Original Article

Access this article online

Quick Response Code:

Website: www.jehp.net

DOI: 10.4103/jehp.jehp_1924_23

Effectiveness of a bioenergy economy program versus mindfulness-based cognitive therapy on the severity and psychological symptoms of irritable bowel syndrome

Mahboubeh Farzanegan[1,2], Ali Azizi[2], Shahla Safavi Fard[3], Ali Sadeghi[2], Mozhgan Arefi[3], Hasan Shahoon Badi[4], Payman Adibi[4,5], Hamed Daghaghzadeh[4,5], Hamid Afshar Zanjani[6]

[1]Department of Bioenergy and Psychosomatic Health, Energy Medicine University, California, USA, [2]Department of Psychosomatic Research, Danesh-e Tandorosti Institute, Isfahan, Iran, [3]Department of Psychology, Islamic Azad University of Khorasgan, Isfahan, Iran, [4]Gastroenterology and Liver Research Center, Isfahan University of Medical Sciences, Isfahan, Iran, [5]Department of Gastroenterology, Isfahan University of Medical Sciences, Isfahan, Iran, [6]Department of Psychiatry, Isfahan University of Medical Sciences, Isfahan, Iran

Address for correspondence:
Mrs. Shahla Safavi Fard, Department of Psychology, Islamic Azad University of Khorasgan University Blvd, Arqavanieh, Jey Street, Isfahan, Iran.
E-mail: sat.safavi@gmail.com

Received: 27-11-2023
Accepted: 20-04-2024
Published: 28-03-2025

Abstract:

BACKGROUND: Irritable bowel syndrome (IBS) is the most common functional gastrointestinal disorder causing a great burden on patients' lives due to its physical and psychological symptoms. Mindfulness-based cognitive therapy (MBCT) has previously alleviated IBS symptoms. Bioenergy economy (BEE) is a novel mind-body intervention that has shown moderating effects on many psychological and physical symptoms, particularly in chronic diseases. This research aimed to compare the effectiveness of MBCT and BEE on IBS symptom severity, somatic symptoms, depression, and anxiety.

MATERIALS AND METHODS: This study was conducted using a quasi-experimental method with a pre-test, post-test, and follow-up design with a control group in Isfahan, Iran. Forty-five patients with IBS were divided into two experimental and one control group (15 subjects in each group). The patients were assessed using the ROME III Diagnostic Criteria for IBS, IBS Severity Index (IBS-SI), Beck Depression Inventory-II (BDI-II), Beck Anxiety Inventory, and Patient Health Questionnaire (PHQ-15) before and after the intervention. Data were analyzed using analysis of covariance, and SPSS-22 software was used.

RESULTS: The findings showed that MBCT and BEE both had significant effects on the IBS symptom severity, somatic symptoms, depression, and anxiety ($P < 0.01$), but there was no significant difference between the mean scores of the two experimental groups in any of the post-test or the follow-up stages ($P > 0.05$). This concludes that there was no difference between the effectiveness of MBCT and BEE programs ($P > 0.05$).

CONCLUSION: Although both interventions had significant results in improving patients' symptoms, the BEE program had a stronger and wider range of effectiveness.

Keywords:

Anxiety, depression, irritable bowel syndrome (IBS), mindfulness, psychosomatic disorders, psychosomatic medicine

Introduction

Irritable bowel syndrome (IBS) is the most common functional gastrointestinal disorder (FGID). IBS is described by abdominal pain or discomfort, alteration of bowel habits, and disordered defecation in the absence of organic disease.[1] The disease is defined by abdominal pain, constipation, diarrhea, or a combination of

How to cite this article: Farzanegan M, Azizi A, Fard SS, Sadeghi A, Arefi M, Badi HS, *et al*. Effectiveness of a bioenergy economy program versus mindfulness-based cognitive therapy on the severity and psychological symptoms of irritable bowel syndrome. J Edu Health Promot 2025;14:107.

