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Original Article

Comparing the Effectiveness of Cognitive-Behavioral Therapy and Acceptance and Commitment Therapy on Psychological Hardiness of Patients with Leukemia

Fereydoon Bagheri Khatoonabadi[1], Farahnaz Meschi[1*], Mona Darya Afzoon[1], Alireza Shokrgozar[1], Fatemeh Mohammadi Shirmahaleh[1]

1- Department of Health and Clinical Psychology, Ka. C., Islamic Azad University, Karaj, Iran

***Corresponding author:**
Farahnaz Meschi, Department of Health and Clinical Psychology, Ka. C., Islamic Azad University, Karaj, Iran
Tel: +989126451225
Email: farahnaz@iau.ac.ir

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Abstract

Background and Objective: This study aimed to compare the effectiveness of cognitive-behavioral therapy and acceptance and commitment therapy on psychological hardiness in patients with leukemia.

Materials and Methods: The research method followed a semi-experimental, pre-test-post-test design with a control group and a follow-up stage. The statistical population of the study included all patients with chronic lymphocytic and myeloid leukemia who visited the Chemotherapy Clinic of Rajaei Hospital, Karaj, Dr. Asadi Oncology Clinic, and Karaj's Mehr Soheila Cancer Charity Institute, in 2024. From which, 45 participants were selected by purposive sampling and randomly assigned to three groups, namely, cognitive-behavioral therapy, acceptance and commitment therapy, and the control group. Participants answered a psychological hardiness questionnaire for pre-test, post-test, and follow-up stages. Therapeutic interventions included 10 sessions of cognitive-behavioral therapy protocol and eight sessions of acceptance and commitment therapy protocol, implemented as group activities. Data were analyzed using mixed analysis of variance.

Results: The findings showed that, compared with the control group, both therapeutic interventions improved patients' psychological hardiness at the post-test phase, and this effect was maintained at the follow-up stage.

Conclusions: Based on the findings obtained, both cognitive-behavioral therapy and acceptance and commitment therapy are effective interventions for improving the psychological well-being of patients' with leukemia.

Keywords: Acceptance and Commitment Therapy, Cognitive-Behavioral Therapy, Leukemia, Psychological Hardiness

Background

Cancer encompasses a group of diseases caused by abnormal cell growth and can begin in almost any organ or tissue when uncontrolled proliferation occurs. Leukemia is a malignant disease of the blood and bone marrow characterized by excessive proliferation of abnormal white blood cells, which can be fatal if diagnosed late. It includes subtypes such as acute lymphoblastic, acute myeloid, chronic lymphocytic, and chronic myeloid leukemia, each with distinct characteristics. These malignant cells disrupt normal blood production, leading to cytopenias such as anemia, increased infection risk, and bleeding [1]. Globally, cancer is the second leading cause of death, with millions of new cases diagnosed annually, imposing a growing burden worldwide. Cancer significantly affects society and the economy, as patients often experience reduced life expectancy and quality of life, further worsened by the high costs of delayed treatment. These challenges emphasize the importance of accurate and timely diagnosis [2].

Psychological hardiness, defined as the ability to cope with psychological pressure, tolerate discomfort, and maintain purposeful behavior despite adversity, is a crucial factor in improving quality of life in patients with chronic diseases such as leukemia [3, 4]. From an existential personality perspective, psychological hardiness reflects beliefs about oneself and the world and includes commitment, control, and struggle. Commitment refers to perceiving meaning and value in life roles and activities, enabling individuals to find purpose in their actions [5].

Promoting psychological hardiness in cancer patients is therefore essential for enhancing adaptation to disease-related stress. By

strengthening control, commitment, and acceptance of challenges, hardiness contributes to better mental health and quality of life during treatment and recovery.

