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Original Article

Effectiveness of Acceptance and Commitment Therapy on Self-Efficacy in Coping with Cancer in Leukemia Patients

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Abstract

Background and Objective: The present study investigated the effectiveness of acceptance and commitment therapy (ACT) on self-efficacy in coping with cancer in leukemia patients.

Materials and Methods: The research was a quasi-experimental study following a pretest-posttest-follow-up design with a control group. For this purpose, 30 leukemia outpatients in the Chemotherapy Clinic of Shahid Rajaee Hospital of Karaj (Iran) in 2024 were selected by convenience sampling and randomly assigned to two experimental and control groups, each with 15 patients. The subjects completed Cancer Behavior Inventory (CBI) before and after the intervention. The intervention included eight 90-minute ACT sessions and targeted only the experimental group. The data were analyzed using a multivariate analysis of covariance (MANCOVA) and repeated measures analysis of variance (ANCOVA) run using the SPSS (version 26) software.

Results: The findings revealed significant differences in the scores of CBI and its subscales, i.e., maintaining activity and independence, coping with treatment-related side effects, accepting cancer, seeking and understanding medical information, regulating effect, seeking support, and stress management between the experimental and control groups. Moreover, the treatment effect continued until the follow-up phase ($P<0.05$).

Conclusions: The findings help us conclude that ACT improves self-efficacy in coping with cancer in leukemia patients and can be employed as an efficient intervention.

Keywords: Acceptance and commitment therapy, Leukemia, Self-efficacy in coping with cancer

Background

Cancers comprise a group of diseases that cause changes and uncontrolled growth in body cells. Many types of cancer cells finally transform into masses or glands called tumors. They then take their names from the body organ the tumors originate from [2]. A prevalent type is blood cancer, defined as a group of illnesses where unruly cells become a component of the blood circulation system [3]. Virtually 1.5% of all males and females in the world will suffer from leukemia. Studies in Iran uncover that leukemic individuals comprise 8% of all cancer patients [4]. Cancer diagnosis and treatment bring considerable psychological disorders, at least in the short run. Many patients recover in the first year after the treatment, although their mental health is endangered noticeably for reasons like fear of cancer recurrence [5].

Since blood cancer develops rapidly as an invasive disease, patients often need to be hospitalized immediately to initiate intensive chemotherapy [6]. Reduced physical functions also interfere with their responsibilities in family and society, alter their lifestyles extensively, influence physical and mental performance, and, finally, reduce their quality of life [7]. Research shows that self-efficacy is a chief mental source in the adjustment to chronic diseases [8,9]. Self-efficacy is a multidimensional construct based on the socio-cognitive approach and means individuals' conceptualization as purposive, active, self-assessing, and self-monitoring agents [10]. The degree of self-efficacy plays a pivotal role in how patients adapt to cancer challenges as a chronic disease. Self-efficacy in cancer patients leads to better adjustment to diagnosis, improves the quality of life, and relieves symptoms. Likewise, high levels of self-efficacy improve cancer patients' mental images and strengthen their relations with the treatment cadre [11].

In addition to chemotherapy and radiotherapy, it is also feasible to improve or alleviate cancer stressors

in patients using various psychological approaches [12]. One of these interventions is acceptance and commitment therapy (ACT), recognized as a third-wave treatment in curing mood and depression disorders. Studies have revealed that ACT can be used as an approach to enhancing adjustment and self-efficacy in cancer patients [13-18]. With regard to personal values, ACT focuses on accepting and not avoiding pain or suppressing distressing factors. This intervention makes subjects react flexibly to life challenges and pain and accept symptoms rather than eliminate them [19].

By incorporating some mechanisms, ACT can help subjects accept and regulate unpleasant emotions instead of avoiding them. This treatment develops psychological flexibility and steers individuals toward a rich and meaningful life [20]. In this respect [21], a review study concluded that ACT taught cancer patients commitment to values and skills for responding to these uncontrollable experiences. It is a kind of empowerment and a proper and timely intervention to empower cancer patients to accept the disease, reduce anxiety and depression, solve the problem, and enhance the quality of life.

