A Cognitive Behavioral Therapy Workbook Delivered Online with Minimal Therapist Feedback Improves Quality of Life for Inflammatory Bowel Disease Patients

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Abstract

Background: Inflammatory bowel diseases (IBDs) increase risk for depression, anxiety, secondary Irritable Bowel Syndrome and impaired health related quality of life (HRQL). Cognitive-behavioral therapy (CBT) is a promising approach for helping IBD patients cope with their disease. CBT teaches effective stress management through relaxation training, cognitive interventions that reduce maladaptive, catastrophic thinking, and behavioral interventions that reduce maladaptive avoidance, shame and secrecy and has been shown to reduce depression and anxiety. Unfortunately, access to trained CBT therapists is limited, and few IBD patients who could benefit receive this type of treatment.
Purpose: To test the acceptability and efficacy of a CBT based workbook delivered online with minimal therapist feedback in IBD patients.
Methods: 63 IBD patients with either co-morbid IBS or a high score on a measure of gastrointestinal (GI) specific catastrophic thoughts were randomized to either immediate treatment or a waitlist control.
Results: Treatment completers experienced significant decreases in GI specific catastrophizing, visceral anxiety, and levels of depression. In addition, participants in the immediate treatment group reported improved HRQL and significantly less distress about GI symptoms post-treatment. Gains were generally maintained three months post-treatment.
Conclusions: CBT is cost effective, easy to disseminate and could improve HRQL for many IBD patients. CBT can be effective in treating a sub-set of the IBD population and an online, largely self-help format of CBT may extend its benefits to those who do not have access to or cannot afford trained therapists. CBT can improve the psychological, emotional, and behavioral aspects of IBDs, which are often not addressed by medical management.
Key Words: Crohn's Disease, Inflammatory Bowel Disease (IBD), Cognitive-Behavioral Therapy (CBT), Health Related Quality of Life

Introduction

Patients suffering from Inflammatory Bowel Diseases (IBDs) are at increased risk relative to the population for co-morbid psychiatric disorders such as depression and anxiety (1). While there is some controversy about the impact of depression and anxiety on actual disease activity, there is no question that psychiatric co-morbidity negatively impacts health related quality of life in IBD patients (2, 3, 4). This remains true even when you control for the severity of the disease (5). Moreover, psychological stress has been reported to be a strong predictor of symptomatic disease course (6, 7, 8) and stress has been linked to increased inflammation (9). There are a variety of mechanisms by which psychological stress/distress has been proposed to affect inflammation, including hypothalamic-pituitary-adrenal (HPA) axis dysfunction, alterations in bacterial-mucosal interactions, effects on mucosal mast cells and mediators such as corticotrophin releasing factor (CRF) (10, 11). In addition, psychological distress is strongly related to *perceived* health in IBD patients over and above actual disease severity (12). This suggests that effective, targeted psychotherapy, as an adjunct to appropriate medical management, might significantly improve patient outcomes in a subset of IBD patients with identified co-morbidities and psychological risk factors (13). Unfortunately, IBD patients with psychiatric co-morbidities do not usually receive appropriate mental health interventions, even when their care is being managed by GI departments in large tertiary care facilities (14). This is especially unfortunate since adjunctive psychotherapy has been shown to significantly reduce health care utilization and sick days in IBD patients (15).

Of the possible therapeutic approaches, including stress management, psychodynamic psychotherapy, hypnosis and cognitive-behavioral psychotherapy (CBT), CBT has the most evidence suggesting that it might be efficacious in reducing depression and anxiety and improving HRQL in IBD patients, though it generally has limited or no impact on actual disease status or objective inflammatory markers (13, 16). Trials with adolescents have been particularly promising. For example, targeted CBT (compared to treatment as usual) has been found to improve global psychosocial functioning and reduce depressive symptoms in youth with IBDs (17, 18). Recent trials with adults have been somewhat more mixed, with most studies showing benefits in at least one or two domains but not necessarily in others (19). One of the most methodologically rigorous trials showed good short term effects on psychological outcomes and quality of life (21) but weak to no long-term maintenance of gains and no impact on objective measures of disease activity (22). However, that particular trial only included patients whose IBD had been in remission for at least 3 months at the outset of the trial, and did not target individuals with known psychological risk factors, raising the question of floor effects. CBT would be expected to be more effective when people were either currently psychologically distressed and/or actually coping with the stressors imposed by the disease.

IBD patients are also at significantly increased risk for developing secondary irritable bowel syndrome (IBS) (23). Co-morbid or secondary IBS reduces HRQL in IBD patients, even when they have been in sustained remission (confirmed by endoscopy), and is associated with heightened risk for depression and anxiety (24, 25, 26). CBT is a strongly empirically supported treatment for IBS, whether delivered in person (27), online (28, 29), or in a purely self-help format (30). Indeed, a number of meta-analyses have shown psychological

interventions for IBS to be both effective and long-lasting (e.g. 31, 32).

If CBT can indeed be helpful to a subset of at-risk IBD patients, the main challenge becomes access to treatment (33, 34, 35). Even in the United Kingdom, where the National Health Service generally recommends CBT as the front-line treatment for many psychological disorders, access to trained CBT clinicians is limited, especially in some geographic regions (36). Thus, many clinicians have called for other methods of dissemination, including online delivery of CBT, for a range of disorders (37). Such internet based interventions are generally found to be as efficacious as face-to-face, in person therapy for patients with both depression and anxiety (38, 39, 40) and for health related problems (41, 42) including IBS (43).

