Original Article

Effectiveness of cognitive-behavioral therapy on pain perception and metacognitive beliefs in patients with irritable bowel syndrome

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Abstract

Background: The most common, costly, and debilitating functional gastrointestinal disorder is irritable bowel syndrome (IBS). This study aimed to determine the effectiveness of cognitive-behavioral therapy on metacognitive beliefs and pain problems in patients with irritable bowel syndrome.

Methods: The study used a quasi-experimental design with pre-test, post-test and a three-month follow-up with the control group. All patients with irritable bowel syndrome at Tehran Shariatee Hospital were included in the statistical population. The sample consisted of 30 patients who were randomly assigned to experimental and control groups using the purposive sampling method. Before the intervention, the pre-test was held, after which the experimental group received cognitive-behavioral therapy in 8 sessions of 90 minutes, but the control group did not receive any intervention. Then, the post-test was administered and after three months of post-test implementation, the follow-up period was performed. The research tools included a metacognitive beliefs questionnaire and pain understanding. Data analysis was performed by SPSS.22 software and univariate variance analysis.

Results: The experimental group was 33.6 (7.8) years old, while the control group was 35.9 (8.4) years old. Both groups were homogenous in terms of gender, age and marital status. The findings showed that cognitive-behavioral therapy was effective on metacognitive beliefs ($P<0.01$) and pain affect ($P<0.01$).

Conclusion: It can be concluded that cognitive-behavioral therapy is effective in treating metacognitive beliefs and pain in patients with irritable bowel syndrome, and that it can be used to help these patients.

Keywords: Cognitive Behavioral Therapy; Irritable Bowel Syndrome; Metacognition; Pain Perception.

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Introduction

The most common, costly, and debilitating functional digestive disorder is irritable bowel syndrome (1). Irritable bowel syndrome (IBS) is a gastrointestinal disorder characterized by changes in bowel movements, pain, and abdominal discomfort without identifiable structural disorders. Because there is no clear diagnostic marker for IBS, it is

diagnosed based on clinical manifestations (2). The most common, costly, and debilitating functional digestive disorder is irritable bowel syndrome (1). Irritable bowel syndrome (IBS) is a gastrointestinal disorder characterized by changes in bowel movements, pain, and abdominal discomfort without identifiable structural disorders. Because there is no clear diagnostic marker for IBS, it is diagnosed based on clinical manifestations (2). Although the pathogenesis is not yet fully known. Intestinal movement disorder, visceral sensitivity, and psychological disorders are known as the basic pathophysiological characteristics of this disease. Also, for central nervous dysfunction, stress and intraductal factors are considered. However, the determinant variables of experiencing these stresses are less known as risk factors for irritable bowel syndrome (3).

In irritable bowel syndrome, the perception of the condition appears to be a crucial psychological element that can be helpful (4). Patients' cognitive representations of what threatens their health are formed as a result of their active processing of their disease, impacting how patients respond to these elements and their compatibility with the disease and its symptoms (5). As a result, studying the impact of sickness perception in chronic disorders like irritable bowel syndrome is crucial and fruitful (6).

Patients' understanding of their ailment is dependent on their perception or cognitive representation of it, as well as information gleaned from numerous sources and beliefs. This factor can have an impact on an individual's mental health and ability to cope with the disease. When a disease is diagnosed for a person or when a person is injured, he or she tries to form a cognitive schema of the disease to make the disease meaningful for itself. This perception of the disease is important in guiding adaptation practices and specific behaviors related to the disease such as adherence to treatment (7). In general, the cognitive schema of the disease or perception of the disease has dimensions that include outcomes, timeline, personal control, treatment control, identity, worry, emotional response, and the cause of the disease (8). On the other hand, reducing perceived pain, both in terms of severity and emotional distress – in other words, reducing pain suffering – is the main demand of patients (9).

Irritable bowel syndrome patients' metacognitive views are also one of the most relevant characteristics (10). Beyond a Greek prefix meaning about, metacognition is a mixture of two words: cognition or cognition signifies knowing and thinking or thinking and thinking. Internal, subjective processes or ways of processing information are referred to as cognition. In other words, cognition is the process of taking into account, recognizing, encoding, and finally storing information in the present instant so that it can be recalled later (11).

In the science of memory, Flavel (12) created the term "metacognition." Flavell was aware of metacognition as a method of controlling cognition or, more broadly, as a method of controlling cognition. Any knowledge or cognitive activity that covers a cognitive subject or disciplines a cognitive action is referred to as metacognition. People's understanding of the nature of people as a cognitive system, as well as knowledge of the nature of distinct cognitive tasks, is referred to as metacognition. Metacognitive ideas are a person's beliefs about thinking and its processes (13).