Despite advances in chemotherapy, targeted therapies, and stem cell transplantation, leukemia remains difficult to treat due to clonal evolution, drug resistance, and high relapse rates. Alongside medical treatments such as chemotherapy and radiotherapy, psychological interventions play an important role in cancer care [6]. Some common psychotherapeutic approaches may fail in cancer patients when they focus solely on symptom reduction and neglect deeper emotional, meaning-related, and value-based needs. Factors such as fluctuating disease-related stress, persistent anxiety, fear of death, and treatment-related physical limitations can reduce treatment effectiveness. Traditional approaches that do not enhance active coping skills and acceptance may not produce lasting improvements in resilience, hardiness, or quality of life. These limitations highlight the need for targeted interventions such as cognitive-behavioral therapy and acceptance and commitment therapy [7].

Cognitive-behavioral therapy can enhance psychological hardiness in leukemia patients by improving coping skills and modifying negative thought patterns [8]. It is recommended as a first-line treatment for psychological problems, either alone for mild to moderate cases or combined with pharmacological treatments for more complex conditions and chronic comorbidities [9]. In this approach, maladaptive behaviors arise from biased automatic information processing, creating a vicious cycle that reinforces negative perceptions and beliefs [10].

Studies show that cognitive-behavioral therapy increases individuals' ability to engage with thoughts, emotions, and bodily sensations in a more flexible manner. The mindfulness and insight developed through this therapy improve psychosocial functioning and psychological hardiness in cancer patients, helping them regulate dysfunctional emotional responses and feel more adaptive when facing illness-related stress. As a result, quality of life and coping abilities improve significantly [11–13].

Acceptance and commitment therapy can also increase psychological hardiness in leukemia patients by promoting acceptance of difficult experiences and commitment to personal values [14]. This approach aims to foster resilient responses to pain and suffering by encouraging acceptance rather than symptom elimination. As a modern behavioral therapy integrating acceptance and mindfulness, it helps individuals disengage from unhelpful thoughts and emotions and act in accordance with personal values [15]. Rooted in behavioral traditions and relational frameworks, acceptance and commitment therapy focuses on changing the individual's relationship with internal experiences rather than altering their frequency or form [16]. Through acceptance and emotional regulation, this therapy enhances psychological flexibility and supports movement toward a meaningful life [17].

Research indicates that acceptance and commitment therapy effectively increases psychological hardiness and adaptation in various populations, including cancer patients. It equips patients with skills to cope with uncontrollable experiences and commit to valued life directions, empowering them to accept the disease, reduce anxiety and depression, resolve psychological crises, and improve quality of life [18–20].

Overall, cognitive-behavioral therapy strengthens emotional regulation and coping with stress by identifying and modifying ineffective beliefs. Leukemia patients learn to replace limiting beliefs with realistic and constructive ones, enhancing their ability to face challenges and pursue goals. Evidence shows that this therapy reduces anxiety and depression and increases psychological hardiness. In contrast, acceptance and commitment therapy enhances psychological toughness by emphasizing acceptance of unpleasant experiences and commitment to personal values and goals. Patients learn to accept difficult thoughts and feelings without resistance and to guide their behavior according to values, reducing avoidance and increasing psychological flexibility when coping with the physical and psychological consequences of leukemia [21].

Objectives

A review of the research literature shows that previous studies have mainly investigated the effectiveness of each treatment approach separately. Furthermore, comparative studies that have simultaneously examined the effects of cognitive-behavioral therapy and acceptance and commitment therapy on variables such as psychological hardiness in patients with leukemia are limited. Therefore, the present study aimed to find whether there is a difference between the effectiveness of cognitive-behavioral therapy and acceptance and commitment therapy on psychological hardiness in patients with leukemia.

Materials and Methods

In terms of objective, the present research was

semi-experimental with a pre-test, post-test, and follow-up (three months) design with a control group. The research population included all patients with chronic lymphocytic and myeloid leukemia who visited the chemotherapy clinic at Rajaei Hospital, Karaj, Dr. Asadi's Oncology Clinic (a blood specialist at Rajaei Hospital), and Karaj's Mehr Soheila Cancer Charity Institute in 2024. From the target population, 45 eligible participants were selected using convenience sampling. Subsequently, they were divided into three equal groups (two experimental groups and one control group, each having 15 participants). The inclusion criteria for the study included a minimum education of a Middle School Diploma, age 30 to 65 years, a diagnosis of chronic myeloid or lymphocytic leukemia by an oncologist, and a relatively stable physical condition to participate in the intervention sessions. The exclusion criteria for the study included having a psychotic disorder, substance dependence or abuse, other chronic medical illnesses, chronic psychiatric disorders simultaneous with leukemia, absence of more than two sessions from participating in any of the intervention programs, and intensification of disease symptoms and the need for hospitalization during the study.