The goal of this study was to test the efficacy of a CBT based workbook, delivered online with minimal therapist feedback for IBD patients. We targeted individuals with either secondary IBS or with a known psychological risk factor for poor HRQL in chronic GI disorders (44). We adapted an existing internet protocol that had been developed and tested in the treatment of IBS (29, 30). The workbook was updated to include additional sections specifically on Inflammatory Bowel Disease (IBD) and was titled *Stress Management for Irritable Bowel Syndrome and Inflammatory Bowel Diseases*. The treatment utilizes a GI informed, cognitive-behavioral approach to managing stress, targeting anxiety and depression, reducing distorted, catastrophic thoughts and visceral hypersensitivity, and reducing behavioral and experiential avoidance through both behavioral experiments and targeted exposure therapy. The workbook is made up of 9 chapters and was broken up into six modules for the purposes of the study.

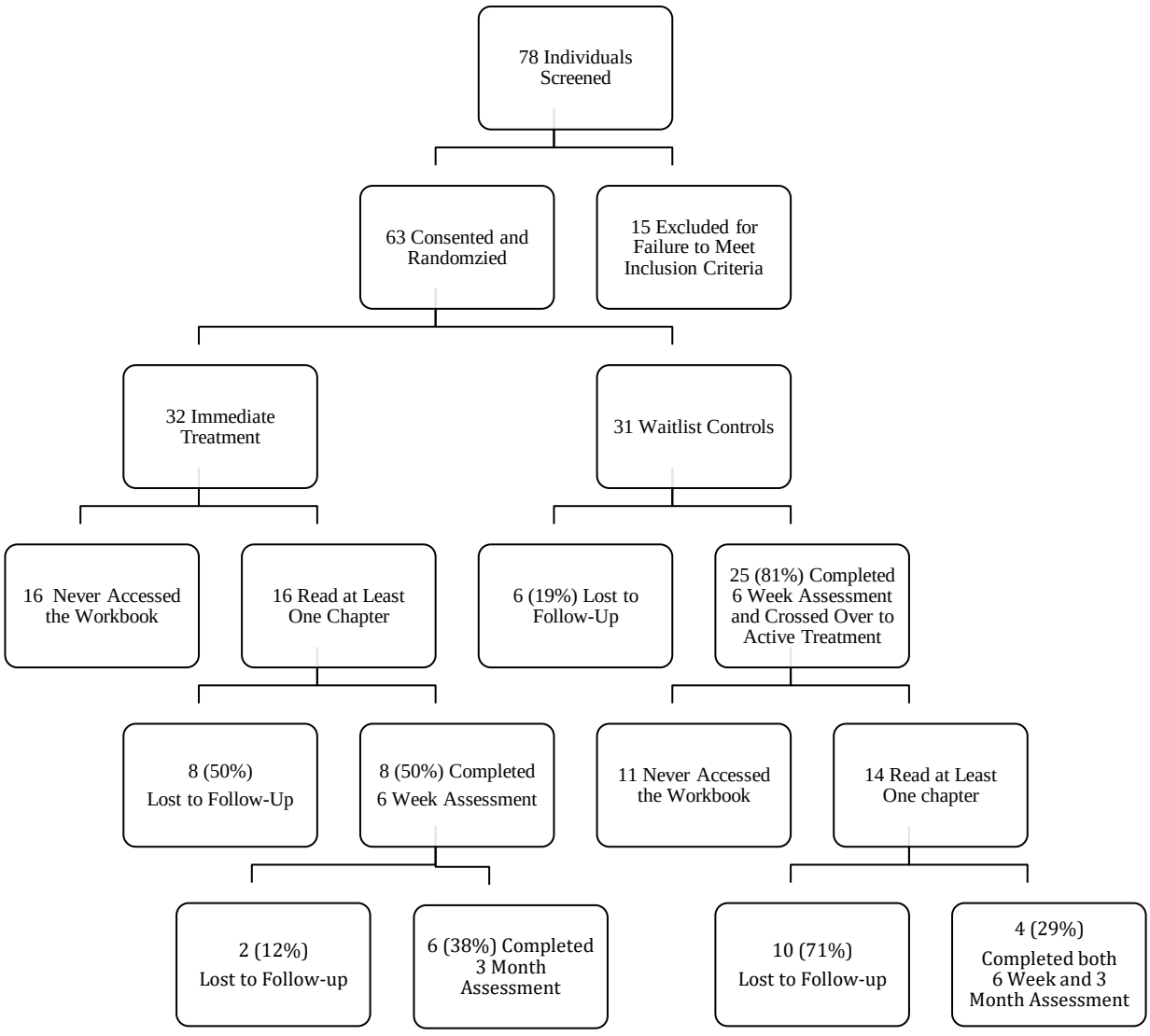
Methods

This study was approved by the Institutional Review Board at the University of Pennsylvania. All subjects were provided with an explanation of the research apprising them of potential risks and benefits. Active, informed consent was obtained from all participants before they were allowed to proceed to the intake questionnaires.

