

Original Research

A Prospective Examination of Acceptance at a CBT-based Interdisciplinary Chronic Pain Management Program

Eleni G. Hapidou, PhD, C. Psych¹⁻⁵; Antonella Markarov, BHSc(Hons)⁵; Cindy Li, BSc(Hons)²

¹Michael G. DeGroot Pain Clinic, McMaster University Medical Centre, Canada

²Department of Psychology, Neuroscience and Behaviour (PNB), McMaster University, Canada

³Michael G. DeGroot Institute for Pain Research and Care, McMaster University, Canada

⁴Department of Psychiatry and Behavioural Neurosciences, McMaster University, Canada

⁵Bachelor of Health Sciences (Honour's) Program, McMaster University, Canada

*Corresponding author

Eleni G. Hapidou, PhD, C. Psych

Associate Professor (PT), Department of Psychiatry and Behavioral Neurosciences, Associate Faculty Member, Department of Psychology, Clinical Behavioral Sciences, & Bachelor of Health Sciences Program, McMaster University, Hamilton, Ontario, L8S 4L8, Canada; Tel. (905) 521-2100; Fax: (905) 575-9500;

E-mail: hapidou@hhsc.ca

Article information

Received: June 17th, 2018; Revised: June 27th, 2018; Accepted: June 28th, 2018; Published: June 30th, 2018

Cite this article

Hapidou EG, Markarov A, Li C. A prospective examination of acceptance at a CBT-based interdisciplinary chronic pain management program. *Psychol Cogn Sci Open J.* 2018; 4(1): 14-23. doi: [10.17140/PCSOJ-4-139](https://doi.org/10.17140/PCSOJ-4-139)

ABSTRACT

Aims/Objectives: Acceptance of chronic pain is related to active patient engagement in valued aspects of life. This study sought to prospectively evaluate acceptance and patient functioning in a Cognitive Behavioural Therapy (CBT) - based chronic pain management program (CPMP).

Methods: Participants in this study were 184 consecutive adult patients with heterogeneous pain admitted to the interdisciplinary four-week Chronic Pain Management Program (CPMP) who completed self-report questionnaires at admission and discharge. Measures examined pain perception, psychological/emotional and social aspects of patient experience with chronic pain. Acceptance was evaluated by the Chronic Pain Acceptance Questionnaire (CPAQ, McCracken et al., 2004).

Results: Patients showed all-round improvement after program completion. Consistent with other studies, higher acceptance scores at admission were associated with more overall positive change at discharge. In addition, greater increase in acceptance scores at discharge was also associated with greater improvement in other variables. However, no significant change was shown in the Pain Willingness subscale of the CPAQ.

Discussion: This study provides a new understanding of the relationship of acceptance of chronic pain with patient functioning in a CBT-oriented pain management program. Results suggest that engaging in activity regardless of pain is an important program goal. This is directly measured by the Activity Engagement component of the CPAQ, which increases following participation in a CBT-based CPMP. Study findings also differ from some previous research and suggest that Pain Willingness may be a poor predictor of patient functioning.

Limitations: Results were obtained from patients at an interdisciplinary program and may not be generalized to the entire chronic pain population. Also, these results only demonstrate associations between acceptance and other variables, not causality. In addition, patients in this study served as their own controls (admission-discharge) thus the study lacks a true control group.

Conclusion: This study extends previous research by contributing needed prospective data on the relationship between acceptance and patient functioning.

Keywords

Pain; Acceptance, CBT, Prospective, Patient Adjustment.

INTRODUCTION

Chronic pain is a multifaceted personal experience, notably related to psychosocial changes. The past 30-years of psychosocial pain treatment have been dominated by advances in Cognitive Behavioural Therapy (CBT). CBT is used to assist patients with pain coping and daily functioning.¹ Acceptance and Commitment Therapy (ACT) has been shown to be equally effective as CBT for reducing pain interference and improving mood.² When patients engage in active struggle to overcome chronic pain, the pain becomes the sole focus. Active need to control pain leads to extended rest, avoidance, medication, and decreased quality of life.³ Individuals who have failed to obtain control over pain for an extended period of time are more likely to benefit from ACT.⁴

Acceptance is willingness to remain in contact with thoughts and feelings without efforts toward following or changing them. Thus in chronic pain, acceptance leads to living with pain without reaction, disapproval or attempts to avoid it.⁵ This functional approach consists of first acknowledging that it is impossible to completely alleviate pain and subsequently adopting an active strategy to engage in life activities. Acceptance involves a focus away from the pain to non-pain aspects of life. The patient is encouraged to stop behaviours such as avoidance that relieve pain at the cost of reducing quality of life.⁶

There is ample evidence that acceptance is associated with psychological outcomes.⁷ Previous cross-sectional studies by McCracken and Eccleston indicate that increase in acceptance, as measured by the Chronic Pain Acceptance Questionnaire (CPAQ) is associated with decreases in overt pain behaviour, disability, depression and anxiety.⁵ Thus acceptance, as measured by the CPAQ, can be seen as a consistent and reliable predictor of a patient's well-being and is a valid tool to utilize in chronic pain management programs.