Subsequently, the first experimental group underwent cognitive-behavioral therapy, and the second group underwent acceptance and commitment therapy, with the control group not receiving any intervention. It should be noted that, in addition to the post-test phase, a follow-up stage was conducted three months later. The data were analyzed using a mixed ANOVA in SPSS software (version 24).

Psychological Hardiness Questionnaire

The Psychological Hardiness Questionnaire by Kobasa and Maddi [22] contains 20 items and assesses three aspects of commitment (items 1-9), control (items 10-16), and struggle (items 17-20) on a 4-point Likert scale from never = 1, rarely = 2, sometimes = 3, to most of the time = 4. Following the study by Kobasa and Maddi [22] and based on principal component analysis and Varimax rotation, three factors were extracted after seven repetitions. These three factors accounted for 50.16% of the test's total variance. In the present study, Cronbach's alpha was 0.79 for the entire scale.

Cognitive-Behavioral Therapy Protocol

Each session lasted 60 minutes, and during each session, patients received an average of 2–3 practical assignments, including cognitive exercises. Table 1 presents a summary of the cognitive-behavioral therapy sessions based on the Beck & Beck protocol [23]:

Table 1. A summary of the cognitive-behavioral therapy sessions

Sessions	Session Subjects
Session 1	Establishing rapport with the patient, setting treatment objectives
Session 2	Identifying disturbances resulting from stressful situations
Session 3	Training in different feelings and emotions
Session 4	Identifying symptoms occurring in stressful situations
Session 5	Training in various physical symptoms occurring in stressful situations
Session 6	Training in various cognitive symptoms occurring in stressful situations
Session 7	Mediation, training in diaphragmatic breathing, and relaxation
Session 8	Practicing cognitive challenges
Session 9	Familiarizing the patient with the exposure rationale, practicing exposure in stressful situations
Session 10	Examining the course of therapy sessions and providing an overall review of the treatment process

Acceptance and Commitment Therapy Protocol

Each session lasted 60 minutes, and during each session, patients received an average of 2–3 practical assignments, including cognitive exercises. Table 2 presents a summary of the acceptance and commitment therapy sessions based on Hayes & Smith's protocol [24]:

Table 2. A summary of the acceptance and commitment therapy sessions.

Sessions	Session Subjects
Session 1	Establishing a therapeutic relationship, contracting, and psychological education
Session 2	Discussing experiences and evaluating them, workability as a criterion, establishing creative hopelessness
Session 3	Stating control as the problem, introducing willingness as an alternative response, and engaging in committed actions
Session 4	Applying cognitive defusion techniques, intervening in the functioning of problematic language chains, weakening the self's alliance with thoughts and emotions
Session 5	Observing oneself as context, weakening the conceptualized self and presenting oneself as observer, demonstrating the separation between oneself, internal experiences, and behavior
Session 6	Application of mindfulness techniques, modelling *stepping out of the mind*, training in viewing the internal experiences as a process
Session 7	Introducing values, demonstrating the risks of focusing on outcomes, identifying practical life values
Session 8	Understanding the nature of willingness and commitment, determining value-consistent action patterns

Results

In the current study, 7 (46.67%) male participants

were assigned to the cognitive-behavioral therapy group, 8 (53.33%) to the acceptance and commitment therapy group, and 7 (46.67%) to the control group. A total of 8 (53.33%) female participants were involved in the cognitive-behavioral therapy group, 7 (46.67%) in the acceptance and commitment therapy group, and 8 (53.33%) in the control group. The ANOVA was used to assess age homogeneity between the experimental and control groups. The ANOVA results indicated that no significant difference existed among the ages of the three groups of male (F=0.958, p=0.043) and female participants (F=0.853, p=0.054). A chi-squared test was used to examine heterogeneity by marital status in the intervention and control groups. The chi-squared test results for the experimental and control groups indicate that there is no significant difference between the groups in marriage frequency (χ2=0.603; p=0.741). Therefore, the experimental and control groups are homogeneous with respect to marriage.

