



Comparison of the Effect of Dialectical Behavior Therapy, Mindfulness Based Cognitive Therapy and Positive Psychotherapy on Perceived Stress and Quality of Life in Patients with Irritable Bowel Syndrome: a Pilot Randomized Controlled Trial

Javad Mohamadi¹ · Firoozeh Ghazanfari² · Fazlollah Mir Drikvand²

Published online: 31 May 2019

© Springer Science+Business Media, LLC, part of Springer Nature 2019

Abstract

This study aimed to compare dialectical behavior therapy (DBT), mindfulness based cognitive therapy (MBCT) and positive psychotherapy (PPT) effects on perceived stress (PS) and quality of life (QOL) among patients with irritable bowel syndrome (IBS). Seventy six eligible patients with a Rome- IV diagnosis were randomly allocated in DBT ($n = 18$), MBCT ($n = 20$), PPT ($n = 18$), and control groups ($n = 20$). All the patients were evaluated for PS by perceived stress scale (PSS) and QOL by irritable bowel syndrome quality of life (IBS-QOL) on the studied groups at the time of their inclusion in the study and 8 weeks after it. Each of the intervention groups took part in 8 group sessions. Conversely, the control group were evaluated without any intervention. 46 female and 27 male in 4 groups completed the study. The results showed significant differences between the groups based on the variables of the PSS and IBS-QOL ($p < 0.05$). In addition, levels of PS were significantly lower for the MBCT intervention compared with the other groups; besides, the significant effects of the QOL variables represented the higher scores of the PPT compared to the treatment groups. The interventions could not be generalized to other samples. Some other limitations included the lack of conducting a follow-up plan. This study provides initial evidence that MBCT and PPT are more effective than other treatment groups on PS decrease and QOL improvement among patients with IBS, respectively.

Keywords Dialectical behavior therapy · Mindfulness based cognitive therapy · Positive psychotherapy · Perceived stress · Quality of life · Irritable bowel syndrome

✉ Javad Mohamadi
javad.m6013@gmail.com

Introduction

Irritable bowel syndrome (IBS) is a chronic, common functional gastrointestinal disorder among people with an estimated worldwide prevalence of 6% using Rome IV [33]. IBS is characterized by abdominal pain, stool pattern change, distention, bloating, straining, abdominal discomfort, and urgency with a complicated etiology (Surdea-Blaga et al., 2012; [13, 27]), all of which can significantly influence daily activities and quality of life (QOL) [22]. Thus, it is likely that QOL is under the negative effects of IBS in various areas including social and occupational functioning, diet, and sexual function in addition to an increased use of health care resources ([4]; Sherwin et al., 2016). Fecal urgency and fecal incontinence are the major concerns for many IBS people, especially those suffering from diarrhea. Consequently, fecal incontinence influences QOL, psychological well-being, and work productivity unfavorably often resulting in shame, social isolation, avoidance behavior, and elevated perceived stress (PS). [1, 51].

PS is the feelings or thoughts about the uncontrollability and unpredictability of one's life that an individual has about how much psychological stress they are under at a given point in time or over a given period [40]. PS is an important contributor to the gastrointestinal dysfunction and symptoms in IBS and the most common disorder observed in gastrointestinal clinical practices [15]. Some studies have demonstrated that high PS levels are associated with an increased risk of IBS relapse [5], however, it seems that syndrome activity, and therefore relapse rate may have been over-estimated as a result [28]. Reducing PS levels may enhance outcomes by reducing the burden of functional symptoms in patients with IBS [6].

The use of dialectical behavior therapy (DBT) has been favored recently [30]. DBT was first suggested for treating the borderline personality disorder and chronic suicidal behavior [19]; however, it has been applied for managing the behavior dysregulation disorders more broadly [12]. Evidences show that borderline personality disorder and IBS are similar in terms of the behavioral elements (e.g., child abuse / neglect history and emotion dysregulation) [20, 34], and RCT data indicates that DBT group skills training may help treat patients with IBS effectively [35]. DBT was developed to integrate cognitive behavioral approaches and mindfulness/acceptance techniques [30] compliantly leading to a natural synthesis of two broader lines of therapy research for people with IBS.

Mind/body approaches are other options that are used today to reduce IBS symptoms [52]. These approaches to IBS has therefore suggested that alternate strategies targeting mechanisms other than thought content change might be helpful, specifically mindfulness or/and mindfulness based therapy approaches [44] as well as mindfulness based cognitive therapy (MBCT). MBCT includes a collection of methods (e.g., simple breathing meditations and yoga stretches) designed to increase awareness of the present moment and combine the principles and methods of cognitive therapy with mindfulness techniques [24]. Studies have shown that mindfulness can promote QOL [2], and decrease PS in IBS [6] and other inflammatory bowel diseases. Given the central role of mindfulness in MBCT, this treatment approach may help patients with IBS.

