This is a non-final version of an article published in final form in: Johnston, M., Foster, T.M., Shennan, J., Starkey, N. J., & Johnson, A. (2010). The effectiveness of an acceptance and commitment therapy self-help intervention for chronic pain. *Clinical Journal of Pain*, 26(5): 393-402.

The Effectiveness of an Acceptance and Commitment Therapy Self-Help Intervention for Chronic Pain

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Pages: 25

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Abstract

Objective: To evaluate the effectiveness of an Acceptance Commitment Therapy (ACT) based self-help book for people with chronic pain.

Method: This was a randomised two group study design. Over a 6-week period, 6 participants read the self-help book and completed exercises from it with weekly telephone support while 8 others formed a wait-list control group. Subsequently, five of the wait-list participants completed the intervention. Participants completed pre- and post-intervention questionnaires for acceptance, values illness, quality of life, satisfaction with life, depression, anxiety and pain. Initial outcome data were collected for 8 control participants and 6 intervention participants. Including the wait-list controls, a total of 11 participants completed pre- and post-intervention measures. Whilst completing the self-help intervention, each week participants' rated the content of the book according to reading level and usefulness, and their comprehension of the content was also assessed.

Results: Compared to controls, participants who completed the book showed improved quality of life and decreased anxiety. When data from all the treatment participants was pooled, those who completed the intervention showed statistically significant improvements (with large effect sizes) for acceptance, quality of life, satisfaction with life, and values illness. Medium effect sizes were found for improvements in pain ratings.

Conclusions: The current findings support the hypothesis that using the self-help book, with minimal therapist contact adds value to the lives of people who experience chronic pain.

Keywords: Acceptance and Commitment Therapy; ACT; acceptance; chronic pain; self-help; quality of life; values.

Introduction

Chronic pain is problematic for those who experience it and can be complicated and costly to treat[1]. It often leads to disability and poor quality of life and is a costly social phenomenon. Psychological functioning and its relation to experiences of pain is a relatively recent area of inquiry. Prior to the development of the Gate Control Theory of Pain[2], chronic pain was treated from a medical perspective with symptom reduction being the main aim[3]. Subsequent developments in the field of pain management have resulted in biopsychosocial models of pain. Thus, current treatment approaches for chronic pain cover physical, psychological and environmental factors and involve a multi-disciplinary pain management approach which, although effective is expensive.

People with chronic pain often develop additional problems over time, such as emotional disturbance, cognitive difficulties, fear and fatigue[4]. In such cases, Cognitive Behavioural Therapies (CBT) are often effectively used to change the client's focus from the pain itself, to the impact the pain is having on their functioning [5, 6]. One recently developed Cognitive Behaviour Therapy (CBT) is Acceptance and Commitment Therapy (ACT). The aim of ACT is to assist people to develop acceptance ("willingness to experience pain or distressing events without attempt to control them"[7]) of their pain and/ or thoughts about their pain, together with enhancing the meaningful aspects of their lives (valued actions). Thus, rather than a futile struggle against pain, acceptance and valued actions are utilised to improve quality of life, regardless of pain. There is growing evidence to support its effectiveness in the treatment of chronic pain[8]. However, the delivery of intensive individual therapeutic approaches, such as ACT, takes time, requires a skilled practitioner and although it is cheaper than treatment by multidisciplinary team, it can be costly. Therefore, the challenge is how to deliver such treatment programmes effectively, tailored to individual needs, while minimising time and cost[4].

Self-help interventions are an approach which provide a means to administer standardised treatment to clients with minimal input from a therapist across a variety of disorders (e.g., depression, anxiety disorders, eating disorders)[9,10]. This approach has the additional benefits of being accessible to a larger numbers of clients at a much lower cost compared to other types of treatment. Thus, the overall aim of the current study was to evaluate the effectiveness of an ACT-based self help workbook ‘Living Beyond your Pain’[11], (in combination with weekly phone and workbook support) for adults who experience chronic pain. More specifically, the study assessed whether participant’s would report ‘added value’ to their lives after the intervention. ‘Added value’ was considered an increase in acceptance, improvement in living in accordance with ones values and improvement in quality of life, depression and anxiety.

Materials and Method

Settings and Participants

The study received approval from the Department of Psychology, University of Waikato, Ethics Committee and the Northern Y District Health Board Ethics Committee. Potential participants were identified from the Waikato Hospital Pain Clinic Psychologist’s waiting list or were people who had been assessed by the Pain Clinic, but not referred to the psychologist, who as judged by the referral had a level of distress which might be helped by the intervention.

The inclusion criteria were; (1) Reading ability sufficient to read and understand the book, (2) No major psychiatric disorder that might impede participation, (3) Stable medication (e.g., for 4 weeks and not considered by the Pain Clinic Psychologist to interfere with participation), (4) No known significant childhood history of trauma. These inclusion criteria were selected to ensure that participants would be able to complete the weekly reading and exercises, and to ensure their safety. Six people were excluded from the study due to access difficulties and two others for their level of reading/cognitive ability.

After this, the Psychologist phoned 30 potential participants to determine if they were interested in participating in the study. Those who expressed an interest in the study were sent an information sheet and were contacted by the primary researcher.

Twenty four participants volunteered there after to participate in the study and the majority of the meetings with these participants took place at their homes. Two participants were seen in the outpatient Pain Clinic rooms at Waikato Hospital. 37.5% (n=10) of the participants were male and 62.5% (n=14) were female. Ages ranged from 20 to 84 years with the median age 43. The first participant was randomly designated to the control (C) or treatment (T) group and from then participants were assigned to each group alternately as they were contacted, to ensure that a similar number of participants were in each group. This resulted in 12 participants in each group.

