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The Efficiency of Emotion Regulation and Distress Tolerance Based on Dialectical Behavior Therapy on Anxiety Sensitivity and Emotion Regulation Difficulties in Women with Irritable Bowel

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ABSTRACT

Background: Irritable Bowel Syndrome (IBS) is a functional gastrointestinal disorder that affects social, occupational, communicational, and psychological functioning. Therefore, the aim of this research was to determine the effect of emotional regulation and distress tolerance skills based on Dialectical Behavior Therapy (DBT) on anxiety sensitivity and emotion regulation difficulties among women with IBS.

Methods: In order to conduct this study, a sample of 30 women with IBS who referred to Tehran healthcare centers was selected using the convenience sampling. Then, participants were assigned to experimental and control groups randomly. In this pretest-posttest semi-experimental study, we used anxiety sensitivity index questionnaire and the emotion regulation questionnaire. The experimental group received the educational intervention in 10 sessions during two and a half months. Data were analyzed by SPSS software.

Results: The results showed that DBT had a significant effect on anxiety sensitivity and emotional regulation difficulties in women with IBS (P-value < 0.001). So, this treatment could reduce the anxiety sensitivity and emotional regulation difficulties in with IBS women.

Conclusion: According to the results, DBT educations can reduce the anxiety sensitivity and negative emotion regulation and increase the positive emotion regulation.

Keywords: Dialectical Behavior Therapy, Anxiety Sensitivity, Emotion Regulation, Irritable Bowel Syndrome

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Introduction

Irritable Bowel Syndrome (IBS) is one of the chronic digestive disorders characterized by abdominal pain and bloating as well as change in bowel patterns (diarrhea and constipation) in the absence of pathological and chemical disorders. These symptoms have irregular fluctuations and do not eliminate completely. According to the statistics, IBS has an incidence rate of 9 - 22 and 6 percent among the western societies and Iran, respectively.[1, 2] Various names were reported for IBS, such as irritable colon, nervous colon, or spastic colon. In spite of its high prevalence, no treatment has been found that influence all symptoms and psychological disorders of IBS. Furthermore, a lot of patients and doctors are not satisfied with the effect of medical and pharmaceutical treatments.[3] According to mentioned reasons, a great deal of effort has been taken in recent years to diagnose the adaptive mechanisms. Through these adaptive mechanisms people with chronic pain can achieve their psychological health and functional ability.[4] It should be noted that IBS is a chronic disease,[5] which affects individuals' social health, lifestyle, and job.[6] Abdominal pain and discomforts with impaired excretion and bowel habits are symptoms of IBS.[7] Patients often complain about abdominal pain or discomfort.[8] This pain has a chronic nature and negative impact on the life quality of patients.[9]

Most patients with IBS are embarrassed to talk about their excretion problems, so they suffer and experience significant anxiety in comparison with healthy people.[10, 11] Subsequently, they experience anxiety sensitivity.[12] In anxiety sensitivity, people have the tendency to interpret their physical, psychological, social, and anxiety experiences as harmful and dangerous.[13] This feature is a cognitive variable derived from individual differences that is diagnosed by fear of anxiety feelings. It indicates the tendency to create catastrophic thinking about the consequences of such emotions.[14, 15] Anxiety sensitivity reflects the individual's expectation of the stimulus outcome and people's individual differences in the tendency to experience fear while responding to the signs of anxiety.[16] Considering the association between stress and disease, anxiety sensitivity acts as a mediator in formation and continuation of psychological disorders.[17-22]

In the case of IBS incidence, the person's emotions are damaged and emotions' regulation is faced with difficulty.[23] Emotion is defined as a specific internal emotional state, which starts with interpretation and explanation of the situation in a particular way, creates physiological changes, and ultimately causes a return to the balance between organism and environment.[24] Several cognitive strategies exist to regulate the emotions that are categorized into two distinct groups. The first group consists of theoretically more adaptive strategies including refocusing on planning and acceptance, positive refocusing, positive re-evaluation, and development of perspective. The second group includes the theoretically non-adaptive strategies, which contain the rumination and catastrophizing, self-blame, and blaming other.[25]

