*

'MPI Scale Δ' represents the residualized change score created by regressing the MPI post-treatment score on the pre-treatment score.

*$r(30)_{0.90} = 0.30$; $r(30)_{0.95} = 0.35$; $r(30)_{0.99} = 0.45$

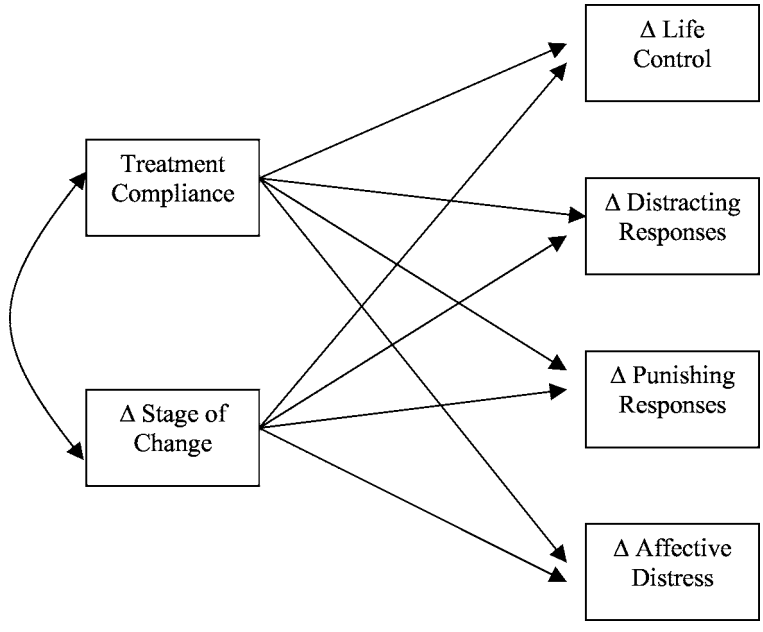

Figure 1. Path model of treatment outcome with compliance and stage of change as predictors.

icantly correlated with their *reductions* in Affective Distress and Punishing Responses ($r = -0.40$ and -0.41, respectively).

Given the significant associations between stage of change improvement, treatment compliance, and improvements in four of the MPI scales, path analysis was used to investigate the collective contribution of stage of change and treatment compliance to treatment outcome. As illustrated in Fig. 1, when the stage of change and compliance composite scores were entered into a path analysis as predictors of improvement in the MPI scales including Life Control, Affective Distress, Punishing Responses, and Distracting Responses, the path model fit the data ($\chi^2(6) = 11.75$, ns). Moreover, the model R^2 was 68%, indicating that Stages of Change improvement and treatment compliance composed 68% of the collective variance in patients' improvements in Life Control, Affective Distress, Punishing Responses, and Distracting Responses.

Finally, as shown in Table VII, patients' composite improvement in stage of change was significantly correlated with the MBHI Introversive, Inhibited,

Table VII.
Correlations between improvement in stages of change, compliance rating, and the MBHI coping style scales

	Average improvement in stage of change	Average compliance rating
Introversive	0.26*	0.23
Inhibited	−0.49*	−0.29*
Cooperative	0.10	0.18
Sociable	0.41*	0.36*
Confident	0.47*	0.12
Forceful	−0.18	−0.29*
Respectful	0.20	0.05
Sensitive	−0.46*	−0.36*

*$r(60)_{0.95} = 0.25$; $r(60)_{0.99} = 0.33$

Sociable, Confident, and Sensitive scales, but not the Cooperative, Forceful, or Respectful scales. Stage of change improvement was inversely related to the Inhibited and Sensitive scales ($r = -0.49$ and -0.46, respectively), and positively related to the Introversive, Sociable and Confident scales ($r = 0.26$, 0.41, and 0.47, respectively). Patients' compliance levels were significantly correlated with the Inhibited, Sociable, Forceful, and Sensitive scales, but not the Introversive, Cooperative, Confident, or Respectful scales. Compliance levels were positively related to the Sociable scale ($r = 0.36$, $p < 0.0001$), but inversely related to the Inhibited, Forceful, and Sensitive scales ($r = -0.29$, -0.29, and -0.36, each $p < 0.0001$, respectively, Table VII).

discussion

Findings from this study indicate that compliance and stages of change as measured by the CPTSCR can be useful variables in understanding how persons suffering from chronic pain progress through MPC treatment. All of the CPTSCR scales appeared to have good inter-rater agreement among the three therapists. Our analyses indicated that on average, our participants exhibited good compliance levels and made substantial improvements in their stage of change from pre to post-treatment.