both diarrhea and constipation, mucus discharge along with stools, and changes in the form of stools.[2] IBS affects as many as 5%–20% of individuals globally, and it is more prevalent in women than men.[3] Recently, it has been declared that the prevalence of IBS is rising among Asian communities. In Iran, the prevalence of IBS was in the range of 1.1%–25% and was found to be more common in women.[4] Many researchers assessed psychological parameters to provide a clear understanding of the psychological burdens of IBS. Patients with IBS report high rates of psychopathology, increased suicidal ideation, and low quality of life. These patients miss more work days, are less productive at work, and use many healthcare resources.[5] Accordingly, primary care visits account for up to 30% of the total direct healthcare costs for patients with IBS, while inpatient care accounts for another 25%–30%.[6] Nearly 40%–60% of patients with IBS have comorbid psychiatric diagnoses (anxiety, major depression, and post-traumatic stress disorder (PTSD)).[5] Various pieces of research have shown that several factors, including visceral hypersensitivity, abnormal motility of the intestine, neurotransmitter imbalance, inflammation, disturbance of brain-gut interaction, autonomic and hormonal events, abnormal central processing, genetics, and environmental factors, may contribute to the incidence of IBS.[4] Psychological factors are also directly or indirectly associated with the pathogenesis of IBS. These factors can affect intestinal function via the autonomic nervous system and brain-gut axis. Psychological factors include environmental factors (incentives, family function, abuse history, psychosocial stressors, and life events such as divorce, unemployment, and death of a close relative), personality traits (neuroticism, agreeableness, and conscientiousness), health beliefs and coping with stress (hypochondriacally beliefs, alexithymia, and health beliefs), maladaptive coping (catastrophizing, self-blame, and substance abuse), negative emotions and psychiatric disorders, and mood disorders (major depression and dysthymic disorder).[7] The lack of satisfactory medical treatment for IBS has led to the development of a variety of psychological therapies, lifestyle, and dietary modifications. Psychological therapies as a whole have demonstrated good efficacy in reducing the intensity of IBS symptoms.[8] Patients with IBS have been shown to have high levels of gastrointestinal (GI)-specific anxiety. It has been observed that GI-specific anxiety acts as an inside stressor, which might be continued steadily by IBS symptoms even in the absence of external stressors. Psychotherapies such as cognitive-behavioral therapy (CBT) and hypnosis positively improve symptoms.[9,10] However, only a subset of patients improved. The potential mechanisms for such psychological therapies are not fully understood, and improvements were found to be moderate and inconsistent.[11]

Mindfulness approaches, with their focus on acceptance and global change, have the potential to be particularly efficacious. Mindfulness-based cognitive therapy (MBCT) was manualized by Segal *et al*.[12] based on Kabat-Zinn's mindfulness-based stress reduction (MBSR) program.[13] MBCT, through its hypothesized mechanisms, could be an alternative treatment for patients with IBS.[14] MBCT is based on contemplative spiritual traditions in which mindfulness and conscious awareness in the present moment are actively experienced in an open and nonjudgmental manner. The application of mindfulness-based techniques is intended to target unhelpful psychosocial processes such as worry, rumination, and poor emotion regulation. These techniques could lead to improved physiological processes, symptoms, and quality of life. Therefore, there is developing interest in the use of MBCT to treat IBS. MBCT merges elements of cognitive therapy that facilitate a detached or decentered view of one's thoughts toward integration.[15] As somatic symptoms and psychological pain are common in patients with IBS, attention with openness, curiosity, and acceptance could help these patients connect with their somatic symptoms, thoughts, and feelings.[16] The efficacy of MBCT in the reduction of depression, anxiety, and somatic symptoms in patients with IBS is well documented in previous studies.[17-19] In addition, energy-based therapies are used in several clinical conditions such as anxiety, chronic pain, and wound healing.[20] Bioenergy economy (BEE) is an integrative care model founded by Goli.[21] The BEE program, as a contextual body-centered approach, tries to make our happiness, salutogenesis, and evolution more unconditional and self-organizing through mindful teleonomic cathexis.[22] Accordingly, BEE is an integrative healing model that tries to abstract healing modalities and integrate them into a psychosomatic health system. This methodological healing system is based on biosemiotics interactions, which are addressed in energy medicine as a fundamental aspect of biomedicine and the translation of consciousness, information, energy, and matter (CIEM) across four levels of body economy, narrative economy, relation economy, and intention economy. The BEE focuses on enhancing the CIEM pathways of salutogenesis. BEE uses strategies such as reprocessing energy information flows, releasing blockages, and resonating biofield with the aim of sustainable development of happiness.[22] According to the effectiveness of BEE on depression, anxiety, and somatic symptoms, it seems to be suited for the therapeutic demands of patients with IBS.[23-27]

