



Effectiveness of Cognitive-Analytical Therapy on Alexithymia and Interpersonal Problems in Patients with Functional Dyspepsia

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ABSTRACT

Cognitive-Analytical Therapy (CAT) appears to be a suitable approach for intervening in the improvement of interpersonal problems in individuals with psychosomatic disorders. The present study aimed to determine the effectiveness of Cognitive-Analytical Therapy on alexithymia and interpersonal problems in patients with functional dyspepsia. The present study employed a quasi-experimental method with a pretest, posttest, and follow-up design, along with a control group. The statistical population consisted of patients with functional dyspepsia who visited the gastroenterology clinic of Shariati Hospital in Tehran in 2021, from which 30 eligible volunteers were selected through convenience sampling and randomly assigned to two groups: the "Cognitive-Analytical Therapy" group and a control group. Research tools included a demographic questionnaire, the Toronto Alexithymia Scale and the Inventory of Interpersonal Problems-32. The content validity of the tools was measured qualitatively, and their reliability was assessed using internal consistency by calculating Cronbach's alpha. After conducting 16 therapeutic sessions for the intervention group, the data were collected and analyzed using SPSS software version 26. In the present study, there was a significant difference between the pretest, posttest, and follow-up scores for both variables ($P = .001$). There was also a significant difference between the intervention and control groups for both alexithymia ($P = .001$, $F = 69.938$) and interpersonal problems ($P = .001$, $F = 70.598$). The results indicated that Cognitive-Analytical Therapy is effective in reducing alexithymia and interpersonal problems in patients with functional dyspepsia. It is recommended that, in addition to medical treatments, psychotherapy interventions such as "Cognitive-Analytical Therapy" be provided for patients with functional dyspepsia.

Keywords: Cognitive-Analytical Therapy, Functional Dyspepsia, Interpersonal Problems, Alexithymia

1. Introduction

Psychosomatic disorders are conditions that manifest physically but are caused by emotional issues that affect the functioning of the "autonomic nervous system," "endocrine glands," and physiological processes, and are closely related to the "sympathetic" and "parasympathetic" systems (1). "Functional gastrointestinal disorders" are a category of psychosomatic illnesses, with "functional dyspepsia" being one of the most common types, characterized by acute, chronic, and recurrent gastrointestinal symptoms in the absence of any organic or metabolic issues that explain the symptoms (2). This disorder includes one or more symptoms such as upper abdominal pain, early satiety, feeling of fullness, heartburn, bloating, and nausea. These chronic symptoms persist over a six-month period without any organic explanation (3). Functional dyspepsia leads to mental health problems and a decrease in the individual's quality of life (4).

Psychosocial disturbances are common among most individuals with this disorder. The most frequent psychological problems observed in these patients are "anxiety disorders," "mood disorders," "major depression," "somatization disorder," and "pain disorder." It appears that patients with functional gastrointestinal disorders, when exposed to a stressful or traumatic event, experience emotional disturbances due to their inability to process emotions cognitively and regulate them, alongside higher levels of "alexithymia". When individuals cannot express their problems and meet their needs, this inability sometimes manifests as physical or psychiatric symptoms (5).

Alexithymia, observed in many patients with psychosomatic disorders (6), encompasses both cognitive and emotional dimensions. The cognitive dimension of alexithymia reflects the ability to identify, describe, and analyze emotions, while the emotional dimension reflects the degree to which individuals are stimulated by emotional stimuli and their ability to engage in fantasy (7). It is believed that the cognitive and emotional characteristics of alexithymia reflect deficits in the process of emotion recognition, regulation, and emotional skills (8). Alexithymia can be conceptualized as a cognitive-emotional regulation strategy marked by deficiencies in recognizing or processing emotions or by avoidant coping strategies (9). While alexithymia is distributed as a normal personality trait

among all people, high levels of alexithymia increase the likelihood of vulnerability to psychosomatic and physical illnesses (10). Individuals with alexithymia cannot properly identify their feelings and emotions and differentiate them from physical sensations, thus struggling to express their emotions easily and effectively (11).

