



Effectiveness of Acceptance and Commitment Therapy on Emotional Self-Regulation and Sense of Coherence in Patients with Irritable Bowel Syndrome

Donya. Balali¹, Leila. Salehi², Mojtaba. Changi Ashtiani^{1*}, Farya. Solat³, Shahram. Menatali⁴, Seyyed Hossein. Alavi⁵

¹ M.A., Department of Clinical Psychology, Kish International Branch, Islamic Azad University, Kish Island, Iran

² B.A. Student, Department of Psychology, Shahr-e-Ghods Branch, Islamic Azad University, Shahr-e-Ghods, Iran

³ M.A., Department of Psychology, Malard Branch, Islamic Azad University, Malard, Iran

⁴ M.A., Department of Psychology, Faculty of Psychology and Educational Sciences, Allameh Tabataba'i University, Tehran, Iran

⁵ Ph.D., Department of Psychology, Bojnourd Branch, Islamic Azad University, Bojnourd, Iran

* Corresponding author email address: mojtabaashtiani98@gmail.com

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ABSTRACT

Emotions and psychological states significantly affect the severity of symptoms in Irritable Bowel Syndrome (IBS), with patients experiencing considerable distress due to various physical symptoms and negative emotions. The present study aimed to examine the effectiveness of Acceptance and Commitment Therapy (ACT) on emotional self-regulation and sense of coherence in patients with IBS. This study employed a quasi-experimental pre-test, post-test design with a control group and a two-month follow-up period. The population consisted of patients with IBS who visited the Gastrointestinal and Liver Research Center in Tehran in the first quarter of 2023. Thirty patients were selected through purposive sampling and randomly assigned to experimental and control groups. The experimental group received ACT in ten 90-minute sessions, once a week. The instruments used included the Gross and John (2003) Emotional Self-Regulation Questionnaire and the Felsenberg et al. (2006) Sense of Coherence Questionnaire. Data were analyzed using repeated measures analysis of variance with SPSS version 26. The results showed that ACT significantly impacted emotional self-regulation ($p=0.002$, $F=11.57$) and sense of coherence ($p=0.004$, $F=9.88$) in patients with IBS. It can be concluded that ACT can be an effective intervention for improving emotional self-regulation and sense of coherence in patients with IBS.

Keywords: *Acceptance and Commitment, Sense of Coherence, Emotional Self-Regulation, Irritable Bowel Syndrome*

1. Introduction

Colorectal cancer is the fourth leading cause of cancer-related deaths worldwide and is highly resistant to both classic chemotherapy agents and new targeted therapies (1), with nearly 1.2 million new patients and 0.6

million deaths associated with colorectal cancer in 2020 (2). Resistance to chemotherapy agents is one of the main barriers in the treatment of colorectal cancer, necessitating the development of new therapeutic targets and psychological interventions (3); some even believe that the treatment for cancer is worse than the disease itself (4). In

general, emotions, moods, and psychological states significantly affect the severity of symptoms in Irritable Bowel Syndrome (IBS), and patients with this syndrome also experience considerable distress due to various physical symptoms and negative emotions (5). These patients often experience higher emotional reactivity and expressivity, which can exacerbate their symptoms, highlighting the role of emotional self-regulation. Emotional self-regulation refers to the process of managing, initiating, inhibiting, maintaining, or modulating internal emotional states, physiological responses, attention, and motivation (6), including the ability to reduce negative emotions that can influence behavior, perception, and attention (7). Self-regulation skills refer to an individual's ability to manage their cognitions, emotions, and behaviors and respond to situational demands (8). Emotional self-regulation skills are crucial for successful adaptation in challenging situations throughout life (9).