Different interventional methods have been used to improve the psychological components of patients with IBS. Among these methods, we can mention the education of emotion regulation and distress tolerance skills based on Dialectical Behavior Therapy (DBT). Linehan developed DBT for the first time to treat patients with borderline personality disorder, who committed suicide repeatedly.[26] This approach emphasizes on non-adaptive behaviors of patients to regulate the annoying emotional experiences.[27] In fact, DBT incorporates the interventions of Cognitive Behavioral Treatments (CBT) based on change principle into the educations and techniques of Zen philosophy based on acceptance principle. Therefore, Linehan cited four interventional components in his group therapy: mindfulness, distress tolerance, emotion regulation, and interpersonal relationship skills.[28] The main focus of DBT is on learning, deployment, and generalization of specific adaptive skills and its ultimate goal is to help the patients to break this defective cycle and overcome it.[29] In DBT, as an integrated therapeutic approach, the patients learn to diagnose their

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internal and external contradictions and achieve an efficient result by combination and integration of these contradictions.[30] The results suggested that this approach was successful in treatment of personality disorder,[31] rumination and catastrophizing in women with breast cancer,[32] emotion regulation therapy,[33] treatment of self- and others- blaming, self-harming behaviors therapy, and decrease of impulsive behaviors among individuals with drug abuse,[34] depressive disorders' treatment,[35] and improvement of interpersonal relationships in families with behavioral problems.[36] In the current study, we used DBT because this therapy utilizes the emotion regulation techniques and distress tolerance skills,[35] which are appropriate for our dependent variables.

Considering the psychological vulnerability of women with IBS, the necessity of using appropriate interventional techniques and treatments, the efficiency of DBT approach in improving the cognitive psychological disorders of different societies, and finally the absence of related studies in this area, we carried out this study. The aim was to evaluate the effectiveness of training the emotion regulation and tolerance distress skills based on DBT on anxiety sensitivity and emotion regulation difficulties among women with IBS. The main issue of the current research was to investigate whether education of emotion regulation and tolerance distress skills based on DBT affects anxiety sensitivity and emotion regulation difficulties among women with IBS?

Methods

In this semi-experimental pretest-posttest study, the independent variable was training of emotion regulation and distress tolerance skills based on DBT and the dependent variables included anxiety sensitivity and difficulties of emotion regulation among women with IBS. The participants consisted of the women with IBS who referred to Tehran healthcare centers in 2016. We used the convenience and random sampling methods to select the required samples. In this regard, Khatam-ol-Anbia healthcare center was selected from the healthcare centers in Tehran using non-random sampling method. Then, 30 patients with IBS were selected and asked to participate in the research. After the participants declared their readiness to participate in the research, we randomly assigned them into experimental (N = 15) and control (N = 15) groups. Later, participants were asked to complete the questionnaires before the educational. In the following step, participants in experimental group participated in the training courses of emotional regulation and distress tolerance skills based on DBT. The education was conducted in 10 sessions of 90 minutes for two and a half months on five-member groups. However, the control group did not receive any education during the research process.

Anxiety sensitivity index

Anxiety Sensitivity Index (ASI) is a self-report questionnaire developed by Floyd, Garfield, and Marcus.[37] The questionnaire includes 16 items and is based on a five-point Likert scale (very low = 0 to very high = 4). Scores can range from zero to 64 and higher scores show higher anxiety sensitivity. The structure of this questionnaire consists of three factors: fear of physical anxiety (8 items), fear of losing cognitive control (4 items), and fear of the anxiety observed by others (4 items).[37] The psychometric properties of this scale showed its internal consistency (alpha ranged from 0.80 to 0.90). The test-retest reliability was 0.75 after two weeks and 0.71 after three years; which indicates that anxiety sensitivity is a sustainable personality structure.[37] The reliability of ASI in Iranian version was measured using three methods of internal consistency, re-test, and split-half and the reported coefficients were 0.93, 0.95, and 0.97, respectively. The validity was measured using three methods of concurrent validity, correlation of subscales with total scale and with each other, and factor analysis. The concurrent validity was calculated by SCL-90 questionnaire with a correlation coefficient of 0.56. The correlation coefficients of the scores with the total score were satisfactory and ranged from 0.41 to 0.88. The correlation among subscales varied from

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0.41 to 0.68.[38] The reliability of this measurement was reported as 0.87 in several studies,[39-40] Ghasemi reported a measure of 0.89, and we calculated a coefficient of 0.89 using the Cronbach's alpha method**.**

