ISSN 2380-727X

PSYCHOLOGY AND COGNITIVE SCIENCES

Open Journal

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Original Research

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

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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

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.

Methods: Participants in this study were 184 consecutive adult patients with heterogeneous pain admitted to a 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).[1]

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.

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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 have been shown to be effective in managing chronic pain.[11] Chronic pain management clinics are focused on these main objectives: 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 was to extend previous findings on acceptance and patient success at multidisciplinary pain rehabilitation programs. This was achieved by examining acceptance at admission and discharge from an interdisciplinary CBT-based pain management program and investigating its effect on outcome variables. We hypothesize that acceptance, as measured by the CPAQ, would increase from admission to discharge. 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-IV[25] criteria. The CES-D is a valid measure of depression in the general population and in chronic pain.[17,25-27]

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]

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.

CPAQ: The CPAQ, as developed 'originally' by Geisser,[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]

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

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 (SD)=3(±1)).[8] The SES has also been found to be valid and reliable.[23]

Treatment

Multidisciplinary pain rehabilitation programs with a CBT approach have been found to be 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]

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 'subscale' 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

Table 1. *Descriptive Statistics for Acceptance.*

Measure	N	Minimum	Maximum	*Mean*	*Std. Deviation*
Admission CPAQ - Activities Engagement	143	0	48	24.1	9.4
Admission CPAQ - Pain Willingness	142	0	40	16.1	7.5
Admission CPAQ - Total Score	144	0	85	40.0	14.1
Discharge CPAQ - Activities Engagement	139	3	53	29.1	10.5
Discharge CPAQ - Pain Willingness	139	1	36	17.6	7.6
Discharge CPAQ - Total Score	141	0	83	46.0	15.2

Table 2. *Correlations*

Acceptance Variable	Other Variable	Pearson Correlation (r)	Sig, (2-tailed)	*N*
Admission CPAQ – Activities Engagement	Admission - CESD	-0.339	0.000427	140
	Admission - PCS	-0.438	0.000496	142
	Admission - CAS	-0.300	0.000299	141
	Admission - Maintenance	0.347	0.000218	143
	Admission - 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
	Discharge - Maintenance	0.311	0.000231	136
Admission CPAQ – Pain Willingness	Admission - PIS	-0.301	0.000301	140
	Admission - PCS	-0.438	0.000563	141
	Admission - Pre-contemplation	-0.299	0.000303	142
	Admission - Guarding	-0.334	0.000519	141
	Discharge - PCS	-0.360	0.000182	135
	Discharge - Guarding	-0.300	0.000380	136

Cont...

Cont...

	Admission - Pre-contemplation	-0.299	0.000303	142
	Admission - Guarding	-0.334	0.000519	141
	Discharge - PCS	-0.360	0.000182	135
	Discharge - Guarding	-0.300	0.000380	136
Admission CPAQ – Total Score	Admission - PIS	-0.354	0.000152	142
	Admission - CESD	-0.329	0.000686	141
	Admission - PCS	-0.467	0.000427	143
	Admission - Maintenance	0.299	0.000268	144
	Admission - Guarding	-0.344	0.000271	142
	Admission - 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
	Discharge - Maintenance	0.295	0.000457	137
	Discharge - Guarding	-0.310	0.000215	138
	Discharge - Resting	-0.297	0.000411	138
Discharge CPAQ – Activities Engagement	Admission - PCS	-0.365	0.000118	137
	Admission- Task Persistence	0.322	0.000130	136
	Discharge - CES-D	0.394	0.000186	139
	Discharge - Self Evaluation	0.385	0.000185	134
	Discharge - PCS	-0.312	0.000184	139
	Discharge - CAS	-0.357	0.000174	138
	Discharge - Maintenance	0.432	0.000107	139
	Discharge - Coping Self - Statements	0.308	0.000227	139
	A-PCS	-0.396	0.000168	137
	Discharge - PCS	-0.574	0.000145	139
Discharge CPAQ – Pain Willingness	Discharge - CAS	-0.374	0.000604	138
	Discharge - PQ	-0.319	0.000427	118
	Discharge - Guarding	-0.293	0.000465	139
	A-PCS	-0.455	0.000189	139
	Discharge - PPSQ	0.303	0.000348	152
Discharge CPAQ – Total Score	Discharge - PCS	-0.467	0.000615	140
	Discharge - PQ	-0.378	0.000249	118
	Discharge - Maintenance	0.384	0.000273	140
	Discharge - Guarding	-0.315	0.000139	141
	Discharge - Coping Self -Statements	0.294	0.000395	141

confirmed that there were no redundant measures.

Results from Admis[illegible] Discharge

A series of paired sample(s) *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.

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

Variable	Admission Mean (SD)	Discharge Mean (SD)	*p*
Pain Intensity Scale (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
CPAQ 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
CPAQ Total Score (n=138)	40.2 (14.14)	45.9 (15.36)	0.000850
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
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*
Activities Engagement	Activities Engagement	-5.2148	0.380	0.000584
Activities Engagement	CPAQ Total Score	-5.7681	0.319	0.000168
Activities Engagement	Pain Catastrophizing Scale	7.0290	0.203	0.048
Activities Engagement	Contemplation	0.1763	0.230	0.025
Activities Engagement	Exercise/Stretch	-1.8420	0.238	0.020
Pain Willingness	Pain Willingness	-1.0672	0.540	0.000161
Pain Willingness	CPAQ Total Score	-5.7681	0.366	0.000140
CPAQ Total Score	Contemplation	0.1763	0.219	0.033
CPAQ Total Score	Exercise/Stretch	-1.8420	0.212	0.039
CPAQ Total Score	Activities Engagement	-5.2148	0.282	0.00095
CPAQ Total Score	Pain Willingness	-1.0672	0.344	0.000471
CPAQ Total Score	CPAQ Total Score	-5.7681	0.431	0.000194

The difference scores on the CPAQ Activities Engagement, Pain Willingness and the Total CPAQ were correlated with the difference scores of the other measures as shown in Table 5. This showed whether positive changes in acceptance scores were associated with change in other treatment outcomes. Change in acceptance scores was found to be significantly associated with positive changes in the maintenance subscale 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.

Correlating change in acceptance with change in other variables: 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.

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Table 5. *Statistically Significant Correlations in Change Variables*

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

DISCUSSION

This study furthers understanding of relationships between acceptance and other chronic pain variables examining patient function in a CBT-oriented pain management 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 'subscales' were significantly predictive of pain-related disability[3] 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.[3] 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. 'The CPMP at Chedoke Hospital' is now part of the Michael G. DeGroote Pain Clinic at McMaster University Medical Center.

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