Positive psychotherapy (PPT) is another technique that is used today to reduce symptoms in chronic medical conditions [21]. PPT is a modern, structured, and therapeutic approach broadly based on the principles of positive psychology [43], which developed by Seligman, Rashid, & Parks, for depression disorder [48]. It is intended to induce and maximize positive effects by minimizing them and enhance subjective well-being and happiness by elevating optimism and gratefulness [42]. Therefore, due to having a focus on the reduce negative emotions and increase positive behaviors and interpersonal relationships [10, 47], PPT was theorized to induce some positive changes in PS and QOL in this research. The efficacy of PPT

has been proved successful on a number of psychological disorders such as depression disorder [42], type 2 diabetes [21], and people who suffer from psychosis [45]. Furthermore, currently PPT has been used in chronic medical conditions and shown hopeful results [21].

Diminished QOL and heightened PS have been found in those who suffer from IBS (Sherwin, Leary et al., 2016; [51]). Recent studies have reported DBT [35], MBCT or/and mindfulness-based approaches [2, 44] as well as PPT [42, 45] positive effects on the psychological problems such as diminished QOL in IBS and some other disorders. Nevertheless, it has not yet been determined what kind of treatment may be the most appropriate option for this disorder in terms of different psychological status, especially PS and QOL. Therefore, the primary objective of the present study was to determine DBT, MBCT and PPT efficacy on PS and QOL among patients with IBS. In addition, in this study, we tried to compare DBT, MBCT and PPT effects on PS and QOL among the afore-mentioned patients using a pilot randomized controlled trial.

Methodology

Study Design and Subjects

To this goal, 76 patients diagnosed with an active IBS according to the Rome -IV, who had attended an Taleghani Hospital and Mahdiyeh Clinic (Kermanshah, IR Iran), were randomly allocated into 4 groups: DBT ($n = 18$), MBCT ($n = 20$), PPT ($n = 18$), and control group ($n = 20$).

A physician screened participant and then a research team member administered the Rome -IV to the potential candidates. Inclusion criteria for the research were IBS patients' self-report. Nevertheless, the Rome IV Questionnaire [37, 38] was also used. To satisfy Rome IV criteria, the patients were required to have experienced the chronic abdominal pain or discomfort happening at least once a week (for female, not exclusively during menstruation) beginning at least within the past 6 months. In addition, the pain was required to be related with two or more of the following criteria at least 30% of the time: defecation, a change in the form of stool, and/or the frequency of stool. If the following conditions were observed, the patients were not included in the study; sign of organic gastrointestinal disease, previous gastrointestinal surgery, sign of pulmonary, renal, endocrine, cardiac, neurologic, or gynecological pathology that probably interfered with IBS diagnosis, and diagnosis with a severe psychiatric or comorbid chronic pain according to their self-report. Exclusion criteria also included receiving DBT, MBCT and PPT or NFB before entering the study, taking daily medications for organic gastrointestinal symptoms or medications that act on the serotonergic, catecholaminergic, or cortisol systems and absence in the sessions.

Intervention

Dialectical Behavior Therapy (DBT)

In this study, DBT skills taught were adjusted from standard DBT ([31]; Table 1). DBT training included an eight-week two hour group therapy sessions, which included the presentation of the goals and topics of the discussions related to that sessions, discussion, and exercises inside and outside the session. Additionally, from the second session, each session started with a five-minute practice of the comprehensive mindfulness through breathing and then reviewing the exercises of the previous session. Skills modules focused on mindfulness

Table 1 DBT program overview

Session number	Intervention component
1	Presenting the definition of dialectics, the principles and ways of thinking and action in a dialectical way, familiarity with the concept of mindfulness and three mind states (logical mind, emotional mind and intellectual mind)
2	Teaching skills what (includes three skills of observation, description and participation) and how (includes having a non-judgmental position, a comprehensive mindfulness and interpersonal effectiveness)
3–5	Teaching the first part of the distress tolerance skills: survival strategies in crisis training)includes four skills of distraction strategies, self-relaxation with five senses; the skills of improving moments and the technique of profit and loss(
6	Teaching the second part of the distress tolerance skills: acceptance of reality training)includes three skills of absolute acceptance, return of mind and satisfaction)
7	Teaching the first part of the emotion regulation skills: identify the emotions and label them, acceptance of emotions even if it is negative and please master skills training
8	Teaching the second part of the emotion regulation skills: teaching positive emotional experiences by creating short-term and long-term positive emotional experiences, learning to release emotional suffering by acceptance of emotions and changing negative emotions through opposite action.

exercises, emotional regulation, distress tolerance, and interpersonal effectiveness. DBT training was led by a certified DBT training coach, who had practiced DBT for more than 3 years with experience in attending DBT retreats.

Mindfulness Based Cognitive Therapy (MBCT)

MBCT program was based on the standardized MBCT manual ([46]; Table 2). In this study, MBCT program consists of eight-week 2.5-h group sessions having three main sections: practicing mindfulness meditation and yoga, sharing experiences, and psychological education. Furthermore, the patients were encouraged to practice daily for 45 min to 1 h at home by using audio CDs instructions and perform other exercises including monitoring positive or negative feelings and emotions. MBCT training was led by a psychologist, who had practiced mindfulness meditation for more than 3 years with experience in attending MBCT retreats.

Positive Psychotherapy (PPT)

PPT training included an eight-week 2.5 h group therapy sessions, which developed by [29]; Table 1). Positive psychology formed the basis of the concepts and theoretical grounds for PPT (Lee [14]). PPT training was led by a certified PPT training coach, who had practiced PPT for more than 3 years with experience in attending PPT retreats (Table 3).