Acceptance is incorporated into various treatment techniques such as Mindfulness Therapy, Contextual Cognitive Behavioural Therapy and Acceptance Commitment Therapy.⁸ Acceptance-based treatment has been shown to reduce depression by 18.3%.⁹

Both CBT and ACT reduce pain catastrophizing in patients,¹⁰ and pain programs based on CBT has been shown to be effective in managing chronic pain.¹¹ Chronic pain management clinics have main objectives such as reducing patient experience of pain, improving physical, and lifestyle function, increasing social support, and reducing dependency on medication.¹² They also include psycho-education to teach patients about methods of pain control and effective coping strategies.

Meta-analysis has shown CBT to be more effective than ACT; however, studies also show the effectiveness of ACT as an equal alternative to CBT.¹³ In addition, acceptance may indirectly affect physical functioning.¹⁴ Further analysis is needed examine the role of acceptance in pain. The purpose of this study is to extend previous findings on acceptance and patient success at multi-disciplinary pain rehabilitation programs. This was achieved by examining acceptance at admission and discharge from an interdis-

ciplinary CBT-based pain management program and investigating its effect on outcome variables. It was hypothesized that acceptance, as measured by the CPAQ would increase from admission to discharge and that this increase would be associated with improved patient functioning. This prospective study extends acceptance research applications to a CBT-based pain management program.

MATERIALS AND METHODS

Participants

Participants were 184 consecutive patients with heterogeneous pain admitted to the four-week Chronic Pain Management Program (CPMP) at Chedoke Hospital, Hamilton Health Sciences, in Hamilton, Ontario, Canada, between September 2006 and July 2007. Participants received written information explaining the purpose of the study and signed informed consent forms. The research was approved by the Hamilton Health Sciences Ethics Review Board. Patients admitted to the CPMP had pain for more than 6-months, were able to walk for at least 15-20 minutes each day, participate in scheduled CPMP activities and had several clear goals for change. They were previously unsuccessful in alleviating their pain by traditional medical treatments. Participants were either part of the day or residential program. They completed a battery of questionnaires at admission and discharge to assess demographic information and several pain-related variables.

Of the 184 patients admitted, 25 discontinued the program voluntarily or were discharged early. Completers (n=159) were 42.5-years of age (SD=9.9) and had 13.1 years of education (SD=2.8). Of those, 54.1% were women (n=86) and 83% were born in Canada. Most were married or common-law (62.3%; with 22.6% being single and 9.4% being divorced/separated). Pain duration ranged from 6 to 348 months, with an average of 51.8 months (SD=58.7). Number of injuries ranged from 1 to 10 (mean =2.2, SD=1.8). Only 35.8% were still employed, while the average period away from work was 30.1 months (SD=32.5).

The non-completers were 38.9 years of age (SD=13.1) and had 12.7 years of education (SD=2.6). Approximately 56% were men (n=14) and 84% were born in Canada. The majority (56%) were married or common-law. Pain duration ranged from 13 to 72 months, with an average of 34.2 months (SD=16.2). Number of injuries ranged from 1 to 5. 76.0% of the patients were still employed, while the average period away from work due to pain was 26.8 months (SD=20.6).

Measures

Program participants were assessed on several variables at admission and discharge. At admission patients submitted demographic information which included age, gender, ethnicity, marital status, occupation, education, pain duration and number of injuries. They also provided information about current employment and the date last employed.

Standardized self-report questionnaires were completed at admission and discharge. Ratings of pain (least and usual) as

well as bothersome symptoms in the past month were obtained at admission and discharge by the Pain Intensity Scale (PIS)¹⁵ and the Patient Questionnaire of the Prime MD (PQ),¹⁶ respectively. Other measures were the Center for Epidemiological Studies-Depressed Mood Scale (CES-D)¹⁷ and the Clinical Anxiety Scale (CAS)¹⁸ to measure depression and anxiety respectively. The readiness to adopt a self-management approach to pain was measured by the Pain Stages of Change Questionnaire (PSOCQ)^{19,20} while coping was evaluated by the Chronic Pain Coping Inventory (CPCI-42).²¹ Catastrophizing was measured by the Pain Catastrophizing Scale (PCS).²² At discharge, patients also completed the Pain Program Satisfaction Questionnaire and the Self Evaluation Scale (PPSQ, SES).²³

Pain Intensity Scale (PIS): The PIS is a composite measure, which averages usual and least pain intensity ratings (0=no pain, 10=unbearable pain). It was found to be more effective than 10 other composites averaging other combinations of individual pain ratings.²⁴

Patient Questionnaire (PQ): The PQ is a section of the Primary Care Evaluation of Mental Disorders (PRIME-MD) questionnaire, which was developed to assess minor psychiatric disorders.¹⁶ It consists of 25 bothersome symptoms as well as a personal health rating ranging from 'poor' to 'excellent'.

Center for Epidemiological Studies-Depressed Mood Scale (CES-D): The CES-D is a 20-item instrument used as a self-report measure of depression and has been successfully extended to the chronic pain population.^{17,25} Subjects rate depressive symptoms on a 4-point scale, ranging from 0 (rarely) to 4 (most of the time). Four of the 20-items are reverse-keyed as they test positive affect (e.g. "I was happy"). In the chronic pain population, a score of 19 or higher suggests depressed mood^{26, 27}; whereas, a score of 27 or higher suggests clinical depression as per the DSM-IV²⁵ criteria. The CES-D is a valid measure of depression in the general population and in chronic pain.^{17,26,27}