We previously used the MBox Test to examine the homogeneity of the covariance matrix, and results showed that this assumption holds (Mbox = 1.22; F = 0.180; df1 = 6; df2 = 5680.302; sig < 0.980).

Based on the results presented in Table 4, a significant difference was observed in psychological hardiness among the cognitive-behavioral therapy group, the acceptance and commitment therapy group, and the control group at the post-test stage (p<0.01), indicating the effectiveness of the therapeutic interventions compared to the control group. Furthermore, at the follow-up stage, a significant difference was found between the two intervention methods (p<0.01), suggesting differential effects of these treatments on psychological hardiness. The persistence of this significant difference at the follow-up stage indicates that the therapeutic effects of both interventions demonstrated relative stability over time and that the improvements in psychological hardiness were maintained. In this regard, the descriptive statistics for psychological hardiness across research groups and assessment stages are presented in Table 3.

Table 3. Descriptive findings related to hardiness by research groups and research stages

		Commitment		Control		Struggle	
		Ave	Std. Dev	Ave	Std. Dev	Ave	Std. Dev
Cognitive-behavioral Therapy	Pre-test	18.75	5/08	13/56	6/43	14/25	7/92
	Post-test	24.31	5/09	20/82	6/54	18/36	7/08
	Follow-up	24.45	4/61	20/67	6/34	17/85	7/79
Acceptance and Commitment Therapy	Pre-test	19.09	5/07	13/84	6/31	14/11	7/82
	Post-test	22.42	4/71	20/62	6/75	17/94	7/28
	Follow-up	22.76	4/43	20/35	6/95	17/51	7/27
Control Group	Pre-test	17.75	4/86	13/71	6/65	14/22	7/43
	Post-test	17.52	5/41	13/55	6/21	13/85	7/48
	Follow-up	17.72	4/89	13/31	6/27	14/15	7/64

Table 4. Conducting the Bonferroni post hoc test to examine the psychological hardiness in experimental and control groups

Dependent Variable		I	J	(I-J)	Error	Significance
Commitment	Pre-test Post-test	CBT	ACT	2/963*	1/210	0/019
			Control	5/940*	1/215	0/000
		ACT	Control	2/978*	1/206	0/018
	Pre-test Follow-up	CBT	ACT	2/963*	1/210	0/019
			Control	5/940*	1/215	0/000
		ACT	Control	2/978*	1/206	0.018
Control	Pre-test Post-test	CBT	ACT	-2/702*		0.042
			Control	-5/371*	1/291	0/000
		ACT	Control	-2/669*	1/281	0/044
	Pre-test Follow-up	CBT	ACT	-2/743*	1/289	0/040
			Control	-5/544*	1/294	0/000
		ACT	Control	-2/800*	1/285	0.035
Struggle	Pre-test Post-test	CBT	ACT	-3/027*		0.000
			Control	-5/234*	0/713	0/000
		ACT	Control	-2/207*	0/708	0/003
	Pre-test Follow-up	CBT	ACT	-3/897*	0/818	0/000
			Control	-6/302*	0/822	0/000
		ACT	Control	-2/405*	0/816	0/005

ACT: Acceptance and commitment therapy, CBT: Cognitive-behavioral therapy

Discussion

The present study aimed to compare the effectiveness of cognitive-behavioral therapy and acceptance and commitment therapy on psychological hardiness in leukemia patients. Findings indicated that both intervention methods significantly increased psychological hardiness in leukemia patients at the post-test stage, and this effect was maintained at the follow-up stage. According to a comparison conducted between the

two intervention groups, cognitive-behavioral therapy was proven to be more effective than acceptance and commitment therapy in increasing psychological hardiness. These results were consistent with the studies conducted by Taghipour et al. [11]; Aghahheris et al. [12]; Banisafar et al. [13]; Hasannejad Resketi et al. [18]; Namazi et al. [19]; Gonzalez-Fernandez and Fernandez-Rodriguez [20], and Sadeghpour et al. [21].

