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Research Article

The Effectiveness of Dialectical Behavior Therapy on Psychological Resilience and Existential Anxiety in Adolescents with Leukemia

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Abstract

Background: Adolescents with leukemia experience a variety of physical and psychological stresses that affect their quality of life. Given the association of resilience and existential anxiety with cancer, one of the methods to help adolescents with leukemia is through dialectical behavior therapy (DBT). The present study aimed to determine the effectiveness of DBT on psychological resilience and existential anxiety in adolescents with leukemia.
Methods: This quasi-experimental study included a pretest / posttest design and a control group. The study sample consisted of 38 adolescents with leukemia living in Rasht City, Guilan Province, Iran (2019); the participants were selected by a simple random sampling and were randomized into an experimental and a control group. Connor-Davidson Resilience Scale (CD-RISC) and Existential Anxiety Inventory (EAI) were used for data collection before and after the intervention. A 12-session DBT was performed for the experimental group, but the control group received no treatment. The analysis of covariance (ANCOVA) was used for data analysis.
Results: The mean ± standard deviation (SD) of the post-test scores for personal competence, strengthening effect of stress, positive acceptance of change, perceptions of control, spiritual influences, and existential anxiety were respectively 29.83 ± 2.28, 24.47 ± 2.51, 17.58 ± 2.19, 10.82 ± 2.47, 6.96 ± 2.14, and 11.75 ± 2.65 in the experimental group and 13.81 ± 2.31, 12.61 ± 2.84, 9.97 ± 2.45, 4.28 ± 1.66, 3.74 ± 1.19, and 22.31 ± 2.23 in the control group. The results indicated that the DBT improved the psychological resilience and existential anxiety in adolescents with leukemia ($P<0.001$).
Conclusions: DBT can be an appropriate therapy for reducing the anxiety in adolescents with leukemia and increasing the resilience in people with chronic diseases; it can also result in life satisfaction among adolescents. This research confirms the fundamental importance of the above facts for education and mental health of adolescents.

Keywords: Dialectical behavior therapy, Resilience, Psychological, Anxiety, Leukemia

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1. Introduction

Leukemia is an advanced and malignant disease affecting hematopoietic organs of the body (1). The condition is characterized by incomplete duplication and evolution of the white blood cells and their progenitors in the blood and bone marrow. In leukemia, bone marrow dysfunction produces high amounts of blood cells. These cells do not function properly compared to normal cells. They interfere with the production of normal white blood cells and minimize the body›s ability to deal with the disease. It also impairs the bone marrow›s ability to produce red blood cells and platelets (2). The common symptoms of this disease are reduced weight and anorexia, fever, tiredness, multiple infections, swelling, dyspnea, bleeding, nosebleed, and small red spots under the skin (3).

Despite the low overall incidence, leukemia is the most common cancer in children and adolescents, accounting for 30% of all cancers diagnosed in adolescents under 15 years of age (4). The prevalence of leukemia ranges from 2.5% to 3% in the general population (5). In Iran, the number of leukemia patients is estimated at 17.43 per 100,000 people, and males are more affected by leukemia based on the ratio of male to female leukemia patients which is 1.75:1 (6).

Recent studies have shown that stress and emotional imbalance are among the most important factors leading to the worsening and recurrence of leukemia symptoms (7, 8). Chronic stress makes the body vulnerable to disease and damages the immune system. In the long run, these emotional problems cause many physical and mental issues and reduce the body›s ability to deal with diseases (9).

A term closely related to adaptation and coping with cancer is resilience, which is defined as the ability to overcome trauma and stress events and respond to them effectively and actively. Resilient people can emerge stronger from difficult situations, improve their coping strategies, and adapt to the adverse situation. Resilience includes protective personality traits such as cognitive flexibility, positive emotions, and active coping (10).

