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Original Article

Comparison of the Effectiveness of Mindfulness-Based Stress Reduction and Compassion-Focused Therapy on the Cognitive Emotion Regulation in Patients with Irritable Bowel Syndrome

Tahereh Pourkazem[1], Ahmad Ghazanfari[1*], Reza Ahmadi[1]

[1]Department of Psychology, Faculty of Humanities, Shahrekord Branch, Shahrekord Islamic Azad University, Shahrekord, Iran

Abstract

Background: We aimed to compare the effectiveness of mindfulness-based stress reduction and compassion-focused on the cognitive regulation of emotion in patients with irritable bowel syndrome (IBS). The research method was the semi-experimental type, with pre-test, post-test, follow-up, and experimental and control groups.

Methods: The population included patients with IBS in Isfahan city; 45 of them were selected by convenience sampling method and randomly assigned to 3 groups (15 in each group). Then, the patients of one experimental group received eight sessions of 90 minutes of a mindfulness-based stress reduction program, while the other experimental group received eight sessions of 90 minutes of compassion-focused therapy. The measurement tools included the Cognitive Emotion Regulation Questionnaire (Garnefski and Kraaij, 2002) and a short clinical interview. Research data were analyzed using variance analysis with repeated measures on one factor (mixed design).

Results: Both intervention methods were equally effective in changing the cognitive regulation of adaptive emotion mean scores ($P<0.01$), but the effect of compassion-focused therapy on improving the mean scores of cognitive regulation of adaptive emotion was more than mindfulness-based stress reduction therapy ($P<0.05$).

Conclusion: It was concluded that both intervention methods can be used as complementary treatment for patients with IBS.

Keywords: Mindfulness-based stress reduction, Compassion-focused therapy, Cognitive regulation of emotion, Irritable bowel syndrome

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Introduction

Irritable bowel syndrome (IBS) is characterized by altered bowel habits in association with abdominal discomfort or pain in the absence of detectable structural and biochemical abnormalities. The prevalence of IBS has been reported differently in different countries. Epidemiological studies show an approximate prevalence of 3.5% to 5.8% in the Iranian population, with a higher prevalence in women.[1] Since IBS does not have a specific physical or biological cause, it is classified as a psychosomatic disease; therefore, these patients eventually need to receive psychological services after consecutive visits to numerous doctors and repeated tests.[2]

The etiology of IBS is complex and multifactorial, and reasons such as abnormal gastrointestinal movements, visceral hypersensitivity, and psychological factors have been confirmed in studies.[3]

While IBS is considered to be a benign disease usually not associated with any excess mortality, it is associated with a significant decrease in the quality of life of patients and causes significant economic problems for them. Numerous studies show that IBS has a strong relationship with psychological disorders such as anxiety, depression, and disease symptom disorder.[4] Therefore, not only does this syndrome severely reduce the patients' quality of life and face them with numerous problems in their daily lives, but it also creates a significant burden for the individual and society and brings about significant material and non-material damages (cost of treatment or luck of work).[5]

Despite the relatively high prevalence of IBS, this disorder is not well managed in the healthcare system due to its heterogeneous nature, which can explain the frustration and dissatisfaction among patients and physicians.[5]

These problems range from poor diagnostic processes to treatment failures. Also, the prevalence and severity of psychological disorders in IBS are closely related to the onset and severity of symptoms of the disease.[6]

Thus, it seems that cognitive regulation of emotion can greatly help people improve psychological conditions when facing IBS symptoms.[7] Research showed that there is a strong relationship between digestive diseases and cognitive emotion regulation. It seems that intervention methods that effectively influence the cognitive regulation

*Corresponding Author: Ahmad Ghazanfari, Email: Aghzan5@yahoo.com

of emotions, in addition to the biological aspects and symptoms of the disease, may be beneficial in controlling and improving IBS.[8,9] Theoretically and fundamentally, the psychological causes of digestive diseases lead psychologists and counselors to investigate the most common digestive diseases, IBS, from the psychological point of view.[10]

More specifically, the results of various research have also shown that people with IBS show excessive sensitivity to environmental issues, making them more vulnerable to difficult emotions.[11]

According to the research, the probability of using positive (adaptive) emotion regulation strategies to modify or change multiple emotional states among people with IBS is very low.[12] The resulting psychological stress, depression, anxiety, stress, and confusion from the lack of optimal cognitive-emotional regulation can further damage the emotional regulation mechanisms of patients with IBS. Emotion regulation refers to the process by which we influence what emotions we experience when we experience them and how we express them.[13]