Figure 1 illustrates the number of participants in each group and the attrition. Intention to treat analysis was applied for participants who withdrew after completing three weeks of the intervention (this was half of the treatment intervention and was considered sufficient for including in the post test analysis). As can be seen in Figure 1, five of the initial treatment group completed the whole intervention; one participant withdrew after the third week of treatment, giving a subgroup of six who completed three or more weeks of treatment. Eight of the control group participants completed the control period and provided pre- and post-data. All of these participants agreed to start the treatment and are referred to as the C-T group. In this group, five completed the treatment. Thus, in total, eleven participated in at least three weeks of treatment.

*************Figure 1 here

Measures

Table 1 shows outcome measures used in the present study including number of items, and classification of scores for functionality. Corresponding domains of functioning as recommended by The Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials (IMMPACT)[12] are also presented in Table 1.

******Insert Table 1 here

Acceptance was measured by the Chronic Pain Acceptance Questionnaire (CPAQ). The CPAQ is a self report questionnaire designed to measure acceptance of pain. It consists of two scales: activity engagement and pain willingness. Combined, the scales assess the individual's level of activity in the presence of pain and the degree to which the individual attempts to avoid or control pain. An increase in CPAQ score is associated with reported improvement in acceptance[13].

Quality of life was used to evaluate participants' perceived subjective wellbeing. The Quality of Life Inventory (QOLI)[14] covers 17 domains of life which are evaluated by a weighted satisfaction score which includes satisfaction with the area of life and the importance of that area to the individual's well being. High scores on the QOLI correspond with a high level of perceived quality of life.

The Satisfaction with Life Scale (SWLS) is a brief self report questionnaire that was designed to assess individual satisfaction with life as a whole[15]. This scale measures the judgemental component (rather than the emotional component) of subjective well being; an increase in SWLS corresponds with improvement in an individual's judgement and reporting of their subjective wellbeing**.**

The Chronic Pain Values Inventory (CPVI) is a self report questionnaire that was used to measure the concept *values illness* that is included in the self-help book. The first half of the items relate to specific areas of life and a rating is given by the individual to quantify the importance of each area. The latter half of the questions relate to how successful the individual considers they have been at living in accordance with their values in each area. A discrepancy between importance and success indicates 'values illness' and hence a decrease in CPVI score is associated with positive change for the individual[16].

The Short-Form McGill Pain Questionnaire (MPQ-SF) is a self report questionnaire that has been used to assess chronic pain experiences across a number of pain conditions. The questionnaire consists of 15 adjectives that describe sensory and affective aspects of pain in addition to a visual analogue scale (VAS) and a present pain intensity (PPI) rating. High scores correspond with reports of high levels of pain[17].

The Chicago Multi-scale Depression Inventory (CMDI) is a self report inventory that was designed to measure depressive symptoms in medical patient populations[18]. The CMDI consists of three subscales; Mood, Evaluative and Vegetative which can be used individually or combined. The non vegetative subscales are most accurate in examining depression in medical patients. High scores on the CMDI reflect reports of a high level of depression and decreases in CMDI score correspond with the reporting of a reduction in depressive symptoms.

The Beck Anxiety Inventory (BAI) is a self report questionnaire that was designed to measure symptoms of anxiety[19]. This measure was used in addition to the CMDI as a measure of emotional functioning. High scores on the BAI reflect high level of anxiety symptoms reported by the individual and a reduction in score corresponds with reported improvement in anxiety symptoms. Half of the items on the BAI represent somatic symptoms of anxiety and the remainder represent cognitive symptoms.

Materials

Each participant who undertook treatment was provided with a copy of Dahl and Lundgren (2006)[11] book, “Living Beyond Your Pain,” together with a workbook. The book is comprised of eight chapters, in addition to introduction and conclusion sections. The chapters and topics covered in each week are summarised in Table 2. The workbook was compiled by the primary researcher and was developed to be used alongside the text. It included a front sheet explaining the weekly intervention requirements which were to read the specified part of the book, complete the exercises and answer questions about these during the weekly phone call. Participants were reassured that the questions during the phone call were not a test. The remainder of the workbook was divided into six sections, with one to be completed per week. Each section consisted of a summary of the week’s reading, spaces to write and complete exercises from Dahl and Lundgren (2006), and a list of question relating to the content for that week. The full contents of the workbook can be viewed at http://hdl.handle.net/10289/2309.

Insert Table 2 around here

Procedure

Once potential participants had received the information sheet in the mail, the primary researcher phoned them to discuss the study details and their participation. For those who wanted to take part, an initial meeting was arranged at either the Pain Clinic or at the participant's home. As described above, the first participant was randomly designated to the control or treatment group and from then participants were assigned to each group alternately as they were contacted. For all participants, the first meeting consisted of reviewing the information sheet, explaining the study and signing the consent form. The battery of tests was completed and a weekly time was arranged for the researcher to make phone contact with the participant.

Control Group

At the initial meeting, in addition to completing the tests and arranging a telephone interview time, control group participants were offered a second meeting six weeks later to repeat the battery of tests and have the opportunity to start the intervention. Control participants were phoned by the primary researcher once a week on the prearranged day and time. During each phone call, they were asked to rate their pain on a ten point scale where zero is no pain and ten is the worst pain imaginable. They also rated their pain according to the Present Pain Intensity (PPI) from the MPQ-SF and were asked if there was anything that they perceived was influencing their pain in a positive or negative way. The PPI is a six item scale where 0 is no pain and 5 is excruciating pain. The numbers between 0 and 5 have corresponding words to describe the level of pain. The main purpose of these questions for the Control group was to establish similar conditions for the Treatment and Control groups, that is, participants from both groups received weekly phone calls and discussed issues around pain. The weekly data from the Control group were not analysed further.