Alexithymia is defined as a deficit in verbal behavior regarding emotional aspects, leading to difficulties in social functioning (12). "Interpersonal problems" are associated with a wide range of psychological issues (13). Faramarzi and colleagues (2014) highlighted weaker interpersonal relationships in patients with functional dyspepsia (14). Given the significant role of unconscious conflicts in the pathology of psychosomatic disorders, intrapersonal and interpersonal conflicts are crucial in this group of patients, and interpersonal problems may play a significant role in the manifestation of symptoms in patients with functional gastrointestinal disorders (15). Unconscious psychological conflict in these patients can have many negative consequences, ranging from psychological responses such as apathy, anxiety, and isolation to maladaptive behavioral responses such as aggression or excessive compliance, as well as physiological responses and physical problems, including extensive gastrointestinal issues (16).

Among the treatments that appear to improve interpersonal relationships and alexithymia in individuals with functional dyspepsia is "Cognitive-Analytical Therapy" (CAT). CAT, as one of the short-term psychological therapies, is a skilled, active, and insight-oriented approach (17). CAT focuses on cognitive errors, providing insight into them, after which the individual begins to change to achieve more constructive strategies and direct their thoughts. Ryle & Kerr (2020), the founders of CAT, argue that this therapy helps individuals understand and improve chronic, self-limiting patterns of emotional inhibition/expression (18). CAT aims to identify core emotional patterns in relation to oneself and others and how they are connected to the client's current problems or overt distress. It seeks to provide a larger picture of the client's psychological world and explain it clearly. Additionally, CAT uses the chain-process model and, through the process of reformulation, the meaning of the client's problems is presented in a narrative form, increasing the client's insight into unconscious meanings (19).

In this context, Shokrolahi and colleagues (2022) demonstrated that CAT is an effective therapy for anxiety sensitivity, catastrophizing pain, experiential avoidance, and cognitive emotion regulation in patients with chronic pain and alexithymia (6). Hadizadeh et al. (2019) concluded that mental health professionals could benefit from CAT in improving interpersonal problems and self-efficacy in women with cluster B personality disorders (20). Gimeno & Chiclana (2016) also identified CAT as an effective treatment in reducing interpersonal problems in individuals with personality disorders (21).

Considering that CAT emphasizes the impact of early relationships with significant others on the formation of characteristics and the role of cognitive structures in the emergence of a disorder, it seems to be a suitable approach for intervening to improve interpersonal relationships and reduce interpersonal problems in individuals with psychosomatic disorders. On the other hand, few studies have examined the effectiveness of CAT on alexithymia and interpersonal problems, particularly in individuals with psychosomatic disorders. Wei and colleagues (2022) introduced psychological therapies as effective treatments in reducing problems in patients with functional dyspepsia (22). In this context, a research gap is observed. Accordingly, the present study aimed to determine the effectiveness of CAT on alexithymia and interpersonal problems in patients with functional dyspepsia.

2. Methods and Materials

2.1. Study Design and Participants

This study utilized a quasi-experimental design with a pretest-posttest-follow-up structure and a control group. The statistical population of this research consisted of patients with functional dyspepsia who visited the gastroenterology clinic at Shariati Hospital in Tehran in 2021. Out of this population, 30 individuals were selected through purposive sampling and randomly assigned to two groups: intervention and control. Based on Cohen's table, with 2 groups ($u = 2$), 95% confidence level, a test power of 0.8, and an effect size of 0.4, the sample size was determined to be 12 participants per group. To account for a 20% dropout rate, the final sample size was set at 15 participants per group.