Flavell defines metacognition as the application of any cognition-related knowledge or activity to oneself, its surroundings, or as part of the cognitive organization. The main point is cognition about cognition. Simply put, metacognition is a process in which learners are aware of how to learn themselves, how to use available information to achieve a goal, the ability to judge cognitive processes in a

specific task, and how to use strategies to achieve their goals in identifying their knowledge and knowledge. Metacognition is the understanding of cognitive processes, which includes performing, organizing, and coordinating the set of these currents (14).

The effect of routine treatments for irritable bowel syndrome and its use chemical drugs have generally been limited and can be difficult and sometimes without problem and turn the patient and the doctor to the right alternative therapies (15-16).

To balance physical and psychological health and improve outcomes such as psychological distress reduction and treatment adherence, psychological therapies are required. Psychological interventions, particularly cognitive-behavioral therapy, have been shown in the research literature to help people with irritable bowel syndrome cope with the normal stresses of the disease (17). Cognitive-behavioral therapy is another approach in improving the status of patients with irritable bowel syndrome that helps patients to recognize the power of "self-talk" (what they call themselves) and increase their coping skills in dealing with emotional distress (18). There is also evidence that cognitive-behavioral therapy is cost-effective (based on factors such as fewer sessions, lower financial burden, and greater collaboration), reduces resource waste, and plays an important role in preventing the progression of chronic and debilitating conditions (19). Another advantage of using this model in the treatment of irritable bowel syndrome patients is that it increases adherence to the treatment regimen (20). As a result of the above, the goal of this study was to see if cognitive-behavioral treatment could help patients with irritable bowel syndrome improve their metacognitive beliefs and pain perception.

The purpose of this study was to see how cognitive-behavioral therapy affected metacognitive beliefs and pain problems in patients with irritable bowel syndrome.

Methods

The current study is an applied and quasi-experimental study with a control group and as a guided study; All patients with irritable bowel syndrome in Tehran Shariatee Hospital were included in the statistical population. The sample comprised of 30 patients who were randomly assigned to one experimental group and one control group, each with 15 patients, using the Purposive sampling approach. Each group's effect size was 0.25, alpha was 0.05, and power was 0.80, so the number of samples was determined accordingly. The sample size required for this study for each group was calculated using G-Power software and was based on 0.35 effect size, 0.05 alpha error probability, and 0.75 test power in three groups and with three measurements (pre-test, post-test).

Prior to the intervention, the experimental group was given a pre-test, after which they got cognitive-behavioral therapy for eight 90-minute sessions, while the control group received no treatment. The post-test was then administered, and the follow-up period began three months after the post-test was implemented. The diagnosis of irritable bowel syndrome based on Rome II criteria, with a gastroenterologist diagnosis, and a lack of psychological treatments in the previous three months will be inclusion criteria. Exclusion criteria included gastrointestinal bleeding, the presence of blood in the stool, fever, a 10% weight loss in the previous 6 months, and a family history of colon cancer. The current study's ethical considerations were as follows: all subjects were given written information about the study.

Wells and Cartwright-Howton (2004) developed the Metacognitive Beliefs Questionnaire, a 30-item self-report questionnaire to assess people's positive and negative metacognitive beliefs about worry and disturbing thoughts (21). The responses on this scale are graded on a Likert scale of 1 to 4, with 1 equaling "I

don't agree" and 4 equaling "A lot." There are five subscales in this scale: 1) reassuring beliefs about worry 2) unshakeable beliefs about risk 3) Beliefs in cognitive sufficiency 4) negative metacognitive beliefs about the need for control in general 5) Beliefs about cognitive self-awareness that are metacognitive. All subscales are directly scored, with higher scores indicating higher levels in each. Collect the points associated with each of the questions in each dimension to calculate the score for each dimension. Shirinzadeh's descendants and stability have translated and prepared for the future.

McGill Pain Questionnaire: This is a condensed version of the McGill Pain Questionnaire, which was created by Melzak to assess the quality and severity of McGill's pain dissemination in order to facilitate accountability. It consists of 15 items that look at the sensory (11 items) and emotional (four items) dimensions of pain. The questionnaire is graded on a scale of zero to four, with zero being the lowest and four being the highest (three). The sum of these two scales yields the overall pain score, which is in addition to the sensory and emotional pain scores. Higher pain intensity is indicated by higher scores. In addition, a visual scale with a grading system (0-10) assesses pain intensity, ranging from painless to excruciating. Melzak determined the tool's validity by comparing it to McGill's long-form pain scale.