Clinical Anxiety Scale (CAS): The CAS is a 25-item scale that measures the amount, degree and severity of clinical anxiety.¹⁸ It consists of 25 statements rated on a 1-5 scale (1=rarely, 5=all the time). There are seven reverse-keyed items (e.g. "I feel confident about the future?"). The total score is calculated by subtracting 25 from the raw score.²⁸ The CAS has high internal consistency ($\alpha=0.94$).¹⁸

Pain Stages of Change Questionnaire (PSOCQ): The PSOCQ consists of 30-items divided into four subscales - 'pre-contemplation', 'contemplation', 'action', and 'maintenance'. Patients rate statements on a scale of 1-5 (1-strongly disagree, 5-strongly agree). Each scale is summed up and divided by the total number of non-missing items within the scale. Scales with more than 25% of their items missing are considered invalid.²⁰

The questionnaire evaluates whether a patient is ready to adopt a self-management approach to chronic pain. High scores on 'pre-contemplation' characterize a person with no interest in implementing behavioural change while high scores on 'contem-

plation', 'action' and 'maintenance' indicate a person who is ready to engage in the treatment successfully by adopting a self-management approach.²⁰

Chronic Pain Coping Inventory (CPCI-42): The CPCI assesses behavioural coping strategies of chronic pain patients.²¹ It is divided into eight sub-scales - 'Guarding' (7 items), 'Resting' (5 items), 'Asking for assistance' (4 items), 'Relaxation' (5 items), 'Task Persistence' (5 items), 'Exercise/Stretch' (6 items), 'Seeking Social Support' (5 items) and 'Coping Self-Statements' (5 items). Each scale is summed up and divided by the total number of non-missing items within the scale. The sub-scales are ranked for each individual to assess the patient's preference for adaptive or maladaptive coping strategies.

Chronic Pain Acceptance Questionnaire (CPAQ): The CPAQ, as developed by Geiser,⁴ assesses the level of acceptance of chronic pain. The questionnaire originally included four factors-life focus, cognitive control, acceptance of chronicity and the need to avoid or control pain. Further research by McCracken, Vowles and Eccleston aimed to eliminate factors that were inconsistent or redundant.³ The current version of the CPAQ consists of 20 statements (11 for Activity Engagement and 9 reverse-keyed for Pain Willingness), rated on a scale from 0-6, (0=never true, 6=always true). The sub-scales assess the degree to which respondents live a normal life regardless of pain and the degree to which they experience pain without trying to control it.²⁹

Pain Program Satisfaction Questionnaire (PPSQ): The PPSQ was designed specifically for the Chronic Pain Management Program at Chedoke Hospital. It includes 11 statements rated on a 4-point scale (1-'not at all', 4-'definitely/extremely') and measures satisfaction of various areas of the program. The PPSQ has been shown to be valid and reliable with an average of 34 ± 5 .²³

Self Evaluation Scale (SES): The SES was also designed specifically for this program to evaluate participants' goal accomplishment (based on improving fitness, general health and nutrition, family, social life and work, and reducing medications). Patients answer "To what extent do you think you have accomplished your goals in the past 4 weeks?" on a 5-point scale ranging from 1=poorly to 5=excellent (mean = $3(\pm 1)$).⁸ The SES has also been found to be valid and reliable.²³

Treatment

Multidisciplinary pain rehabilitation programs, which involve CBT approaches have been found effective in improving treatment outcomes.¹¹ Patients in such programs experience fewer negative outcomes, greater increase in functional activity, ability to return to work and closure of disability claims.¹¹ The present sample included participants of the CPMP at Chedoke Hospital in Hamilton, Ontario, Canada.

Patients were part of a four-week residential (n=56) or day (n=123) program, based on initial assessment and personal needs. The treatment structure is essentially the same for day and

residential patients and includes daily scheduled activities from 9:00-4:00, Monday-Friday; all weekends are spent at home. Patients work with multiple professionals including occupational therapists, physiotherapists, a psychiatrist, psychologists, pharmacist, nutritionist, social workers, pool therapists and several assistants to achieve individual goals.

The program utilizes the biopsychosocial approach to treat chronic pain in a group setting. Participants attend psycho-educational sessions on relaxation, nutrition, anger management, self-talk, medication use, pacing, communication skills, sexuality, relationships, vocation, body care, illness behaviours, sleep, assertiveness, goal setting, community resources, and acute *versus* chronic pain. They also participate in various functional activities such as

daily fitness and relaxation training sessions, shopping trips, walks, and hydrotherapy to build up confidence, endurance, strength, and flexibility. The schedule includes individual meeting times with an assigned case manager to discuss short- and long-term goals, challenges, and barriers. The goals of the program include helping the patients to become more physically active, pace and modify, reduce emotional distress, set life goals, and overall, cope with chronic pain and improve quality of life.