Inclusion criteria included a confirmed diagnosis of functional dyspepsia based on Rome IV diagnostic criteria by a gastroenterologist, age between 20 to 55 years, and a minimum education level of a high school diploma. Exclusion criteria included any organic gastrointestinal diseases, thyroid disease diagnosis, corticosteroid or immunosuppressant medication use in the past 6 months, irritable bowel syndrome, a history of substance abuse, presence of psychiatric disorders or severe psychological distress, concurrent psychological treatments, history of psychological treatment in the past year, pregnancy, extreme scores on the research tools, unwillingness to cooperate at any stage, or missing more than two therapy sessions. These criteria were obtained through self-reporting from the study participants.

After obtaining ethical approval from Islamic Azad University, Karaj, the research was advertised at Shariati Hospital, Tehran. After patients expressed interest, informed consent was obtained, and an online demographic questionnaire was administered. The inclusion and exclusion criteria were assessed through the questionnaire, and 30 individuals were selected. To ensure confidentiality, all data were securely stored and only used for the thesis. Participants were assured that they could withdraw from the study at any time and, if gastrointestinal symptoms worsened, they would receive free treatment. After randomization, participants completed the pretest. The intervention group received Cognitive-Analytical Therapy in-person or online, while the control group received no educational intervention. After the intervention, both groups completed the posttest and a follow-up test one month later. The total study duration was two months, and the control group was offered the intervention after the study.

2.2. Measures

The Demographic Questionnaire included age, gender, education, marital status, employment status, and disease duration.

The Toronto Alexithymia Scale consists of 20 items assessing three components: difficulty identifying feelings (items 1, 3, 6, 7, 9, 13, 14), difficulty describing feelings (items 2, 4, 11, 12, 17), and externally-oriented thinking (items 5, 8, 10, 15, 16, 18, 19, 20) on a 6-point Likert scale ranging from 1 (completely disagree) to 5 (completely

agree). Items 4, 5, 10, 18, and 19 are reverse scored. A higher score indicates a higher level of alexithymia (23). Bagby and colleagues (1994) evaluated the psychometric properties of the Toronto Alexithymia Scale on a sample of 965 Canadian students. Construct validity was confirmed through confirmatory factor analysis of the three general factors, and internal consistency reliability was reported with a Cronbach's alpha of 0.81. Arenliu et al. (2021) examined the psychometric properties of the scale on a sample of 196 patients with mental disorders in Albanian clinics (24). Construct validity was confirmed with three general factors, and reliability was reported with a Cronbach's alpha of 0.77. Besharat (2008) evaluated the psychometric properties of the scale on a sample of 175 patients with mental disorders in Tehran, reporting a Cronbach's alpha between 0.78 and 0.81. Besharat (2008) also examined the scale on a sample of 321 individuals with substance abuse disorders in Tehran, reporting a Cronbach's alpha between 0.71 and 0.80, and convergent validity with the Mental Health Inventory at -0.73 (25, 26).

The Inventory for Interpersonal Problems-32 contains 32 items assessing six components: assertiveness and sociability (items 1, 2, 3, 4, 7, 9, 11), openness (items 10, 17, 24, 29), caring (items 18, 25, 26, 32), aggression (items 20, 21, 28, 30), supportiveness and involvement (items 5, 8, 12, 13, 14, 15, 16), and dependency (items 22, 23, 27) on a 6-point Likert scale from 0 (not at all) to 5 (severely). Higher scores indicate greater interpersonal problems (27). Psychometric properties of the scale were examined on a sample of 250 British patients with psychiatric disorders. Construct validity was confirmed with eight general factors, and internal consistency reliability was reported with a Cronbach's alpha of 0.86. Bailey et al. (2018) examined the scale on a sample of 115 American female students, reporting convergent validity with the Experiences in Close Relationships Scale for anxious attachment ranging from 0.26 to 0.50 and internal consistency reliability with a Cronbach's alpha of 0.93 (28). Fath et al. (2013) evaluated the scale's psychometric properties on a sample of 384 female students at Shiraz University, confirming construct validity with six general factors and convergent validity with the Toronto Alexithymia Scale at 0.53, with a Cronbach's alpha of 0.83 (29). Abdollahi et al. (2022) examined the psychometric properties of the scale on a sample of 370

university students in Tehran, reporting convergent validity with the Interpersonal Mindfulness Scale at -0.64 and a Cronbach's alpha of 0.83 (5).