The high incidence of psychological disorders in leukemia patients calls for the further attention of mental health authorities. Treatment complications in these patients reinforce emotional disorders and noticeably decrease the quality of life. These intricacies underscore identifying psychological outcomes in cancer patients. Psychosocial factors, as well as psychosocial interventions, have now become issues for study in relationship to cancer onset, quality of life, and length of survival. Many cancer patients use psychological therapies because they expect them to cure their cancer or to improve their recovery. Despite these high expectations, both patients and oncologists report being moderately satisfied with the results of psychological therapies. Previous reviews of the literature have concluded that psychological therapies may help cancer patients in various ways, ranging from reducing the side effects of cancer treatments to improving patients' immune function and longevity. The evidence on the efficacy of psychotherapy in cancer patients is unsatisfactory.

Objectives

There is a need for more rigorous and well-designed clinical trials on this topic [5]. As explained, the increasing number of leukemia patients, on the one hand, and the surge of psychical and psychological burdens and disease-originated pain, on the other hand, cause mental disorders in these patients and necessitates strengthening some traits, such as self-efficacy in coping with cancer, in these patients. Therefore, the present study sought to answer the following question: Does ACT influence self-efficacy in coping with cancer in leukemia patients?

Materials and Methods

The present research was an applied quasi-experimental study with a pretest-posttest-follow-up (3 months) design with a control group. The statistical population consisted of all outpatients with chronic blood cancer in the chemotherapy clinic of Shahid Rajaee Hospital of Karaj (in Iran) in 2024. The sample size was estimated by the G-power software at 30 with respect to an effect size of 0.3, test power of 0.8, and alpha value of 0.05. Therefore, considering the inclusion and exclusion criteria, 30 patients were selected by convenience sampling and randomly assigned into two experimental and control groups (15 subjects per group). The experimental group intervened with ACT, while the control group received no intervention. The inclusion criteria were diagnosis with chronic myeloid and lymphoid leukemia, possessing primary school literacy at the minimum, aging between 30 and 50 years, disease duration of above six months, and consent to participate in the study. The exclusion criteria included receiving psychedelic and psychologic drugs and psychotherapy during the research, suffering from other acute or chronic mental or somatic disorders, disease recurrence or exacerbation, absence for more than two sessions, and discontinued cooperation. Table 1 summarizes the content of the ACT sessions based on Hayes' [22] protocol. To describe and analyze the data, analysis of variance with repeated measures design and Bonferroni post hoc test and significance levels of 0.05 and 0.01 were used. The data were analyzed using the SPSS (version 24) software.

Table 1. Topics of Hayes' [22] ACT sessions

Sessions	Session content
1	Building therapeutic relations, concluding treatment contracts, and psychoeducation
2	Discussing and evaluating patient experiences, efficacy as a measurement criterion, the development of creative helplessness
3	Explaining control as a problem, introducing willingness as another reaction, involvement in purposeful actions
4	Using cognitive diffusion techniques, intervening in the functions of language-interfering chains, weakening integration with thoughts and emotions
5	Observing the self as the base, enfeebling the self-conceptualization and expressing the self as an observer, displaying the separation of the self, internal experiences, and behavior

6	Applying mental techniques, modeling mind-leaving, teaching to consider inner experiences as a process
7	Introducing values, signifying outcome-oriented risks, discovering pragmatic life values
8	Perceiving the nature of tendency and commitment, determining value-fit pragmatic models

Research instrument

Cancer Behavior Inventory (CBI): Developed by Heitzmann et al. [1], CBI includes 33 items and seven components: Maintaining activity and independence (items 1, 4, 8, 21, and 30), coping with treatment-related side effects (items 10, 13, 25, 31, and 32), accepting cancer/maintaining a positive attitude (items 2, 3, 24, 28, and 33), seeking and understanding medical information (items 5, 9, 15, 19, and 29), regulating effect (items 11, 14, 18, 20, and 22), seeking support (items 7, 16, and 26), and stress management (items 6, 12, 17, 23, and 27). The items are scored on a 7-point Likert scale (1, 2, and 3 = not at all confident, 4, 5, 6 = somehow confident, and 7, 8, and 9 = totally confident). The minimum and maximum scores are 11 and 278, and higher scores indicate higher self-efficacy in cancer patients. Karamozan et al. [23] ran a confirmatory factor analysis of the 31-item and 7-component CBI and omitted items 3 and 5. They introduced the concurrent correlation of the components with the general self-efficacy scale as a convergent validity index and the Cronbach alpha coefficients of 0.75 for the whole instrument and 0.69-0.74 for the seven factors as internal consistency indices.

Results

Table 2 indicates the demographics of the samples in the experimental and control groups.