Previous studies at the CPMP found that completers report less pain, emotional distress, more adaptive coping strategies and better overall use of self-management approaches to chronic pain.³⁰⁻³³

Table 1. Descriptive Statistics for Acceptance

	Measures	N	Minimum	Maximum	Mean	Std. Deviation
Admission CPAQ	Activities Engagement	143	0	48	24.1	94
	Pain Willingness	142	0	40	16.1	7.5
	Total Score	144	0	85	40.0	14.1
Discharge CPAQ	Activities Engagement	139	3	53	29.1	10.5
	Pain Willingness	139	1	36	17.6	7.6
	Total Score	141	0	83	46.0	15.2

Table 2. Significant Correlations between Acceptance and other Patient Measures

Acceptance Variable	Measures	Pearson Correlation (r)	Sig (2-tailed)	N
Admission CPAQ - Activities Engagement	CES-D	-0.339	0.000427	140
	PCS	-0.438	0.000496	142
	Admission CAS	-0.300	0.000299	141
	PSOCQ Maintenance	0.347	0.000218	143
	CPCI Task Persistence	0.391	0.000153	142
	Discharge CES-D	-0.391	0.000305	134
	Discharge PCS	-0.319	0.000152	136
	Discharge CPAQ Total Score	0.481	0.000269	137
Admission CPAQ - Pain Willingness	Discharge PSOCQ Maintenance	0.311	0.000231	136
	Admission PIS	-0.301	0.000301	140
	Admission PCS	-0.438	0.000563	141
	Admission PSOCQ Pre-contemplation	-0.299	0.000303	142
	Discharge CPCI Guarding	-0.334	0.000519	141
	Discharge PCS	-0.360	0.000182	135
	Discharge CPCI Guarding	-0.300	0.000380	136
	Admission CPAQ - Total Score	Discharge PIS	-0.354	0.000152
Discharge CES-D		-0.329	0.000686	141
Admission PCS		-0.467	0.000427	143
Admission PSOCQ Maintenance		0.299	0.000268	144
Discharge CPCI Guarding		-0.344	0.000271	142
Discharge CPCI Task Persistence		0.408	0.000458	142
Discharge PIS		-0.296	0.000469	136
Discharge PCS		-0.358	0.000178	137
	Discharge CAS	-0.365	0.000154	137

Cont...

Cont...					
		PSOCQ Maintenance	0.295	0.000457	137
		CPCI Guarding	-0.310	0.000215	138
		CPCI Resting	-0.297	0.000411	138
Discharge CPAQ - Activities Engagement	Admission	PCS	-0.365	0.000118	137
		CPCI Task Persistence	0.322	0.000130	136
		CES-D	0.394	0.000186	139
		SES	0.385	0.000185	134
	Discharge	PCS	-0.312	0.000184	139
		CAS	-0.357	0.000174	138
		PSOCQ Maintenance	0.432	0.000107	139
	CPCI Coping Self Statements	0.308	0.000227	139	
Discharge CPAQ - Pain Willing- ness	Admission	PCS	-0.396	0.000168	137
		PCS	-0.574	0.000145	139
	Discharge	CAS	-0.374	0.000604	138
		PQ	-0.319	0.000427	118
		CPCI Guarding	-0.293	0.000465	139
Discharge CPAQ - Total Score	Admission	PCS	-0.455	0.000189	139
		PPSQ	0.303	0.000348	152
		PCS	-0.467	0.000615	140
	Discharge	PQ	-0.378	0.000249	118
		PSOCQ Maintenance	0.384	0.000273	140
		CPCI Guarding	-0.315	0.000139	141
	CPCI Coping Self Statements	0.294	0.000395	141	

Table 3. : Paired T-Test Results – Change from Admission to Discharge

Variable	Admission Mean (SD)	Discharge Mean(SD)	p
PIS (n=136)	6.4 (1.65)	6.08 (1.81)	0.006
CES-D (n=134)	33.2 (10.19)	24.7 (10.37)	0.000325
CAS (n=136)	36.4 (17.97)	31.8 (18.0)	0.000142
PQ (n=113)	12.4 (3.96)	10.9 (4.28)	0.000149
Activities Engagement (n=135)	24.0 (9.38)	29.2 (10.7)	0.000320
CPAQ			
Pain Willingness (n=134)	16.4 (7.54)	17.5 (7.61)	0.138
Total Score (n=138)	40.2 (14.14)	45.9 (15.36)	0.000850
PSOCQ			
Pre-contemplation (n=139)	2.9 (0.654)	2.8 (2.25)	0.600
Contemplation (n=139)	4.0 (0.51)	3.8 (0.49)	0.000542
Action (n=139)	3.4 (0.06)	3.9 (0.04)	0.000542
Maintenance (n=139)	3.2 (0.69)	3.8 (0.53)	0.000953
CPCI			
Guarding (n=138)	4.3 (1.46)	3.9(1.46)	0.000363
Resting (n=138)	4.7 (1.60)	4.6 (1.50)	0.639
Asking for assistance (n=138)	3.9 (1.90)	3.5 (1.87)	0.030
Relaxation (n=138)	2.6 (1.67)	4.2 (1.37)	0.000490
Task Persistence (n=138)	2.7 (1.57)	3.2 (4.48)	0.203
Exercise / Stretch (n=138)	2.8 (1.82)	4.6 (1.44)	0.000198
Seeking Social Support (n=138)	3.1(1.96)	3.7(1.76)	0.000134
Coping Self Statements (n=138)	4.1(1.88)	4.5(1.82)	0.00719

Table 4. Correlations- Acceptance Scores at Admission vs. Difference Scores

Acceptance variable at admission	Change variable	Change variable difference score	Pearson Correlation Coefficient (r)	p
CPAQ - Activities Engagement	CPAQ Activities Engagement	-5.2148	0.380	0.000584
	CPAQ Total Score	-5.7681	0.319	0.000168
	PCS	7.0290	0.203	0.048
	PSOCQ Contemplation	0.1763	0.230	0.025
	CPCI Exercise/Stretch	-1.8420	0.238	0.020
CPAQ - Pain Willingness	CPAQ Pain Willingness	-1.0672	0.540	0.000161
	CPAQ Total Score	-5.7681	0.366	0.000140
CPAQ - Total Score	PSOCQ Contemplation	0.1763	0.219	0.033
	CPCI Exercise/Stretch	-1.8420	0.212	0.039
	CPAQ Activities Engagement	-5.2148	0.282	0.00095
	CPAQ Pain Willingness	-1.0672	0.344	0.000471
	CPAQ Total Score	-5.7681	0.431	0.000194