Emotion regulation is one of the fundamental factors of well-being, playing an important role in adaptive coping with life events.[14] In fact, some characteristics of people suffering from psychosomatic diseases, including emotional disorders, make the person unable to process and perceive the emotional information caused by that event correctly in different situations and, as a result, give an appropriate response to the.[15] Several clinical and experimental studies have shown that emotion regulation as an indicator reduces the stress effects on emotional well-being in psychosomatic disorders. And the inability to deal efficiently with emotions is the most important factor in psychopathology.[16] Nowadays, various psychological treatments have been used to reduce anxiety, depression and pain in psychosomatic disorders , including these interventions mindfulness-based stress reduction therapy and compassion-focused therapy, which belong to the new third wave of cognitive-behavioral treatments. In a completely integrated manner, these two types of interventions control and balance physical, cognitive, and emotional functions.[17,18]

Examining the effectiveness of mindfulness-based and compassion-focused stress reduction therapies has shown that both independently and comparatively present an opportunity for researchers and psychologists to assess the utility of these intervention methods in the cognitive emotion regulation process as a mediating factor in the development and severity of psychological symptoms associated with IBS. The mindfulness-based stress reduction program, initially suggested by Kabat-Zinn for individuals with specific medical conditions and those experiencing chronic pain and related stress, can yield advantageous outcomes.[19]

In fact, people with the disease may react in a dysfunctional way when faced with stress and anxiety. Such emotional and behavioral reactions are commonly referred to as automatic stress responses. However, mindfulness interventions have been shown to facilitate a more mindful and efficacious response in such circumstances.[20] Mindfulness interventions reduce negative repetitive cognitive processing and negative memory by activating cognitive and emotional self-regulation skills, which in turn have a positive effect on the final physiological, psychological, and behavioral responses.[21,22]

Compassion-focused therapy is a comprehensive experimental behavioral therapy that draws upon developmental psychology, neuroscience, Buddhist philosophy, and evolutionary theory. This therapeutic approach emphasizes the regulation of emotions. Interventions are employed to establish particular emotional regulation patterns, mental states, and personal experiences that serve as the foundation for the process of transformation.[17] However, despite the fact that many studies have been conducted regarding the effectiveness of mindfulness-based and compassion-focused stress reduction treatments on IBS, there are few comparative studies in which the effectiveness of the two mentioned methods in the cognitive regulation of emotion has been investigated. Therefore, the current research seeks to determine the effectiveness of mindfulness-based and compassion-focused stress reduction therapy on cognitive emotion regulation in patients with IBS.

Materials and Methods

It was a semi-experimental study with a pre-test, post-test, a control group, and a 3-month follow-up. The population consisted of all people suffering from IBS in Isfahan city who visited one of the gastroenterology clinics during March to September 2022. The sampling method was purposeful because only those who visited gastroenterology clinics were included in the research. Then, the patients were interviewed and clinically evaluated by gastroenterologists based on the Rome-IV diagnostic criteria, and 45 patients who were diagnosed with IBS and met other criteria for entering the study were randomly assigned into two experimental groups and a control group (15 in each group and a total of 45).

The inclusion criteria were: receiving a definitive diagnosis of IBS by a gastroenterologist, having an age range between 20 and 40 years, having a minimum education level, providing written consent to enter the research, having an absence of severe psychological diseases, lack of psychiatric medication, and non-attendance at other psychoeducational programs at the same time.

Exclusion criteria were receiving drug treatments for physical and psychological disorders during the research, absence in two consecutive sessions, and failure to perform homework. It should be noted that ethical considerations such as providing full information about the conditions of the research, confidentiality, obtaining informed consent for all participants, and using data exclusively for the purposes of the current research were fully observed in this research. In the present study, a symptom severity questionnaire and a short clinical interview were used to collect information.

Clinical interview: A structured clinical interview by a Ph.D. student in psychology based on DSM-5 diagnostic criteria was used to check and diagnose the absence of severe mental disorder or personality disorder and the presence of a substance abuse history.[23]

The Cognitive Emotion Regulation Questionnaire is a self-report tool developed by Garnefski et al[24] to identify the cognitive coping strategies of people after experiencing negative events or situations with 36 items and 9 different dimensions. This questionnaire is very easy to administer and can be used for people over 12 years old (both normal people and clinical populations). Unlike other questionnaires that lack clarity in differentiating between individuals and their actual behaviors, this questionnaire evaluates an individual's cognitive responses following a negative experience or traumatic event. The questionnaire comprises two categories of maladaptive strategies, namely self-blame, blaming others, rumination, and catastrophizing, as well as positive adaptive strategies, including acceptance, positive refocusing, refocusing on planning, positive re-evaluation, and perspective-taking.

The scale scores of this questionnaire range from 1 (never) to 5 (always), with each scale comprising four items. The total score for each scale is calculated by summing the scores of the individual items. Therefore, the range of scores of each of the subscales will be between 4 and 20, and the sum of the total scores will be in the range of 36 to 180.[25] The authors of this questionnaire have reported its reliability through Cronbach's alpha for positive strategies 0.91, negative strategies 0.87, and the entire questionnaire 0.93. The Persian version of this questionnaire was evaluated for validity through internal consistency methods, resulting in subscale scores ranging from 0.76 to 0.92. Retest scores ranged from 0.51 to 0.77, and criterion validity was determined by correlating scores with Beck's second Depression Inventory (1996), resulting in a range of 0.25 to 0.48. and its structure was reported to be favorable based on principal component analysis using Varimax rotation (explaining 74% of the variance).[25,26] In this study, reliability was assessed using Cronbach's alpha coefficient, resulting in scores ranging from 0.72 to 0.89, as described in Table 1.