The data from the pre-test, post-test, and follow-up stages were analyzed with descriptive statistics indices like mean and standard deviation, as well as inferential statistics indicators from repeated measurement analysis and the spss.22 software.

Results

The experimental group was 33.6 (7.8) years old, while the control group was 35.9 (8.4) years old. Table 1 shows the demographic characteristics of the participants. In terms of gender, marital status, age, and education, there was no difference between the experimental and control groups. The demographic characteristics of the participants in the two groups are listed in Table 1.

Analysis of variance with repeated measures was used to analyze the difference in symptom severity scores between the experimental and control groups. Before repeating the measuring variance analysis, the findings of the M box, Mauchly spherical test, and Levene's tests were reviewed. Because the M box test was not significant for any of the research variables, the variance-covariance matrix's homogeneity criterion was correctly observed. The absence of significance of any of the variables in the Levene's test also indicated that the equality criterion of intergroup variances was met, and the variance of dependent variable error was equal in all groups. Finally, the findings of the Mauchly spherical test revealed that it was also utilized to determine the severity of symptoms. All tests are significant at the 0.0001 level, showing that the mean of the tests differ significantly between the experimental and control groups in terms of

Table 1- Frequency distribution and comparison of demographic characteristics

Demographic variable		Experimental	Control	P-value
Gender	Female	8 (53.3)	6 (40)	0.34
	Male	7 (46.7)	9 (60)	
Marriage	Single	3 (20)	1 (6.7)	0.59
	Married	12 (80)	14 (93.3)	
Age	20-30	6 (40)	5 (33.3)	0.31
	31-40	4 (26.7)	5 (33.3)	
	41-50	5 (33.3)	5 (33.3)	

Table 2- Mean and standard deviation of scores of research variables in experimental and control groups

Variable	Group	Pre-test		Post-test		Follow-up	
		M	SD	M	SD	M	SD
Metacognitive Beliefs	Experimental	60.60	4.30	66.05	3.63	65.35	3.55
	Control	59.95	4.51	60.50	4.62	60.45	4.68
Pain Perception	Experimental	12.80	1.65	9.80	1.14	9.13	1.30
	Control	12.40	1.45	12.20	1.12	12.43	1.40

the efficiency of cognitive-behavioral treatment in improving metacognitive beliefs and pain perception. With a value of 0.09 and F=132.67, the Wilks Lambda test demonstrates a significant difference in scores between the experimental and control groups on the effectiveness of cognitive-behavioral therapy in enhancing metacognitive beliefs and pain perception at a significant level of 0.0001.

Table 3 demonstrates that the within-subject component (time) is significant but not the between factor (group size). These findings suggest that the effect of time alone is significant, regardless of the group effect. Furthermore, the interaction between group and time was significant (F=71.43, df=2), with an impact of 0.71. Also, analysis of variance is significant for the intra-group factor (time) but not for the intergroup factor in pain perception. These findings suggest that the effect of time alone is significant, regardless of the group effect. Furthermore, the interaction between group and time was significant (F=63.12, df=2), with an effect of 0.68. To compare the two groups, the Bonferroni post-hoc test was used.

Table 4 shows that the experimental group scored higher on the metacognitive beliefs variable at the post-test stage than the control group. Metacognitive beliefs can be improved with cognitive behavioral therapy. When compared to the control group, metacognitive beliefs in the cognitive-behavioral group did not increase significantly in the follow-up stage. The experimental group's pain perception variable score is lower than the control group's at the post-test stage. To put it another way, cognitive behavioral therapy has a high rate of success in reducing pain perception. These findings show that pain perception in the cognitive-behavioral group did not decrease significantly in the follow-up stage when compared to the control group.