While all of the participants in this study were responders (they completed treatment and improved their functional capacity), there was still variability in patients' levels of compliance and stage of change. Improvements in stages of change were associated with higher levels of perceived life control and lower levels of affective distress and punishing behaviors from significant others. Compliance was also associated with higher levels of perceived life control and interpersonal behaviors designed to distract oneself from pain, and lower levels of affective distress and punishing behaviors from significant others. While a recent study by the authors found a significant association between compliance and improvements in functional capacity,[6] the correlation in this study only approached significance ($r = 0.22$). Therefore, our findings did not reproduce those of Lutz and colleagues who found a relationship between compliance and reductions in pain and functional impairment.[2] Since our study focused only on responders, all patients exhibited significant improvements in pain and functional impairment, and all patients were essentially compliant. Thus, the restricted range in these variables is likely to have limited the size of the intercorrelations. However, contrary to the findings of Funch and Gale,[3] who did not find an association between compliance and depression, we found an association between compliance and changes in the Affective Distress scale of the MPI, which measures overall mood, irritabil-

ity, and tension/anxiety. Thus, better treatment compliance was associated with greater reductions in irritability, depression, and anxiety.

Personality variables were also associated with compliance and improvements in stage of change. Higher compliance levels were associated with good social skills and low levels of avoidance and aggression, confirming similar findings in a sample of persons with social phobia by Edelman and colleagues.[5] Improvements in stages of change were associated with social skills, confidence, and low levels of avoidance and moodiness.

clinical implications

Clinicians working in MPCs are likely to maximize treatment outcome by assisting patients' progression through stages of change toward therapeutic goals. Our findings indicate that progression to a more active stage of change was associated with greater treatment compliance and improvements in treatment outcome. Helping patients progress to an active stage of change involves assessing patients' current stage of change and choosing the 'stage-appropriate' therapeutic interventions. For example, patients in an MPC who are in the precontemplative stage of change are unaware of (or do not believe in) the benefits of a particular treatment objective. A precontemplative patient may privately believe that relaxation will not lower their level of perceived pain or suffering. These attitudes and beliefs can inhibit reasonable and sincere compliance to cognitive/behaviorally-oriented interventions, and therefore need to be explored by the psychotherapist once an empathic rapport is established. Precontemplative patients may respond best to empirical demonstrations of efficacy (such as biofeedback as described by Schwartz[21]), collaborative psychoeducation, and collaborative homework involving cognitive-behavioral experiments, such as those described by Beck and colleagues[22] and Burns.[23]

MPC patients who are in the contemplative stage of change often realize that cognitive-behavioral and lifestyle change may be beneficial, but they may feel 'stuck' or unable to change because of emotional, behavioral, situational or attitudinal barriers. These patients may respond best to emotionally neutral and rational exploration of the advantages and disadvantages of several change options and strategies while exploring or experimenting with specific behavioral interventions involving lifestyle change. Situational analysis,[24] automatic thought records, behavioral experiments and several other therapeutic techniques may help these patients explore and overcome psychosocial barriers to self-directed change. Commitment and determination for change will build in the patient until change is attempted and maintained.