Measurements

Rome IV Questionnaire

The Rome IV IBS-specific questionnaire is an authenticated self-report measure involving the diagnostic criteria for IBS patients. There are studies that support the sensitivity and high specificity as well as good test– retest reliability. [37, 38].

Table 2 MBCT program overview

Session number	Theme	Intervention component
1	Automatic pilot	<i>Psychoeducation</i> : what is mindfulness <i>Exercise</i> : mindfulness eating (“Raisin exercise”)/body scan <i>Homework</i> : mindfulness of a routine activity/body scan
2	Dealing with barriers	<i>Psychoeducation</i> : association of mood and thoughts <i>Exercise</i> : thoughts and feelings exercise/body scan/mindful breathing meditation <i>Homework</i> : body scan/breathing meditation/pleasant events calendar
3	Mindfulness of the breath	<i>Psychoeducation</i> : awareness of mind wandering and focusing on the breath <i>Exercise</i> : breathing meditation/gentle yoga/mindful walking <i>Homework</i> : breathing meditation/gentle yoga/mindful walking/unpleasant events calendar
4	Staying present	<i>Psychoeducation</i> : staying present/about irritable bowel syndrome symptoms ^a <i>Exercise</i> : meditation of sounds and thoughts/breathing meditation <i>Homework</i> : meditation of sounds and thoughts/breathing meditation/3-min breathing space
5	Allowing/letting be	<i>Psychoeducation</i> : exploring difficulty <i>Exercise</i> : breathing meditation/meditation of sounds and thoughts/exploring difficulty <i>Homework</i> : breathing meditation/meditation of sounds and thoughts/exploring difficulty/3-min breathing space
6	Thoughts are not facts	<i>Psychoeducation</i> : cognitive biases <i>Exercise</i> : breathing meditation/meditation of sounds and thoughts/exploring difficulty <i>Homework</i> : breathing meditation/meditation of sounds and thoughts/exploring difficulty/3-min breathing space
7	How can I best take care of myself?	<i>Psychoeducation</i> : choosing functional behaviors/behavioral activation/identifying triggers <i>Exercise</i> : mindfulness meditation of sounds and thoughts/breathing meditation <i>Homework</i> : meditation of sounds and thoughts/breathing meditation/3-min breathing space + action plan
8	Using what has been learned to deal with future mood	Personal reflections of course/plans for future practice and strategies for maintaining momentum/farewell <i>Exercise</i> : body scan/breathing meditation

^a The lecture relevant to depression was replaced by that about irritable bowel syndrome in session 4

Perceived Stress Scale (PSS)

The perceived stress scale (PSS) was used for evaluation of PS levels. PSS shows how much the responder considers his/her life conditions within stressful. The original scale involved 14 items, with subsequent versions involving four and ten items. Preceding studies used the four-item PSS [26], whereas recent researchers have used the ten item PSS effectively; this ten item has been used in this study to explore the stressful conditions [32]. Items are correspondent to the Likert scale ranging from zero (never) to four (very often) and total PSS score calculated by totaling scores within the negative items and adding the reverse scores of the positive items. The results show that psychometric evaluation of the PSS was consistent (estimates across two samples of college students and one sample of a smoking-cessation group: Cronbach’s $\alpha =$

Table 3 PPT program overview

Session number	Name	Goals	Examples of activity
1	A curve of life	Introduce each individual, explore the meanings of pain and a purpose in life by understanding your past	Draw a curve of life after finding the meanings of the past and present pains
2	My present	Understand and know yourself	Talk about IBS symptoms and write 10 sentences that show your understandings of feelings and emotions
3	A tree of life	Discover the positive and negative aspects of yourself	Draw a tree with good and bad fruits on it and talk about those you wish to keep or throw away
4	Family story	Discover your positive traits by helping to solve others' family conflicts	Talk about the family members' specifications of the past three generations and the conflicts between them after drawing their family tree with lines representing their closeness and problems, exchange suggestions on resolving problems
5	Healing of the hurt mind	Seek health by understanding the concept of forgiveness	Share some experiences of the situations, in which you have received emotional scars and have had to forgive and be forgiven by role playing after writing a list of them.
6	Good communication	Practice an appropriate communication	Role play in a recent stressful situation after writing about it or writing it through I-messages
7	Life and death	Practice coping with the concept of life and death, practice an appropriate communication with others	What would you write on your tombstone when you imagine your grave? Express appreciation to your family and write apologies for the emotional wounds you have left behind during your life, while making your last demands
8	Planning the future	Accept responsibility for life	Know your wishes in life and make detailed plans.

0.84–0.86; [9]); some studies confirm the validity of the PSS is acceptable [51]. The reliability of this study was estimated by using Cronbach's alpha coefficient of 0.76 for PSS.