Table 5. Statistically Significant Correlations in Change Variables

Acceptance change variable	Other change variable	Pearson Correlation (r)	p
CPAQ - Activities Engagement	SES	0.368	0.000245
	PIS	0.246	0.016
	PSOCQ Contemplation	0.222	0.031
	CPCI Exercise/Stretch	0.265	0.009
	CPCI Coping Self Statements	0.225	0.028
CPAQ - Pain Willingness	PCS	0.305	0.00269
	CPCI Coping Self Statements	0.237	0.05
CPAQ - Total Score	SES	0.367	0.000250
	PPSQ	0.218	0.034
	PIS	0.230	0.025
	PCS	0.256	0.012
	PSOCQ Maintenance	0.214	0.037
	CPCI Guarding	0.209	0.042
	CPCI Exercise/Stretch	0.289	0.0044
	CPCI Coping Self Statements	0.290	0.0043

RESULTS

Preliminary Analyses

When comparing the completers with non-completers through a series of independent sample *t*-tests, no significant differences ($p < 0.05$) were found in age, years in Canada, marital status, employment, education, pain duration, number of injuries, pain intensity, depression, anxiety, catastrophizing, pain stages of change, acceptance or coping strategies. However, non-completers tended to score higher on the PQ (12.6, *vs.* 10.6 for completers) and had overall lower total acceptance scores (37.2 *vs.* 39.9 for completers).

Non-completers were eliminated from further analysis. All measures were checked for outliers and shapes of frequency

of distributions. While some outliers were found, they were not excluded as they were not based on errors in data and could prove to be clinically relevant.

As shown in Table 1, the means of the subscales and total CPAQ scores at admission are similar to those reported by McCracken et al. Activity Engagement=29.3 (SD=12), Pain Willingness=17.4, (SD=9.7).³ There were no significant gender differences in the CPAQ scores at admission either for the subscales or the total score ($p > 0.05$).

Relationship between the CPAQ Activity Engagement, Pain Willingness and Total Scores at admission and discharge and other variables.

Pearson correlations (r) values are presented in Table 2. Due to a large number of correlations and increased probability of a Type I error, a Bonferroni adjustment was applied to the level of significance ($0.05/70=0.0007$). Only correlations with $p<0.0007$ were considered significant in this analysis. The correlation analysis confirmed that there were no redundant measures.

Results from Admission to Discharge

A series of paired sample t -tests was used to estimate the within-subjects change from admission to discharge. Table 3 includes means, standard deviations and p -values of all variables. Results at discharge showed general change, meeting statistical significance. There were significant reductions in pain intensity, depression, anxiety and catastrophizing. In terms of acceptance, there was an increase in Activities Engagement, but not in Pain Willingness. Patients showed significant increases in the action and maintenance stages of the PSOCQ, showing a positive change in self-management approaches to pain. There were also overall improvements in the adaptive coping strategies of relaxation, exercise, seeking social support, and coping self-statements and a decrease in the maladaptive coping strategy of guarding.

Correlating admission acceptance scores with change in other variables: In order to examine variables as they changed from admission to discharge, difference scores (admission-discharge) were used. A negative difference score indicates that at discharge, a certain score is higher than at admission. Acceptance scores at admission were correlated with difference scores on all variables. As shown in Table 4, Activities Engagement was significantly correlated with reductions in catastrophizing and contemplation, and an increase in the frequency of use of exercise/stretch. The total CPAQ score was correlated with a reduction in contemplation and an increase in exercise/stretch. Pain Willingness was not significantly correlated with any of the difference scores.

Correlating change in acceptance with change in other variables: The difference scores on the CPAQ Activities Engagement, Pain Willingness and the Total CPAQ were correlated with the difference scores of the other measures in Table 5. This showed whether positive changes in acceptance scores were associated with change in other treatment outcomes. Change in all acceptance scores was found to be significantly associated with positive changes in the action and maintenance subscales of the PSOCQ, exercise/stretch and coping self-statements of the CPCI-42, as well as reductions in catastrophizing and guarding. Change in acceptance scores was also associated with higher self-evaluations of goal accomplishment and greater satisfaction with the program.

Acceptance scores at admission were also associated with changes in acceptance scores at discharge: Higher scores on Activities Engagement were associated with greater positive change in the Activities Engagement and Total Score on the CPAQ. Higher scores in Pain Willingness were associated with differences in Pain Willingness and the Total Score. A high admission Total Score was associated with greater difference scores on Activities Engagement, Pain Willingness and the Total Score at discharge. Thus, patients with better acceptance admission scores were more likely to

make a greater positive change in their acceptance over the course of treatment.

DISCUSSION

This study provides a new understanding of the relationship of acceptance of chronic pain with patient functioning in a CBT-oriented pain management program. Several measures of patient functioning in relation to acceptance were examined at admission and discharge from the four-week program. These included pain intensity, recent bothersome symptoms, anxiety, depression, catastrophizing, stages of change, coping strategies, self- and program evaluations.