After six weeks of weekly contact, participants repeated the battery of tests and were offered the opportunity to continue to the intervention. Participants that moved to the intervention phase followed the procedure described below. After completing the intervention, these participants completed the battery of tests for the third time.

Treatment group

Treatment participants were loaned a copy of the self help book and given their own copy of the accompanying workbook to use during the intervention and keep afterwards. Participants were instructed to start the first week of the intervention right away. This involved them reading the selected portion of the text (documented in the front sheet of the workbook), completing the exercises in the workbook for that section, and noting the answers to the questions for that week (see Table 2).

The weekly phone calls from the primary researcher to these participants involved three standard questions: 1. Did you do all, some or none of the reading and the exercises? 2. Did you find the reading level easy, medium, or hard? 3. Was the book very useful, moderately useful, or not useful at all? Once these questions had been responded to, the researcher addressed the questions in the workbook for each week. The participants relayed their answers to the researcher who wrote down the participants' responses verbatim. These answers were later evaluated by the researcher to assess comprehension of the material described in the book.

After they had completed reading the book and using the workbook over a six week period, Treatment participants repeated the battery of tests and thereby completed the study. The dependant variables measured by the battery of tests included acceptance, subjective wellbeing, values illness, pain and emotional functioning.

Results

Statistical Analysis

Data Analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 14.0. Once data collection was completed, t-tests were used to compare participants assigned to the control and treatment groups on all measures. Thereafter statistical analyses were conducted using t-tests and/or ANOVA's as appropriate. The Alpha level for statistical significance was defined as $p < .05$.

As sample size was small, statistical effect sizes were included to give a measure of the magnitude of change (from pre to post intervention) on each measure. Effect size provides a way to analyse the importance of change irrespective of sample size. Statistical effect sizes were calculated as part of the ANOVA (partial η^2) and were considered small if between .10 to .29; medium if between .30 and .49; and large if greater than .50[20].

As well as looking at statistical effects, clinically significant improvement was examined. Clinical significance is defined as a change in reported level of functioning that corresponds with a shift from a clinical population (prior to treatment) to a general (more functional) population (after treatment)[21]. A shift in score toward the mean of the general population is considered to show improvement. The range of measures used in the current study meant that clinically significant improvement had to be defined in different ways (see Table 1). For measures (such as the ACT measures) where no clinical cutoff was reported in the literature, improvement in score following treatment, was considered clinically significant improvement. The cutoffs for the QOLI and CMDI were defined by using their respective manual specifications for symptoms in the clinical range. For pain, the Present Pain Intensity (PPI) scale from the MPQ-SF was utilised to analyse clinically significant change and is shown as any movement in the direction of improvement.

Initial Analysis: Control vs Treatment

The means and standard deviations (SDs) of the scores for the tests from the first administration (T1) for the all of the initial treatment (n=6) and control groups (n=8) and from the first and second administrations (T2) for those who completed both the pre- and post-measures are given in Table 3. The original Control and Treatment groups (all participants) obtained similar scores on most measures apart from the CMDI. However, when looking at the baseline measures for participants who completed to T2, differences between the scores of the control and treatment groups at baseline are evident for most measures. Six weeks later (T2), both the control and treatment groups have shown improvements on all measures.

****Insert Table 3 here.

Two-way repeated measures ANOVAs (groups: control and treatment; time: T1 and T2) were conducted to compare data for those who completed both T1 (pre) and T2 (post) measures. The results of these are given in the first three columns of Table 4. In Table 4, and thereafter, statistically significant values are asterisked, bolded values represent large effect sizes and italicised values represent medium effect size using the criteria suggested by Cohen[20].

From Table 4 it can be seen that the main effect of group membership was significant for the BAI, with the controls showing higher levels of anxiety compared to the treatment group. The main effect of time of administration (T1 / T2) was significant for the CPAQ and the CPVI, reflecting the increase in acceptance scores and decrease in values illness scores over the six week period in both groups. All other effects were not statistically significant.

Table 4 also summarises the results of independent t-tests comparing the control and treatment groups test scores at T1 and T2. These show the T1 scores were not significantly different between the groups. However, at T2 there were significant differences between the groups for scores on the QOLI and BAI (with large effect sizes). The treatment group showed significantly improved quality of life and lower levels of anxiety compared to controls.

The scores from the other five tests CPAQ, SWLS, CMDI, CPVI and MPQ-SF were not significantly different between the groups at T2. However, large effect sizes were found for the difference in CPAQ scores (treatment group showing higher acceptance), and medium effect sizes for CPVI, CMDI and MPQ-SF (the treatment group showing more favourable scores in each case). The effect size for SWLS was small.

*****Insert Table 4 here.

Second Level of Analysis: Control-Treatment (C-T) Group

The means and SEs of the scores from all test administrations for each test for the five control participants who continued to treatment (and completed a minimum of three weeks of the intervention) and are given in Table 5. The results of repeated measures t-tests, comparing the measures between T1 and T2 and between T2 and T3 for the C-T group, are also in Table 5. These data show that while there were no significant differences between the T1 and T2 or T2 and T3 administrations, there were large effect sizes for T2 vs.T3 for the QOLI, SWLS, and CPVI, and medium effect size for MPQ-SF. A small effect size was seen for the CMDI for T2 vs T3.