In this study, content validity of the Toronto Alexithymia Scale and the Inventory for Interpersonal Problems-32 was confirmed by three psychology faculty members from Islamic Azad University, Karaj branch. Internal consistency reliability for the tools in this study, based on a sample of 30 patients with functional dyspepsia, yielded a Cronbach's alpha of 0.71 for alexithymia and 0.74 for interpersonal problems.

2.3. Intervention

2.3.1. Cognitive-Analytical Therapy

The intervention consisted of 16 weekly 60-minute sessions of Cognitive-Analytical Therapy (CAT) based on the intervention outlined by Ryle & Kerr (2020).

Session 1: Initial assessment and formulation of target problems.

Session 2: Formulation based on personal history and disease history.

Session 3: Formulation based on symptom onset and development.

Session 4: Formulation of cognitive errors, identification of repetitive behavioral cycles, and writing a reformulation letter.

Session 5: Treatment goals and final formulation.

Session 6: Identification of problem triggers and strengths, providing a diagrammatic formulation.

Session 7: Identifying dysfunctional thoughts and reviewing symptom severity.

Session 8: Identifying old emotional patterns and teaching strategies for correcting these.

Session 9: Symptom assessment and review of patient progress.

Session 10: Procedural revision focusing on the patient's emotions and persistent maladaptive patterns.

Session 11: Procedural revision focusing on patient values and negative automatic thoughts.

Session 12: Revising the patient's treatment map with realistic goals.

Session 13: Revising interpersonal maps and social supports.

Session 14: Revising intrapersonal and interpersonal growth barriers.

Session 15: Insight development and redefining life goals.

Session 16: Writing farewell letters and summarizing the treatment process (18).

2.4. Data Analysis

Descriptive statistics (mean, standard deviation) and inferential statistics were used, including repeated measures ANOVA, Fisher's statistic, Shapiro-Wilk test, Levene's test, Mauchly's test of sphericity, and Bonferroni test, with significance levels set at 0.05 and 0.01. Data were analyzed using SPSS version 26.

3. Findings and Results

According to the results, in the intervention and control groups, 5 and 2 participants, respectively, were between 20 to 35 years old, and 10 and 13 participants, respectively, were between 36 to 55 years old. In terms of education, 4 and 2 participants in the intervention and control groups, respectively, had a high school diploma; 6 and 11 participants had a bachelor's degree; and 5 and 2 participants

had a master's degree or higher. Regarding marital status, 8 and 6 participants in the intervention and control groups, respectively, were single, and 7 and 9 participants were married. In both the intervention and control groups, 10 participants were employed, and 5 participants were unemployed. Additionally, in terms of disease duration, 11 and 13 participants in the intervention and control groups, respectively, had been suffering from functional dyspepsia for 1 to 5 years, while 4 and 2 participants had been suffering for more than 5 years.

Next, the assumptions for repeated measures analysis of variance (ANOVA) were examined. Levene's test statistic was not significant for any of the study variables, confirming the assumption of homogeneity of variance for the dependent variables at all three stages. The results of Mauchly's test of sphericity indicated that the assumption of equal variances within subjects was met for both alexithymia and interpersonal problems. The assumption of normality was assessed using the Shapiro-Wilk test.

Table 1 shows the means and standard deviations of alexithymia and interpersonal problems for the participants in the intervention and control groups at the pretest, posttest, and follow-up stages.

Table 1

Descriptive Statistics for Study Variables by Group

Variable	Group	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Follow-up Mean	Follow-up SD
Alexithymia	Intervention	58.70	2.34	45.27	3.46	45.70	4.17
	Control	58.90	3.18	58.03	5.57	57.73	4.49
Interpersonal Problems	Intervention	60.40	7.70	38.46	5.56	36.93	8.19
	Control	61.33	5.86	60.33	6.02	59.73	8.51

Table 1 displays changes in the mean and standard deviations of alexithymia and interpersonal problems for

both groups across the pretest, posttest, and follow-up stages.