Procedure

After content preparation and reviewing the background of the research, the necessary coordination was made with the Isfahan Gastroenterology Clinics Association, and the necessary explanations were given regarding the objectives of the study and the type of collaboration.

After the implementation of the questionnaires, patients with IBS who received a definitive diagnosis of the disease were invited, and after providing the necessary explanations regarding the objectives, structure, and content of the training sessions, 45 people who agreed were selected and randomly divided into two experimental groups and a control group.

One of the experimental groups received 8 sessions of 90 -minute of a mindfulness-based stress reduction program based on Kabat-Zinn's protocol. The other experimental group received 8 sessions of 90-minute compassion-focused therapy based on the Gilbert protocol (Tables 2 ,3), while the control group did not receive any

Table 1. Questions regarding the components of the Cognitive Emotion Regulation Questionnaire (Garnefski and Kraaij, 2002)

Row	Dimension	Related questions	Alpha Cronbach
1	Acceptance	2,11,20,29	80
2	Positive refocusing	4,22,13,4	83
3	Refocus on planning	5,14,23,32	74
4	Positive reevaluation	24,33,15,6	72
5	Perspective taking	7,34,25,16	74
	Adaptive strategies (positive)	questions of the above 5 strategies	79
6	Blaming others	9,36,27,18	80
7	Self-blaming	28,19,10,1	83
8	Rumination	30,21,12,3	74
9	Catastrophizing	26,35,17,8	72
	Maladaptive strategies (negative)	questions of the above 4 strategies	74

Table 2. Treatment sessions of mindfulness-based stress reduction program (Kabat-Zinn, 2003)

Sessions	Process and therapeutic focus in sessions
First session	Communicating and conceptualizing, explanation of disease symptoms and the need to use mindfulness training, explanation of the automatic pilot, body scan exercise, mindful eating (raisins), presenting CD No. 1 (body scan)
Second session	Confronting obstacles, giving feedback on exercises done, doing breathing mindfulness meditation, 10-15 minutes sitting meditation practice.
Third session	Standing stretching exercise, mindful walking, mindful seeing and hearing, describing being in the present moment, and paying attention to thoughts only as thoughts and not as facts.
Fourth session	Doing sitting meditation with an emphasis on the body sensations perception, deep listening to others, giving explanations regarding the judgment and the reasons for the negative judgment, homework, and presentation of CD No. 2 (mindful yoga).
Fifth session	Mindful breathing at the beginning of each session and giving feedback. Describing the acceptance concept and using it in dealing with problems and unpleasant experiences. Mindful sitting, body scan, reviewing of homework exercises.
Sixth session	Long-term sitting meditation, awareness of breath, sounds, and then thoughts, reviewing of homework exercises, mindful walking, standing stretching exercises, presentation of CD #3: Sitting meditation.
Seventh session	The day of silence, loving-kindness meditation training, exercises, and mindful attention to repetitive daily tasks.
Eighth session	Practicing body scan, practicing doing nothing, examining obstacles to applying techniques, reviewing past material and summarizing, preventing disease recurrence (discussing the signs of recurrence and noting important points about this), discovering potential ability in oneself, reminding, as much as you can practice.

intervention during the study and only received two sessions of mindfulness-based and compassion-based combined therapy after the study termination.

It should be noted that all interventions were presented in person. In addition, the data related to the three phases of the research (pre-test, post-test, and 3-month follow-up) were entered into the SPSS software and finally analyzed.

Data Analysis

To analyze the data obtained from the research tools, descriptive and inferential statistics were used. The relevant statistical analyses were performed using the SPSS software version 25.

Descriptive statistics indicators included frequency table and frequency percentage, mean, and standard deviation. To verify research hypotheses, analysis of variance with repeated measurements on one factor (mixed design) was used, and Bonferroni's post hoc test was used to compare the mean scores of different groups.

As can be seen in Table 4, the mean and standard deviation of the maladaptive (negative) cognitive regulation scores in the pre-test did not differ much from each other. However, in the post-test and follow-up, the mean scores of the test groups decreased compared with the control group.

At the same time, the mean scores of the total cognitive regulation of the adaptive (positive) emotions did not differ from each other in the pre-test stage but increased in the post-test and follow-up stages. These differences are subject to further examination in the subsequent tables and in the analysis of the primary hypotheses of the study.