Furthermore, due to the commonalities of MBCT and the BEE program in modalities such as cognitive, behavioral, mindful, and body-centered approaches, they are a perfect pair for comparison. Additionally, considering the presence of other influential factors within the BEE,

such as spiritual and energy dimensions, this body-centered approach may have a noticeable impact on improving anxiety and depression in patients with IBS. According to WHO, to evaluate the effectiveness of one type of treatment, the study ought to compare it with other supplementary and biomedical approaches.[28] Thus, this research compared the effectiveness of the BEE program versus MBCT on depression, anxiety, and physical symptoms in patients with IBS.

Materials and Methods

Study design and setting

This study was conducted using a quasi-experimental method with pre-test, post-test, and follow-up design with a control group.

Study participants and sampling

The research population included all women and men with IBS referred to an internist in Isfahan in 2017. The sample consisted of 45 subjects divided into two experimental and one control group (15 subjects in each group). The inclusion criteria were the definitive diagnosis of IBS by an internist, subject selection from 30–60-year-old patients, having at least reading and writing skills, completing the questionnaires, and willingness to participate in the study. The exclusion criteria were the history of participation in MBCT and BEE classes and subjects who were absent for more than one session in classes.

Data collection tools and technique

Procedure

Forty-five subjects were randomly put into the experimental and control groups. The first experimental group (n = 15) underwent MBCT within eight 90-minute weekly sessions that lasted 8 weeks. The second group (n = 15) underwent BEE within eight 90-minute weekly sessions, again lasting for 8 weeks. The control group (n = 15) received no training in this period. At last, the post-test was carried out on the three groups. These groups were given the follow-up test after 1 month of education, and the effectiveness of the independent variable on tests and the stability of the teaching effect was investigated using statistical methods.

ROME III Diagnostic Criteria for IBS: This questionnaire has been accepted around the world as a standard criterion for IBS diagnosis with high validity.[29] Cronbach's alpha of the Rome III criteria was calculated as 0.90. When the compliance between expert assessment and IBS Rome III diagnostic criteria was compared, the diagnostic criteria's sensitivity was determined as 78.6%, and their specificity was 82.9%. When the Rome III criteria test-retest agreement was analyzed, the sensitivity, specificity, and negative and positive predictive values of the Rome III diagnostic criteria were determined as 97.4%.[29,30]

The IBS Severity Index (IBS-SI): The IBS Severity Index (IBS-SI) was used to determine the severity of the disease in the subjects. This index incorporates pain, distension, bowel dysfunction, and quality of life/global well-being. It is interpreted as follows: 0–75: In remission/No Disease, 75–175: Mild case, 175–300: Moderate case, and 300–500: Severe case.[31]

Beck Depression Inventory-II (BDI-II): Beck Depression Inventory (BDI-II), the revised form of BDI, is a 21-item self-report inventory. It is applied to determine the severity of depression and depressive symptoms in psychiatric patients and determine depression in the general population. The scores of the inventory are placed up to 3 based on four options (0–3) for the absence of the specific indication to the highest degree of the sign in the scope. Beck *et al*.[32] reviewed studies that had used this tool and found that its reliability coefficient using retesting varied from 0.48 to 0.86 according to the distance between the frequency and the running. Several studies have been conducted in Iran to measure the psychometric properties of BDI-II; its reliability was found to be 0.78, and its validity varied from 0.70 to 0.90.[33]

Beck Anxiety Inventory: The Beck Anxiety Inventory includes 21 items, and there are four options for every phrase to answer. Each phrase reflects one of the symptoms of anxiety that is usually experienced by people who are clinically anxious or are in a state of apprehension. The subjects sign their suffering from symptoms of anxiety for their last week in a column. The scoring system includes the following categories: "not at all" (score: 0), "low" (score: 1), "medium" (score: 2), and "severe" (score: 3). The anxiety scores can range from 0 to 63. In 1988, Beck *et al*.[32] reported a high reliability of the questionnaire, with a coefficient of 0.75, based on the retesting of 83 outpatients within a week. Fydrich *et al*.[34] reported an alpha coefficient of as high as 0.94 for 40 outpatients. In a study on the Iranian population, Cronbach's alpha coefficient was 0.90.[6] In addition, the validity, reliability, and internal consistency of the Beck Anxiety Inventory on the Iranian population were recorded as 0.72, 0.83, and 0.92, respectively.[33,34]