Table 2. Demographic-based group frequency

Variable	Category	ACT		Control group	
		Frequency	%	Frequency	%
Gender	Female	10	66.66	11	73.33
	Male	5	33.33	4	26.66
Age	<40 years	9	60	7	46.66
	>40 years	6	40	8	53.33
Education	Without higher education literacy	4	26.66	5	33.33
	With higher education literacy	11	73.33	10	66.66
Marital status	Single	5	33.33	4	26.66
	Married	10	66.66	11	73.33
Occupational status	Jobless	7	46.66	8	53.33
	Working	8	53.33	7	46.66

As Table 2 demonstrates, females outnumber males in the two groups with a virtually similar gender balance. Likewise, many blood cancer patients in both groups are below 40 years old and married (with an almost equal balance) and have higher education literacy. On the other hand, the groups are not significantly different in terms of occupational status. Table 3 presents the mean and standard deviation (SD) of the self-efficacy in coping with cancer and its components (maintaining activity and independence, coping with treatment-related side effects, accepting cancer/maintaining a positive attitude, seeking and understanding medical information, regulating effect, seeking support, and stress management) in leukemia patients in the experimental and control groups in the pretest, posttest, and follow-up phases.

Table 3 depicts the mean scores of CBI and its components (maintenance of activity and independence, coping with treatment-related side effects, accepting cancer/maintaining a positive attitude, seeking and understanding medical information, regulating effect, seeking support, and stress management) in leukemia patients are higher in the experimental than in the control group in the posttest and follow-up phases. When applying parametric statistical tests, respective assumptions must be confirmed initially. Therefore, this study first investigated the assumptions of MANCOVA and repeated measures ANOVA, including the normality of data distribution, homoscedasticity, and the homogeneity of the covariance matrix in both groups. Table 4 displays MANCOVA results for examining the mean differences between the experimental and control groups in self-efficacy in coping with cancer and its components in the pretest, posttest, and follow-up phases.

Table 3. Group-separated descriptive indices of CBI and its components

Variable	Phase	Pretest		Posttest		Follow-up	
	Group	Mean	SD	Mean	SD	Mean	SD
Maintaining activity/independence	Experimental	17.15	3.422	21.9	3.160	22.3	2.754
	Control	15.85	3.422	16.25	3.290	15.25	2.593
Coping with treatment-related side effects	Experimental	12.90	2.074	21.1	1.552	21.45	1.571
	Control	13	2.247	13.250	1.996	12.65	1.84
Accepting cancer	Experimental	10.45	1.431	19.65	2.32	19.8	2.166
	Control	10.55	1.43	11.1	1.48	11.45	1.099

Seeking and understanding medical information	Experimental	12.8	3.66491	19.9	3.68	19.55	3.425
	Control	13.5	4.11	14.25	3.69	14.35	3.58
Regulating effect	Experimental	11	1.48	20	2.44	19.7	2.05
	Control	10.8	1.196	11.35	1.308	11.55	1.099
Seeking support	Experimental	6.5	1.76	11.3	1.52	10.95	1.099
	Control	5.8	2.39	6.25	2.46	5.9	1.88
Stress management	Experimental	11.8	1.79	20	1.52	20.6	0.882
	Control	12	1.68	12.2	1.36	11.85	1.386

Table 4. MANCOVA test examining the mean differences between the groups' scores in CBI and its components in the pretest, posttest, and follow-up phases

Variable	Test	Value	F	Df assumption	Df error	Sig.	Effect size	Statistical power
Time	Pillai's trace	0.968	43.670	16	23	0.000	0.968	1
	Wilk's Lambda	0.032	43.670	16	23	0.000	0.968	1
Time*group	Pillai's trace	0.968	43.469	16	23	0.000	0.968	1
	Wilk's Lambda	0.032	43.469	16	23	0.000	0.968	1

Table 4 reveals that the experimental and control groups are significantly different in at least one of the research variables, including self-efficacy in coping with cancer and its components (P<0.01). The intra-group analysis also reflects differences between the measurement phases (pretest, posttest, and follow-up) in at least one of the research variables. Furthermore, the table demonstrates that the interaction effect of measurement time and group membership is significant in at least one of the research variables (P<0.01). Repeated measures ANOVA was employed to discover which measurement phase (pretest, posttest, and follow-up) caused a difference between the groups (Table 5).