Cognitive emotion regulation questionnaire

This 36-item questionnaire was developed by Garnowski, Craig, and Spin in 2001. Contrary to other questionnaires of this field that do not differentiate between the individual's thoughts and their real actions, this questionnaire evaluates the individuals' thoughts after encountering a negative experience or harmful events. The implementation of this questionnaire is very easy and is applicable to people over 12 years (both normal people and clinical populations). The questionnaire of cognitive emotion regulation consists of nine subscales: self-blame (questions 1, 10, 19, 28), self-acceptance (questions 2, 11, 20, 29), rumination (questions 3, 12, 21 and 30), positive refocusing (questions 4, 13, 22, 31), refocus on planning (questions 5, 14, 23, 32), positive reappraisal (questions 5, 16, 24, 33), perspective adoption (questions 7 , 16, 25, 34), catastrophic beliefs (questions 8, 17, 26, 35), and blaming others (questions 9, 18, 27, 36). Each question should be scored from one (never) to five (always). High scores in each subscale indicate higher use of strategy in facing or confronting with stressful and negative events.[41] The scales of this questionnaire are divided into positive and negative cognitive regulation factors, which should be analyzed in a statistical analysis separately. The positive cognitive regulation includes subscales of self-acceptance, positive refocusing, refocusing on planning, positive reappraisal, and perspective adoption. However, negative cognitive regulation includes the subscales of self-blame, ruminating, catastrophic beliefs, and blaming others.

The reliability of this questionnaire was confirmed in several studies, for example, Carnovsky et al. used Cronbach's alpha coefficient and reported the reliability of this test as 0.91, 0.87, and 0.93.[41] In Iran, the reliability of this scale was measured using the correlation of total score with subscales and the results showed that all measures were significant and ranged from 0.41 to 0.68 with an average of 0.56.[42] The reliability of the questionnaire in this research obtained using the Cronbach's alpha coefficient for the subscales of self-blame, acceptance, rumination, positive reappraisal, refocus on planning, reappraisal, perspective adoption, catastrophic beliefs, and blaming others were 0.72 , 0.74, 0.76, 0.82, 0.75, 0.76, 0.75, 0.75, and 0.74, respectively.

The process of research implementation

In order to conduct the research, we referred to Khatam-ol-Anbia healthcare center in Tehran and selected the samples. We collected informed consent forms from the participants and classified them into the experimental and control groups. Regarding the ethical considerations, participants were asked to complete the consent forms and they were provided with detailed explanation about the research process. Moreover, we ensured the control group members that they would receive the education after the end of the research procedures. In addition, both groups were assured about confidentiality of the information and the fact that they should not mention their names on the questionnaires. Finally, the educational intervention over emotion regulation and distress tolerance skills based on DBT was performed on the experimental group according to Table 1, whereas, the control group was trained as usual. The interventional program on emotional regulation and distress tolerance skills based on DBT was performed in 10 sessions of 90 minutes during two and a half months.

In this research, we used the descriptive and inferential statistics to analyze the data. We used the mean and standard deviation in the descriptive statistics and the Shapiro-Wilk test to evaluate the normal distribution of variables in the inferential statistics. Levene test was also applied to investigate the quality of variances, regression analysis to evaluate the slope of linear regression, and

covariance analysis to study the research hypothesis. Statistical analysis was analyzed using $SPSS_{23}$.

Results

Results from cognitive data showed that the participants' mean age was in the range of 27 - 52 years, the mean and standard deviation of age was 38.30 (5.66) years. Moreover, the highest level of education was diploma (43%) (Table 2).

The results of Table 2 show that the mean scores of positive and negative emotion regulation as well as the anxiety sensitivity changed in the experimental group in comparison with the control group in the post-test phase. The significance of this difference was evaluated by the inferential statistics.

Before presenting the results of covariance test analysis, we evaluated the assumptions of parametric tests. Therefore, Shapiro Wilk test's results confirmed the presumption of normal distribution of samples (P-value < 0.05). Likewise, the homogeneity of variance assumption was evaluated by Levene test. The results were not significant, which showed homogeneity of variances (P-value < 0.05). Regarding the assumption of homogeneity of regression slopes, the results showed that the pre-test results did not have a significant correlation with the grouping variable in the post-test stages in the positive and negative emotional regulation variables and anxiety sensitivity. In other words, the hypothesis of regression homogeneity was confirmed in positive and negative emotional regulation as well as anxiety sensitivity variables. In addition, t-test results indicated that the pre-test scores of the experimental and control groups were not significantly different considering the dependent variables (P-value < 0.05). The results of covariance analysis regarding the effect of group membership on the positive and negative emotional regulations as well as anxiety sensitivity of women with IBS are presented in Table 3.