The results of Table 5 show that the result for the mean scores of the total adaptive cognitive emotion regulation the measurement time (pre-test, post-test, and follow-up) as ($F = 57.77$ and $P = 0.001$) and the interaction of the measurement time with the group as ($F = 6.62$ and $P = 0.001$) have been obtained, which shows that the mean scores of adaptive cognitive regulation were significantly different not only in different measurement times but also in different groups.

The results of Table 5 show that the mean scores of the total maladaptive cognitive emotion regulation at the time of measurement (pre-test, post-test, and follow-up) were obtained as ($F = 74.60$, $P = 0.001$). The interaction of the time of measurement with the group was ($F = 27.80$, $P = 0.001$), which was analyzed in Table 5 using intergroup analysis. The results of Levene's test to measure the equality

Table 3. Content of compassion-focused therapy sessions (Gilbert, 2014)

Sessions	Process and therapeutic focus in sessions
First session	Greetings and initial familiarization among group members, reviewing the structure of meetings, introducing the general principles and distinguishing compassion from self-pity, conceptualizing self-compassion training.
Second session	Mindfulness training along with body and breathing exercises, familiarity with brain systems based on compassion, empathy training, and introducing visualization.
Third session	Describing the characteristics of compassionate people, compassion towards others, cultivating a feeling of warmth and kindness towards oneself, cultivating and understanding that others also have defects and problems (cultivating a sense of human commonalities) in contrast to the self-destructive feelings of shame, training the empty chair technique, homework assignment.
Fourth session	Reviewing the previous session exercise, encouraging the subjects to self-knowledge according to the learned topics and investigating their personality as a non-compassionate or compassionate person, identifying and applying exercises to building a compassionate mind, training forgiveness, and homework assignments.
Fifth session	Introducing the three-dimensional behavioral model to express the common relationship between behavior/emotions, psychological functions, and observable behavior and discussion about efforts to change behavior based on it, receiving feedback and homework assignments, nurturing a compassionate mind exercise, and non-judgmental acceptance. Tolerance training.
Sixth session	Reviewing the previous session exercise, creating compassionate images, techniques, and methods of expressing compassion training (verbal, practical, and continuous compassion), integrating these practices in daily life, training the development of valuable and sublime feelings, and homework assignments.
Seventh session	Reviewing the previous session exercise, training how to write compassionate letters for oneself and others, and training how to record and keep a diary of real situations based on compassion and individual performance in that situation.
Eighth session	Training and practicing skills, reviewing and practicing the skills presented in previous sessions, training how to create a safe place, cultivating self-compassion, and finally summarizing and guidelines to integrate this method in everyday life.

Table 4. The mean and standard deviation of the cognitive emotion regulation of adaptive and maladaptive emotions (positive and negative) of the experimental and control groups in the pre-test, post-test, and follow-up

Variable	Stage	Pre-test, post-test, 3-month follow-up				
		Mean	SD	Mean	SD	Mean
Adaptive cognitive regulation scores	Mindfulness 8.39	40.33	12.81	63.93	14.30	66.06
	Compassion 9.70	40.06	9.20	65.26	9.52	64.86
	Control 7.27	41.33	11.13	46.20	9.74	48.60
Maladaptive cognitive regulation scores	Mindfulness 7.61	41.66	6.58	29.00	8.44	29.20
	Compassion 3.54	38.60	6.21	22.40	3.54	21.46
	Control 7.52	39.93	7.19	42.26	7.77	41.13

of variances of adaptive cognitive emotion regulation in different groups are presented in Table 6.

According to Table 6, the mean scores of the adaptive cognitive emotion regulation of the experimental and control groups had a significant difference from each other ($F=14.20$ and $P=0.001$). The obtained eta coefficient is also equal to 0.386. The mean scores of the maladaptive cognitive emotion regulation of the experimental and control groups had significant differences from each other ($F=20.76$ and $P=0.001$). The obtained eta coefficient is equal to 0.497.

Thereby, it was found that there was a significant difference between the mean scores of adaptive and maladaptive cognitive emotion regulation in the three groups. These differences were subsequently examined in pairs utilizing Bonferroni's test, as presented in Table 7.

The results of Table 7, using Bonferroni's paired test, show that there exists a significant difference between the mean scores of the total adaptive cognitive emotion regulation of the experimental groups (mindfulness-based stress reduction and compassion-focused therapy) and the control group ($P=0.001$), while there was no significant difference between the mean scores of the mindfulness group and the compassion therapy group ($P<0.01$). Thus, it was concluded that both mindfulness-based stress reduction and compassion-focused therapy were equally effective in increasing the adaptive cognitive emotion regulation mean.

The results of Table 7, using the paired Bonferroni test, show that there exists a significant difference between the mean scores of the total maladaptive cognitive emotion regulation of the test groups (mindfulness-based stress reduction and compassion-focused therapy) with the control group ($P=0.001$). Also, there was a significant difference between the mean scores of the mindfulness group and compassion therapy ($P<0.01$).