*******Insert Table 5 here

Third Level of Analysis: Pooled Data from all Participants completing the Intervention

Table 6 gives the means and SEs for all the tests for participants who completed at least three weeks of the treatment. This includes data from the initial analysis together with the C-T group's T2 (pre-self-help intervention) and T3 (post-self-help intervention) data. The pre-test scores are those from T1 for the initial treatment group and from T2 for the C-T group. The post-tests scores are those from T2 for the initial treatment group and from T3 for the C-T group. The results of paired t-tests (pre and post-treatment) for all treatment completers are given in Table 6, while the percentage change in each of the measures can be seen in Figure 2.

Statistically significant differences (and large effects sizes) were found between the pre- and post- intervention test scores for CPAQ, QOLI, SWLS, and CPVI. This shows that overall; there were improvements in acceptance, quality of life, satisfaction with life and values illness for those who completed at least three weeks of the self-help intervention. This is reflected by the large percentage change in these scores which can be seen in Figure 2. Furthermore, a medium effect size was observed for the change in score on the MPQ-SF and a small effect size was found for the CMDI.

For clinical significance, Table 6 shows the number of participants for whom there were clinically significant improvement (as previously defined) for each measure on completion of the self help intervention. As can be seen in Table 6, the majority of participants' quality of life, satisfaction with life, acceptance and values illness measures showed clinically significant improvements. Just over half of the participants' anxiety and depression measures showed improvement, and for pain four people reported decreased pain intensity on completion of the intervention.

***********Insert Table 6 and Figure 2 here

Ratings of the self-help book

To ensure treatment integrity and to provide information about the way participants experienced the self-help book, data were collected during the weekly phone calls from participants who were completing the treatment. These data are shown in Table 7. Participants rated the degree to which they completed the weekly requirement (presented as percentage of participants who completed all, some or none of the weekly requirements). Comprehension scores (derived from weekly questions asked on the phone) were given to each participant per week and are presented in Table 7. This measure indicates the percentage of questions about the material for that week answered correctly during the weekly phone call.

Participants also rated how useful they found the weekly requirements (percentage of participants who rated the weekly material of no, some or high use), and how difficult they found the reading level for the weekly reading (percentage of participants that rated the reading level easy, medium or hard). These data are also included in Table 7. As can be seen in Table 7, most participants completed all or some of the readings and exercises for each week. In terms of comprehension, the contents of Week 4 (mindfulness) appeared to be less well understood by the participants in this study. Participants' ratings for usefulness of the weekly reading and exercises show variation, with the highest number of "no use" ratings for Week 3 (cognitive defusion). For difficulty ratings, Week 3 (cognitive defusion) received the most "hard" ratings, and the highest number of "easy" ratings were given for Weeks 2 (values) and 6 (committed action).

********Insert Table 7 here

Discussion

The results of this study support the effectiveness of the self help book by Dahl and Lundgren[11] for adults with chronic pain. In particular, statistically and clinically significant improvement and large effect sizes were shown for participants' acceptance, quality of life, satisfaction with life and values illness scores. Additionally, the pooled data indicated a medium effect size for participants' reports of reduced pain after they had completed the intervention. Thus, the present study showed that adult participants with chronic pain benefited from utilising an ACT-based self help manual, with therapist support.

These findings are in keeping with those reported in Watkins and Clum's[10] review of self-help interventions and they provide support for previous studies which demonstrated the efficacy of self-help type interventions with minimal therapist contact, for children with chronic headache and recurrent pain[22, 23].

Acceptance is a core process of ACT and one to one ACT therapy increases acceptance[24-26]. Acceptance also forms a central theme of Dahl and Lundgren's book[11] and given the significant increases in acceptance reported here, this suggests that ACT can be effectively delivered via a self help book.

From an ACT perspective acceptance is not passive but involves allowing oneself to experience thoughts, feelings and physical sensations as a means to engage in valued activities[27]. In the present study activity levels were not formally measured, however, many of the current participants reported increasing their involvement in activities they valued. These changes may be the result of the emphasis ACT gives to 'willingness to engage' and the text's[11] aim to increase the reader's valued activities and to minimise their avoidance behaviour.

Acceptance of pain, and engaging in activity despite pain, have been found to correlate positively with quality of life[28,29]. In the present study those who participated in the self-help intervention reported higher quality of life and satisfaction with life at the end of the intervention. These findings add to those from acceptance and mindfulness-based studies with problems other than pain (e.g., with Generalised Anxiety Disorder[30]) which have found increases in subjective well-being. The increases in subjective wellbeing reflect participants' reports of increased satisfaction with many aspects of their lives.

The role of values is also a core process of ACT and is emphasised by Dahl and Lundgren[11]. The efficacy of utilising one's personal values to assist with living with pain has been well established[16, 31,32]. In support of these findings, the present study found significant improvement as a result of treatment in terms of living in alignment with values. McCracken and Vowles[32] propose that acceptance and values-based action are distinct but related processes and the improvement shown in both of these areas by participants in this study support this view.