Training emotion regulation and distress tolerance skills based on DBT could cause a significant difference in the mean scores of positive and negative emotion regulations as well as anxiety sensitivity in women with IBS (Table 3). The error level was set at 0.05. Therefore, we can conclude that by controlling the interventional variables, the average scores of the positive and negative emotion regulations as well as the anxiety sensitivity in women with IBS changed by attending the training programs for emotion regulation and distress tolerance skills based on DBT. The post-test scores of negative emotion regulation and anxiety sensitivity decreases, but the mean scores of positive emotion regulation increased. The effect of training on emotion regulation and distress tolerance skills based on DBT in positive and negative emotional regulation as well as anxiety sensitivity in women with IBS were 0.67, 0.75, and 0.60 respectively. This means that 67, 75, and 60 percent of the variation in the positive and negative emotional regulation variables and the anxiety sensitivity of women with IBS can be explained by group membership.

The current study had some limitations such as the fact that the results were confined with gender, specific geographical region, limited research tools, i.e. questionnaires, as well as lack of the follow-up. Given the limitations, we suggest other researchers to conduct similar studies a statistical population consisting of both genders in other geographic regions. They also can design studies with follow-ups to increase the generalizability of the results. Based on the findings of current research, we recommend the authorities of healthcare centers to use skillful psychologists in treating the patients with irritable bowel. Therefore, the patients should receive both therapeutic and physiological therapies along with physiological treatment.

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Table 1. An overview of DBT training sessions[43, 44]

Row	Session	Session description
1	The First session	At first, the researcher welcomed the participants and explained about the aim, duration, number, conditions for leaving, and homework of the educational sessions. The pre-test was conducted. The first part of distress tolerance component: Relaxation training (body relaxation), diaphragmatic breathing training, symptom-related relaxation, caring about and living the moment
2	The Second session	The second session of distress tolerance component was passive recession and refocus on thoughts
3	The Third session	The third session of distress tolerance component was the basic acceptance
4	The Forth session	The fourth session of the distress tolerance component of values- a committed or adherent performance
5	The Fifth session	Mindfulness: the first category is What skills that include the things one should do to reach mindfulness that contains three skills of observation, description, and participation.
6	The Sixth session	Mindfulness: The second category is How skills: Skill to adopt a non-judgmental position, Comprehensive self-consciousness, and efficient performance
7	The Seventh session	Emotion regulation: such as: What is the emotion and what are its components? Training on the cognitive emotions' patterns and tagging them, which increase the ability to control the emotions; Acceptance of emotions, even in the case that they are negative, being trained about "please control yourself" skills to reduce the vulnerability to negative emotions.
8	The Eighth session	Emotion regulation: train to generate the positive emotional experiences through the development of short-term positive emotional experiences (e.g. recreation) and long-term positive emotional experiences (by working on three areas of life goals, relationships, and comprehensive wisdom versus positive experiences. Train to get rid of emotional distress by accepting the emotions and revising the negative emotions through acting in opposite of emotion
9	The Ninth session	The effective communication skills: 1- communicational styles: passive, aggressive, courageous 2- Barriers to expressive behavior
10	The Tenth session	The effective communication skills: An expressive communication and post-test performance

Table 2. Descriptive statistics of variables in the pre-and post-test stages in two groups

Groups		Pre-test		Post-test	
		Mean	SD	Mean	SD
Experimental Group	Positive Emotion Regulation	38.98	4.63	50.20	5.14
	Negative Emotion Regulation	41.46	4.64	31.26	4.09
	Anxiety Sensitivity	42.26	4.90	33.60	4.32
Control Group	Positive Emotion Regulation	40.33	4.71	39.80	4.45
	Negative Emotion Regulation	40.13	4.06	40.24	5.23
	Anxiety Sensitivity	42.60	5.09	42	5.12

Table 3. Covariance analysis of the effect of group membership on positive and negative emotion regulation and anxiety sensitivity in women with IBS