The Patient Health Questionnaire (PHQ-15): The PHQ-15 is a validated brief self-report screening for somatoform disorders, including the 15 most typical somatic complaints in primary care. Participants rate the somatic symptom burden within the preceding 4 weeks on a 3-point scale (0 = "not bothered at all" to 2 = "bothered a lot"). The PHQ-15 has proven to be a reliable instrument ($\alpha = 0.80$).[35] In a study, Cronbach's

alpha of 0.79 was reported for this questionnaire. The concurrent validity of this questionnaire with the physicalization scale of the SCL-90 questionnaire is 0.74, and the internal consistency of this questionnaire is reported as 0.76 using Cronbach's alpha method.[35]

Intervention

Mindfulness-based cognitive therapy

The instructions for treatment sessions are presented in Table 1. They are based on the guidelines for MBCT for depression.[36]

Bioenergy economy

According to the guidelines for the BEE-based Health Improvement (BEHI) program, a specific training package was designed in eight sessions of 120 minutes for 8 weeks.[37,38] In the interval between classes during the week, the two intervention groups were asked to perform the home exercises. Moreover, the summary of the educational materials in each class and the exercises of each session were presented to the class members in the form of a CD and a written summary, respectively. A summary of the sessions is presented in Table 2.

Ethics consideration

Ethical considerations in this research were such that participation in this research was completely voluntary. Before starting the project, the participants were familiarized with the specifications of the project and its regulations. People's attitudes and opinions were respected. The members of the experimental and control groups were allowed to withdraw from the research at any stage. In addition, if interested, the members of the control group could receive the intervention performed for the experimental group in similar treatment sessions after the completion of the plan. All documents, questionnaires, and confidential records were only available to the executives. All candidates were elaborated on the study's perspective and afterward, written informed consents were obtained. The study protocol was approved by the Islamic Azad University of Khorasgan's ethics committee (Ethical code: 23820705952061) and was held in total accordance with the Declaration of Helsinki.

Statistics

In the descriptive analysis of the data, the statistical indices related to each of the research variables were calculated. In the inferential statistics section, analysis of covariance and SPSS-22 software were used.

Results

Based on the descriptive findings of the study, the mean ± SD age of the MBCT, BEE, and control groups was 38.07 ± 10.07, 39.33 ± 12.7, and 37.53 ± 9.11 years, respectively. According to the marital status, in MBCT, BEE, and control groups, 73.3%, 66.7%, and 86.7% of the individuals were married, respectively. Regarding the education level, 53.3%, 20%, and 53/3% of individuals had bachelor's degrees in MBCT, BEE, and control groups, respectively. As shown in Table 3, the mean scores of the IBS severity of symptoms, somatic symptoms, depression, and anxiety of the groups were different in the pre-test, post-test, and follow-up stages.

Table 1: MBCT themes and content

Session	Themes	Home practice
Orientation session	Explaining the rationale of MBCT[1] concerning a person's history and expectations for attending MBCT	
Session one	Introducing "automatic pilot" and how it contributes to depression. Attending to direct experience through the five senses and body	Body scan and mindfulness of a regular activity
Session two	Doing and being mode. Awareness of unpleasant, pleasant, and neutral experiences, using the body to stay present	Body scan, mindfulness of breathing, pleasant events, and mindfulness of regular activity
Session three	Staying with the present experience. Using breathing and body as an anchor to connect to the present moment	Mindful movement, stretching, and breathing, along with regular breathing spaces
Session four	Linking habitual reactions to the unpleasant event with depression. Staying present with experience.	Sitting meditation, breathing, along with regular breathing spaces
Session five	Needing no things to be different from how they are. Relating differently to experiences, accepting experience. Choice and responding.	Sitting meditation and working with difficulties, breathing, along with regular breathing spaces
Session six	Seeing thoughts as products of the mind. Thoughts are not facts. Relating differently to thought	Selection of a guided practice, breathing, along with regular breathing spaces
Session seven	Taking care of oneself in the face of lowering mood, responding to one's pattern of early warning signs of depression, taking wise and skillful action	Sitting meditation, breathing space, and developing an action plan using the "working wisely with unhappiness and depression" worksheet
Session eight	Reviewing and reflecting on learning. Planning to continue mindfulness practice	
Follow-up	Reinforcing people to do daily mindfulness practice, share experiences, and learn from each other	