Discussion

Thus, it was concluded that both mindfulness-based stress reduction and compassion-focused therapy, particularly compassion-focused therapy, were effective in reducing the maladaptive cognitive emotion regulation mean, although the effectiveness of compassion-focused therapy was higher. Therefore, the research hypothesis is confirmed. This study sought to determine the effectiveness of mindfulness-based stress reduction program and compassion-focused therapy in the cognitive regulation of emotions in patients with IBS.

The findings of the research showed that both mindfulness-based stress reduction program and compassion-focused therapy are equally effective in the emotion cognitive regulation of patients. This finding is in line with the research results of Hassannezhad and colleagues,[27] Pashing and Khosh Lahjeh Sedgh,[28] Ghandi

Table 5. Within-subject effects of adaptive and maladaptive cognitive regulation

Variable	Source	Sum	df	Mean squares	F	*P* value	Eta coefficient
Adaptive cognitive Regulation	Measurement time	10396.72	2	5198.36	57.77	0.001	0.579
(assumed sphericity)	Group *time	238.29	4	596.07	6.62	0.001	0.240
	Error	7557.64	84	89.97			
Maladaptive cognitive regulation	Measurement time	2523.43	1.50	1676.80	74.60	0.001	0.640
(Greenhouse)	Group *time	1881.23	3 .01	625.03	27.80	0.001	0.570
	Error	1420.66	63.20	22.47			

Table 6. The intergroup effects test of the mean scores of adaptive and maladaptive cognitive regulation

Variable	Source	Sum	df	Mean squares	F	*P* value	Eta coefficient
Adaptive cognitive regulation	Constant	37867.18	1	37867.18	25.74	0.001	0.984
	Group membership	3883.65	2	1941.83	14.20	0.001	0.386
	Error	6178.48	42	147.10			
Maladaptive cognitive regulation	Constant	15572.18	1	15572.18	137.57	0.001	0.973
	Group membership	0	2	0	20.76	0.001	0.497
	Error	4263.60	101.27				

Table 7. Pairwise comparison of the mean scores of adaptive and maladaptive cognitive emotion regulation of the groups

Variable	Means pairwise comparison	Comparison	Mean Difference	Standard error	*P* value
Adaptive cognitive	Mindfulness	Compassion	1.044	2.55	0.900
Emotion regulation		Control	11.40	2.55	0.001
	Compassion	Control	12.35	2.55	0.001
Maladaptive cognitive	Mindfulness	Compassion	5.80	2.12	0.027
Emotion regulation		Control	-7.82	2.12	0.002
	Compassion	Control	-13.62	2.12	0.001

et al,[11] and Tiwari and colleagues[29] in regard to the effectiveness of compassion-focused interventions.

In explaining these findings, it can be said that contrary to old beliefs, psychological literature suggests that emotions have useful functions and are essential for adaptation in everyday life, and according to what studies have shown if emotions are expressed at the right time, place, and situation, they will lead to positive consequences. Given the significant impact of emotional distress and tension on the exacerbation of symptoms in individuals with IBS, interventions that effectively address their psychological and emotional disturbances may prove beneficial in mitigating the symptoms experienced by these patients.[30]

As previously stated, the implementation of the mindfulness-based stress reduction program and compassion-focused therapy, utilizing the structural and content capabilities of third-wave cognitive behavioral therapies, resulted in enhanced adaptive cognitive emotion regulation through distinct mechanisms of action.

In fact, cognitive emotion regulation includes a number of cognitive, behavioral, and physiological mechanisms that are used unconsciously and consciously. Some emotion regulation strategies are activated before or at the beginning of an event, and some of them are activated after the occurrence of an event or after the formation of an emotion.[31]

The evidence indicates that the present-moment awareness and non-judgmental acceptance that is cultivated by mindfulness play an important role in promoting self-control. This increases sensitivity to emotional cues within one's experiential field and improves response to early emotional cues that contribute to effective emotional regulation and increases brain theta wave activity in the anterior cingulate cortex, middle prefrontal cortex, and emotional regulation.[32]

On the other hand, compassion-focused therapy, which is generally known as emotional self-regulation therapy, helps a person with a type of emotion-focused coping style to cope with situations where problem-focused coping strategies are ineffective so that by using these strategies he or she can adjust to the upcoming issues.[33] Another finding of this research is that the interventions are stable during the 3-month follow-up period. This finding is in line with Moghtadaei et al,[34] Khosh Chin Gol et al,[35] and Tiwari et al[29] findings. In explaining this finding, it can be said that the cognitive regulation of positive emotions improves individuals' ability to deal with emotions, thereby enabling them to recognize emotions in themselves and others so that they can show an appropriate reaction in stressful situations.[36]

In general, the goal of mindfulness-based interventions is not just to reduce tension but to be present in the present moment and acceptance without judgment, which is cultivated through mindfulness. In this way, mindfulness can be seen in two ways: as a process of sensitization and desensitization.