Irritable Bowel Syndrome Quality of Life (IBS-QOL)

For QOL assessment, the irritable bowel syndrome quality of life (IBS-QOL) was utilized. This scale has a 34-item self-report questionnaire that specifies the factors influencing the health-related quality of life negatively [39]. Items are correspondent to a Likert scale ranging from 1 (not at all) to 5 (a great deal/extremely) and standardized scores range from 0 (not at all impaired) to 100 (extremely impaired), as well as higher scores indicated more impairment. In terms of the research goals, the acceptable validity of IBS-QOL was supported by some studies [39]. For example, Weaver et al. [51], studied IBS-QOL psychometrically and verified the internal consistency/reliability (Cronbach's $\alpha = 0.95$), reproducibility (intraclass correlation $\alpha = 0.86$), and convergent

and discriminant validity. In this study, the Cronbach's alpha coefficient for IBS-QOL 0.75 was used to estimate reliability.

Outcome Assessment

The participants in groups were evaluated for PS using PSS and QOL using IBS-QOL. PS and QOL were administered at the baseline time and 8 weeks after beginning the study. Accordingly, the participants in the experimental groups were evaluated before and after 8 sessions of DBT, 8 sessions of MBCT, and 8 sessions of PPT, while the subjects in the control group were assessed at the baseline and after 8 weeks of inclusion in the study without any interventions.

Statistical Analysis

Data were presented as mean \pm standard deviation and frequency (percentage), respectively. All the findings were consistent when analyzed by time (pre- and post-test periods) and group (DBT, MBCT, PPT, and control groups) via repeated measures MANOVA. The independent between-group variables included the 4 levels of DBT, MBCT, PPT and control groups. The independent within-group variables consisted of the 2 levels of pre- and post-test evaluation periods. The dependent variables were the PS and QOL variables. Bonferroni's post-hoc analysis was used to compare the PS and QOL variables between the 4 study groups before and after the interventions. Cohen's *d* provided the small, medium, and large estimations of 0.02, 0.15, and 0.35 for the effect sizes, respectively [8]. All statistical analyses were conducted with IBM SPSS Statistics, version 20.0 (IBM [23]). *p* values less than 0.05 were considered as statistically significant.

Results

Demographic Data

Totally, 126 IBS patients participated in the study to be then screened based on the eligibility criteria (Fig. 1). Out of them, 50 did not meet the eligibility criteria: 21 individuals clinically diagnosed with an active IBS not meeting Rome IV criteria were excluded from the research; 7 and 6 showed the presence of other gastrointestinal diagnoses and prior gastrointestinal surgery, respectively, while 7 taking daily medications, 4 received DBT, 3 received MBCT, and 2 received PPT before entering the research. Those participants were excluded. The remaining 80 patients were randomly into the four mentioned groups. 2 patients dropped out during each pre-test period of DBT training. Also, 1 patients dropped out at the post-test in the PPT group. Finally, 73 patients with IBS completed the study: DBT ($n = 16$), MBCT ($n = 20$), PPT ($n = 17$), and control group ($n = 20$).

As shown in Table 4, the total sample included 73 individuals (46 and 27 female and male, respectively), while the mean and standard deviation of participants' age were (30.68 ± 3.07) years, (28.60 ± 3.20) years, (28.76 ± 5.01) years and (29.85 ± 4.51) years in DBT, MBCT, PPT and control groups, respectively. Summary participant demographics data are presented in Table 4.

Descriptive Findings

The mean and standard deviation of the PSS and IBS- QOL were compared at the baseline and the 8 week of inclusion based on each group of the study (Table 5). The mean PS in the PSS and QOL in the IBS- QOL were decreased at the 8 weeks in the intervention groups, but not for the control group (Table 5).

Inferential Findings

Comparison of the PSS and IBS-QOL at the baseline and the 8 weeks of inclusion between the four groups are presented in Table 6.

The variables of PS in the PSS and QOL in the IBS- QOL were evaluated for the four groups at the baseline and 8 weeks after beginning the investigation. Repeated measures MANOVA depicted significant multivariable effects for the groups ($d=0.10, p=0.001, F_{(6,138)}=23.65, V=1.014$), and evaluation periods ($d=0.16, p=0.001, F_{(2,68)}=215.48, V=0.864$), as well as significant interaction effects between the groups and evaluation periods ($d=0.21, p=0.001, F_{(6,138)}=15.24, V=0.797$).

The univariable between-group analysis displayed significant effects for the PS ($d=0.16, p=0.001, F_{(3,69)}=12.65$), and QOL ($d=0.08, p=0.001, F_{(3,69)}=122.66$) with lower scores of the PPT compared to the other groups. The univariable within-group analysis demonstrated that the PS ($d=0.03, p=0.001, F_{(1,69)}=120.28$), and QOL ($d=0.15, p=0.001, F_{(1,69)}=402.29$) significantly improved from the pre-test to the post-test stages, regardless of the