Participants

Sample: 78 individuals completed intake questionnaires to determine eligibility into the study. A total of 63 subjects met eligibility criteria and were consented into the study (47 female, 13 male, 3 declined to identify). 32 participants were randomized to the immediate treatment group, and 31 randomized to the waitlist control group. The sample consisted of 62 Crohn's Disease patients and 1 patient with Ulcerative Colitis. Nine patients had also been diagnosed with comorbid IBS. Ages ranged from 19-59 years old (M = 36, SD = 10). The majority of the sample (92%) was white, with 1.5% of the sample each reporting being Asian, black or of mixed race. According to the results of the Harvey Bradshaw Index, 21% of the sample reported being in remission, 38% reported mild disease activity, 38% reported moderate disease activity and 3% reported severe disease activity. Of the 32 participants randomized to immediate treatment, 16 (50%) actually accessed the workbook at least once and were considered to comprise the intent to treat sample. See Figure 1 for Consort Diagram of study participation.

Figure 1- Consort Diagram



Recruitment: Participants were recruited for the study in three ways: through online IBD support group websites and discussion forums such as Facebook, crohnsforum.com, healingwell.com, and ibdsupport.org; from a previous study (35); and through the gastroenterology department in the Hospital of the University of Pennsylvania.

Inclusion/Exclusion Criteria: Inclusion criteria included being at least 18 years old, and self-report of a previous diagnosis of either Crohn's disease or ulcerative colitis by a medical professional. Subjects who reported a diagnosis of both IBD and co-morbid IBS were automatically eligible for the study. Subjects with a sole diagnosis of IBD were eligible if they had a score of 20 or higher on the Gastrointestinal Cognitions Questionnaire (GI-COG) (44), which indicates at least moderate catastrophizing.

Intervention

The intervention was an adapted version of an IBS-specific workbook developed for individuals with IBS (30). See Table 1.

Table 1- Intervention

Module	**Chapters**	**Description**
Module 1	Chapters 1-3	Provides an introduction to the workbook, discussions on differential diagnosis, psychoeducation, and relaxation exercises.
Module 2	Chapter 4	Discusses "catastrophic cognitions", and introduces cognitive restructuring. Asks participants to complete and practice thought records. Participants describe a recent situation, list their thoughts associated with the situation, list their feelings connected to those thoughts, and then list a rational response/alternative explanation for the situation.
Module 3	Chapter 5	Works to focus cognitive restructuring specifically on GI symptoms and participants are asked to complete more thought records.
Module 4	Chapter 6	Describes behavioral experiments. Participants are asked to think of and complete some of their own behavioral experiments and then describe what they did and how it went.
Module 5	Chapters 7 and 8	Chapter 7 discusses avoidance behaviors and how to begin reducing them. Specifically discusses food avoidance. Chapter 8 discusses the empirical evidence regarding diet in relation to GI symptoms.
Module 6	Chapter 9	Provides concluding remarks and discussion of relapse prevention strategies such as persistent practice of the exercises in the book, as well further treatment options.

Measures

Harvey-Bradshaw Index (HBI)-The HBI, also known as the Simple Index or Modified CDAI, is a 5-item, self-report questionnaire that assesses disease activity in Crohn's disease patients. It is easy to administer and is highly correlated with the Crohn's Disease Activity Index (CDAI) (r = .93) (45, 46).

Gastrointestinal Symptom Rating Scale (GSRS) – The GSRS is a 13 item self-report scale that measures GI symptom severity across five domains (bloating, diarrhea, constipation, pain, and satiety) (47). Responses are scored on a 7-point Likert scale, ranging from 0 (Not at all) to 6 (Very Severe). Each domain has demonstrated high internal consistency, with Crohnbach's alpha ranging from .74 (pain) to .85 (satiety). The scale also demonstrates high test-retest reliability between the five domains (all r=.55 to .70), and good convergent validity (47).

Visceral Sensitivity Index (VSI) - The VSI is a 15-item self-report scale that measures gastrointestinal symptom-specific anxiety (48) . Items are endorsed on a 6-point Likert scale ranging from 0 (Strongly Disagree) to 5 (Strongly Agree). It has high internal consistency, (Cronbach's alpha of about 0.93) and a mean inter-item correlation of r = 0.47. Studies have shown the VSI to have good concurrent, divergent and discriminant validity (48).

Gastrointestinal Cognitions Questionnaire (GI-COG)- The GI-COG is a 16 item self-report questionnaire designed to assess levels of catastrophic cognitions or catastrophizing. Items are rated on a 5-point Likert scale, ranging from 0 (Hardly) to 4 (Very much). The GI-COG has been shown to have excellent internal consistency ($\alpha = .92$) and test re-test reliability ($r = .87$, $p < .001$) (44.

The Short Inflammatory Bowel Disease Questionnaire (SIBDQ) - The SIBDQ is the short version of the Inflammatory Bowel Disease Questionnaire (IBDQ). The IBDQ is the standard instrument for assessment of health-related quality of life (HRQOL) in patients with inflammatory bowel diseases (49). The SIBDQ is made up of 10 questions across four categories: bowel symptoms, emotional health, systemic systems, and social function. Responses are scored on a 7-point Likert Scale ranging from 1 (All of the time) to 7 (None of the time). Internal consistency reliability for the IBDQ is adequate at 0.70 (49).

Spielberger-Trait Anxiety Inventory (STAI)- The STAI consists of 20 items that are rated on a 4-point Likert scale, ranging from 1 (Not at all) to 4 (Very much so). The items measure current feelings or states of anxiety. Scores range from 20-80. The STAI has good test-retest reliability ranging from r = .73-.86 and is internally consistent (alpha= .92) (50)

Beck Depression Inventory (BDI)- The BDI is a 21-item self-report questionnaire that measures current patient levels of depression. The BDI is reliable, valid, and internally consistent for use in medical patients (51).