From an ACT perspective, the focus of therapy is not on reducing pain but on living a valued life. The present results showed that while participants increased their acceptance of living with pain, their pain (MPQ-SF) scores did not decrease significantly. Given that overall there was a medium statistical effect size for reduction of pain, sample size may have influenced this outcome. These findings were similar to those of Morone, Greco and Weiner[33] who carried out a randomised controlled pilot study to evaluate an eight week mindfulness group intervention for community dwelling older adults with lower back pain. Using the same measure (MPQ-SF), they found that participants from their intervention group showed improvement in pain scores on completion of the intervention, but this did not reach statistical significance. Interestingly, the Morone study[33] also reported statistically significant improvement in acceptance scores (also measured by the CPAQ) for the mindfulness intervention group. Other studies have reported statistically significant reductions in pain severity when ACT[7] or components of ACT are utilised[34, 35]. However, these studies used different measures, different populations and a different treatment format. Using the Present Pain Intensity rating scale (PPI) as a way to assess clinically significant change in pain, showed that just under half the participant's reported some improvement in pain once they had completed the intervention. In the present study pain scores may have been influenced by participants' use of pain medication at data collection times (when the MPQ-SF was administered). It was common for participants to comment that they had taken pain medications a short time prior and that their pain had been worse at a different time of the day. Such factors are likely to have interfered with the accuracy of the pre- and post-data collected for participants' pain.

Similar to other outcomes reported in the literature[36], several participants from the present study commented on the difficulty in engaging with the intervention when their pain level was higher than usual. In line with these reports, those who pulled out of the study reported higher initial pain score. However, those who participated still experienced pain.

There was little evidence to support the notion that ACT therapy delivered via a self help book improved mood. This is contrary to other research[26, 37-40]. This may, in part, be due to the use of different measures to assess mood. For example, the Pain Anxiety Symptom Scale and the BDI were most commonly used in the above studies, rather than the BAI and the CMDI, as used in the present study. The BAI was chosen for the current study to provide an overall measure of anxiety, rather than one which is pain specific, whilst the CMDI was used as it minimises the overlap between symptoms of depression and symptoms associated with pain. At baseline, around half of the participants obtained scores within the normal / non clinical range for anxiety and depression. Thus, this group would not necessarily be expected to improve further. For example, on the CMDI five of the 11 participants who completed the intervention scored below 98 (the cut off score) at baseline. Anxiety scores also showed this pattern. However, the majority of participants whose scores reflected severe depression and anxiety pre-intervention had improved (at least one level, e.g., moderate to mild for anxiety or below the cut off score for depression) at post intervention. That is even though the changes in these measures were not statistically significant, overall, the treatment completers who scored in the ‘dysfunctional’ range prior to treatment showed clinically significant improvements in depression and anxiety scores on completion of treatment. As cautioned by Jacobson and Truax[21] cutoff scores can be arbitrary and may not capture all improvements (e.g., from one end of a range to another). One participant’s anxiety score was 14 (high end of mild range) at baseline and 8 post intervention (cut off from minimum to mild range), illustrating the way in which even an analysis of clinical significance may not reflect the full picture of improvement. With this in mind, we conclude that the majority of participants who reported problematic anxiety at baseline showed clinically significant improvement after completing the intervention.

Cuijpers[9] emphasised the importance of the role of the professional in supported self-help interventions and the present study led to questions about how to define therapist ‘support’ participants received from the researcher. For example, the role of the researcher involved more than data collection but less than regular one-on-one therapy. Throughout the intervention, participants commented on the importance of the weekly phone call for motivation to complete the weekly tasks and in giving them the opportunity to ask questions. On a small number of occasions therapist input was required to support participants with difficulties that arose during the process of the intervention. This outcome mirrors the existing literature that documents the benefits of providing therapist support with a self-help intervention[9, 41]. The present outcomes also support Watkins and Clums’ [10] proposition that the role of the practitioner be made explicit to intervention participants.

Limitations

The present study utilised a small sample and included a high proportion of participants who either did not start or withdrew from the intervention. The numbers of those originally contacted to ascertain interest in participating in the study were not officially recorded. Thus the flow chart of participants begins with the 24 people who agreed to participate. However, the fact that the treatment produced statistically significant effects in this sample adds more weight to the current findings, as it is more difficult to obtain statistically significant findings with a small number of participants.

Also, no longer term follow up data were obtained to evaluate the persistence of the effects. Due to variation in the measures utilised in the study, a consistent analysis of clinically significant change was difficult. In order to provide consistency in discussing clinically significant change, and as recommended by Jacobson and Truax[21], overall improvement (shift toward mean of general population) was reported. In addition to this, information about movement from dysfunctional classification of score to more functional classification of score was also included when possible. Additional measures, e.g., of readiness to change and of level of disability, could have been included in the present study; however, adherence to the IMPAACT recommendations was considered sufficient.

Summary

This study shows support for the use of a self-help intervention with therapist support, for people with chronic pain. Those who completed the intervention showed improved acceptance, quality of life and satisfaction with life in addition to living more closely aligned with their values. Further research is warranted with a larger sample size to assess the longer term effects of the intervention, as it may prove to be a cost-effective alternative for treatment of chronic pain. Such research could include an analysis of the characteristics of those who might benefit from such an approach. In addition it would be useful examine the role of the therapist in the delivery and outcomes for self-help participants.

Acknowledgements

Thank you to the Waikato Hospital Pain Clinic and to those who participated in the study.