In relation to patients with IBS, the sense of coherence is also important. Sense of coherence is described as individuals' ability to mobilize internal and external resources to cope with everyday life challenges and plays a central role in moving towards health continuum (10). Sense of coherence is a general term that encompasses the idea of having good social networks, being in touch with one's inner life, having a meaningful daily life, and having clear "coordinates" in life (11). Sense of coherence is a global orientation that reflects the extent of a pervasive, enduring, and dynamic feeling of confidence (12). Individuals with a higher sense of coherence can better cope with situations and avoid stressors (13).

Acceptance and Commitment Therapy (ACT) is a form of cognitive-behavioral therapy that, instead of focusing on emotion regulation and symptom reduction, promotes acceptance of difficult thoughts and feelings and acts in ways that are consistent with a meaningful and valued life, even in the presence of difficult thoughts, feelings, and circumstances (14). The aim of this therapy is to increase psychological flexibility (15) by focusing on accepting feelings, thoughts, and bodily sensations, and having a valued life without fighting what is lost (16), which has been used to enhance the well-being of individuals with advanced progressive diseases and their caregivers (14). Given the limited success of conventional treatments and the psychological impact of IBS, there is a need to explore the potential of ACT in enhancing emotional self-regulation and sense of coherence in patients with IBS. The connection between IBS and extra-intestinal

manifestations, such as eating disorders and urological problems, underscores the importance of exploring emotional self-regulation and sense of coherence in patients with IBS (17). The present study was conducted to investigate the effectiveness of ACT on emotional self-regulation and sense of coherence in patients with IBS.

2. Methods and Materials

2.1. Study Design and Participants

The present research employed a quasi-experimental design with pre-test-post-test with a two-month follow-up period for the intervention group. The statistical population consisted of all patients with IBS referring to the Digestive and Liver Research Center in Tehran during the first quarter of the year 2023. A purposive sampling method was utilized to determine the sample size. Accordingly, 30 patients were purposefully selected among those referring to the Digestive and Liver Research Center in Tehran. The selection process involved the distribution of volunteer forms among the patients, and after collecting the forms, eligible volunteers for the research were identified. Among the eligible patients, 30 individuals were randomly assigned to either the experimental or control groups, with 15 participants in each group. Subsequently, the experimental group received ACT treatment. Inclusion criteria encompassed individuals aged between 30 to 55 years old, having at least a middle school education, and experiencing symptoms for more than two years. Furthermore, exclusion criteria included having more than two absences, non-cooperation, failure to perform tasks during the training session, and lack of willingness to continue cooperation.

Ethical considerations in this research involved voluntary participation. Before commencing the study, participants were briefed on the study's details and regulations. Respect for individuals' attitudes and beliefs was maintained throughout the study. Participants in both the experimental and control groups had the right to withdraw from the study at any stage. Additionally, members of the control group were offered the intervention received by the experimental group in similar therapy sessions after the completion of the study, upon their interest. All documents, questionnaires, and confidential records were solely accessible to the researchers. Written informed consent was obtained from all volunteers.

2.2. Measures

2.2.1. Emotion Regulation Questionnaire (ERQ)

This questionnaire, developed by Gross and John (2003), was translated and validated in Iran by Narimani et al. (2014). It consists of 20 items and measures three underlying factors: cognitive reappraisal, expressive suppression, and tolerance. Responses are rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with total scores ranging from 20 to 100. The reliability of the total scale was reported as 0.81 using Cronbach's alpha coefficient by Gross and John (2003), and Narimani et al. (2014) reported alpha coefficients of 0.70, 0.75, and 0.50 for cognitive reappraisal, expressive suppression, and tolerance respectively (18). The present study obtained a reliability coefficient of 0.74 for this scale using Cronbach's alpha.