In fact, mindfulness desensitizes people by reducing avoidance of negative, unpleasant aspects, and it creates a sensitivity in them by paying attention to the relationship between emotional states and experiencing automatic responses. The desensitization quality of mindfulness increases people's mental adaptability and reduces people's mental occupations.[37]

According to another finding of the current study, both mindfulness-based and compassion-focused stress reduction methods are effective in reducing adaptive and maladaptive cognitive emotion regulation, although compassion-focused therapy's effectiveness in adaptive cognitive regulation is higher. This finding is somewhat consistent with the results of Dabbaghi Zarif et al,[38] Pashing and Khosh Lahjeh Sedgh,[28] Naliboff et al,[39] and Henrich et al[21] and their colleagues, who have confirmed the effect of mindfulness-based interventions in improving emotional processes and cognitive regulation of emotion.

This finding is also in line with the results of the research of Sepanta et al,[40] and Khalife Soltani and colleagues,[41] which have confirmed the effectiveness of compassion-focused therapy in improving the cognitive regulation of uncompromising emotion. Mindfulness and compassion-based interventions possess a unique capability to address psychological problems and disorders due to their multidimensional cognitive-emotional and physiological structure.

These interventions are mainly based on emotional self-regulation training programs, whose goal is to reduce emotional reactivity to perceived stress and the consequences of chronic disease. In addition, daily compassionate behaviors in patients serve as a coping approach to alleviate negative stress, which helps them manage their emotions more easily and use positive strategies optimally.[42] Regarding the higher effectiveness of compassion-focused therapy compared with mindfulness-based stress reduction therapy in uncompromising cognitive regulation strategies such as self-blame and blaming others, it can be stated that compassion-focused therapy is not solely focused on adjusting emotion-oriented coping strategies,[28] but also involves compassion and flexibility towards oneself and others, which leads to improvement in these emotion regulation strategies.

In fact, when people resort to negative strategies, they tend to blame and criticize themselves and others, get stuck in the issue for an extended period, and make a disaster about it.[43] Conversely, mindfulness and compassion-based treatments due to the acceptance of thoughts and feelings, and bodily sensations can set the stage for accepting such thoughts.

Compassion-based interventions prepare the ground for accepting negative thoughts and less use of incompatible and negative strategies by increasing kindness towards oneself and others.[44]

Conclusion

According to the results of the present study, cognitive emotion regulation strategies are an important and

effective factor that can contribute to the exacerbation and persistence of IBS symptoms.

The results of the present study indicate the effectiveness of mindfulness-based stress reduction therapy and especially compassion-focused therapy in the cognitive regulation of emotion on promoting and improving positive strategies of cognitive emotion regulation and reducing negative strategies of cognitive emotion regulation in patients with IBS. Therefore it is recommended that psychological treatments, especially mindfulness-based stress reduction therapy and compassion-focused therapy, be utilized as an adjunct to common medical treatments. This necessitates the cooperation of gastroenterologists, psychologists, and psychiatrists so that patients can benefit from psychological therapies as complementary treatments in a safe treatment environment.

A limitation of the study is that the statistical population was confined to a small number of participants, which may limit the generalizability of the results. This study employed a convenience sampling method, which should be considered. According to the limitations of the current study, it is recommended to conduct a similar study with a larger number of participants in the future.

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Competing Interests

The authors declare no conflict of interest related to this work.

Ethical Approval

This study was approved by Shahrekord Islamic Azad University under the code of ethics IR.IAU.SHK.REC.1401.069.