[1]Mindfulness-based cognitive therapy

Table 2: BEE themes and content

Session	Title	Focuses	Activities – Homework
Session 1	Program Orientation	The opening session, initiation, and goal setting	Explaining rationales and integrating participants' common motives into the BEE[2] program objectives.
Session 2	Body Economy	Basic concepts of BEE and body-centered emotion regulation	Contemplation on needs, resources, and sustainable development of happiness introducing bodily memory and armors, the distinction of load and work/Practicing "diaphragmatic breathing"/Practicing "body refinement" - shifting from distressing object to releasing the body.
Session 3	Body Economy	Levels of pleasure and tensegrity as being secure in body	Contemplation on pleasure from the sooner and the more to the sustainable and the unconditioned levels, Security as the key for higher levels of BEE/Practicing "wavy breathing," bioenergetic vibration, and percussion exercises/Practicing "tensegrity meditation."
Session 4	Narrative Economy	Attention flexibility and bioenergy reprocessing	Clarification of values and revealing resources/Practicing "attention exercises"/"Gratitude practice"/Continuing tensegrity meditation.
Session 5	Narrative Economy	Memory flexibility and re-narrating ourselves based on body wholeness	Introducing bodily states as the music of our autobiographic song/Practicing "self-directed and pragmatic speech"/Practicing "fluent-focused body awareness."
Session 6	Relation Economy	Relation flexibility and intercorporeal bioenergy Reprocessing	Introducing self as a micro-society, and others as value systems of self/Practicing "fielded body awareness"/Practicing awareness of "distance, angle, and bond."
Session 7	Intention Economy	Intentionality, value-based goal setting, and imagination	Contemplation on salutogenesis and the four acts of wholeheartedness: gratitude, forgiveness, amazement, and donation/ From the imaginary to the value-based goal setting/Practicing goal-directed visualization; from image to bodily state/Continuing the fluent-focused body awareness.
Session 8	Intention Economy/ Conclusion	The way of unconditioned love, and transpersonal communication	Contemplation on salutogenesis and wholeness/Practicing "nonlocal body awareness"/Setting daily routine practices and notices.

[2]Bioenergy Economy

Table 3: Mean and standard deviation of pre-test, post-test, and follow-up scores of the studied variables

Variables	Groups	Pre-test		Post-test		Follow-up	
		M[3]	SD[4]	M	SD	M	SD
Severity of symptoms	MBCT[5]	127.33	58.85	105.33	35.43	83.33	34.74
	BEE[6]	127.33	59.93	76.67	33.73	66	28.73
	Control	128	46.63	120	39.46	148	47.09
Somatic symptom	MBCT	23.60	5.37	21.13	3.02	21.27	4.46
	BEE	24.33	4.22	18.47	2.921	18.93	2.66
	Control	22.86	4.79	23.53	4.67	22.67	5.14
Depression	MBCT	15.53	11.25	8.13	7.62	7.2	9.67
	BEE	19.07	7.45	5	7.45	6.27	6.69
	Control	16.45	10.16	14.53	9.66	17.53	7.11
Anxiety	MBCT	16.67	10.39	8.4	7.07	9.4	8.97
	BEE	16.6	8.76	6.27	5.3	5.07	3.39
	Control	16.4	7.67	15.53	7.46	11.93	2.96

[3]Mean, [4]Standard Deviation, [5]Mindfulness-based cognitive therapy, [6]Bioenergy Economy

According to Table 3, the mean scores of the IBS severity of symptoms, somatic symptoms, depression, and anxiety were decreased in the post-test and follow-up of the MBCT and BEE groups. In this study, the analysis of covariance was used for the inferential analysis of the results. Before performing the test, the Kolmogorov-Smirnov test was used to check the normality of the research data. The null hypothesis for the normality of the distribution of research variables in the pre-test, post-test, and follow-up stages was confirmed. Thus, the research variables were following the normal distribution.