2.2.2. Sense of Coherence Questionnaire (SCQ)

The SCQ, developed by Antonovsky (1987), was translated and validated in Iran by Babae (2014). It

consists of 32 items measuring three subscales: comprehensibility, manageability, and meaningfulness. Responses are rated on a 3-point Likert scale ranging from 1 to 3, with total scores ranging from 32 to 96. Higher scores indicate a greater sense of coherence. Antonovsky (1987) reported a content validity of 0.87 and reliability coefficients using Cronbach's alpha of 0.70, 0.75, 0.78, and 0.79 for the subscales comprehensibility, manageability, meaningfulness, and the total score respectively. In Iran, Babae (2014) confirmed the content validity, face validity, and reliability of the questionnaire, reporting a Cronbach's alpha coefficient of above 0.70 for this instrument (13). The present study calculated a reliability coefficient of 0.71 for this questionnaire using Cronbach's alpha.

2.3. Intervention

2.3.1. ACT

In the present study, the Zettle protocol (2003) was implemented, consisting of 10 sessions lasting 90 minutes each, conducted weekly (19).

Table 1

Summary of ACT Sessions

Session	Content
1	Introduction and establishing a connection with group members. Education about ACT and its objectives. Definition of research components and explanation of the study's purpose to participants.
2	Discussion about experiences and their assessment. Efficiency as a criterion for evaluation. Generating creative hopelessness using the farm and toolbox metaphor. Challenge to change plans, assigning homework.
3	Exploring the inner and outer worlds in ACT. Encouraging the abandonment of ineffective programs. Emphasizing that control is the problem, not the solution. Introducing willingness as an alternative to control, assigning homework.
4	Discussing control as a problem. Introducing willingness/feelings, memories, and physical symptoms as responses using the uninvited guest metaphor, assigning homework.
5	Application of cognitive defusion techniques and weakening self-coalition with thoughts and emotions. Practice of mindfulness walking, assigning homework.
6	Emphasizing being present and avoiding mental wandering. Imaginative reflections on the effects of illness, assigning homework.
7	Observing oneself as a context. Weakening of the self-concept and presenting oneself as an observer using the bus and passengers metaphor, assigning homework.
8	Application of mindfulness techniques for detaching from thoughts using the trains under the bridge metaphor, assigning homework.
9	Introduction to the concept of values. Highlighting the risks of focusing on outcomes and discovering practical life values using the mental compass metaphor, assigning homework.
10	Applying learned experiences in real life. Summary and lifelong task assignment.

2.4. Data Analysis

Descriptive statistics were calculated for each research variable. Inferential statistical analysis was conducted using repeated measures analysis of variance (ANOVA) with the SPSS-26 software.

3. Findings and Results

The mean and standard deviation of the ages of the control group participants were 43.34 and 4.42, respectively, and for the experimental group, 42.54 and 5.63. Regarding marital status, 25 participants (83.33%) were married, and 5 (16.66%) were single. In terms of education, 14 participants (46.66%) had a high school

diploma, 12 (40%) had a bachelor's degree, 3 (10%) had a master's degree, and 1 (3.3%) had a doctoral degree.

Table 2

Descriptive Statistics of Research Variables by Test Type and Groups

Variable	Group	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	Follow-up Mean	Follow-up SD
Emotional Self-Regulation	Experimental	46.93	9.33	67.46	8.65	67.13	9.52
	Control	49.00	8.42	49.06	8.28	49.20	8.41
Sense of Coherence	Experimental	33.66	4.45	55.66	4.35	55.70	5.05
	Control	37.46	5.55	37.66	5.44	38.60	5.87

According to Table 2, the mean scores of the experimental group on emotional self-regulation and sense of coherence variables in the post-test showed a greater increase compared to the control group. This change remained more pronounced at the follow-up stage. To determine effectiveness, basic assumptions of the analysis of variance test were examined. The normal distribution of variable scores was assessed with the Shapiro-Wilk test, and the results were not significant, indicating that the distribution of scores for dependent variables is normal. The homogeneity of variance errors was examined using Levene's test. The results of Levene's test indicated that

variance errors for emotional self-regulation ($p=0.666$, $F=0.190$) and sense of coherence ($p=0.734$, $F=0.07$) were not significant at the 0.05 level, thus the groups were comparable. The Box's M test results for examining the homogeneity of variance-covariance were statistically non-significant, meaning the homogeneity of the covariance matrix assumption was met. Additionally, the interaction level between group and pre-test for emotional self-regulation and sense of coherence was not significant ($p>0.05$), indicating that the assumption of homogeneity of regression slopes is met and necessary. Conditions for covariance analysis were fulfilled.