Table 2

Repeated Measures ANOVA Results Explaining the Effect of the Independent Variable on Alexithymia and Interpersonal Problems

Variable	Source	Sum of Squares	df	Mean Square	F	p-value	Effect Size
Alexithymia	Time	795.70	1	795.70	50.183	.001	0.642
	Group	184.50	1	184.50	69.938	.001	0.714
	Time*Group	561.20	1	561.20	35.394	.001	0.558
Interpersonal Problems	Time	2356.26	1	2356.26	50.184	.001	0.642
	Group	5198.40	1	5198.40	70.598	.001	0.716
	Time*Group	1793.06	1	1793.06	38.189	.001	0.577

Table 2 shows that the effect of time was significant for both alexithymia ($F = 50.183, p = .001$) and interpersonal problems ($F = 50.184, p = .001$), indicating significant differences between pretest, posttest, and follow-up scores for both variables. The effect of group was also significant for both alexithymia ($F = 69.938, p = .001$) and interpersonal

problems ($F = 70.598, p = .001$), indicating a significant difference between the intervention and control groups for both variables. The interaction effect of time*group was also significant for both alexithymia ($F = 35.394, p = .001$) and interpersonal problems ($F = 38.189, p = .001$).

Table 3

Bonferroni Post-Hoc Test Results for Differences Between Pretest, Posttest, and Follow-up in the Intervention Group

Variable	Test Stage	Mean Difference	Standard Error	p-value
Alexithymia	Pretest-Posttest	6.95	0.899	.001
	Pretest-Follow-up	7.28	1.02	.001
	Posttest-Follow-up	0.333	0.934	.724
Interpersonal Problems	Pretest-Posttest	11.46	1.50	.001
	Pretest-Follow-up	12.53	1.76	.001
	Posttest-Follow-up	1.06	1.51	.486

Table 3 shows that there were significant differences between the pretest and posttest, and pretest and follow-up for both alexithymia and interpersonal problems, but no significant difference between posttest and follow-up for these variables. These findings indicate that Cognitive-Analytical Therapy was effective in reducing alexithymia and interpersonal problems in patients with functional dyspepsia, and this effectiveness was maintained through the follow-up stage.

4. Discussion and Conclusion

The aim of the present study was to determine the effectiveness of Cognitive-Analytical Therapy (CAT) on alexithymia and interpersonal problems in patients with functional dyspepsia.

The results of the present study indicated that CAT was effective in reducing alexithymia in patients with functional dyspepsia, and this effectiveness was sustained over time. These findings are consistent with the results of previous studies (6, 22). In line with these findings, Shokrolahi et al. (2022) concluded that the nature of CAT involves identifying the core emotional patterns of patients through therapeutic techniques during the sessions. The therapy aims to increase the patient’s insight and awareness of the developmental trajectory of their emotional problems, helping to reduce their issues and enable them to manage their emotions, thoughts, and behaviors in relation to themselves, others, and stressors. Additionally, by providing

awareness of cognitive errors and the nature of symptoms, the client is encouraged to change and adopt more constructive methods to direct their thoughts (6). Initially, methods for this change in perspective are presented to clients during the therapy sessions, where they learn to accept negative emotions, thoughts, and feelings as part of their condition instead of avoiding them, and work toward behavioral change. The therapist assists the patient in the cognitive component by enhancing abstract thinking to reflect on hypotheses, emotions, and behaviors. In the analytical component, the therapist helps the patient recognize unconscious factors and understand the relationship between the therapist and the client (19). The primary goal throughout the sessions is to identify the patient’s core emotional patterns through procedural revision based on increasing insight and awareness of the developmental path of their problems to reduce mental preoccupations and manage their emotions, thoughts, and behaviors concerning themselves and others, which are linked to the patient’s stress and problematic issues (30). Furthermore, this therapy presents the origin of the problematic process through diagrams and reformulation letters to the client, which clarifies the root of repetitive dysfunctional patterns and the main problem. Many reformulation letters also include a diagram of the reciprocal patterns used by the client, the sequential processes involved, and the consequences. The client’s response to the reformulation letter depends on their basic problems, which prevent emotional avoidance and suppression (31). Overall,