Table 4 demonstrates the findings of the analysis of covariance. According to the values of F and its significance levels, as well as the results of the effects between subjects (group membership) or the effects of independent variables (MBCT and BEE), it was observed that the difference between the adjusted score means of the intervention groups was significant ($P < 0.05$). This significance applies to the four measured values in the post-test and follow-up stages. Thus, the intervention methods were effective in the post-test and the follow-up investigations.

To determine the effectiveness of each group compared to the other group, a pairwise comparison of the groups with the Bonferroni test was used; the results are reported in Table 5.

According to Table 5, there was no significant difference between the mean scores of the two experimental groups in any of the post-test or the follow-up stages. This concludes that there is no difference between the effectiveness of MBCT and BEE programs.

Although there was no significant difference between MBCT and BEE interventions, there were profound differences in comparing the MBCT-Control and the BEE-Control data. There was a significant difference between the mean scores of the BEE group and the control group in terms of symptom severity, somatic symptoms, depression, and anxiety in the post-test and

Table 4: Multivariate analysis of covariance test under the influence of group membership on research variables

Variables	SS[7]	Stage	SS	DF[8]	MS[9]	*F*[10]	*P*[11]	Eta2
Severity of symptoms	Pre-test	Post-test	11045.54	1	11045.54	10.23	0.003	0.2
		Follow-up	5789.86	1	5789.86	4.42	0.04	0.10
	Group membership	Post-test	14460.38	2	7230.19	6.7	0.003	0.25
		Follow-up	53351.12	2	26675.56	20.36	0.000	0.50
Somatic symptom	Pre-test	Post-test	49.45	1	49.45	4.024	0.05	0.09
		Follow-up	48.43	1	48.43	2.843	0.09	0.06
	Group membership	Post-test	215.08	2	107.54	8.753	0.001	0.30
		Follow-up	123.8	2	61.90	3.632	0.035	0.15
Depression	Pre-test	Post-test	1134.39	1	1134.39	26.38	0.000	0.39
		Follow-up	284.025	1	284.025	4.932	0.03	0.11
	Group membership	Post-test	886.02	2	443.01	10.3	0.000	33.4
		Follow-up	1236.36	2	618.18	10.73	0.000	33.4
Anxiety	Pre-test	Post-test	783.24	1	783.24	29.4	0.000	0.42
		Follow-up	331.82	1	331.82	12.6	0.001	0.23
	Group membership	Post-test	723.88	2	361.94	13.6	0.000	0.40
		Follow-up	367.26	2	183.63	6.97	0.002	0.25

[7]Sum of the Square, [8]Degree of Freedom, [9]Mean Square, [10]*F*-value, [11]*P*-value

Table 5: Pair comparison results of the effect of group membership on research variables (Bonferroni test)

Values	Compared groups	Post-test mean difference	*P*[12]	Follow-up mean difference	*P*
Severity of symptom	BEE[13]-MBCT[14]	26.67	0.060	23.33	0.250
	MBCT-Control	−14.47	0.700	−58.53	0.001
	BEE-Control	−43.14	0.003	−81.86	0.001
Somatic symptom	BEE-MBCT	2.83	0.100	2.5	0.160
	MBCT-Control	−2.56	0.160	−1.56	0.920
	BEE-Control	−5.397	0.001	−4.06	0.030
Depression	BEE-MBCT	5.02	0.130	1.87	0.990
	MBCT-Control	−5.9	0.050	−10.08	0.001
	BEE-Control	−10.92	0.001	−11.96	0.001
Anxiety	BEE-MBCT	2.1	0.810	4.313	0.080
	MBCT-Control	−7.26	0.001	−2.62	0.510
	BEE-Control	−9.93	0.001	−6.93	0.002

[12]*P*-value, [13]Bioenergy Economy, [14]Mindfulness-based cognitive therapy

follow-up stages. However, there was only a significant difference between the mean scores of the MBCT and the control groups in terms of depression and anxiety in the post-test stage. Moreover, in the follow-up phase, there was only a significant effect on anxiety.