Table 3- Comparison of pre-test, post-test, and follow-up of metacognitive beliefs and pain perception in experimental and control groups using repeated measure analysis of variance

Variable	Source of change	SS	Df	MS	F	P	Eta
Metacognitive Beliefs	Time	185.08	1.38	133.96	124.71	0.001	0.81
	Time*Group	106.02	1.38	76.73	71.43	0.001	0.71
	Group	263.51	1	263.51	5.87	0.022	0.17
Pain Perception	Time	143.11	1.38	122.54	110.94	0.001	0.76
	Time*Group	102.16	1.38	65.20	63.12	0.001	0.68
	Group	220.44	1	220.44	4.03	0.034	0.15

Table 4- Results of Bonferroni posthoc Test to compare the Severity of Symptoms and Perception of Disease

Variable	Group		Pre-test	Follow-up
Metacognitive Beliefs	CBT	Pre-test	-3.16*	-2.90*
		Post-test	-	0.26
	Control	Pre-test	-0.06	-0.08
		Post-test	-	-0.11
Pain Perception	CBT	Pre-test	-13.50*	-13.06*
		Post-test	-	0.43
	Control	Pre-test	-0.06	-0.08
		Post-test	-	-0.11

Discussion

This study aimed to determine the effectiveness of cognitive-behavioral therapy on metacognitive beliefs and pain problems in patients with irritable bowel syndrome. The results were in line with the research of Hufart, Johnson, Nordeahl, and Wells (24), Postolica, Lorga, Putario, and Azusai (25) and Baber and Rodriguez (26).

In explaining this finding, it can be said that patient's assessment of the effect of irritable river syndrome on his life process and excessive stress and irritability caused by negative thoughts are among the factors that have caused anxiety and anxiety in these patients more than the disease itself. Specific beliefs about the disease lead to maladaptive coping methods exacerbating psycho-physical symptoms and the resulting suffering and disability. Cognitive-behavioral group therapy first provides the grounds for patients to express their dysfunctional thoughts and beliefs and cognitive distortions freely and without fear, and then to investigate and correct thoughts, infrastructural beliefs, and cognitive distortions. According to Beck's cognitive therapy model, cognitive therapy will have the greatest effect when the therapist corrects these infrastructure assumptions in patients and surrogates positive, logical, and non-emotional thoughts (27). Cognitive restructuring, also known as logical empiricism, helps people to identify the flow of their anxious thoughts and even test their dominant anxiety thoughts by using logical reasoning to practically test the content of their anxious thoughts in the face of the reality of their life experiences. That is, they are concerned about the possibility of something happening (28). Therefore, cognitive assessment of accidents on response to those events will be a past effect and a prelude to changing cognitive activity. Cognitive-behavioral training plays an important role in creating or changing cognition and attitude in people. Considering that followers of the cognitive-behavioral approach believe that the existence of some common mental errors can impair our interpretation and perception of reality and subsequently inappropriate moods and behaviors appear, therefore cognitive-behavioral training can be effective in improving metacognitive beliefs and perceptions of patients' pain, depending on their ability to clear, correct and effectively convey their thoughts, feelings, needs, and desires.

In explaining this finding, it can be said that cognitive-behavioral therapy improves the metacognitive beliefs of patients. According to the cognitive model of behavior, what people believe affects their feelings and behaviors. Patients' knowledge and attitudes also have an important effect on metacognitive beliefs. Negative cognitions and attitudes about disease control improve the individual's

metacognitive beliefs. One of the fundamental principles of the behavioral cognitive model is the mutual impact and interaction between the person's knowledge or beliefs about the disease (thoughts), his feelings, his behaviors, and his relationships with others. The cognitive-behavioral approach to individuals, who often have cognitive errors, irrational and destructive beliefs in their lives, has led to an increase in people's awareness of irrational documents and beliefs. Also, by doing training sessions and assignments outside the sessions, correct the wrong beliefs and documents that improve the metacognitive beliefs of patients (29). Cognitive-behavioral training emphasizes the importance of acquiring skills and using these skills, during the training, people, in addition to working on negative thinking, learn fruitful behavioral methods, which make them face valuable resources in life, people affected by these training will find the ability to have automatic thinking and their associative emotions, as well as documents to confirm them. And disapproval provides them with some kind of self-awareness (30). Considering that followers of the cognitive-behavioral approach believe that the existence of some common mental errors can impair our interpretation and perception of reality and subsequently inappropriate moods and behaviors appear, therefore cognitive-behavioral training can be effective in improving patients' metacognitive beliefs, depends on their ability to convey their thoughts, feelings, needs, and desires. As a result, cognitive-behavioral therapy is effective in improving metacognitive beliefs and pain problems in patients with irritable bowel syndrome. One of the many researchers who may cause the subject to respond to a large number of research questionnaires. It is recommended that cognitive-behavioral therapy be used in health care settings to treat the psychological problems of patients with irritable bowel syndrome.

Conclusion

It can be concluded that cognitive-behavioral therapy is effective for improving metacognitive beliefs and pain in patients with irritable bowel syndrome.

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