Table 3

Results of Multivariate Statistics Test in Multivariate Analysis of Variance

Test	Value	F	df Effect	df Error	Significance Level
Pillai's Trace	0.631	29.063	2	27	<0.001
Wilks' Lambda	0.369	29.063	2	27	<0.001
Hotelling's Trace	1.710	29.063	2	27	<0.001
Roy's Largest Root	1.710	29.063	2	27	<0.001

According to Table 3, the significance levels of all four multivariate statistics, including Pillai's trace, Wilks' lambda, Hotelling's trace, and the largest root were significant at the 0.001 level ($p<0.01$), indicating that, in

general, ACT had an effect on the research variables. Subsequently, results of the repeated measures analysis of variance for dependent variables are presented.

Table 4

Repeated Measures ANOVA for Comparison of Pre-test, Post-test, and Follow-up of Research Variables in Experimental and Control Groups

Variable	Source of Variation	Sum of Squares	df	Mean Square	F	Significance Level	Eta Squared
Emotional Self-Regulation	Time*Group	70.067	2	35.033	4.262	<0.001	0.132
	Group	21.41	1	21.41	11.57	0.002	0.308
Sense of Coherence	Time*Group	59.267	2	29.633	12.761	<0.001	0.313
	Group	23.71	1	23.71	9.88	0.004	0.276

Based on the data from Table 4, after adjusting for pre-test scores, there was a significant effect of the between-subjects factor for the variables of emotional self-regulation

and sense of coherence. Therefore, it can be concluded that ACT has an effect on emotional self-regulation and sense of coherence variables.

Table 5

Pairwise Comparison of Pre-test, Post-test, and Follow-up Stages

Variable	Stage 1	Stage 2	Mean Difference	SD	P
Emotional Self-Regulation	Pre-test	Post-test	-10.30	0.648	<0.001
	Pre-test	Follow-up	-10.20	0.739	<0.001
Sense of Coherence	Pre-test	Post-test	-11.50	0.519	<0.001
	Pre-test	Follow-up	-11.67	0.556	<0.001

As shown in Table 5, there was a significant difference between the pre-test, post-test, and follow-up mean scores for emotional self-regulation and sense of coherence variables. This means that ACT significantly changed the post-test and follow-up scores compared to the pre-test phase. This change continued during the follow-up period as well.

4. Discussion and Conclusion

The current study aimed to evaluate the effectiveness of ACT on emotional self-regulation and sense of coherence in patients with IBS. The results indicated that ACT was effective in enhancing emotional self-regulation and sense of coherence in patients with IBS. These findings are consistent with previous research by Hashemi et al. (2020), Li et al. (2021), Lackner et al. (2020), and Jo et al. (2018) (20-23). Poor management and inability to control emotional processes are pathways to psychological pathology and psychosomatic diseases. It's important to note that because increasing attention and awareness towards thoughts, emotions, and behavioral tendencies is a positive aspect of ACT, it leads to the alignment of adaptive behaviors and positive psychological states, even improving individual capacity for personal and social activities and interest in these activities (20). ACT can be beneficial and effective in improving emotional regulation in patients. Given that participants in the treatment group showed better emotional regulation than the control group in the post-test phase, this result aligns with previous findings. Therefore, since emotions play a significant role in life, attending to them at any life stage is essential.