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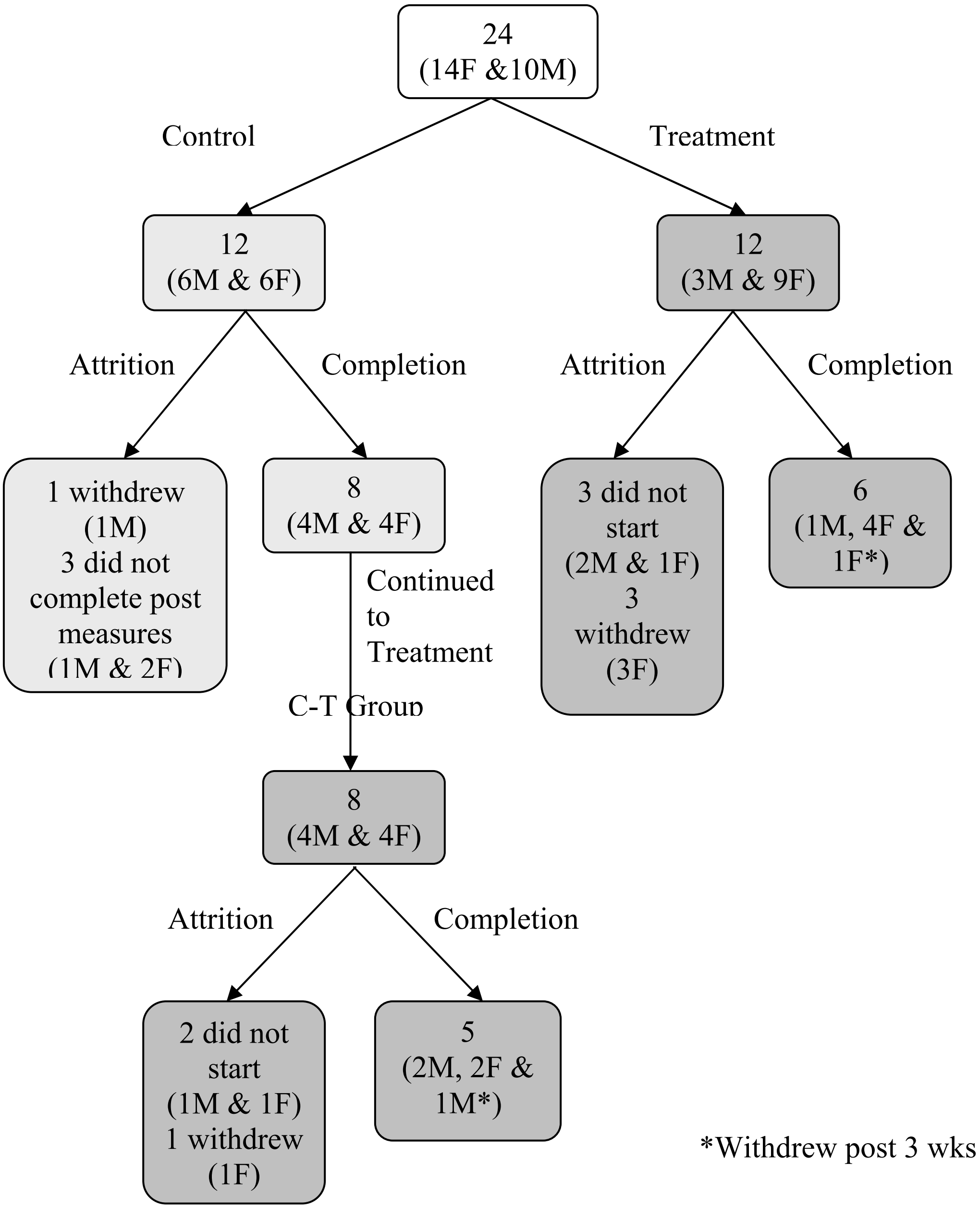

Figure 1. Flow diagram of the study design and the fate of the participants in each group. light grey boxes = control, dark grey = treatment.

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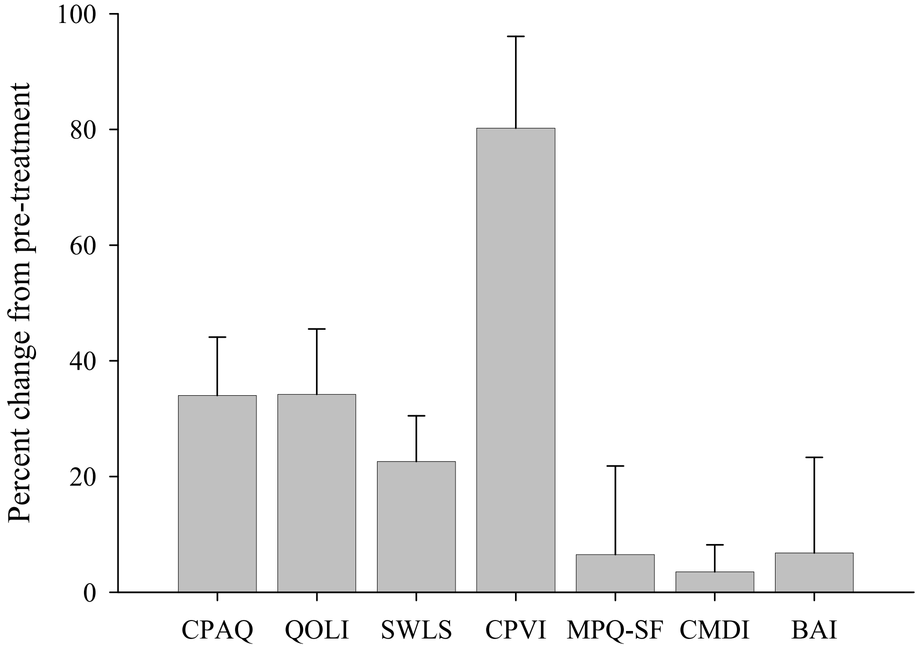

Figure 2. Percent change (+SE) from pre-treatment to post-intervention for all participants completing more than three weeks of the self help book. See text for further details.
BAI = Beck Anxiety Inventory, CMDI = Chicago Multiscale Depression Inventory, CPAQ =Chronic Pain Acceptance Questionnaire, CPVI = Chronic Pain Values Inventory, MPQ-SF = Short- Form McGill Pain Questionnaire QOLI = Quality of Life Inventory, SWLS = Satisfaction with Life Scale.