Procedure

All participants followed a link to the consent form and the intake questionnaires. Research assistants reviewed the responses and determined eligibility for each participant. If eligible, participants were randomized based on order of enrollment to either an immediate treatment group or waitlist control group. While order of enrollment is not a "true" randomization strategy, it does not introduce any bias when there is no blinding of participants and all outcome measures are based on self-report.

Immediate Treatment Condition:

Participants assigned to the immediate treatment group were granted access to the first module of the online workbook. Subjects were asked to read and complete the exercises of each module before receiving the next one.

The workbook was provided using Google documents. An individual Google doc was created for each participant and only the subject, study therapist (the lead author, who is a licensed clinical psychologist), and research assistants were able to view it. Participants were encouraged to read and complete study exercises directly into the Google doc. Participants indicated they read the module by marking an "X" at the end of each chapter. As participants completed the study exercises, they received written therapist support and corrective feedback into their individual workbooks. Once participants had completed each module and feedback had been received, research assistants added the next module into the participants' documents. Participants were given six weeks to complete the treatment. At the end of six weeks, subjects in the treatment group completed a set of post-treatment questionnaires. Three months after completing the treatment, participants were sent a set of 3-month follow up questionnaires to assess long-term effects of the intervention.

Waitlist Control Condition:

Participants assigned to the waitlist control group were asked to wait six weeks before being given the workbook. They were sent a check-in email 3 weeks into the waiting period to remind them of their participation, thank them for their patience, and answer any questions they had at that time. At the end of six weeks, the waitlist group completed the same battery of questionnaires as the immediate treatment group. They were then crossed over to the active treatment and were granted access to their individualized workbook documents. The same procedure as the immediate treatment group was followed thereafter.

Results

Baseline Severity and Attrition

At baseline, the sample reported considerable burden of illness and impaired HRQL. The baseline mean score on the SIBDQ for our sample (M =37) was comparable to and not significantly different from a sample with a physician confirmed diagnosis (M =35, *ns*) (52). Randomization was generally successful, and no significant differences were found on any demographic variables between the treatment and waitlist groups.There were also no significant differences on most of the baseline variables including HBI, GSRS, VSI, GICOG and SIBDQ. There were, however, significant differences in both depression and anxiety, with the waitlist group reporting more distress on both the BDI and the STAI than the immediate treatment group [both $t(61) > 2.75$, both $p < .01$]. However, the differences, while statistically significant, were not particularly clinically meaningful. Both groups were in the moderate range of symptom severity on both measures. All analyses controlled for baseline symptoms.

There was significant attrition from the study across groups. In the immediate treatment group, only half the individuals accessed the workbook even once. Of those 16 individuals, 8 (50%) were lost to follow-up before the 6-week post-treatment assessment, while 8 individuals completed the intervention and the 6-week assessment. This is comparable to attrition rates in other fully online internet based trials in which the cost of "enrolling" is very low. The average attrition rate in such studies is 47% (53). In the waitlist group, 6 out of 31 individuals (19%) were lost to follow-up before the 6-week assessment. Of the 25 individuals who crossed over to the active treatment, 11 (52%) never accessed the workbook. Of the 14 individuals who accessed the workbook, 10 (71%) were lost to follow-up before the 6-week assessment. None of the baseline demographic or symptom variables were associated with attrition in either the waitlist or the immediate treatment group.

Because there were such high rates of attrition, results will be reported primarily as completer analyses. However, multiple imputation of missing data was also undertaken to account for attrition, and results will be reported that way as well.

Six Week Assessment – Treatment Completers

Participants who completed the treatment showed statistically significant improvement compared to the waitlist control across all possible outcome measures with the exception of the HBI and the STAI. Moreover, all of the effect sizes, as measured by Cohen's *d*, were in the very large to extremely large range. For the GSRS, which assesses how *bothered* participants were by GI symptoms, $F(1,33) = 11.68$, $p = .002$, $d = 1.06$. For the VSI, which assesses visceral sensitivity and anxiety about GI symptoms, $F(1,33) = 17.44$, $p < .001$, $d = 1.25$. For the GICOG, which assesses catastrophizing about the social and occupational implications of GI symptoms, $F(1,33) = 24.22$, $p < .001$, $d = 1.46$. For the SIBDQ, which assesses IBD related quality of life, $F(1,33) = 12.92$, $p = .001$, $d = 1.48$. For the BDI, which assesses depressive symptoms, $F(1,33) = 5.54$, $p < .05$, $d = 1.41$. In other words, individuals who completed the treatment showed remarkable improvement HRQL, depression, and known psychological risk factors for poor outcomes (visceral hypersensitivity and catastrophizing).

Three Month Follow-Up

Individuals in the waitlist were crossed over to active treatment after the 6-week assessment. All individuals from both the immediate treatment group and the crossed-over waitlist group were pooled three months after they had finished the active treatment. Paired samples t-tests were carried out comparing their 3 month outcomes to their own baseline scores. GSRS scores had returned to being not significantly different from baseline (although the trend was still towards improvement with a moderate effect size) at $t(7) = 1.33$, *ns*, $d = .56$. However, visceral sensitivity, catastrophizing, depression and anxiety all remained significantly improved over baseline. For the VSI, $t(7) = 3.66$, $p < .01$, $d = 1.46$. For the GICOG, $t(7) = 3.23$, $p < .05$, $d = 1.29$. For the BDI, $t(7) = 2.4$, $p < .05$, $d = .95$. For the STAI, $t(7) = 2.88$, $p < .05$, $d = .63$. Quality of life remained marginally significantly improved compared to baseline with a large effect at $t(7) = 1.96$, $p = .09$, $d = .97$.