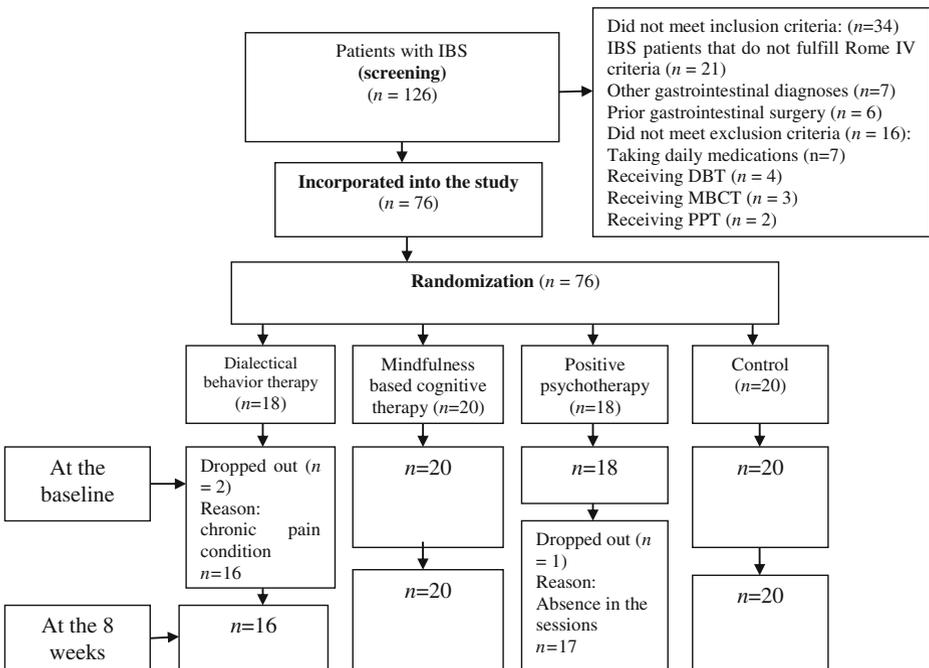


Fig. 1 Distribution of study patients

Table 4 Participant demographics

Age, $M \pm SD$	DBT group ($n = 16$) 30.68 ± 3.07 n (%)	MBCT group ($n = 20$) 28.60 ± 3.20 n (%)	PPT group ($n = 17$) 28.76 ± 5.01 n (%)	control group ($n = 20$) 29.85 ± 4.51 n (%)
Sex				
Female	8 (50.0)	11(55.0)	9 (52.9)	8 (50.0)
Male	8 (50.0)	9 (45.0)	8 (47.1)	8 (50.0)
Educational level				
Low	9 (56.3)	9 (45.0)	9 (53.0)	8 (40.0)
Medium	4 (24.9)	10(50.0)	4 (23.5)	9 (45.0)
High	3 (18.8)	1 (5.0)	4 (23.5)	3 (15.0)
Marriage status				
Marride	9 (56.3)	16 (80.0)	16 (94.1)	12 (60.0)
Single	7 (43.7)	4 (20.0)	1 (5.9)	8 (40.0)

Note. M : mean, SD : standard deviation. $N = 73$

groups. In addition, there were significant interaction effects between the groups and evaluation periods in terms of the PS, $d = 0.01$, $p = 0.035$, $F_{(3,69)} = 3.02$, and QOL, $d = 0.14$, $p = 0.001$, $F_{(3,69)} = 48.88$ (Table 6).

Post-hoc comparisons using the Bonferroni's test were indicative of significant effects for the PS associated with the higher scores of the MBCT compared to the DBT, and PPT groups ($p < 0.001$) as well as those of the experimental compared to the control group ($p < 0.001$). Also, the significant effects of the QOL represented the higher scores of the PPT compared to the treatment groups ($p < 0.001$) as well as those of the experimental compared to the control group ($p < 0.001$).

Discussion

The data analysis revealed some PS and QOL changes caused by DBT, MBCT, and PPT in IBS patients. For example, PS in the PSS and QOL in the IBS- QOL were reduced after DBT, MBCT, and PPT training ($p < 0.05$, Table 6).

Table 5 Mean and standard deviation of the PS and QOL at the baseline and the 8 weeks of inclusion between the four groups

Variable	Groups	$M \pm SD$ at the baseline	$M \pm SD$ at the 8 weeks
PS	DBT	5.64 ± 14.12	5.11 ± 10.37
	MBCT	5.78 ± 15.25	5.69 ± 11.10
	PPT	6.84 ± 14.47	5.22 ± 10.64
	Control	5.83 ± 13.05	5.90 ± 13.11
QOL	DBT	14.24 ± 85.26	13.03 ± 77.81
	MBCT	14.09 ± 86.45	13.66 ± 79.30
	PPT	89.42 ± 16.30	75.82 ± 15.10
	Control	12.05 ± 80.14	12.14 ± 80.15

M mean, SD standard deviation, PS perceived stress, QOL quality of life, DBT dialectical behavior therapy, $MBCT$ mindfulness based cognitive therapy, PPT positive psychotherapy

$N = 73$

Table 6 Main effect and interaction effect comparison of the PSS and IBS-QOL measures between the four groups

	Main effect						Interaction effect		
	Within-group			Between-group			<i>F</i>	<i>p</i>	<i>d</i>
	<i>F</i>	<i>p</i>	<i>d</i>	<i>F</i>	<i>p</i>	<i>d</i>			
PS	120.28	0.001	0.03	12.65	0.001	0.16	3.02	0.035	0.01
QOL	402.29	0.001	0.15	122.66	0.001	0.08	48.88	0.001	0.14

F and *p* values refer to repeated-measures MANOVA comparing groups, *d* = Cohen's effect size

Different studies have indicated that IBS patients have diminished QOL and heightened PS significantly correlated with IBS symptoms [4], while improvement of the PS and QOL can result in reduced IBS symptoms [35].