Table 1
IMMPAACT Criteria, the Corresponding Dependant Variables and Measures Utilised in this Study with Classification Scores for Functionality

IMMPACT Criterion	**Dependant Variable**	**Measure Name**	**Achronym**	**Number of items**	**Classification of scores**
Physical functioning	Acceptance*	Chronic Pain Acceptance Questionnaire	CPAQ	20	Not applicable
Global improvement	Quality of Life	Quality of Life Inventory	QOLI	32	< 42[b] 0 - 36 = very low, 37- 42= low 43-57 = average, 58 – 77 = high
Global improvement	Satisfaction with Life	Satisfaction with Life Scale	SWLS	5	Not applicable
	Values Illness*	Chronic Pain Values Inventory	CPVI	12	Not applicable
Pain	Pain	Short- Form McGill Pain Questionnaire	MPQ-SF	17	Present Pain Intensity only used (PPI) 0 = no pain, 1 = mild, 2 = discomforting 3 = distressing 4 = horrible, 5 = excruciating
Emotional functioning	Depression	Chicago Multiscale Depression Inventory	CMDI	50	> 98[b]
Emotional functioning	Anxiety	Beck Anxiety Inventory	BAI	21	0-7 = minimum, 8-15 = mild 16-25 = moderate, 26-63 = severe

* Not a formal/standardised measure
b Manual provided cutoff score for functionality

Table 2
Details of the book chapters covered each week and a summary of the content.

Week	Chapters	Summary of content
1	Introduction	*What is pain? What is ACT?*
	Ch 1 & 2	Changing one's relationship with pain, the main ideas of ACT, the pain avoidance suffering cycle, how one's experience of pain may limit participation in valued activities.
2	Ch 3	*What do you value?*
		Identifying values (important aspects of life) and the concept that values are a way of living. Introduction of 'values illness' - how one's experience with pain may inhibit them from living a life they value
3	Ch 4	*You are not your thoughts*
		How to develop distance from thoughts. Introduces cognitive defusion and the idea of thought observation without judgement.
4	Ch 5	*Mindfulness*
		Identifying three aspects of the self, and who are we if our thoughts don't identify us? How to practice mindfulness.
5	Ch 6, half Ch 7	*Are you willing? Committed Actions*
		Introduces acceptance and willingness to engage with pain. Taking committed actions (deciding what to do and doing it), and identifying obstacles to this.
6	Remainder Ch 7, Ch 8	*Committed Actions & What's holding you back?*
		Identifying vital (actions that support living a valued life) and non-vital actions, using the bulls-eye to get closer to values. Thinking about future obstacles and developing committed action plans for obstacles which may be encountered in the future

Table 3
Means, standard deviations (SD) and number of participants (N) for each test in the battery for all participants at Time 1, and for those who completed to Time 2, at Time 1 and Time 2.

	Time 1 (T1)						Time 2 (T2)		
	All Participants data at T1			T1 data for Participants who completed to T2			T2 data for Participants who completed to T2		
Group	*N*	Mean	SD	*N*	Mean	SD	*N*	Mean	SD
Chronic Pain Acceptance Questionnaire (CPAQ)									
Control	11	56.3	17.0	8	52.3	13.8	8	62.3	24.8
Treatment	12	49.5	13.1	6	59.0	8.2	5	77.4	9.1
Quality of Life Inventory (QOLI)									
Control	11	35.3	16.7	8	31.1	12.6	8	34.4	19.6
Treatment	12	35.8	11.7	6	41.5	9.7	6	51.0	5.6
Satisfaction with Life Scale (SWLS)									
Control	11	17.6	6.9	8	17.4	4.0	8	18.1	8.3
Treatment	12	15.7	6.0	6	19.3	6.5	6	22.5	6.5
Chronic Pain Values Inventory (CPVI)									
Control	11	10.0	7.7	8	16.0	9.4	8	7.0	8.7
Treatment	12	11.3	7.7	6	12.7	4.8	6	3.5	3.0
McGill Pain Questionnaire, Short Form (MPQ-SF)									
Control	11	20.5	11.9	8	22.4	10.4	8	20.1	8.4
Treatment	12	21.2	10.9	6	16.0	9.6	5	15.6	7.5
Chicago Multiscale Depression Inventory (CMDI)									
Control	11	104.4	31.0	8	113.9	24.4	8	102.6	25.0
Treatment	12	122.6	40.9	6	89.0	23.9	6	86.3	25.6
Beck Anxiety Inventory-II (BAI)									
Control	11	15.8	8.9	8	20.0	8.8	8	18.5	7.7
Treatment	12	17.5	13.5	6	12.0	8.7	6	8.3	5.4

Table 4
Two way ANOVA and independent t test results evaluating the effects of the self help intervention on the initial sample