Multiple Imputation to Control for Attrition

Because only fifty percent of the sample completed the 6-week post-treatment assessment, we used multiple imputation to address the missing data. SPSS version 23 allows for multiple imputation using either Markov-Chain Monte Carlo (MCMC) modeling, when the data are missing at random, or monotone imputation strategies to reduce bias when the missing data are not random. Since none of the baseline variables predicted attrition, MCMC modeling was employed. The program then supports inferential statistics using the pooled data. We set the specifications to a total of ten iterations (54). The imputation regression included sex, age, condition, all baseline measures, and post-treatment assessment variables.

Table 2 – Means and Standard Deviations of all Outcome Measures by Condition Over Time

	Baseline Treatment N = 32 Waitlist N = 31	6 Weeks Treatment N = 8 Waitlist N = 26	Post-Treatment for Waitlist Control Waitlist N = 4	3 Month Follow-Up All Participants N = 8
HBI				
Treatment	7.9 (4.5)	5.6 (2.1)	NA	5.25 (5.5)
Waitlist	6.5 (3.4)	6.2 (2.9)	3.25 (1.7)	NA
GSRS				
Treatment	28.1 (10.7)	18.9 (6.9)	NA	20.5 (17)
Waitlist	28 (13.8)	29.6 (12.7)	16.75 (16.8)	NA
VSI				
Treatment	51.4 (12)	35.8 (8.1)	NA	42.7 (13)
Waitlist	52.8 (12.5)	49.6 (13.3)	46.7 (14.9)	NA
GICOG				
Treatment	35.7 (11.7)	21.4 (6.2)	NA	26 (10.6)
Waitlist	36.7 (9.8)	35.3 (11.8)	25.3 (9.7)	NA
SIBDQ				
Treatment	37 (7.7)	48.8 (5.6)	NA	45.6 (9.9)
Waitlist	36.4 (8.4)	37.8 (8.9)	44 (12.6)	NA
BDI				
Treatment	18 (8.7)	8.9 (5.1)	NA	13.8 (5.8)
Waitlist	24.8 (9.9)	21.8 (11.9)	22 (11.9)	NA
STAI				
Treatment	47.8 (8.7)	42 (9.5)	NA	47 (9.6)
Waitlist	54.1 (9)	51.2 (11)	58 (9)	NA

We then ran ANCOVAs comparing baseline symptoms to symptoms at 6 weeks across the active treatment and waitlist control conditions using the pooled imputed data. We found highly significant differences across *all* the variables, with the treatment group improving across the board compared to the waitlist. For the HBI, $F(1,663) = 12.2$, $p = .001$. For the GSRS, $F(1,663) = 145$, $p < .001$. For the VSI, $F(1,663) = 397$, $p < .001$. For the GICOG, $F(1,663) = 592$, $p < .001$. For the SIBDQ, $F(1,663) = 219$, $p < .001$. For the BDI, $F(1,663) = 85$, $p < .001$. For the STAI, $F(1,373) = 21$, $p < .001$. Thus, even using the most sophisticated and conservative estimates of missing data (e.g. compared to last-observation-carried-forward or LOCF analyses), the results of treatment appear to be robust.

Similarly, the pooled imputed data for all treatment completers showed significant maintenance of gains at three months, with 3 month post-treatment scores remaining significantly improved for the VSI, the GICOG and the SIBDQ.

Discussion

The goal of this study was to test the acceptability and efficacy of a GI informed CBT based workbook delivered online with minimal therapist feedback for a sub-set of individuals with IBDs. We predicted that the workbook would effectively lower levels of catastrophizing, visceral sensitivity, and depression in a population of at risk IBD patients. We also hypothesized that participants who completed the treatment workbook would have improved health related quality of life when compared to a waitlist control group. These hypotheses were strongly supported for individuals who completed the treatment. They did indeed show significantly lower levels of catastrophizing as measured by the GI-COG, and lower visceral sensitivity or anxiety about their gut symptoms as measured by the VSI. Completers also reported a greater decrease in depression symptoms and being bothered by GI symptoms less compared to the waitlist group. In addition, they reported significantly improved HRQL despite no change in disease activity. Multiple imputations to account for attrition resulted in very similar findings. Moreover, many of the gains were maintained at 3-month follow-up post-treatment. Results suggests that a GI informed CBT workbook delivered online with minimal therapist feedback can be quite helpful for IBD patients with known psychological risk factors and/or co-morbid IBS, but may not be acceptable to about half the patients to whom it is offered.

One limitation of this study is that no formal diagnostic criteria beyond self-report were used as part of the inclusion criteria. In addition, all of our baseline and outcome measures were self-report. However, overall HBI scores were equivalent to physician referred samples, and the majority reported having an active flare at baseline. This suggests our sample was appropriate for the study. In addition, not requiring physician confirmation of diagnosis maximizes our external validity. This is exactly the population, largely recruited from online support groups and forums, that would be the most likely to seek out and purchase self-help books. However, in the future the findings should be replicated in a sample with physician confirmed diagnoses.