it can be said that the goal of CAT is to understand and modify chronic, restrictive patterns of emotions, inhibitions, and desires to identify the core emotional patterns related to the person's relationships with others and link them to the individual's current problems. CAT focuses on identifying and monitoring both conscious and unconscious emotions, as well as the physical symptoms of emotions, helping to reduce emotional deficiencies and expression, thereby decreasing alexithymia.

The results of the present study also indicated that CAT was effective in reducing interpersonal problems in patients with functional dyspepsia, and this effectiveness was sustained over time. This finding is consistent with the results of prior studies (18, 20-22). In line with these findings, Hadizadeh et al. (2019) found that patients with personality disorders have not learned how to meet interpersonal needs during their developmental stages, leading to constant conflicts with others (20). Thus, CAT was shown to be an effective treatment for reducing these patients' problems. CAT allows clients to change their relationship with their internal experiences, reduce schemas of rejection, mistrust, emotional deprivation, and dependency/incompetence, and enhance flexibility and valued actions. Changing the relationship with internal experiences involves expanding and clarifying internal awareness while emphasizing the development of a non-judgmental and compassionate relationship with experiences (32). Consistent with these findings, Gimeno & Chiclana (2016) noted that psychoeducational training helps clients understand the nature of their internal experiences (especially emotional functioning) and replace negative feelings with positive ones through cognitive techniques, avoiding dichotomous and judgmental thinking about others' behaviors (21). Overall, based on the CAT approach, early interpersonal pressures form an internal emotion, and the shared description and repeated revision of this process are central to CAT techniques. These elements are represented in writing and mapping, which significantly contribute to reducing interpersonal problems in individuals.

The results demonstrated that CAT is effective in reducing alexithymia and interpersonal problems in patients with functional dyspepsia. It is recommended that alongside medical treatments, psychological interventions such as CAT be made available to patients with functional

dyspepsia. Since this study used self-report tools to measure alexithymia and interpersonal problems, individuals may have consciously or unconsciously attempted to present themselves more favorably or deny problems, so caution should be exercised when generalizing the results. Additionally, the lack of complete control over medication use and certain confounding variables such as adherence to pharmaceutical and non-pharmaceutical treatments, and not accounting for the effects of prior treatments, were the main limitations. These should be considered when interpreting and generalizing the study findings.

Authors' Contributions

M. H., S. M. A., M. K. A. W., A. K. M., and A. D. all contributed to the design and execution of this research. M. H. and S. M. A. were responsible for the conceptualization and development of the study design, particularly focusing on the therapeutic intervention. M. K. A. W. supervised the data collection and analysis process, ensuring methodological accuracy. A. K. M. played a key role in patient recruitment and coordination of the study, facilitating the intervention sessions. A. D. provided expertise in statistical analysis and contributed to the interpretation of the results. All authors reviewed and approved the final version of the manuscript.

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 placed a high emphasis on ethical considerations. Informed consent obtained from all participants, ensuring they are fully aware of the nature of the study and their role in it. Confidentiality strictly maintained, with data anonymized to protect individual privacy. The study adhered to the ethical guidelines for research with human subjects as outlined in the Declaration of Helsinki. This study is part of the doctoral dissertation of Maliheh Hashemi, the first author of the article, in the field of General Psychology, under the supervision of Dr. Mohammad Kazem Atef Vahid at Islamic Azad University, Karaj Branch. It was registered on February 23, 2022, under the code IR.IAU.K.REC.1401.016 in the National Ethics in Biomedical Research System, available at <https://ethics.research.ac.ir>.

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