Variables	Statistical Indicators of Variables	Sum of Squares	Degrees of Freedom	Average Squares	F	Significance Level	Effect Size	Test Power
Positive Emotion Regulation	Pre-Test	16.13	1	16.13	1.08	0.30	0.04	0.17
	Group Membership	821.78	1	821.78	55.38	0.0001	0.67	1
	Error	400.60	27	14.84				
Negative Emotion Regulation	Pre Test	163.01	1	163.01	19.58	0.001	0.42	0.99
	Group Membership	683.81	1	683.81	83.29	0.0001	0.75	1
	Error	221.56	27	8.21				
Anxiety Sensitivity	Pretest	296.30	1	296.30	24.29	0.001	0.47	0.99
	Group Membership	501.64	1	501.64	41.13	0.0001	0.60	1
	Error	329.29	27	12.19				

Discussion

The current research was conducted to determine the efficiency of emotion regulation and distress tolerance skills based on DBT on anxiety sensitivity and emotion regulation difficulties among women with IBS. The results of data analysis showed that education of DBT increased the positive emotional regulation and decreased the anxiety sensitivity and negative emotional regulation in women with IBS (P-value < 0.001).

The results from the current study are in the same line with the results of Eisner et al. (2017) on depressive disorder therapy, Wilks et al. (2017) on improving the interpersonal relations in families with behavioral problems, Taghvaie et al. (2015) on self-blame therapy and blaming others, rumination, and catastrophic beliefs among women with breast cancer, Salehi et al. (2012) on the effect of DBT on emotional difficulties, Littlefield et al. (2009) in self-harming behaviors therapy and reduction of impulsive behaviors among individuals with drug abuse, and Lynch et al. (2007) on personality disorders.[31-36]

The radical acceptance skill is one of the DBT techniques, in which participants learn to change the behaviors leading to others or their own distress. This skill helps the participants to accept themselves with all their strengths, weaknesses, passions, and emotions simultaneously. Participants can discover their values and use them in enduring the stressful situations to achieve more satisfaction using this skill. They also can implement their intentions in life and engage in committing actions toward their own selves.[45] The ability to cope with stress naturally, discover values, and increase the personal ability to cope with anxiety can reduce the anxiety sensitivities of the patients.

Reduction of daily unpleasant experiences and emotional instability, application of self-motivational inspirational thoughts, and the ability to regulate and modify the negative emotions are the results of DBT trainings,[46] They increase the patient's self-confidence, motivation, and positive emotions so that the individuals can have more emotion regulation. On the other hand, turning-attention skills help the individual to focus on creative and innovative images in facing the negative thoughts derived from illnesses; therefore, people can prevent further engagement of their minds in these thoughts. Similarly, application of mindfulness leads to reduction of the rumination and makes the individual's mind less engaged in the past painful experiences and future threats. Moreover, these skills provide tools for the participants to stop judging and negative thoughts, while improving their own calmness. By relaxation, patients have more ability to regulate their

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emotional processes and show more positive emotions.

Emphasis is employed on retrieving emotions in the functional level of DBT, so that unpleasant emotions become adaptive and helpful emotions. The aim of DBT is to reduce the sufferings of individuals who are engaged in emotional difficulties. In order to achieve this goal, awareness, the emotions regulation, effective communication, and distress tolerance skills should be educated to people.[28, 47] Obviously, patients with emotional awareness can reduce their negative emotions more effectively and can regulate their emotional processes. Furthermore, individuals with emotion regulation skills and emotional awareness can observe the natural process of their emotions and tolerate them without any resistance or avoidance.[29] One of the strategies that can prevent the futile emotional responses is the technique of "taking opposite actions to intense emotional excitement". This technique helps the individuals to regulate emotions such as the tendency to repeat the actions and thoughts .

Conclusion

According to our results, it is suggested that the healthcare centers provide psychological as well as physiological treatments and apply psychological methods of emotional regulation and distress tolerance based on DBT.

Conflicts of Interest

In this study, were not reported any potential conflicts of interest by the authors.

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Authors' Contribution

Conceptualization, A.A.N. and Z.Y.; Methodology, M.S.; Formal Analysis, M.S., Investigation, A.A.N.; Data Curation, Z.Y., Writing – Original Draft, Z.Y. and A.A.N.; Writing – Review and Editing, M.S Resources, Z.Y.; Supervision, M.S.

All authors read and approved the final manuscript and are responsible about any question related to article.

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