The study's findings demonstrated that ACT is effective for emotional self-regulation. Explaining these findings, the presence of disease can be stressful for individuals, while possessing emotional regulation skills can help them manage, modulate, and regulate emotions to reduce the intensity of unpleasant and painful emotions and experience more positive emotions (23). One of the strategies for enhancing emotional regulation skills is ACT,

which, due to its underlying mechanisms such as acceptance, increased awareness, presence in the moment, non-judgmental observation, committed action based on values, and avoidance of experiential avoidance, can equip clients with beliefs, behaviors, and values that allow for greater self-awareness and management of unpleasant and threatening emotions, leading to constructive emotional regulation. Emotional regulation, as a method for modulating emotions, facilitates effective coping with stressful situations and increases activity in response to tense situations. In fact, individuals participating in ACT sessions are less negatively affected by stressful conditions due to the creation of values and the presence of meaning in their lives, finding greater capability in regulating and managing their emotions.

Moreover, the results deemed ACT effective on the sense of coherence variable. Explaining these findings, encouraging patients to clarify values, set goals, anticipate obstacles, and ultimately commit to actions towards achieving goals and values despite disease presence leads to goal fulfillment and happiness derived from it, enhancing disease perception improvement, and freeing them from a cycle of negative thoughts and feelings (22). Patients with IBS perceive their world as comprehensible, manageable, and meaningful, showing a higher ability to manage life and stressful events. Also, examining the effectiveness between ACT and sense of coherence revealed a significant positive relationship between these two variables. Studies show ACT is effective in patients, also reducing stress and anxiety, serving as a crucial resource for adapting to disease and stressors, potentially impacting the sense of coherence level in patients with IBS, aiding them in better understanding life events and emotions, using successful coping strategies, and acting powerfully in controlling stressful situations. Additionally, patients with IBS learned concepts and metaphors from ACT to adhere to constructive life goals, accept their conditions, and act purposefully in life instead of daily struggling and emotional confrontation with the disease.

Ultimately, shaping new values, defining constructive life goals, and committed action towards these goals during ACT can place patients on a constructive psychological path and strengthen emotional, cognitive, and psychological coherence (21).

Finally, the current study was effective in evaluating the effectiveness of ACT on emotional self-regulation and sense of coherence in patients with IBS. This means that ACT increases emotional self-regulation and sense of coherence in patients with IBS. Limitations of the current study included the restricted sample population to patients with IBS in Tehran and the use of purposive sampling. It is recommended that to increase the generalizability of results, this study be conducted in other cities with different cultures, other patients, using random sampling methods. This process can speed up the therapeutic follow-up process and improve patients by improving psychological, emotional, and social conditions.

Authors' Contributions

Donya Balali: Contributed to the conceptualization of the study, participated in data collection, and played a role in the interpretation of findings. Also involved in drafting and revising the manuscript.

Leila Salehi: Contributed to the design of the study and the selection of research instruments. Involved in data collection, data analysis, and interpretation of results. Contributed to manuscript writing and revision.

Mojtaba Changi Ashtiani (Corresponding Author): Provided leadership in the design and implementation of the study, including the selection of Acceptance and Commitment Therapy (ACT) as the intervention. Supervised data collection, analysis, and interpretation. Played a major role in manuscript preparation and revision.

Farya Solat: Participated in the recruitment of participants, data collection, and implementation of the intervention. Contributed to data analysis and interpretation. Also involved in manuscript writing and revision.

Shahram Menat Ali: Contributed to the design of the study and provided expertise in the field of psychology and psychotherapy. Participated in the interpretation of findings and contributed to manuscript writing and revision.

Hossein Alavi: Contributed to the conceptualization of the study and provided expertise in the field of gastroenterology. Participated in the recruitment of participants and interpretation of clinical aspects of the findings. Contributed to manuscript writing and revision, particularly in discussing clinical implications.

Overall, all authors have contributed significantly to different aspects of the research, from study design to data analysis, interpretation, and manuscript preparation. Their collective efforts have ensured a comprehensive investigation into the effectiveness of Acceptance and Commitment Therapy on emotional self-regulation and sense of coherence in patients with Irritable Bowel Syndrome (IBS).

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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