Results were consistent with previous cross-sectional studies by McCracken and associates, which indicated that acceptance is associated with lower depression and anxiety as well as an overall improvement in well being.^{1,34} This study extends previous research by contributing needed prospective data on the relationship between acceptance and patient functioning. Data were collected on two occasions, four weeks apart, minimizing sources of error common in cross-sectional designs. In a one-time questionnaire, the results might be affected by influences such as the patient's current mood and level of pain. Collecting data at different points in time minimizes those factors as sources of error. Furthermore, the study is based on a sample of a Canadian chronic pain population. The correlations observed are not limited to the specific circumstances reported by previous research and provide further support that the results are valid regardless of sample demographics. The current results also extend acceptance findings to CBT-based interdisciplinary programs, the chief current approach to chronic pain management.^{11,12,35} Although acceptance is not the primary focus of these programs, acceptance variables could indirectly play an important role in the treatment process.

The patients at the examined Pain Management Program experienced several positive changes over the course of treatment such as reductions in their pain intensity, and symptoms of depression and anxiety. There were increases in the action and maintenance stages of the PSOCQ indicating a positive change in self-management approaches. There were also overall improvements in adaptive coping strategies as measured by the CPCI-42. When examining acceptance, there was an increase in Activities Engagement but not in Pain Willingness at discharge. These results are not in support of those by McCracken et al, which demonstrated that both sub-scales were significantly predictive of pain-related disability³ even though disability *per se* was not directly measured in the present study, only its correlates. Moreover, Nicholas and Asghari found that Activity Engagement and not Pain Willingness was useful in considering acceptance in the context of catastrophizing, avoidance and self-efficacy beliefs.³⁶ It has also been suggested that Activity Engagement is more sensitive to changes in outcome measures as compared to Pain Willingness.³⁷ These results may be understood as follows: while Activities Engagement is a behaviour, which can be altered with education and training, Pain Willingness is an attitude, making it difficult to influence during the treatment process. However, even if patients have not changed their views about Pain Willingness but increased their Activities Engagement,

the overall acceptance score increases and they still exhibit overall improvement as demonstrated by their scores on the self-report questionnaire. If the change of behaviour is positive, and Activity Engagement increases, it is possible that the change in attitude and Pain Willingness will also improve with time as the patient engages in a more positive lifestyle.

Previous research by McCracken and Eccleston correlated acceptance with improved patient life and functioning.⁹ This concept was extended in relevance to a chronic pain management program. Acceptance scores at admission influenced changes in attitudes towards Activities Engagement and Pain Willingness at discharge. Higher scores at admission correlated with greater positive change at discharge. Activities Engagement was also correlated with a reduction in catastrophizing and contemplation, as well as an increase in the frequency of exercise/stretch as a coping strategy. The total CPAQ score was also correlated with a reduction in contemplation and an increase in exercise/stretch. The reduction found in contemplation is consistent with research conducted by Carr, Moffett, Sharp and Haines, on the association of acceptance with the PSOCQ.³⁸ It has been proposed that acceptance is a precursor of positive change in a self-management approach by encouraging progress from the pre-contemplation/contemplation stages to the action/maintenance stages.³⁸ This is expected as patients who are more accepting of their pain are likely to make behavioural changes through adopting and maintaining a self-management approach and successful goal accomplishment.

Patients who showed a greater positive change in acceptance scores also improved in other variables that measure well-being. Increases in acceptance, including Activities Engagement, Pain Willingness and Total Scores were associated with increases in action and maintenance self-management approaches, exercise/stretch and coping self-statements, and reductions in catastrophizing and guarding. Increases in exercise/stretch may provide further evidence in improvement of physical functioning.¹⁴ Increases in acceptance were also associated with higher self-evaluation of goal accomplishment and greater satisfaction with the program at discharge. Acceptance seems to be an important, significant variable, essential to evaluating patient success at a pain management program.

The current study authors suggest that longitudinal follow up studies allow for increased precision in measuring the effectiveness of a psycho-educational intervention.

There are several limitations to the study. The sample was highly selective as it consisted of patients who were referred for interdisciplinary treatment as a last resort. Thus, results cannot be generalized to the entire chronic pain population. Also, these results only demonstrate associations between acceptance and other variables, not causality. It cannot be determined as to whether acceptance leads to better functioning or if better functioning encourages acceptance. In addition, the study incorporated assessment of variables on the same patients upon admission and discharge, lacking a true control group. The dataset is based on self-report questionnaires. Thus patient mood, pain intensity at the time and other confounding variables could have influenced the

results.

Acceptance-based treatment may not be the most appropriate when pain can be easily controlled or when control leads to improved overall functioning.³⁴ Acceptance-related processes are not critical for everyone to the same extent. It is also important to recognize that all patients have unique histories, life problems and other health issues, which contribute to variance within the data.