The essential measures for increasing psychological resilience include engaging in self-restoration, matching behaviors, getting rid of damaging conditions, and improving life. However, resilience is not the only line of defense against damages or threatening conditions, and active and constructive participation in the environment plays a significant role. It helps adolescents achieve more adaptability in stressful situations and maintain their bio-psychological balance against problems (11). The results of various studies address a close relationship between psychological resilience strategies and psychological problems. In this regard, the use of maladaptive strategies in resilience can lead to psychological damage, such as fear, depression, aggression, and violence (12).

Different investigations have indicated that emotions such as anxiety are potentially harmful for cancer (13-15). A review of previous studies shows that anxiety and its relationship with physical diseases have been taken into consideration (16, 17), but certain variables such as existential anxiety have been overlooked. Nevertheless, empirical research confirms the existence of an important link between existential anxiety and physical illness (18).

Existential anxiety occurs when people think deeply about their existence, which can lead to a feeling of alienation and isolation, which means becoming aware of absurdity (19). Investigations have shown that people with anxiety disorders are three times more likely to develop chronic diseases (20, 21). In addition, a systematic review on patients with cancer showed that anxiety in these patients was related to the risk of early death (22).

So far, several methods have been used to treat psychological and anxiety problems, but no treatment method has been entirely effective. In recent decades, one treatment that has encouraged active engagement with the acceptance of mental experiences is dialectical behavior therapy (DBT) (23). Over the recent years, DBT has developed treatment patterns known as third-wave therapies for behavioral therapy (24).

This treatment, proposed by Linehan in 1993, belongs to cognitive-behavioral treatments and targets emotional instability and impulsivity (25). This approach combines interventions related to cognitive-behavioral therapies based on the principle of change with instructions and techniques of the Eastern philosophy of mindfulness. This philosophy is founded on acceptance and accordingly, proposes four components, namely intervention, mindfulness, tolerance of stress (as acceptance and regulation of emotions), and the effectiveness of interpersonal relationships (as change components in its treatment method)(26). In this context, the findings of researchers such as Haghayegh and colleagues (27) on patients with irritable bowel syndrome indicated that by improving psychological resilience, DBT can influence the physical problems of these patients. In addition, Navarro-Haro and co-workers (28) reported that DBT was able to reduce the maladaptive patterns of patients with physical problems and regulate their anxiety. Findings from similar studies show that DBT can improve resilience and anxiety in leukemia patients (29, 30).

Due to the high prevalence and related cognitive complications of leukemia in the social and family fields and the small number of studies in this area, this study aimed to investigate the effectiveness of DBT on psychological resilience and existential anxiety in adolescents with leukemia.

2. Methods

The present study was a quasi-experimental one with a pretest / posttest design and a control group. The study sample consisted of 40 male leukemia adolescents living in Rasht City, Guilan Province, Iran (2019). To select the sample via simple random sampling, one clinic was selected among the hematology/oncology clinics in Rasht city. Subsequently, to identify eligible participants, a one-day seminar was held for the patients of the hematology/

oncology clinic. After this seminar, 92 patients expressed their willingness to participate in the study. Based on interviews, feedback, and inclusion criteria, 63 adolescents were chosen as suitable test subjects, of whom 40 subjects were randomly selected and divided into experimental and control groups (each with 20 subjects). According to the design of the present study, we used the following formula to calculate the sample size (31):

$$n = \frac{(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2(\sigma_1^2 + \sigma_2^2)}{(M_1 - M_2)^2}$$

M1= The mean of the outcome variable of the experimental group

M2= The mean of the outcome variable of the control group

σ1= The standard deviation of the outcome variable of the experimental group

σ2= The standard deviation of the outcome variable of the control group

Z= Value from the probability table of the standard normal distribution for the desired confidence level (Z = 1.96 for 95% confidence)

With a test power of 0.80, alpha=0.05, M1-M2=6, and σ12+σ22=120 and to prevent sample loss, we selected 20 adolescents for each group. The investigator carried out the randomization and the participants were assigned to the groups according to a coin toss, which traditionally involves throwing a coin into the air and seeing which side lands facing up (32). For each participant in the experimental group, a coin was thrown into the air once, and the members of the experimental group were first selected; the remaining individuals were primarily considered as a control group. Participants› parents were asked to sign an informed consent. The principles of information confidentiality and ethical considerations were also accounted for at all stages of the research. Both groups underwent a pre-test. Twelve 60-min sessions (two sessions per week of DBT) were implemented for the experimental group, but the control group received no treatment. Also, one week after the treatment, a post-test was taken from both groups. During the intervention period, two participants (one person from each group) withdrew from the study due to personal issues.