References

1. Ghannadi K, Emami R, Bashashati M, Tarrahi MJ, Attarian S. Irritable bowel syndrome: an epidemiological study from the west of Iran. *Indian J Gastroenterol* 2005;24(5):225-6.
2. Sebastián Sánchez B, 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. doi: 10.17235/reed.2017.4660/2016
3. Singh R, Salem A, Nanavati J, Mullin GE. The role of diet in the treatment of irritable bowel syndrome: a systematic review. *Gastroenterol Clin North Am* 2018;47(1):107-37. doi: 10.1016/j.gtc.2017.10.003
4. Tosic-Golubovic S, Miljkovic S, Nagorni A, Lazarevic D, Nikolic G. Irritable bowel syndrome, anxiety, depression and personality characteristics. *Psychiatr Danub* 2010;22(3):418-24.
5. Frändemark Å, Törnblom H, Jakobsson S, Simrén M. Work productivity and activity impairment in irritable bowel syndrome (IBS): a multifaceted problem. *Am J Gastroenterol* 2018;113(10):1540-9. doi: 10.1038/s41395-018-0262-x
6. Singh R. Salem A,Nanavati J, Mullin GE.The rol of diet in the treatment of irritable bowel syndrome: a systematic review. *Gastroenterology Clinics of North America* 2018;47(1):107-137.
7. Fava GA, Sonino N, Wise TN. *The Psychosomatic Assessment: Strategies to Improve Clinical Practice*. Karger; 2011.
8. Ljótsson B, Hedman E, Lindfors P, Hursti T, Lindefors N, Andersson G, et al. Long-term follow-up of internet-delivered exposure and mindfulness based treatment for irritable bowel syndrome. *Behav Res Ther* 2011;49(1):58-61. doi: 10.1016/j.brat.2010.10.006
9. Zielińska A, Sałaga M, Włodarczyk M, Fichna J. Chronic abdominal pain in irritable bowel syndrome - current and future therapies. *Expert Rev Clin Pharmacol* 2018;11(7):729-39. doi: 10.1080/17512433.2018.1494571
10. Blanchard EB, Lackner JM, Sanders K, Krasner S, Keefer L, Payne A, et al. A controlled evaluation of group cognitive therapy in the treatment of irritable bowel syndrome. *Behav Res Ther* 2007;45(4):633-48. doi: 10.1016/j.brat.2006.07.003
11. Ghandi F, Sadeghi A, Bakhtyari M, Imani S, Abdi S, Banihashem SS. Comparing the efficacy of mindfulness-based stress reduction therapy with emotion regulation treatment on quality of life and symptoms of irritable bowel syndrome. *Iran J Psychiatry* 2018;13(3):175-83.
12. Khoshsorour S, Kazemi Rezaei A. The role of cognitive emotion regulation strategies and perceived social support in predicting quality of life and severity of symptoms of patients with irritable bowel syndrome (IBS). *Iranian Journal of Rehabilitation Research in Nursing* 2019;6(1):60-8. [Persian].
13. Szczygieł D, Buczny J, Bazińska R. Emotion regulation and emotional information processing: the moderating effect of emotional awareness. *Pers Individ Diff* 2012;52(3):433-7. doi: 10.1016/j.paid.2011.11.005
14. Sadri Damirchi E, Esmaeili Ghazivaloyi, Asadi Shishegaran S. Comparison of cognitive emotional regulation, locus of control and meaning in life between addicted and normal women. *Quarterly Journal of Woman and Society* 2016;7(2):129-46. [Persian].
15. Basharpoor S, Almardani Someeh S, Shahmohammadzadeh Y. The role of alexithymia and emotional expressivity in predicting somatization symptoms among students of Mohaghegh Ardabili University during 2014-2015. *J Rafsanjan Univ Med Sci* 2015;13(10):961-72. [Persian].
16. Kadzikowska-Wrzosek R. Perceived stress, emotional ill-being and psychosomatic symptoms in high school students: the moderating effect of self-regulation competences. *Arch Psychiatry Psychother* 2012;3:25-33.
17. McCarney RW, Schulz J, Grey AR. Effectiveness of mindfulness-based therapies in reducing symptoms of depression: a meta-analysis. *Eur J Psychother Couns* 2012;14(3):279-99. doi: 10.1080/13642537.2012.713186
18. Seyyedjafari J. The effectiveness of compassion-focused therapy on reducing stress, anxiety, depression and symptoms of patients with irritable bowel syndrome. *Journal of Excellence in Counseling and Psychotherapy* 2019;8(30):40-52. [Persian].
19. Kabat-Zinn J. Mindfulness-based interventions in context: past, present, and future. *Clini Psychol Sci Pract* 2003;10(2):144-56. doi: 10.1093/clipsy.bpg016
20. Michalak J, Burg J, Heidenreich T. Don't forget your body: mindfulness, embodiment, and the treatment of depression. *Mindfulness* 2012;3(3):190-9. doi: 10.1007/s12671-012-0107-4
21. Henrich JF, Gjelsvik B, Surawy C, Evans E, Martin M. A randomized clinical trial of mindfulness-based cognitive therapy for women with irritable bowel syndrome-effects and mechanisms. *J Consult Clin Psychol* 2020;88(4):295-310. doi: 10.1037/ccp0000483
22. Ljótsson B, Hedman E, Lindfors P, Hursti T, Lindefors N, Andersson G, et al. Long-term follow-up of internet-delivered exposure and mindfulness based treatment for irritable bowel syndrome. *Behav Res Ther* 2011;49(1):58-61. doi: 10.1016/j.brat.2010.10.006
23. American Psychiatric Association (APA). *Diagnostic and Statistical Manual of Mental Disorders (DSM-5®)*. 5th ed. Washington, DC: APA; 2013.