CONCLUSION

Despite the limitations, the results of the study are consistent with published literature and extend previous findings as well. Participants in a CBT-based interdisciplinary pain program demonstrated statistically significant increases in their acceptance scores, associated with overall improvement in patient functioning. Higher acceptance scores at admission are associated with the adoption of a self-management approach to chronic pain. Thus, the CPAQ could be used as a tool to predict whether a patient is a good candidate for an interdisciplinary pain program. Increases in acceptance scores are correlated with many positive changes as measured by other variables, thus CBT programs could include acceptance as an additional focus during treatment. Program goals should focus on increasing patient functioning and minimizing avoidance. An acceptance-based approach would focus on the awareness of emotions through mindfulness and cognitive diffusion. There has been recent support for success of programs, which incorporate acceptance as a focus.⁹ In a previous study by McCracken et al an acceptance-based approach was evaluated in a 3-4 week residential program. Acceptance, as assessed by the CPAQ, was strongly related to changes in key outcome variables, thus further examination of acceptance at a chronic pain management unit is a necessary step towards improving treatment methods. The investigation of acceptance should also be broadened to a wider sample of the chronic pain population, as this topic is likely to be vital for understanding both the suffering of chronic pain patients and its alleviation.

CONFLICTS OF INTEREST

There is no conflict of interest in the data collection and reporting of the results of this study.

ACKNOWLEDGEMENTS

We would like to thank the staff at the Chedoke CPMP for all of their assistance with this study as well as Mary Lou Schmuck for her assistance with data analysis.

REFERENCES

1. McCracken LM, Vowles K. Acceptance of Chronic Pain. *Curr Pain and Headache Rep.* 2006; 10(2): 90-94.
2. Wetherell JL, Afari N, Rutledge T, et al. A randomized, controlled trial of acceptance and commitment therapy and cognitive-behavioral therapy for chronic pain. *Pain.* 2011; 152(9): 2098-

2107. doi: 10.1016/j.pain.2011.05.016

3. McCracken LM, Vowles K, Eccleston C. Acceptance of chronic pain: component analysis and a revised assessment method. *Pain*. 2004; 107(1-2): 159-166. doi: <https://doi.org/10.1016/j.pain.2003.10.012>

4. Geiser D. A comparison of acceptance-focused and control-focused psychological treatments in a chronic pain treatment center. University Microfilms International, University of Nevada, Reno, USA: 1-10, 1992.

5. McCracken LM, Eccleston C. Coping or acceptance: What to do about chronic pain? *Pain*. 2003; 105(1-2): 197-204. doi: [https://doi.org/10.1016/S0304-3959\(03\)00202-1](https://doi.org/10.1016/S0304-3959(03)00202-1)

6. Viane I, Crombez G, Eccleston C, et al. Acceptance of pain is an independent predictor of mental wellbeing in patients with chronic pain: Empirical evidence and reappraisal. *Pain*. 2003; 106(1-2): 65-72. doi: 10.1016/S0304-3959(03)00291-4

7. McCracken LM. Social context and acceptance of chronic pain: The role of solicitous and punishing responses. *Pain*. 2005; 113(1-2): 155-159. doi: 10.1016/j.pain.2004.10.004

8. Asmundson G, Hadjistavropoulos H. Acceptance and Commitment therapy in the rehabilitation of a girl with chronic idiopathic pain: are we breaking new ground? *Cogn Behav Pract*. 2006; 13(3): 178-181. doi: 10.1016/j.cbpra.2006.05.001

9. McCracken LM, Eccleston C. A prospective study of acceptance of pain and patient functioning with chronic pain. *Pain*. 2005; 118(164-118169). doi: <https://doi.org/10.1016/j.jpain.2005.01.212>

10. Schütze R, Rees C, Smith A, Slater H, Campbell JM, O'Sullivan P. How Can We Best Reduce Pain Catastrophizing in Adults with Chronic Non-Cancer Pain? a Systematic Review and Meta-Analysis. *J Pain*. 2017; 23(1): 21-29. doi: 10.1016/j.jpain.2017.09.010

11. Townsend C, Bruce B, Hooten W, Rome J. The role of mental health professionals in multidisciplinary pain rehabilitation programs. *J Clin Psychol*. 2006; 11: 1433-1443. doi: 10.1002/jclp.20322

12. Maruta T, Swanson D, McHardy M. Three year follow up of patients with chronic pain who were treated in a multidisciplinary pain management center. *Pain*. 1990; 41(1): 47-53. doi: 10.1016/0304-3959(90)91108-U

13. Veehof MM, Oskam MJ, Schreurs KM, Bohlmeijer ET. Acceptance-based interventions for the treatment of chronic pain: a systematic review and meta-analysis. *Pain*. 2011; 152(3): 533-542, doi: 10.1016/j.pain.2010.11.002

14. Cederberg JT, Cernvall M, Dahl J, von Essen L, Ljungman G: Acceptance as a mediator for change in acceptance and commitment therapy for persons with chronic pain?. *Int J Behav Med*. 2016;

23(1): 21-29, doi: 10.1007/s12529-015-9494-y

15. Jensen M, Romano J, Turner J, Good A, Wald L. Patient beliefs predict patient functioning: Further support for a cognitive-behavioral model of chronic pain. *Pain*. 1999; 81(1-2): 94-104. doi: 10.1016/S0304-3959(99)00005-6

16. Spitzer R, Williams J, Kroenke K, et al. Utility of a new procedure for diagnosing mental disorders in primary care. The PRIME-MD 1000 study. *JAMA*. 1994; 272(22): 1749-1756. doi: 10.1001/jama.1994.03520220043029

17. Radloff L. The CES-D Scale. A self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1977; 1(3): 385-401. <https://doi.org/10.1177/014662167700100306>

18. Thyer B. Development and validation of the Clinical Anxiety Scale. A rapid assessment instrument for empirical practice. *Educational and Psychological Measurement*. 1989; 49(1): 153-163. <https://doi.org/10.1177/0013164489491016>