Mohammadi and Azizi [35], reported that DBT training can improve QOL in patients with IBS and this intervention is effective in improving IBS symptoms. The effectiveness of the DBT appears to be associated with the process of change that has been approved in some studies. For example, DBT training reduced experiential avoidance [18], and experiential avoidance is a functionally important process of change in DBT training [50]. Other change processes recognized potentially significant are emotional processing [17], and balancing acceptance and change [49].

There are some evidences that show mindfulness based interventions can promote QOL [2, 36], and decrease PS in IBS and other inflammatory bowel diseases [6]. MBCT targets various chief aspects of mindfulness including present-moment awareness, being nonjudgmental and nonreactive, and acceptance and decentering/distancing [3] that these aspects are related to the enhancement of QOL and decreasing PS in IBS patients. Some investigators have recommended reduced maladaptive cognitive processes such as rumination [25] or/and thought suppression influence the results [7].

The efficacy of PPT has been proved successful on a wide range of psychological problems including depression disorder [42], type 2 diabetes [21], and people who suffer from psychosis [45] and some other disorders. Regarding results in pervious studies and obtained results in present research, it would be mention that PPT effectiveness on PS and QOL appears to be associated with PPT techniques such as expressing gratitude, forgiveness and sharing memories about family members. However, further study is required to prove any association between PPT techniques and change mechanisms.

The main results obtained from our research were suggestive of decreased PS through MBCT compared to DBT and PPT programs based on PSS assessment. It is likely that MBCT influences the clinical results by interrupting the maladaptive links between what IBS patients think, feel, or/and do (i.e., a desynchrony effect) (Raes et al., 2009). For instance, the inclination for depressed behaviors and thoughts to be triggered by depressed mood are decreased by MBCT that influences the link between the frequency of repetitive thoughts and negative reactions to these thoughts [16]; consequently, it reduced PS in our study population. In addition, MBCT (which was one of the best therapies) lasted longer than the other therapies. Four hours more treatment could make the difference.

According to another finding of this research, PPT training was more effective on QOL than DBT and MBCT improvements among the subjects. Practice some simple intentional

positive activities (e.g., think of methods of appropriate communication with others or acceptance of life responsibilities) improve QOL in patients with IBS.

In any case, as clearly shown by our research, the DBT training had a greater impact on PS compared to MBCT and PPT groups, while the training PTT was more effective than other treatments in terms of the QOL variable. There are many different kinds of PPT training [43] or/and mindfulness based interventions leading to various outcomes [11]. Besides, DBT program consists of 4 modes of delivery including group and individual skills training, phone coaching, and group consultation for experts [19], DBT, MBCT and PPT may be altered into a very different protocol [41]. Therefore, the effectiveness of interventions may change, but its confirmation will require further study.

Limitations

This study is the first research that to compare DBT, MBCT and PPT effects on PS and QOL in IBS patients. The study had the limitation of being performed only on IBS patients and hence, the intervention could not be generalized to other samples like patients with inflammatory bowel diseases and/or other chronic medical conditions. Patients is not a large sample for an IBS study, and the group sizes were small. Some other limitations included the lack of conducting a follow-up plan and ruling out the therapist effects or non-specific factors of group psychotherapy. Therefore, future studies should consider the issues mentioned.

Conclusion

In this investigation, DBT, MBCT and PPT efficacy in reducing PS and improving QOL among IBS patients was documented. We concluded that MBCT and PPT are more effective than other treatment groups on PS decrease and QOL improvement among patients with IBS, respectively.

In brief, the results demonstrated the increasing evidence of the positively contributing DBT, MBCT and PPT effects on the treatments of different forms of chronic medical conditions, including IBS, thus indicating the effectiveness of this type of interventions.

Compliance with Ethical Standards

Conflict of Interest This study was approved by the Lorestan University of Medical Sciences and was assigned as IR.LUMS.REC.1396352 serial number and the authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

References

1. Atarodi S, Rafieian S, Whorwell PJ. Faecal incontinence—the hidden scourge of irritable bowel syndrome: a cross-sectional study. *BMJ Open Gastroenterol.* 2014;1(1):e000002.