Personality variables appear to affect or mediate stage of change and treatment compliance. The findings of this study indicate that patients with confident and sociable personality traits are more likely to comply with the MPC treatments, while those who are avoidant and/or moody may have a more difficult time complying with treatment. As suggested by the authors in a recent study, MPC patients have diverse personality profiles, and therapies that tailor the treatment toward each patient's personality and coping style likely to maximize progress.[25] For example, those patients with mood disorders or high levels of psychopathology will require different treatment approaches than those with high social skills and coping mechanisms. The former tend to respond favorably to practical relaxation and cognitive interventions that address both emotional and physical suffering quickly, with both pain and mood being addressed concurrently. The latter may respond more favorably to biofeedback, activity scheduling, and other methods that accommodate patients' potential resistance to being treated by a psychologist.

In summary, the extent to which patients in MPCs comply with and progress through treatment is associated with the extent to which patients yield favorable outcomes. Personality styles are likely to play a role in this process. Therefore, clinicians should be alerted to the diverse paths that patients take in progressing through treatments in MPCs, and should be able to identify treatment objectives and levels of change that are relevant to each patient's individual treatment plan in order to maximize outcome.

notes

1. Complete treatment outcome analyses are available upon request by emailing dcipher@hsc.unt.edu. See also: Cipher DJ, Fernandez E, Clifford PA, Cost effectiveness of multidisciplinary pain management: Comparison of three treatment groups, *Journal of Clinical Psychology in Medical Settings* **8** (4), 237–44 (2001).
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Appendix. Cognitive psychophysiological therapy clinical stages of change and compliance rating scales (CPTSCR).

Domain	Stage of change rating: evaluation	Stage of change rating: treatment completion	Compliance and collaboration rating: treatment completion
Pain/Symptom Management	P = 1 C/R = 2 NA AS = 3 SDA = 4	P = 1 C/R = 2 NA AS = 3 SDA = 4	N = 1 S = 2 G = 3 NA O = 4 SD = 5
Relaxation / Hypnoanalgesia	P = 1 C/R = 2 NA AS = 3 SDA = 4	P = 1 C/R = 2 NA AS = 3 SDA = 4	N = 1 S = 2 G = 3 NA O = 4 SD = 5
Emotional Management	P = 1 C/R = 2 NA AS = 3 SDA = 4	P = 1 C/R = 2 NA AS = 3 SDA = 4	N = 1 S = 2 G = 3 NA O = 4 SD = 5
Activity Management	P = 1 C/R = 2 NA AS = 3 SDA = 4	P = 1 C/R = 2 NA AS = 3 SDA = 4	N = 1 S = 2 G = 3 NA O = 4 SD = 5
Social Functional Restoration	P = 1 C/R = 2 NA AS = 3 SDA = 4	P = 1 C/R = 2 NA AS = 3 SDA = 4	N = 1 S = 2 G = 3 NA O = 4 SD = 5
Recreational Functional Restoration	P = 1 C/R = 2 NA AS = 3 SDA = 4	P = 1 C/R = 2 NA AS = 3 SDA = 4	N = 1 S = 2 G = 3 NA O = 4 SD = 5
Vocational Functional Restoration	P = 1 C/R = 2 NA AS = 3 SDA = 4	P = 1 C/R = 2 NA AS = 3 SDA = 4	N = 1 S = 2 G = 3 NA O = 4 SD = 5
Substance / Medication Management	P = 1 C/R = 2 NA AS = 3 SDA = 4	P = 1 C/R = 2 NA AS = 3 SDA = 4	N = 1 S = 2 G = 3 NA O = 4 SD = 5
Weight Management	P = 1 C/R = 2 NA AS = 3 SDA = 4	P = 1 C/R = 2 NA AS = 3 SDA = 4	N = 1 S = 2 G = 3 NA O = 4 SD = 5
ANS Training/ Neuromuscular Re-education	P = 1 C/R = 2 NA AS = 3 SDA = 4	P = 1 C/R = 2 NA AS = 3 SDA = 4	N = 1 S = 2 G = 3 NA O = 4 SD = 5

P = Precontemplative; C/R = Contemplative/Relapse; N = Needs Improvement; S = Satisfactory; G = Good; AS = Action with Support; SDA = Self-Directed Action; O = Outstanding; SD = Self-Directed.