Cognitive-behavioral therapy (CBT) is grounded in the cognitive model, which emphasizes the role of individuals' perceptions, thoughts, and beliefs in shaping emotional and behavioral responses [25]. By targeting maladaptive cognitions and restructuring negative thought patterns, CBT facilitates emotional regulation, strengthens coping skills, and promotes constructive behaviors [26,27]. The sustained effectiveness of CBT observed in the follow-up stage may be attributed to its structured and goal-oriented approach, which enables patients to apply learned cognitive and behavioral strategies when facing psychological stressors and treatment-related challenges, thereby enhancing psychological hardiness [28,29].

Acceptance and commitment therapy (ACT) integrates mindfulness, acceptance, values clarification, and committed action with the aim of increasing psychological flexibility [30]. Rather than attempting to eliminate negative thoughts and emotions, ACT encourages individuals to accept internal experiences and engage in behaviors aligned with personal values [31]. Through processes such as values clarification and committed action, patients learn to pursue meaningful and value-consistent lives despite the presence of psychological distress [30,31]. The stable effects of ACT may be explained by its emphasis on acceptance of difficult experiences and reduction of experiential avoidance, which helps individuals respond more flexibly to stress and maintain adaptive functioning over time [32].

Overall, CBT may lead to more immediate psychological changes due to its direct focus on modifying dysfunctional cognitions and behaviors, whereas ACT may foster more gradual but enduring changes by promoting acceptance and value-driven action [28-32]. In explaining the superiority of cognitive-behavioral therapy (CBT) over acceptance and commitment therapy (ACT) in enhancing psychological hardiness, fundamental differences in theoretical frameworks and underlying psychological mechanisms can be highlighted. The CBT, by directly targeting the identification, evaluation, and modification of maladaptive thoughts and irrational beliefs [33], actively strengthens cognitive components associated with psychological hardiness, including perceived control, commitment, and challenge. As noted by Abdollahi et al. [34], through the training of problem-solving skills, cognitive restructuring, and active coping strategies, this approach enables patients to perceive disease-related stressors as more predictable and manageable [34], which is directly linked to increased psychological hardiness. In contrast, as noted by Rezaei et al. [35], ACT with its emphasis on acceptance of internal experiences and reduction of experiential avoidance, focuses more on altering individuals' relationships with thoughts and emotions rather than modifying their cognitive content. Although this process enhances psychological flexibility and long-term adaptation [35], it may exert less immediate impact on structural components of psychological hardiness, particularly perceived cognitive control and active appraisal of stressful situations. Therefore, the problem-focused, structured, and skills-based nature of CBT may account for its greater effectiveness in enhancing psychological hardiness compared to ACT, especially in the context of chronic and life-threatening conditions such as leukemia, which demand active coping strategies and a higher sense of psychological mastery.

Enhancing psychological hardiness through either cognitive-behavioral skill training or acceptance- and values-based interventions can help patients with leukemia feel a greater sense of control, sustain motivation for treatment, and manage negative thoughts and emotions in a constructive manner.

Conclusion

According to the results, cognitive-behavioral therapy can serve as a first-line option for strengthening psychological hardiness in the short term, while acceptance and commitment therapy can be offered as a practical complementary or alternative method for patients who need long-term psychological hardiness.

Ethical Considerations

This study has been registered under the code IR.IAU.K.REC.1403.161 in the National Committee for Ethics in Biomedical Research: https://ethics.esearch.ac.ir

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Author Contributions

All of the aforementioned authors contributed to the preparation and modification of this study and are deemed responsible for its content.

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Conflicts of Interest

All participants provided written informed consent prior to participation, after being fully informed about the study objectives, procedures, potential benefits, and possible risks. Confidentiality of all participant data was strictly maintained, and personal identifiers were anonymized during data collection, storage, and analysis. The authors declare no conflicts of interest related to this study.

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