2. Azizi A, Mohamadi J. Mindfulness efficacy on the perception of the disease and the quality of life of patients with irritable bowel syndrome. *Journal of Ilam University of Medical Sciences*. 2018;25(6):1–9.
3. Baer RA, Smith GT, Hopkins J, Krietemeyer J, Toney L. Using self-report assessment methods to explore facets of mindfulness. *Assessment*. 2006;13:27–45.
4. Ballou S, Bedell A, Keefer L. Psychosocial impact of irritable bowel syndrome: a brief review. *World J Gastrointest Pathophysiol*. 2015;6:120–3.
5. 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*. 2010;105(9):1994–2002.
6. Berrill JW, Sadlier M, Hood K, Green JT. Mindfulness-based therapy for inflammatory bowel disease patients with functional abdominal symptoms or high perceived stress levels. *J Crohn's Colitis*. 2014;8(9): 945–55.
7. Bowen S, Witkiewitz K, Dillworth TM, Marlatt GA. The role of thought suppression in the relationship between mindfulness meditation and alcohol use. *Addict Behav*. 2007;32:2324–8.
8. Cohen J. A power primer. *Psychol Bull*. 1992;112:155–9.
9. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;24: 385–96.
10. D'raven LL, Pasha-Zaidi N. Positive psychology interventions: a review for counselling practitioners interventions. *Can J Couns Psychother*. 2014;48:383–408.
11. Davis DM, Hayes JA. What are the benefits of mindfulness? A practice review of psychotherapy-related research. *Psychotherapy (Chic)*. 2011;48:198–208.
12. Dimeff LA, Koerner KE. *Dialectical behavior therapy in clinical practice: applications across disorders and settings*. New York, NY: Guilford Press; 2007.
13. Drossman DA. Functional gastrointestinal disorders: history, pathophysiology, clinical features, and Rome IV. *Gastroenterology*. 2016;150(6):1262–79.
14. Duckworth AL, Steen TA, Seligman ME. Positive psychology in clinical practice. *Annu Rev Clin Psychol*. 2005;1:629–51.
15. Edman JS, Greeson JM, Roberts RS, Kaufman AB, Abrams DI, Dolor RJ, et al. Perceived stress in patients with common gastrointestinal disorders: associations with quality of life, symptoms and disease management. *Explore (NY)*. 2017;13(2):124–8.
16. Feldman, G., Greeson, J., Senvil, J. Differential effects of mindful breathing, progressive muscle relaxation and loving kindness meditation on decentering and negative reactions to repetitive thoughts. *Behav Res Ther*. 2010;48:1002–11.
17. Feldman G, Harley R, Kerrigan M, Jacobo M, Fava M. Change in emotional processing during a dialectical behavior therapy-based skills group for major depressive disorder. *Behav Res Ther*. 2009;47:316–21.
18. Hayes SC, Strosahl K, Wilson KG, Bissett RT, Pistorello J, Toarmino D, et al. Measuring experiential avoidance: a preliminary test of a working model. *Psychol Rec*. 2004;54:553–78.
19. Hayes SC, Villatte M, Levin M, Hildebrandt M. Open, aware, and active: contextual approaches as an emerging trend in the behavioral and cognitive therapies. *Annu Rev Clin Psychol*. 2011;7:141–68.
20. Heitkemper MM, Cain KC, Burr RL, Jun SE, Jarrett ME. Is childhood abuse or neglect associated with symptom reports and physiological measures in women with irritable bowel syndrome? *Biol Res Nurs*. 2013;13(4):399–408.
21. Huffman JS, DuBois CM, Millstein RA, Celano CM, Wexler D. Positive psychological interventions for patients with type 2 diabetes: rationale, theoretical model, and intervention development. *J Diabetes Res*. 2015;428349:2015.
22. Hunt MG, Wong C, Ajmain S, Dawodu I. Fecal incontinence in people with self-reported irritable bowel syndrome: prevalence and quality of life. *J Psychosom Res*. 2018;113:45–51.
23. IBM Corp. *IBM SPSS Statistics for windows, version 20.0*. IBM Corp. Armonk, NY; 2011.
24. Idusohan-Moizer H, Sawicka A, Dendle J, Albany M. Mindfulness-based cognitive therapy for adults with intellectual disabilities: an evaluation of the effectiveness of mindfulness in reducing symptoms of depression and anxiety. *J Intellect Disabil Res*. 2015;59(2):93–104.
25. Jain S, Shapiro SL, Swanick S, Roesch SC, Mills PJ, Bell I, et al. A randomized controlled trial of mindfulness meditation versus relaxation training: effects on distress, positive states of mind, rumination, and distraction. *Ann Behav Med*. 2007;33:11–21.
26. Lackner JM, Gudleski GD, Firth R, Keefer L, Brenner DM, Guy K, et al. Negative aspects of close relationships are more strongly associated than supportive personal relationships with illness burden of irritable bowel syndrome. *J Psychosom Res*. 2013;74:493–500.
27. Lacy BE, Mearin F, Chang L, Chey WD, Lembo AJ, Simren M, et al. Bowel disorders. *Gastroenterology*. 2016;150:1393–407.