Research instruments

Connor-Davidson Resilience Scale (CD-RISC): This is a 25-item self-report scale used to measure psychological resilience. Items are rated on a 5-point scale from 0 (not at all true) to 4 (true nearly all the time); the total score ranges from 0 to 100, with the highest score reflecting greater psychological resilience. This scale contains five conceptually distinct subscales: personal competence, strengthening effects of stress, positive acceptance of change, perceptions of control, and spiritual influences. Connor and Davidson reported a Cronbach alpha coefficient of 0.89 for this scale (33). In this study, eight experts verified the Persian version of the scale (CVI=0.86, CVR=0.82). Furthermore, its reliability was measured, and the Cronbach alpha coefficient was 0.84.

Existential Anxiety Inventory (EAI): This is a 32-item (true-false options) self-report inventory developed by Good and Good in 1974 to assess feelings of apathy, emptiness, and lethargy (34). The Cronbach alpha coefficient for this inventory was 0.89 (18). In this study, eight experts verified the validity of the Persian version of this inventory (CVI=0.79, CVR=0.85). Furthermore,

Table 1: Categories of dialectical behavior therapy concepts and techniques

The concept of DBT	Related DBT techniques
Dialectical therapy style: balance between change and acceptance	- Style that alternates between disrespect and mutual communication - Balance between nurturing and challenging
Assessment and goal setting	- Comprehensive evaluation of the history of medical non-adherence - Recognizing and operationalizing short and long term goals; connection to adherence
The cycle of negative reinforcement of non-adherence	- Unprejudiced conceptualization of non-adherence - Orientation and rationale for self-monitoring
Mindfulness, emotion regulation, validation	- Analysis of non-adherence chain behavior - The importance of identifying and labeling emotions; connection between emotions and non-adherence -Transactional nature of non-adherence: the need to learn something else
Interpersonal effectiveness for self-defense, radical acceptance, goal setting	- How active participation in the patient-doctor relationship can change attitudes and behaviors - Fighting reality and staying miserable vs. accepting reality and coping - Multiparty feedback; coping ahead plans
Overview of skills, prevention of recurrence	- Review skills and refine using them - Review progress toward goals and next steps
Overview of skills, reflection and growth	- Reflection on progress - Determining short and long term goals for after treatment - Preparation for failures and coping ahead to manage them

Table 2: Description and comparison of the groups in terms of demographic variables

Groups	Experimental		Control		Chi-square (χ^2)	P
	Frequency	Percentage	Frequency	Percentage		
Age (years)						
15-16	11	57.89	10	52.63	0.87	0.789
17-18	8	42.11	9	47.37		
Educational level						
9th	4	21.05	4	21.05	0.79	0.798
10th	7	36.84	6	31.58		
11th	6	31.58	6	31.58		
12th	2	10.53	3	15.79		
Birth order						
First	10	52.63	9	47.37	0.73	0.869
Second	6	31.58	7	36.84		
Third	3	15.79	3	15.79		

its reliability was measured, and the Cronbach alpha coefficient was 0.87.

Executive protocol

Dialectical behavior therapy: The experimental group received DBT over twelve 60-minute sessions held two times a week. The treatment was based on the methods and principles of DBT (35). The aim of the treatment is to improve the general performance of the patient. DBT seems suitable for targeting medical non-adherence in adolescents with various chronic illnesses due to several reasons. DBT considers non-adherence as the main goal of treatment and uses commitment strategies to increase full participation in treatment. It increases awareness about the consequences of lacking engagement. Non-adherence can be understood as an emotional avoidance. The goal of DBT teaching is to regulate emotions and mindfulness, thereby reducing emotional release and crisis behaviors through more careful responses to emotions. The emphasis on acceptance in DBT (i.e., radical acceptance) has a significant impact on disease acceptance and willfulness/denial to disease management (36). Table 1 shows the DBT techniques.