ANOVA								t-tests (Control vs Treatment)					
		Group (G) (treatment / control)		Time (T1 / T2)		Interaction (G x Time)		T1			T2		
Measure	*df*	*F*	$P\ \eta^2$	*F*	$P\ \eta^2$	*F*	$P\ \eta^2$	*t*	*df*	*d*	*t*	*df*	*d*
CPAQ	1, 11	1.62	.13	9.61*	*.47*	.90	.08	-1.06	12	**.61**	-1.57	9.5	**1.0**
QOLI	1, 12	4.33	.27	3.55	.23	.85	.07	-1.68	12	**.97**	-2.29*	8.4	**1.6**
SWLS	1, 12	1.00	.08	1.66	.12	.63	.05	-.70	12	*.40*	.38	12	.22
CPVI	1, 12	1.09	.08	15.74*	*.57*	.01	.01	.79	12	*.46*	.93	12	*.54*
MPQ-SF	1, 11	.85	.07	1.28	.10	.03	.01	1.16	12	**.67**	.98	11	*.59*
CMDI	1, 12	2.78	.19	1.92	.14	.73	.06	1.91	12	**1.10**	1.20	12	*.69*
BAI	1, 12	9.14*	.43	.75	.06	.13	.01	1.69	12	**.98**	2.76*	12	**1.6**

d = Cohen's effect size (**bold** = large, *italics* = medium), *df* = degrees of freedom, *F*= ANOVA statistic $P\ \eta^2$= partial eta squared, *t* = t obtained from independent groups t-test, * = p<0.05. BAI = Beck Anxiety Inventory, CMDI = Chicago Multiscale Depression Inventory, CPAQ =Chronic Pain Acceptance Questionnaire, CPVI = Chronic Pain Values Inventory, MPQ-SF = Short- Form McGill Pain Questionnaire QOLI = Quality of Life Inventory, SWLS = Satisfaction with Life Scale

Table 5
The mean scores obtained by the control – treatment group participants, at the start of the control period (T1), the beginning of the intervention (T2) and after completing the intervention (T3). Data are presented as mean (SE), the *t* values from dependent *t*- tests comparing across the time periods are also presented.

	Mean (SE)				T1 vs T2			T2 vs T3		
Measure	*N*	T1	T2	T3	*t*	*df*	*d*	*t*	*df*	*d*
CPAQ	5	52.6 (9.3)	54.0 (7.9)	72 (11.6)	-0.5	4	.22	-2.7	4	.01
QOLI	5	33.8 (10.3)	33.8 (6.9)	43.8 (6.7)	0.1	4	0	-2.0	4	**.89**
SWLS	5	16.0 (4.2)	18.2 (2.2)	22.4 (3.0)	-0.8	4	.34	-2.5	4	**1.1**
CPVI	5	11.0 (2.9)	16.0 (5.2)	4.4 (3.4)	-0.8	4	.37	2.2	4	**.96**
MPQ-SF	5	22.0 (3.6)	22.8 (2.1)	19.8 (3.0)	-0.4	4	.17	1.6	4	*.73*
CMDI	5	113.1 (10.9)	111.7 (4.6)	107.1 (12.1)	0.2	4	.08	0.5	4	.22
BAI	5	20.0 (7.0)	21.8 (3.2)	19 (4.2)	-0.4	4	.19	0.4	4	.17

d= Cohen’s *d* effect size (**bold** = large*, italics* = medium) *df* = degrees of freedom N = number of participants, T1 = Time 1, T2 = Time 2, T3 = Time 3, BAI = Beck Anxiety Inventory, CMDI = Chicago Multiscale Depression Inventory, CPAQ =Chronic Pain Acceptance Questionnaire, CPVI = Chronic Pain Values Inventory, MPQ-SF = Short- Form McGill Pain Questionnaire QOLI = Quality of Life Inventory, SWLS = Satisfaction with Life Scale

Table 6
The effect of the self help book on test scores from participants who completed at least three weeks of treatment. Data are presented as mean (SE) along with the results of the repeated measures t test and summary of clinically significant improvement.

		Mean (SE)		Pre- vs. post-treatment *t* tests			Clinical Significance
Measure	*N*	Pre-test	Post-test	*t*	*df*	*d*	No participants with clin. sig. improvement
CPAQ	10	56.3 (4.3)	74.7 (5.9)	-4.1*	9	**1.30**	9
QOLI	11	38 (3.8)	47.7 (3.3)	-3.63*	10	**1.10**	10 (4 of which above cut-off)
SWLS	11	18.8 (1.7)	22.5 (1.9)	-2.82*	10	**.85**	10
CPVI	11	14.2 (2.5)	3.9 (1.6)	4.04*	10	**1.21**	10
MPQ-SF	10	20.7 (2.1)	17.7 (2.2)	1.73	9	*.55*	4
CMDI	11	99.3 (6.5)	95.8 (8.2)	.71	10	.21	6 (1 of which below cut-off)
BAI	11	16.5 (2.8)	13.2 (2.7)	.95	10	.29	7 (3 of which moved categories)

d= Cohen's *d* effect size (**bold** = large*, italics* = medium) *df* = degrees of freedom N = number of participants, *= p<0.05. BAI = Beck Anxiety Inventory, CMDI = Chicago Multiscale Depression Inventory, CPAQ =Chronic Pain Acceptance Questionnaire, CPVI = Chronic Pain Values Inventory, MPQ-SF = Short- Form McGill Pain Questionnaire QOLI = Quality of Life Inventory, SWLS = Satisfaction with Life Scale

Table 7
Participant's weekly ratings for completion of material, utility of material, difficulty of material, and comprehension of material, obtained from weekly telephone support.

Week	1	2	3	4	5	6
Corresponding content of the book	Definitions of pain & ACT Control is not the answer	Values	Cognitive defusion	Mindfulness	Willingness & committed action	Committed action & obstacles
Completion (%)						
All	81	79	75	56.	78	67
Some	13	14	25	44	22	33
None	6	7	0	0	0	0
Comprehension (% score)						
Mean	72	79	73	58	77	81
Sd	21	30	19	22	16	13
Use (%)						
Very	50	39	50	36	56	33
Medium	43	46	25	45	22	44
None	7	15	25	18	22	22
Difficulty (%)						
Easy	33	43	25	22	33	56
Medium	53	36	33	44	44	22
Hard	13	21	41	33	22	22