28. Lahiff C, Safaie P, Awais A, Akbari M, Gashin L, Sheth S, et al. The crohn's disease activity index (CDAI) is similarly elevated in patients with crohn's disease and in patients with irritable bowel syndrome. *Aliment Pharmacol Ther.* 2013;37(8):786–94.
29. Lee EJ. The effect of positive group psychotherapy on self-esteem and state anger among adolescents at Korean immigrant churches. *Arch Psychiatr Nurs.* 2015;29(2):108–13.
30. Linehan MM. *Cognitive-behavioral treatment of borderline personality disorder.* New York, NY: Guilford Press; 1993a.
31. Linehan MM. *Skills training manual for treating borderline personality disorder.* New York, NY: Guilford Press; 1993b.
32. Liston C, McEwen BS, Casey BJ. Psychosocial stress reversibly disrupts prefrontal processing and attentional control. *Proc Natl Acad Sci U S A.* 2009;106:912–7.
33. Lovell RM, Ford AC. Global prevalence of and risk factors for irritable bowel syndrome: a meta-analysis. *Clin Gastroenterol Hepatol.* 2012;10(7):712–21 e4.
34. Menon P, Chaudhari B, Saldanha D, Devabhaktuni S, Bhattacharya L. Childhood sexual abuse in adult patients with borderline personality disorder. *Ind Psychiatry J.* 2016;25(1):101–6.
35. Mohammadi J, Azizi A. Dialectical behavior therapy group on the perception of the disease and quality of life of patients with irritable bowel syndrome. *Journal of Ilam University of Medical Sciences.* 2017;25(2): 18–26.
36. Neilson K, Ftanou M, Monshat K, Salzberg M, Bell S, Kamm MA, et al. A controlled study of a group mindfulness intervention for individuals living with inflammatory bowel disease. *Inflamm Bowel Dis.* 2016;22(3):694–701.
37. Palsson OS, van Tilburg MA, Simren M, Sperber AD, Whitehead WE. Mo1642 population prevalence of Rome IV and Rome III irritable bowel syndrome (IBS) in the United States (US), Canada and the United Kingdom (UK). *Gastroenterology.* 2016a;150(4):S739–40.
38. Palsson OS, Whitehead WE, van Tilburg MAL, Chang L, Chey W, Crowell MD, et al. Development and validation of the Rome IV diagnostic questionnaire for adults. *Gastroenterology.* 2016b;150(6):1481–91.
39. Patrick DL, Drossman D, Frederick I, Dicesare J, Puder K. Quality of life in persons with irritable bowel syndrome: development and validation of a new measure. *Dig Dis Sci.* 1998;43:400–11.
40. Phillips AC. Perceived stress. In: Gellman MD, Turner JR, editors. *Encyclopedia of behavioral medicine.* New York, NY: Springer; 2013.
41. Ritschel LA, Lim NE, Stewart LM. Transdiagnostic Applications of DBT for Adolescents and Adults. *Am J Psychother.* 2015; 69(2):111–28.
42. Pietrowsky R, Mikutta J. Effects of positive psychology interventions in depressive patients: a randomized control study. *Psychology.* 2012;3(12):1067–73.
43. Rashid T. Positive psychotherapy: a strength-based approach. *J Posit Psychol.* 2014;1(10):25–40.
44. Sánchez SB, Gil Roales-Nieto J, Ferreira NB, Gil Luciano B, Sebastián Domingo JJ. New psychological therapies for irritable bowel syndrome: mindfulness, acceptance and commitment therapy (ACT). *Rev Esp Enferm Dig.* 2017;109(9):648–57.
45. Schrank B, Brownell T, Jakaite Z, Larkin C, Pesola F, Riches S, et al. Evaluation of a positive psychotherapy group intervention for people with psychosis: pilot randomised controlled trial. *Epidemiol Psychiatr Sci.* 2016;25(3):235–46.
46. Segal Z, Williams M, Teasdale J. *Mindfulness-based cognitive therapy for depression: a new approach to preventing relapse.* New York, NY: Guilford Press; 2002.
47. Seligman MEP, Csikszentmihalyi M. Positive psychology: an introduction. *Am Psychol.* 2000;55:5–14.
48. Seligman MEP, Rashid T, Parks AC. Positive psychotherapy. *Am Psychol.* 2006;61:774–88.
49. Shearin EN, Linehan MM. Patient-therapist ratings and relationship to progress in dialectical behavior therapy for borderline personality disorder. *Behav Ther.* 1992;23:730–41.
50. Stepp SD, Epler AJ, Jahng S, Trull TJ. The effect of dialectical behavior therapy skills use on borderline personality disorder features. *J Personal Disord.* 2008;22:549–63.
51. Weaver KR, Melkus GD, Fletcher J, Henderson WA. Perceived stress, its physiological correlates, and quality of life in patients with irritable bowel syndrome. *Biol Res Nurs.* 2018;20(3):312–20.
52. Zomorodi S, Abdi S, Tabatabaee SK. Comparison of long-term effects of cognitive-behavioral therapy versus mindfulness-based therapy on reduction of symptoms among patients suffering from irritable bowel syndrome. *Gastroenterol Hepatol Bed Bench.* 2014;7(2):118–24.

Javad Mohamadi is a psychology student from Lorestan University who has been trained in dialectical behavior therapy in Iran and has published articles in this field.

Firoozeh Ghazanfari is an associate professor of psychology at Lorestan University, who is the head of the psychological system of Lorestan province and has been trained in the field of cognitive-behavioral therapy in Iran. Currently, she is teaching trainees with a cognitive-behavioral approach.

Fazlollah Mir Drikvand is an associate professor of psychology at Lorestan University, He is interested in research in the field of health. Also, he is the director of the Department of Psychology at Lorestan University and director of the University Psychology Clinic at Lorestan University.

Affiliations

Javad Mohamadi¹ • **Firoozeh Ghazanfari**² • **Fazlollah Mir Drikvand**²

Firoozeh Ghazanfari
firoozeh.ghazanfari@yahoo.com

Fazlollah Mir Drikvand
Fazlolah2020@gmail.com

¹ Lorestan University, Khoram Abad, Iran

² Department of Psychology, Lorestan University, Khoram Abad, Iran