The major limitation of these findings is that there was significant attrition from the study. Fifty percent of the participants initially assigned to the immediate treatment group never actually opened the book. Of those who did open the book, only half completed the 6-week assessment. This suggests that the "true" level of attrition was about 50%, comparable to most internet based trials (54). Given the extremely low cost of being consented into the study, we consider this the best way to think about the data.

We were able to contact 10 of the individuals who dropped out early on and requested feedback from them about their reasons for leaving the study. Not a single person suggested that the treatment felt irrelevant or not applicable. Rather, every person cited other intervening life complications or disease burden. For example, half the people cited lack of time. Others noted that they had been hospitalized shortly after consenting or that they were preparing for surgery. Most requested that we *resend* the workbook links so that they could read it when they had time.

Nevertheless, the high rates of attrition do raise important questions about the *acceptability* of this sort of psychological intervention with the IBD population. Many IBD patients, even those with co-morbid IBS or clear psychological risk factors, may be reluctant to undertake psychotherapy for what they view as a purely medical condition. Indeed, current guidelines for the management of Crohn's disease in adults promulgated by the American College of Gastroenterology note only that the role of stress is controversial, and mention psychosocial functioning only in the context of surgery (55). This is unfortunate, because it is clear from prior research that effective psychosocial treatment can decrease overall disease burden. It is also clear from the current findings that a low-cost, highly accessible and easy to disseminate CBT workbook *can* be significantly and dramatically helpful to *some* individuals with IBDs, reducing depression and GI related distress and improving health related quality of life.

Despite the limitations, we deem these results to be encouraging. This study was the first of its kind to test the efficacy of a largely self-help intervention involving no face-to-face consultation with a therapist for patients with IBDs. Many participants provided very positive feedback about the workbook, saying they found it to be supportive and helpful in reducing stress and coping with their disease. A number of them noted the *need* for this sort of intervention. For example, one participant wrote:

"GI doctors deal with the physical, but we don't get support for the emotional part.

Thank you for all of your support!"

Another commented:

"I think that this is an excellent method for helping patients with IBD cope with the anxieties that can come up. Having gone through this workbook, I feel better able to tackle them. THANK YOU!"

We are hopeful that future research will help to refine this treatment and make it both more acceptable and more effective. We are also hopeful that GI doctors will recognize the importance of helping patients find a way to address the complex psychosocial and emotional ramifications of living with an IBD, and will recommend empirically supported, CBT based adjunctive psychosocial support.

References

1. Walker JR, Ediger JP, Graff LA, et al. The Manitoba IBD Cohort Study: A Population-Based Study of the Prevalence of Lifetime and 12-Month Anxiety and Mood Disorders. American J of Gastroenterol. 2008;103:1989–1997.

2. Mikocka-Walus AA, Turnbull DA, Moulding, NT, et al. Controversies surrounding the comorbidity of depression and anxiety in inflammatory bowel disease patients: A literature review. Inflamm Bowel Dis. 2007 Feb;13(2):225–234.

3. Nordin K, Påhlman L, Larsson K, et al. Health-related quality of life and psychological distress in a population-based sample of Swedish patients with inflammatory bowel disease. Scand J Gastroenterol. 2002;37:450–457.

4. Iglesias-Rey M, Barreiro-de Acosta M, Caamaño-Isorna F, et al. Psychological factors are associated with changes in the health-related quality of life in inflammatory bowel disease. Inflamm Bowel Dis. 2014 Jan;20(1):92-102. doi: 10.1097/01.MIB.0000436955.78220.bc.

5. Guthrie E, Jackson J, Shaffer J, et al. Psychological disorder and severity of inflammatory bowel disease predict health-related quality of life in ulcerative colitis and Crohn's disease. American J Gastroenterol. 2002;97(8):1994–1999.

6. Bernstein CN, Singh S, Graff LA, Walker JR, Miller N, Cheang M. A prospective population-based study of triggers of symptomatic flares in IBD. Am J Gastroenterol. 2011;105(9):1994–2002.

7. Sajadinejad MS, Asgari K, Molavi H, Kalantari M, and Adibi P. Psychological Issues in Inflammatory Bowel Disease: An Overview. Gastroenterology Research and Practice, vol. 2012, Article ID 106502, 11 pages, 2012. doi:10.1155/2012/106502

8. Mittermaier C, Dejaco C, Waldhoer T, et al. Impact of depressive mood on relapse in patients with inflammatory bowel disease: a prospective 18-month follow-up study. Psychoso Med. 2004;66(1):79–84.

9. Maunder RG, Levenstein S. The role of stress in the development and clinical course of inflammatory bowel disease: epidemiological evidence. Curr Mol Med. 2008;8(4):247–52.

10. Mawdsley JE, Rampton DS. Psychological stress in IBD: new insights into pathogenic and therapeutic implications. Gut. 2005;54(10):1481–1491. doi:10.1136/gut.2005.064261

11. Mawdsley JE, Rampton DS. (2006). The role of psychological stress in inflammatory bowel disease. Neuroimmunomodulation. 2006;13(5-6):327–336. doi:10.1159/000104861

12. Graff LA, Walker JR, Clara I, et al. Stress coping, distress, and health perceptions in inflammatory bowel disease and community controls. American J Gastroenterol. 2009;104(12):2959–2969. doi:10.1038/ajg.2009.529

13. Knowles SR, Monshat K, Castle DJ. The Efficacy and Methodological Challenges of Psychotherapy for Adults with Inflammatory Bowel Disease: A Review. Inflamm Bowel Dis. 2013;19(12):2704–2715.