Table 5. Repeated measures ANOVA examining ACT effectiveness in self-efficacy in coping with cancer and its components in the pretest, posttest, and follow-up phases

Variable		SSE	Sum of squares	df	Mean of squares	F-statistic	Sig.	Effect size	Test power
Maintaining activity and independence	Intra-group	Factor	158.617	2	79.308	57.459	0.001	0.602	1
		Interaction effect	179.817	2	89.908	65.139	0.001	0.632	1
		Error	104.900	76	1.380				
	Inter-group	Group	653.333	1	653.333	24.637	0.001	0.393	0.998
		Error	1007.700	38	26.518				
Coping with treatment-related side effects	Intra-group	Factor	462.350	2	231.175	130.530	0.001	0.775	1
		Interaction effect	477.717	2	238.858	134.868	0.001	0.780	1
		Error	134.600	76	1.771				
	Inter-group	Group	913.008	1	913.008	125.59	0.001	0.768	1
		Error	276.250	38	7.270				
Accepting cancer	Intra-group	Factor	667.917	2	333.958	197.465	0.001	0.839	1
		Interaction effect	487.550	2	243.775	144.141	0.001	0.791	1
		Error	128.533	76	1.691				
	Inter-group	Group	940.800	1	940.800	173.658	0.001	0.820	1
		Error	205.867	38	5.418				
Seeking and understanding medical information	Intra-group	Factor	398.150	2	199.075	123.273	0.001	0.764	1
		Interaction effect	251.117	2	125.558	77.749	0.001	0.672	1
		Error	122.733	76	1.615				
	Inter-group	Group	343.408	1	343.408	9.072	0.005	0.193	0.835
		Error	1438.517	38	37.856				
Regulating effect	Intra-group	Factor	601.717	2	300.858	203.972	0.001	0.843	
		Interaction effect	449.517	2	224.758	152.379	0.001	0.800	
		Error	112.100	76	1.475				
	Inter-group	Group	963.333	1	963.333	177.105	0.001	0.823	
		Error	206.800	38	5.442				
Seeking support	Intra-group	Factor	162.517	2	81.258	69.130	0.001	0.645	1
		Interaction effect	126.150	2	63.075	53.661	0.001	0.585	1
		Error	89.333	76	1.175				
	Inter-group	Group	388.800	1	388.800	44.830	0.001	0.541	1
		Error	329.267	38	8.673				
Stress management	Intra-group	Factor	484.817	2	242.408	232.712	0.001	0.860	1
		Interaction effect	483.350	2	241.675	232.008	0.001	0.859	1
		Error	79.167	76	1.042				
	Inter-group	Group	891.075	1	891.075	203.26	0.001	0.842	1
		Error	166.583	38	4.384				

Considering Table 5 and the significance of the intra-group factor, the differences between the three measurement phases (pretest, posttest, and follow-up) for self-efficacy in coping with cancer and its components (maintaining activity and independence, coping with treatment-related side effects, accepting cancer/maintaining a positive attitude, seeking and understanding medical information, regulating effect, seeking support, and stress management) are confirmed (P<0.01). Moreover, the significant intra-group interaction effect indicates the difference between the two groups' self-efficacy and its components in three measurement phases (P<0.01). In the following, the post hoc Bonferroni test (Table 6) uncovers to which phase these differences belong.

Table 6. Comparison of the post hoc Bonferroni test results for pairwise comparison of the mean scores of the research variable in three phases

Variable	Phase I	Phase J	Mean difference J-I	Standard error	Sig.
Maintaining activity and independence	Pretest	Posttest	-2.575	0.252	0.001
	Pretest	Follow-up	-2.275	0.318	0.001
	Posttest	Follow-up	0.300	0.206	0.463
Coping with treatment-related side effects	Pretest	Posttest	-4.225	0.339	0.001
	Pretest	Follow-up	-4.100	0.349	0.001
	Posttest	Follow-up	0.125	0.169	1
Accepting cancer	Pretest	Posttest	-4.875	0.329	0.001
	Pretest	Follow-up	-5.125	0.315	0.001
	Posttest	Follow-up	-0.250	0.216	0.765
Seeking and understanding medical information	Pretest	Posttest	-3.925	0.326	0.001
	Pretest	Follow-up	-3.800	0.331	0.001
	Posttest	Follow-up	0.125	0.163	1
Regulating effect	Pretest	Posttest	-4.775	0.317	0.001
	Pretest	Follow-up	-4.725	0.274	0.001
	Posttest	Follow-up	0.050	0.214	1
Seeking support	Pretest	Posttest	-2.625	0.259	0.001
	Pretest	Follow-up	-2.275	0.282	0.001
	Posttest	Follow-up	0.350	0.172	0.148
Stress management	Pretest	Posttest	-4.200	0.254	0.11
	Pretest	Follow-up	-4.325	0.229	0.001
	Posttest	Follow-up	-0.125	0.198	1