Statistical analyses

The data were analyzed via descriptive and inferential statistics, including the mean, standard deviation (SD), and analysis of covariance (ANCOVA) to examine the effects of DBT on psychological resilience and existential anxiety among the adolescents. The Shapiro-Wilk and Levin test confirmed the normality and homogeneity variance of the collected data (37). All statistical analyses were performed in SPSS 24.0.

3. Results

A total of 38 adolescents with leukemia (19 subjects in each group) participated in the study. Inclusion criteria were no history of participation in an intervention plan, more than two years of diagnosed leukemia, no concurrent participation in other interventions, a minimum of secondary education, and the ability to communicate in Persian. The exclusion criteria were unwillingness to continue the treatment process and more than two sessions of absence from the treatment. The mean ± SD of the adolescents' age in the experimental and control groups were 16.74 ± 1.14 and 16.21 ± 1.23, respectively, with an age range of 15-18 years; the mean duration of the disease in the experimental and control groups were 3.9 and 4.2 years, respectively. Also, the results of demographic data in Table 2 indicate that there were no significant differences between the experimental and control groups.

Table 3 presents the mean and SD of the studied variables in the experimental and control groups in the pre-test and post-test. According to this table, the mean of the personal competence, strengthening effect of stress, positive acceptance of change, perceptions of control, and spiritual influences showed a rising trend, and the mean of the existential anxiety showed a decreasing trend in the post-test compared to the pre-test. Regarding the normal distribution of the dependent

Table 3: Status of psychological resilience and existential anxiety pre-and post-intervention

Variables	Phase	Experimental group	Control group	P-value (within groups)	P-value (between groups)
		M ± SD	M ± SD		
Personal competence	Pre-test	14.65 ± 2.78	14.11± 2.89	0.698	<0.001
	Post-test	29.83 ± 2.28	13.81 ± 2.31	<0.001	
Strengthening effect of stress	Pre-test	12.81 ± 2.32	11.98 ± 2.17	0.971	<0.001
	Post-test	24.47 ± 2.51	12.61 ± 2.84	<0.001	
Positive acceptance of change	Pre-test	9.42 ± 2.58	9.32 ± 2.70	0.789	<0.001
	Post-test	17.58 ± 2.19	9.97 ± 2.45	<0.001	
Perceptions of control	Pre-test	3.47 ± 2.09	3.79 ± 1.89	0.825	<0.001
	Post-test	10.82 ± 2.47	4.28 ± 1.66	<0.001	
Spiritual influences	Pre-test	2.89 ± 1.87	3.12 ± 1.58	0.838	<0.001
	Post-test	6.96 ± 2.14	3.74 ± 1.19	<0.001	
Existential anxiety	Pre-test	23.85 ±2.87	23.14 ± 2.11	0.796	<0.001
	Post-test	11.75 ± 2.65	22.31 ± 2.23	<0.001	

variables in the groups, the results of the Shapiro-Wilk test exhibited that the studied variable followed a normal distribution (37).

Since the assumptions of multivariate analysis of covariance were not met, the ANCOVA test was considered for the study variables. As seen in Table 3, after eliminating the pre-test effect of the F statistic of the ANCOVA, there was a significant difference between the experimental and control groups concerning the parameters of personal competence (F=5.12), strengthening effect of stress (F=4.75), positive acceptance of change (F=4.21), perceptions of control (F=3.44), spiritual influences (F=2.81), and existential anxiety (F=3.23), (P<0.001). Thus, the DBT improved psychological resilience and existential anxiety in adolescents suffering from leukemia.

4. Discussion

The purpose of the present study was to examine the effectiveness of DBT on psychological resilience and existential anxiety in adolescents with leukemia. Based on the results, DBT influenced the psychological strength of adolescents with leukemia (P 0.001), which is consistent with the results of previous research (27, 29).