Discussion

This research aimed to compare the effectiveness of MBCT and BEE on the IBS symptom severity, somatic symptoms, depression, and anxiety. Results revealed that the severity of symptoms, somatic symptoms, depression, and anxiety was significantly reduced in the post-test and follow-up stages in these patients. It was demonstrated that both MBCT and BEE programs have effects on the four mentioned values. It was found that there was a significant difference between the experimental groups and the control group over time.

A bulk of psychological approaches have been investigated for IBS treatment. A profound meta-analysis of 18 CBT-based random clinical trials revealed superior effects of CBT on IBS in comparison with conventional basic supports or medical treatments. This study reported no superiority of CBT to other psychological treatments.[39] Other recent studies on CBT similarly reported the improvement of gastrointestinal symptoms in comparison with the usual treatments.[40,41] Similarly, decent systematic reviews and meta-analyses demonstrated the highly beneficial effects of hypnosis for IBS. The brain-gut axis could develop neural and endocrinal pathways, which could lead to the treatment of adults/children with IBS.[42-44] Moreover, recent studies conducted in 2022 revealed MBSR as an effective and stable method for improving quality of life and diminishing the severity of symptoms in patients with IBS.[45,46] These data accord with the cognitive, behavioral, mindful, and body-centered approaches of our study.

MBCT is a mind-body approach that is used to reduce IBS symptoms. In addition to thought content change

approaches, MBCT utilizes a collection of methods for increasing the awareness of body and mind to the present moment. Via techniques such as breathing meditation and yoga workouts, MBCT applies principles of cognitive therapy and mindfulness techniques for the well-being of the individual.[47]

The BEE program has been previously applied for improving the well-being of patients with a variety of diseases and disorders such as migraine, myofascial pain, tethered cord, coronary heart disease, myocardial infarction, breast cancer, obesity, PTSD, anxiety, depression, sleep disorder, and in general, quality of life.[23-25,38,48-51] The BEE program includes four parts as follows: body awareness, coherent narrative, synergetic relationship, and non-dual intentionality. This method could reduce distress and increase mind-body integrity, which are correlated.

MBCT has been markedly known as an effective method for IBS treatment.[14,16-19] As BEE and MBCT have structural similarities, these two interventions were selected for this study. Both methods include cognitive, behavioral, body-centered, and mindful therapeutic elements. The outcome of cognitive dissonance and relaxed behavior is a reduction in distress. On the contrary, body awareness and a mindful mindset detach the individual from the fusion and hyper-identification of thoughts. Hence, less impact of the stressful thoughts leads to reduced IBS symptoms. By increasing the awareness of the body, the intensity of agitated thoughts and stressful biases is diminished. This circulation of awareness through the body accelerates the bodily vibration, thus summoning the individual attention to the here and now instead of the past or future. MBCT has some yoga-like stretch movements for its body-centered practices. However, BEE involves adding percussional and vibrational movements in addition to its specific tensile movements. The triad of these tensile, percussional, and vibrational movements changes the distribution of bioenergy in the body. This redistribution decreases body tensions and increases bodily homogeneity. In short, BEE has a vast and more focused concentration on different body-awareness properties rather than MBCT.