14. Bennebroek Evertsz' F, Thijssens NA, Stokkers PC, et al. Do Inflammatory Bowel Disease patients with anxiety and depressive symptoms receive the care they need? J Crohns Colitis. 2012 Feb;6(1):68-76. doi: 10.1016/j.crohns.2011.07.006. Epub 2011 Sep 9.

15. Deter HC, Keller W, von Wietersheim J, et al. Psychological treatment may reduce the need for healthcare in patients with Crohn's disease. Inflamm Bowel Dis. 2007 Jun;13(6):745-52.

16. von Wietersheim J, Kessler H. Psychotherapy with chronic inflammatory bowel disease patients: a review. Inflamm Bowel Dis. 2006;12:1175–1184.

17. Thompson RD, Craig A, Crawford EA, et al. Longitudinal results of cognitive behavioral treatment for youths with inflammatory bowel disease and depressive symptoms. J Clin Psychol in Med Settings. 2012;19(3):329-337. doi:http://dx.doi.org/10.1007/s10880-012-9301-8

18. Szigethy E, Kenney E, Carpenter J, et al. Cognitive-behavioral therapy for adolescents with inflammatory bowel disease and subsyndromal depression. J American Acad of Child & Adoles Psychiatry. 2007;46(10):1290-1298. doi:http://dx.doi.org/10.1097/chi.0b013e3180f6341f

19. McCombie AM, Mulderb, RT, Gearrya RB. Psychotherapy for inflammatory bowel disease: A review and update. J of Crohn's and Colitis. 2013;7(12,15):935–949.

21. Mikocka-Walus A, Bampton P, Hetzel D, et al. Cognitive-behavioural therapy has no effect on disease activity but improves quality of life in subgroups of patients with inflammatory bowel disease: a pilot randomised controlled trial. BMC Gastroenterology. 2015;15:54.

22. Mikocka-Walus A, Bampton P, Hetzel D, et al. Cognitive-behavioural therapy for inflammatory bowel disease: 24-month data from a randomised controlled trial. Interna J of Behav Med. 2016:doi:http://dx.doi.org/10.1007/s12529-016-9580-9

23. Halpin SJ, Ford AC. Prevalence of symptoms meeting criteria for irritable bowel syndrome in inflammatory bowel disease: systematic review and meta-analysis. Am J Gastroenterol. 2012 Oct;107(10):1474-82. Epub 2012 Aug 28.

24. Simrén M, Axelsson J, Gillberg R, Abrahamsson H, Svedlund J, Björnsson ES Quality of life in inflammatory bowel disease in remission: the impact of IBS-like symptoms and associated psychological factors. Am J Gastroenterol. 2002;97(2):389.

25. Minderhoud IM, Oldenburg B, Wismeijer JA, van Berge Henegouwen GP, Smout AJ IBS-like symptoms in patients with inflammatory bowel disease in remission; relationships with quality of life and coping behavior. Dig Dis Sci. 2004;49(3):469.

26. Farrokhyar F, Marshall JK, Easterbrook B, Irvine EJ. Functional gastrointestinal disorders and mood disorders in patients with inactive inflammatory bowel disease: prevalence and impact on health. Inflamm Bowel Dis. 2006;12(1):38.

27. Craske MG, Wolitzky-Taylor KB, Labus J, Wu S, Frese M, Mayer EA, Naliboff BD. A cognitive-behavioral treatment for irritable bowel syndrome using interoceptive exposure to visceral sensations. Behav Res Ther. 2011 Jun;49(6-7):413-21. doi:

10.1016/j.brat.2011.04.001. Epub 2011 Apr 19.

28. Ljótsson B, Andersson G, Andersson E, Hedman E, Lindfors P, Andréewitch S, Rück C, Lindefors N. Acceptability, effectiveness, and cost-effectiveness of internet-based exposure treatment for irritable bowel syndrome in a clinical sample: a randomized controlled trial. BMC Gastroenterol. 2011 Oct 12;11:110. doi: 10.1186/1471-230X-11-110.

29. Hunt MG, Moshier S, Milonova M. Brief cognitive-behavioral internet therapy for irritable bowel syndrome. Behav Res Ther. 2009 Sep;47(9):797-802. doi: 10.1016/j.brat.2009.05.002. Epub 2009 May 20.

30. Hunt M, Ertel E, Coello J, Rodriguez, L. Empirical Support for a Self-Help Treatment for IBS. Cognitive Therapy and Research, 2014 39(2), 215-227. doi:http://dx.doi.org/10.1007/s10608-014-9647-3

31. Laird KT, Tanner-Smith EE, Russell AC, Hollon SD, Walker LS. Short-term and Long-term Efficacy of Psychological Therapies for Irritable Bowel Syndrome: A Systematic Review and Meta-analysis. Clin Gastroenterol Hepatol. 2016 Jul;14(7):937-947.e4. doi: 10.1016/j.cgh.2015.11.020. Epub 2015 Dec 22.

32. Li L, Xiong L, Zhang S, et al. Cognitive–behavioral therapy for irritable bowel syndrome: A meta-analysis. J Psychosomatic Res. 2014;77(1):1–12.

33. Mohr DC, Hart SL, Howard I, Julian L, Vella L, Catledge C, et al. Barriers to psychotherapy among depressed and nondepressed primary care patients. Annals of Behav Med. 2006;32(3):254–8.