19. Bandura A. The anatomy of the stages of change. *Am J Health Promot*. 1997; 12: 8-10. doi: 10.4278/0890-1171-12.1.8

20. Kerns R, Wagner J, Rosenberg R, Haythornthwaite J, Caudill-Slosberg M. Identification of subgroups of persons with chronic pain based on profiles on the pain stages of change questionnaire. *Pain*. 2005; 116(3): 302-310. doi: 10.1016/j.pain.2005.04.022

21. Jensen M, Turner J, Romano J, Strom S. The Chronic Pain Coping Inventory. Development and preliminary validation. *Pain*. 1995; 60(2): 203-216. doi: 10.1016/0304-3959(94)00118-X

22. Sullivan M, Bishop S, Pivik J. The pain catastrophizing scale: Development and validation. *Psychological Assessment*. 1995; 7(4): 524-532. doi: <http://dx.doi.org/10.1037/1040-3590.7.4.524>

23. Hapidou, EG. Program evaluation of pain management programs. Paper presented at the 9th Inter-Urban Pain Conference, Kitchener, Ontario, Canada, 1994.

24. Jensen M, Karoly P, Braver S. The measurement of clinical pain intensity: A comparison of six methods. *Pain*. 1986; 27(1): 117-126, [https://doi.org/10.1016/0304-3959\(86\)90228-9](https://doi.org/10.1016/0304-3959(86)90228-9)

25. Geisser M, Roth R, Robinson M. Assessing the depression among persons with chronic pain using the Center for Epidemiological Studies-Depression Scale and the Beck Depression Inventory: A comparative analysis. *Clin J Pain*. 1997; 13(2): 163-170. doi: 10.1097/00002508-199706000-00011

26. Magni G, Moreschi C, Rigatti-Luchini S, Merskey H. Prospective study on the relationship between depressive symptoms

- and chronic musculoskeletal pain. *Pain*. 1994; 56(3): 289-297, doi: [10.1016/0304-3959\(94\)90167-8](https://doi.org/10.1016/0304-3959(94)90167-8)
27. Turk D, Okifuji A, Scharff L. Chronic pain and depression: Role of perceived impact and perceived control in different age cohorts. *Pain*. 1995; 61(1): 93-101. doi: [10.1016/0304-3959\(94\)00167-D](https://doi.org/10.1016/0304-3959(94)00167-D)
28. Hudson W. *The Clinical Measurement Package: A Field Manual*. Homewood, IL, Dorsey Press, 1982.
29. McCracken LM, Eccleston C. A comparison of the relative utility of coping and acceptance-based measures in a sample of chronic pain sufferers. *Eur J Pain*. 2006; 10(1): 23-29. doi: [10.1016/j.ejpain.2005.01.004](https://doi.org/10.1016/j.ejpain.2005.01.004)
30. Haidar R. Relationships between chronic pain treatment outcomes and pain-related psychological variables. Unpublished undergraduate thesis, McMaster University, Ontario, Canada, 2004.
31. Hapidou EG, Abbasi H. Readiness to adopt a self-management approach to chronic pain and pain management outcomes. *PAIN PRACTICE*, Book of Abstracts, 3rd World Congress, 2004; 72(1): 21-25. World Institute of Pain, Barcelona, Spain, doi: [10.1016/S0304-3959\(97\)00038-9](https://doi.org/10.1016/S0304-3959(97)00038-9)
32. Nassar D. Stage of change and development of a self-management approach in chronic pain. Unpublished undergraduate thesis, McMaster University, Ontario, Canada, 2006.
33. Williams RM, Hapidou EG, Lin CY, Abbasi H. Examining the use of the pain stages of change questionnaire in chronic pain. *Physiotherapy Canada*. 2007; 59(2): 132-141. doi: <https://doi.org/10.3138/ptc.59.2.132>
34. McCracken LM. Learning to live with the pain: Acceptance of pain predicts adjustment in persons with chronic pain. *Pain*. 1998; 74(1): 21-27. doi: [10.1016/S0304-3959\(97\)00146-2](https://doi.org/10.1016/S0304-3959(97)00146-2)
35. Lipchik G, Milles K, Covington E. The effects of multidisciplinary pain management treatment on Locus of Control and pain beliefs in chronic non-terminal pain. *Clin J Pain*. 1993; 9(1): 49-57.
36. Nicholas M, Asghari A. Investigating acceptance in adjustment to chronic pain: Is acceptance broader than we thought? *Pain*. 2006; 124(3): 269-279. doi: [10.1016/j.pain.2006.04.032](https://doi.org/10.1016/j.pain.2006.04.032)
37. Vowles K, McCracken LM, Eccleston C. Processes of change in treatment for chronic pain: The contributions of pain, acceptance and catastrophizing. In Press, Corrected Proof, *Eur J Pain*. 2006; 11(7). doi: [10.1016/j.ejpain.2006.12.007](https://doi.org/10.1016/j.ejpain.2006.12.007)
38. Carr J, Moffett J, Sharp D, Haines D. Is the pain stages of change questionnaire (PSOCQ) a useful tool for predicting participation in a self-management programme? Further evidence of validity, on a sample of UK pain clinic patients. *BMC Musculoskelet Disord*. 2006; 7: 101-108. doi: <https://doi.org/10.1186/1471-2474-7-101>