To explain these findings, we can refer to psychological resilience as an essential and determining factor in the psychological wellbeing of adolescents with leukemia (12). Psychological resilience is similar to using adaptive strategies to regulate emotions in moderating perceptual stress (7). Studies have shown that negative strategies in psychological resilience, such as self-blame, rumination and blaming others, have a positive relationship with anxiety (10, 13). Self-blame, rumination, and catastrophizing further cause anxiety (11). The most common cognitive discomfort experienced by adolescents with leukemia is mental rumination that includes high rates of distress with anxious thoughts (15). On the other hand, most adolescents with leukemia show poor skills in regulating their emotions (25). However, DBT, with an emphasis on maladaptive coping strategies and schemas formed during childhood, presents cognitive and behavioral techniques to provide more adaptive patterns instead of ineffective coping strategies and styles (26).

Psychological resilience is a positive adaptation against undesirable conditions. DBT can increase the resilience of these people with a direct effect on maladaptive schemas and control emotional instability symptoms under complex situations. Also, according to the cognitive-behavioral program (that necessitates identification of maladaptive schemas), DBT improves people›s awareness and encourages active coping with complex conditions, resulting in higher resilience (23).

DBT mainly emphasizes emotions, and the use of empirical techniques constitutes a significant part of this treatment. It seems that DBT helps people become more aware of their feelings and accept and regulate them better. Emotional skills can be conducive to preparing for the appropriate use of adaptive strategies to regulate emotions through emotional reorganization, learning new aspects, regulating interpersonal emotions, and self-relaxation (25). In addition, the results of the present study showed that DBT was able to improve the existential anxiety of these patients (P>0.001), which is in line with the results of previous research (28, 30). To

explain this finding, we can mention that a small amount of existential anxiety can result in better emotional responses by patients and can change their lifestyles and help them show appropriate adaptive behaviors (14). However, excessive anxiety stimulates the sympathetic nervous system, which leads to exhaustion, followed by physical weakness against diseases (16).

According to different studies, people with leukemia use emotional strategies against problems(unlike healthy people) and suffer from interpersonal conflicts in their relationships (17). The anxiety caused by leukemia can be due to various reasons such as fear of chemotherapy, fear of disability to control pain, uncertainty about correct treatment, and death (21). As a result, anxiety is a negative emotion that has a close relationship with leukemia and its detrimental consequences (20). In other words, anxiety is one of the most common psychological responses of patients to cancer (22), it is linked to increased mortality in patients with leukemia (21), and it intensifies anxious responses in people with physical diseases (17). Despite the high incidence of anxiety in these patients, only a few are under treatment with psychological drugs and receive appropriate psychological-social support (19). DBT emphasizes maladaptive coping styles and correct behavioral patterns in medicine, providing opportunities to alleviate the existential anxiety symptoms of leukemia patients. Focusing on maladaptive coping methods and teaching correct behaviors can reduce the feelings of isolation and negative emotions in daily social relationships (26).

In conclusion, through activating emotional control, DBT reduces the patients' anxiety symptoms and concerns. The patient is taught to manage and regulate emotions and use strategies against other emotions such as anger, sadness, and frustration. DBT saves time and costs compared with other available treatments that emphasize a particular construct.

One of the limitations of this study was that the therapist and investigator were the same person. Another limitation was the lack of follow-up. To avoid the effect of bias, we suggest designating a person as the therapist, and if possible, considering a 3 to 6 month follow-up course to assess the treatment effects in future studies. Finally, based on the results of the current research, specialists and therapists are recommended to consider DBT methods and develop treatment plans when working with leukemia patients.

5. Conclusion

DBT instruction is effective in the improvement of psychological resilience and existential anxiety in adolescents suffering from leukemia. According to the desired results obtained herein, the effectiveness of DBT package should be examined on the parameters of psychological resilience and existential anxiety among other groups and social textures. This research confirms the fundamental importance of the above facts for the education and mental health of adolescents.

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Ethical Approval

The study was approved by the Ethics Committee of Guilan University of Medical Sciences with the code of IR.GUMS.REC.1396.612.

Conflict of interest: None declared.

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