34. Young AS, Klap R, Sherbourne CD, Wells KB. The quality of care for depressive and anxiety disorders in the United States. Archives Gen Psychiatry. 2001;58(1):55–61.

35. Bee PE, Lovell K, Lidbetter N, Easton K, Gask L. "You can't get anything perfect": user perspectives on the delivery of cognitive behavioural therapy by telephone. Soc Sci Med. 2010 Oct; 71(7):1308-15.

36. Cavanagh K. Geographic inequity in the availability of cognitive behavioural therapy in England and Wales: a 10-year update. Behav Cogn Psychother. 2014 Jul;42(4):497-501. doi: 10.1017/S1352465813000568. Epub 2013 Jul 8.

37. Olthius JV, Watt MC, Bailey K, et al. Therapist-supported internet cognitive–behavioural therapy for anxiety disorders in adults. BJPsych Advances Sep 2015;21(5):290; DOI: 10.1192/apt.21.5.290

38. Newman MG, Szkodny LE, Llera SJ, et al. A review of technology-assisted self-help and minimal contact therapies for anxiety and depression: is human contact necessary for therapeutic efficacy? Clin Psych Review. 2011;31(1):89–103. doi:10.1016/j.cpr.2010.09.008

39. Ruwaard J, Lange A, Schrieken B, Dolan CV, Emmelkamp P. The effectiveness of online cognitive behavioral treatment in routine clinical practice. PLoS One. 2012;7(7):e40089. doi: 10.1371/journal.pone.0040089. Epub 2012 Jul 5.

40. Spek, V, Cuijpers, P, Nyklicek, I, et al. Internet-based cognitive behavior therapy for symptoms of depression and anxiety: a meta-analysis. Psychological Med. 2007 March;37(3): 319-328.

41. Cuijpers P. Internet-administered cognitive behavior therapy for health problems: a systematic review. J Behav Med. 2008 April;31(2):169–177.

42. Beatty L, Lambert S. A systematic review of internet-based self-help therapeutic interventions to improve distress and disease-control among adults with chronic health conditions. Clin Psychol Rev. 2013 Jun;33(4):609-22.

43. Ljotsson B, Hedman E, Lindfors P, et al. Long-term follow-up of internet-delivered exposure and mindfulness based treatment for irritable bowel syndrome. Behav Res Ther. 2011 Jan;49(1):58-61.

44. Hunt M, Ertel E, Coello J, et al. Development and validation of the GI-Cognitions Questionnaire. Cog Ther Res. 2014;38(4):472-482. http://www.springerlink.com/openurl.asp?genre=article&id=doi:10.1007/s10608-014-9607-y

45. Vermeire S, Schreiber S, Sandborn WJ., et al. (2010). Correlation between the Crohn's disease activity and Harvey-Bradshaw indices in assessing Crohn's disease severity. Clin Gastro Hep. 2010;8(4):357–363. doi:10.1016/j.cgh.2010.01.001

46. Yoshida EM. (1999). The Crohn's Disease Activity Index, its derivatives and the Inflammatory Bowel Disease Questionnaire: a review of instruments to assess Crohn's disease. Canadian J Gastro. 1999;13(1):65–73.

47. Wiklund IK, Fullerton S, Hawkey CJ, et al. (2003). An irritable bowel syndrome-specific symptom questionnaire: development and validation. Scand J Gastro. 2003;38(9):947–954.

48. Labus JS, Bolus R, Chang L, et al. The Visceral Sensitivity Index: development and validation of a gastrointestinal symptom-specific anxiety scale. Ali Pharm Ther. 2004;20(1):89–97. doi:10.1111/j.1365-2036.2004.02007.x

49. Pallis AG, Mouzas IA, Vlachonikolis IG. The inflammatory bowel disease questionnaire: a review of its national validation studies. Inflam Bowel Dis. 2004;10(3):261–269.

50. Spielberger CD. Assessment of state and trait anxiety: Conceptual and methodological issues. Southern Psychologist. 1985;2(4):6–16.

51. Arnau RC, Meagher MW, Norris MP, et al. Psychometric evaluation of the Beck Depression Inventory-II with primary care medical patients. Health Psych. 2001;20(2): 112–119. doi:10.1037/0278-6133.20.2.112

52. Irvine EJ, Zhou Q, Thompson AK. The Short Inflammatory Bowel Disease Questionnaire: a quality of life instrument for community physicians managing inflammatory bowel disease. CCRPT Investigators. Canadian Crohn's Relapse Prevention Trial. American J Gastro. 1996;91(8), 1571–1578.

53. Mathieu E, McGeechan K, Barratt A, et al. Internet-based randomized controlled trials: a systematic review. J American Med Informatics Assoc. 2013;20(3):568-576.

54. Spratt M, Carpenter J, Sterne JA, et al. Strategies for multiple imputation in longitudinal studies. Am J Epidemiol. 2010 Aug 15;172(4):478-87. doi: 10.1093/aje/kwq137. Epub 2010 Jul 8.

55. Lichtenstein GR, Hanauer SB, Sandborn WJ; Practice Parameters Committee of

American College of Gastroenterology. Management of Crohn's disease in adults. Am J Gastroenterol. 2009 Feb;104(2):465-83; quiz 464, 484. doi: 10.1038/ajg.2008.168. Epub 2009 Jan 6.