Table 6 indicates that the mean scores of self-efficacy in coping with cancer and its components are significantly different in blood cancer patients between the pretest and posttest (P<0.01) and the pretest and follow-up phase (P<0.01). However, this difference is not significant between the posttest and follow-up (P>0.05), indicating the irreversibility of the results in the follow-up phase. Therefore, it can be explained that ACT improved self-efficacy and its components in leukemia patients in the posttest and follow-up phases.

Discussion

The present study aimed to determine the effectiveness of ACT on self-efficacy in coping with cancer in leukemia patients. The findings unveiled that ACT could improve self-efficacy in coping with cancer and its components in leukemia patients. Likewise, the effect of the therapy continued up to the follow-up phase. This result aligns with the research outcomes of Li et al. (2022), Mathew et al. [18], Mohades Shakouri Ganjavi et al. [24], and Hassannezhad et al. [21] . Li et al. [25] reported that ACT could improve health-related quality of life and cancer-related fatigue, as well as depression, anxiety, and distress symptoms, in patients with advanced lung cancer. In a systematic study, Mathew et al. [18] investigated ACT effectiveness in adult cancer survivors. The outcomes of this work revealed that ACT was an effective intervention for improving common concerns among cancer survivors. In addition, Mohades Shakouri Ganjavi et al. [24] indicated that ACT improved the fasting blood sugar levels in females with type II diabetes.

It can be explained that psychological flexibility is the most significant ACT construct, i.e., individuals can effectively operate along their values despite accompanying problems and pain [26], which helps them become aware of their weaknesses without any justification and accept themselves as they are in reality. The ACT makes individuals psychologically flexible through six processes. One that crucially contributes to this therapy is to specify values and committed actions accurately. Encouraging patients to identify values, determine goals, and commit to their acts to realize goals and values leads to high life satisfaction and achieving objectives [27]. Another process is to develop an observing self as an observer in individuals. The self-observer is considered a substitution for the conceptualized self. During this process, clients perceive that they should separate the self from inner experiences [28]. Besides, cognitive defusion exercises break down the literal meaning of inner events and make individuals consider thoughts and feelings only as reflections and sentiments, not

anything else. This therapeutic approach helps clients function according to human values and promotes quality of life by improving their psychological flexibility. The quality of life in leukemia patients drops intensively and influences their somatic and mental health. At this time, patients usually turn to avoid or control annoying thoughts, feelings, memories, and body senses to reduce physical and psychological problems, although it does not work or is only influential in the short run. However, those thoughts, feelings, and unpleasant senses return in a long time. In such circumstances, ACT helps individuals abandon previous ineffective strategies, accept unpleasant thoughts, feelings, and body senses, and turn to cognitive defusion and mindfulness. The therapy also assists them in determining their basic life values and committing themselves to take steps for their attainment. All these actions help individuals experience fewer mental and somatic problems despite the present pain or sorrow of loss and enhance their self-efficacy in coping with cancer.

Conclusions

It can be generally concluded that ACT, as an efficient and suitable intervention, has received attention for improving self-efficacy in coping with cancer in leukemia patients. Similar to other studies, this research faces some limitations, e.g., the statistical population was limited to leukemia outpatients in the chemotherapy clinic of Shahid Rajaee Hospital of Karaj (Iran) in 2024, reducing the generalizability of the outcomes. Another limitation was linked to not controlling other family conditions, including social and economic states. Therefore, future studies are recommended to examine the effect of ACT on self-efficacy in coping with cancer in leukemia patients in other societies and cultures. According to present findings, ACT can improve coping with cancer in leukemia patients. Therefore, it is suggested that therapists employ ACT in their interventions on leukemia patients.

Compliance with ethical guidelines

Participants in the present study first read the written informed consent form and completed it if they were willing to participate. In addition, the research received ethical approval from the Ethics Committee of Islamic Azad University, Roudehen Branch, Iran, with the ethical reference code IR.IAU.R.REC.1403.028.

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Authors' contributions

All authors contributed scientifically to this study. All authors read and approved the final manuscript.

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Conflicts of Interest

The authors declare that there is no conflict of interest.

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