IBS intersects with biological, psychological, environmental, and social factors. These all represent a physiological system well known as the brain-gut axis (BGA). BGA is a bidirectional pathway connecting the enteric nervous system (ENS), located in the walls of the gastrointestinal (GI) tract, with the autonomic nervous system (ANS) and the central nervous system (CNS). These systems interact through various mechanisms, including the autonomic stress response, endocrine signaling, neuroimmune interactions, and neural pathways, which involve the hypothalamic-pituitary axis (HPA). As a result, the BGA serves as the interface through which psychological factors can influence physical outcomes.[52] Previous works investigated factors associated with IBS as follows: early life stress, anxiety, depression, chronic stressors of caregiving for severe illnesses, altered cognition, altered acute response related to stress, mood disorders, catastrophizing, and hypervigilance to negative stimuli.[52] In addition, illness-related cognitions comprising catastrophizing about symptoms, negative illness perceptions, symptom focusing, and symptom-central beliefs were defined to have an impact on these patients. Moreover, illness-related behaviors were also found to have an impact. These behaviors mostly comprise avoidance behavior (limited access to the toilet and social occasions) and safety behavior (stool checking, spare underwear or tissue, and anti-motility medications).[53] Furthermore, personality traits and emotional patterns were shown to have a fundamental role in impacting autonomic, immune, inflammatory, and endocrine functions.[54] Type D personality (traits including negative affectivity and social inhibition) was reported to have interference with IBS symptoms. Similarly, conscientiousness and neuroticism factors of personality traits were also found to have significantly higher scores in patients with constipation-dominant IBS (C-IBS).[55,56] Considering this variety of mechanisms and elements underlying the IBS, it is speculated that the BEE program could have a more pristine and integrated approach. By a collection of its cognitive, behavioral, mindful, and body-centered methods, the BEE program could suggest a stronger match.

Delving deeper into this subject, it is important to elaborate that BEE represents a more focused concentration on mindful modalities and mindset change compared to MBCT. To be precise, the BEE program investigates the nonduality mindset as a key element. This nondual value system integrates different levels of conventional polarizations comprising body-mind, self-others, life treatment, etc.[51,57] Many of the daily conflicts and tensions are due to these dual mindsets that bring unfavorable energy investments. BEE focuses on the attunement and coordination of these energy investments toward salutogenesis and sustained happiness. Accordingly, BEE evaluates and indicates how much a mindset change would affect distress. When the dominant thoughts are targeted at dualities, every action and interaction would lead to failure and dissatisfaction. If an individual's mindset perceives life as fragmented particles and holds the belief that each part must be correct for the whole to be correct, achieving integrity becomes unattainable. By shifting this mindset to wholeness and developing the upward-down (top-down) organization, BEE facilitates

the individual's health and healing. It might be beneficial to become whole and feel the totality at first and then let the healing happen. In this scenario, one might sense that it is not necessary to correct the parts one by one to achieve wholeness. Totality is the act of openness to the whole and not the correctness of each component *per se*. These elements of wholeness, salutogenesis, and boundlessness concepts and experiences are less touched in the MBCT. Intentionality itself and changes in healing expectations are important elements in the empowerment of meaning response to therapies, which are highlighted in the BEE program.[58] They are the cardinal healing anchors of the BEE program. Based on stronger statistical significance, the BEE program is suggested for further therapy interventions for patients with IBS.

This study acknowledges a limitation regarding the long-term effects of the findings. As discussed, the psychosomatic characteristics of IBS demand holistic and continuous care. The authors propose that a more comprehensive understanding of the outcomes of the models could be achieved by conducting long-term follow-up investigations. Another limitation of the current work is its relatively small population. Therefore, the generalizability of the results could be challenged. More extensive studies with a larger number of participants and more replications could contribute to this matter. Of note, pre-existing psychotherapy or concurrent psychological support could play a role in the effectiveness of the interventions. The authors recommend additional screening for possible ongoing therapies.

All in all, it seems that distress reduction and mind-body integrity could affect IBS severity via three hypothetical pathways. First, it could directly improve depression, anxiety, and IBS symptoms by reducing stressors. Second, it could affect psychoneuroimmunological trajectories, which might lead to reduced inflammation and consequently alleviate IBS severity. Third, it could induce illness behavioral changes and lead to the improvement of functional factors.

Conclusion

In conclusion, receiving the MBCT or the BEE programs along with conventional therapies in patients with IBS can moderate patients' anxiety and depression and ameliorate the severity of IBS by facilitating psychological and lifestyle changes. Although both interventions had significant results in alleviating patients' symptoms, the BEE program had a higher significance level in moderating mental and physical symptoms in patients with IBS.

Acknowledgments

We appreciate the Department of Psychology and Psychotherapy and Psychosomatic Research Center of the Albert-Ludwig's University of Freiburg, the Gastroenterology and Liver Research Center of Isfahan University of Medical Sciences, and the Islamic Azad University of Khorasgan for their kind contribution and all the participants and the staff for their commitment and responsibility that provided a lively, and healing atmosphere.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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