24. Garnefski N, Kraaij V, Spinhoven P. Manual for the Use of the Cognitive Emotion Regulation Questionnaire. The Netherlands: DATEC; 2002.
25. Hasani J. The psychometric properties of the cognitive emotion regulation questionnaire (CERQ). *J Clin Psychol* 2010;2(3):73-84. doi: 10.22075/jcp.2017.2031
26. Hasani J , Miraghaei AM. The relationship between cognitive emotion regulation strategies and suicidal ideation. Contemporary Psychology 2012;7(13):61-72.
27. Hassannezhad N, Alipour A, Hosseini N. Comparison of the effectiveness of mindfulness-based cognitive therapy and acceptance and commitment-based therapy on perceived stress and depression in patients with irritable bowel syndrome. *Med J Mashhad Univ Med Sci* 2021;64(2):2953-63. doi: 10.22038/mjms.2021.18521
28. Pashing S, Khosh Lahjeh Sedgh A. Comparison of effectiveness of acceptance commitment therapy and metacognitive therapy on reducing symptoms, psychological capital and quality of life of patients suffering from irritable bowel syndrome. *Medical Sciences Journal of Islamic Azad University* 2019;29(2):181-90. doi: 10.29252/iau.29.2.181
29. Tiwari V, Antony B, Acharya MK. Effect of compassion focused therapy (CFT) on level of depression and self-compassion. *Indian J Ment Health* 2018;5(4):443-52.
30. Trindade IA, Pereira J, Galhardo A, Ferreira NB, Lucena-Santos P, Carvalho SA, et al. The life with IBD intervention: study protocol for a randomized controlled trial of a face-to-face acceptance and commitment therapy and compassion-based intervention tailored to people with inflammatory bowel disease. *Front Psychiatry* 2021;12:699367. doi: 10.3389/fpsyt.2021.699367
31. Besharat MA. Cognitive emotion regulation questionnaire: instruction and scoring. *Journal of Developmental Psychology* 2016;13(50):221-3. [Persian].
32. Tang YY, Hölzel BK, Posner MI. The neuroscience of mindfulness meditation. *Nat Rev Neurosci* 2015;16(4):213-25. doi: 10.1038/nrn3916
33. Gilbert P, McEwan K, Catarino F, Baião R. Fears of compassion in a depressed population: implication for psychotherapy. *J Depress Anxiety* 2014;S2:1-8. doi: 10.4172/2167-1044.S2-003
34. Moghtadaei K, Ebrahimi A, Haghayegh SA, Rezaie Jamalouei H, Adibi P. The effectiveness of acceptance and commitment therapy on emotional regulation and disease perception in women with irritable bowel syndrome. *Journal of Applied Family Therapy* 2022;3(3):176-91. doi: 10.22034/aftj.2022.331625.1421
35. Khosh Chin Gol N, Akbari B, Moghtader L, Shakerinia I. Comparison of the effectiveness of mindfulness based cognitive therapy and neurofeedback on severity and intensity of somatic symptoms and emotional regulation in patients with irritable bowel syndrome. *Health Psychol* 2021;10(3):121-44. doi: 10.30473/hpj.2021.57590.5135
36. Gross JJ. *Handbook of Emotion Regulation*. New York: Guilford Publications; 2007.
37. Gao J, Fan J, Wu BW, Zhang Z, Chang C, Hung YS, et al. Entrainment of chaotic activities in brain and heart during MBSR mindfulness training. *Neurosci Lett* 2016;616:218-23. doi: 10.1016/j.neulet.2016.01.001
38. Dabbaghi Zarif S, Aliakbari Dehkordi M, Alipoor A. Effectiveness of the mindfulness-based stress reduction on the mental health and quality of life among the female patients of the irritable bowel syndrome. *J Nurs Educ* 2021;9(6):85-93. [Persian].
39. Naliboff BD, Smith SR, Serpa JG, Laird KT, Stains J, Connolly LS, et al. Mindfulness-based stress reduction improves irritable bowel syndrome (IBS) symptoms via specific aspects of mindfulness. *Neurogastroenterol Motil* 2020;32(9):e13828. doi: 10.1111/nmo.13828
40. Sepanta M, Shirzad M, Bamdad S. The effectiveness of mindfulness-based cognitive therapy on catastrophizing and anxiety associated with pain in adolescents with leukemia. *Int J Body Mind Cult* 2019;6(1):27-34. doi: 10.22122/ijbmc.v6i1.149
41. Khalife Soltani F, Alizadeh K, Ahadi K. The effectiveness of compassion- focused therapy on depression, self –care behaviors and quality of life in patients with irritable bowel syndrome. *Journal of Disability Studies*. 2010;10:149.
42. McRae K. Cognitive emotion regulation: a review of theory and scientific findings. *Curr Opin Behav Sci* 2016;10:119-24. doi: 10.1016/j.cobeha.2016.06.004
43. Ford BQ, Gross JJ. Emotion regulation: why beliefs matter. *Can Psychol* 2018;59(1):1-14. doi: 10.1037/cap0000142
44. Doull M, O'Connor AM, Welch V, Tugwell P, Wells GA. Peer support strategies for improving the health and well-being of individuals with chronic diseases. *Cochrane Database Syst Rev* 2017;2017(6):CD005352. doi: 10.1002/14651858.CD005352.pub2