

Table 2. Central and dispersion index of the studied variables in the experimental and control groups

Variable	Group	Pretest		Posttest	
		Mean	SD	Mean	SD
Anxiety	Acceptance and commitment therapy	14.20	2.48	9.80	2.67
	Cognitive-behavioral therapy	15.40	3.35	12.73	3.34
	Control	15.47	1.55	15	1.51
Perceived stress	Acceptance and commitment therapy	14.27	3.08	10.33	3.08
	Cognitive-behavioral therapy	15	3.07	12.60	2.97
	Control	13.73	2.08	13.27	2.08
Pain coping strategies	98.80	11.15	21.40	14.23	98.80
	101.60	8.44	115.07	8.30	101.60
	100.07	10.54	100.53	10.37	100.07

Univariate ANCOVA was conducted separately for each variable in order to determine the significant source of the multivariable effect. The results presented in table 3 indicate that the group significantly effects the scores of anxiety (Partial $\eta^2 = 0.78$; $P > 0.0001$; $F(2,39) = 72.89$), perceived stress (Partial $\eta^2 = 0.78$; $P > 0.0001$; $F(2,39) = 71.01$) and pain coping strategies (Partial $\eta^2 = 0.85$; $P > 0.0001$; $F(2,39) = 113.14$).

In order to determine the groups in which there was a significant difference, Bonferroni post hoc test was used. Paired comparison using the post hoc test (Table 4) showed that the mean anxiety score in the ACT group was lower compared to the CBT and control groups at the end of the training ($P < 0.01$). The mean perceived stress score in the ACT group was lower compared to the CBT and control groups at the end of the training ($P > 0.01$). Moreover, the mean coping strategies score in the ACT group was lower compared to the CBT and control groups at the end of the training ($P > 0.01$). No significant difference was observed between the ACT group and CBT and control groups in terms of the scores of anxiety, perceived stress, and pain coping strategies ($P > 0.05$). Thus, ACT had a greater effect on the improvement of anxiety, perceived stress, and pain coping strategies compared to CBT ($P > 0.01$).

Discussion

This study was conducted to compare the effectiveness of CBT and ACT on anxiety, perceived stress, and pain coping strategies in patients with cancer. The findings indicated that CBT and ACT are effective on anxiety, perceived stress, and coping strategies in patients with cancer. The results of this study were consistent with the findings of Borji et al. (2017), which indicated that CBT is effective on the anxiety, depression, and stress of family caregivers of patients with cancer. Furthermore, this finding is consistent with the results of the study by Abad et al. (2016), which indicated that CBT is effective in decreasing stress and anxiety in patients with breast cancer.

To explain these findings, it can be said that the patient’s assessment of the effect of cancer on his/her life progress and excessive tension and irritability resulted from negative thoughts are among the factors that cause anxiety and worry in the patients more than the disease itself.

Table 3. The results of analysis of covariance of anxiety, perceived stress, and pain coping strategies in the experimental and control groups

Variable	SS	Df	MS	F	P	Eta	Observed power
Anxiety	112.64	2	56.32	72.89	0.0001	0.78	1.00
Perceived stress	82.35	2	41.17	71.01	0.0001	0.78	1.00
Pain coping strategies	3608.04	2	1804.02	113.14	0.0001	0.85	1.00

Table 4. Bonferroni post hoc test results

Dependent variable	Group	Group	Difference of means	Significant level
Anxiety	Acceptance and commitment	Cognitive-behavioral	-1.92	0.0001
		Control	-3.96	0.0001
Perceived stress	Cognitive-behavioral	Control	-2.04	0.0001
		Acceptance and commitment	-1.51	0.0001
	Cognitive-behavioral	Control	-3.38	0.0001
		Control	-1.86	0.0001
Pain coping strategies	Acceptance and commitment	Cognitive-behavioral	9.58	0.0001
		Control	22.33	0.0001
	Cognitive-behavioral	Control	12.75	0.0001

Certain beliefs about the disease lead to incompatible coping methods, and intensification of the physical-psychological symptoms and the resulting suffering and disability. CBT first allows patients to state their thoughts and ineffective beliefs and cognitive distortions freely and without fear, then, these thoughts, structural beliefs, and cognitive distortions are reviewed and corrected (Jennings, Flaxman, Egdell, Pestell, Whipday, Herbert, 2017).

According to Beck's cognitive therapy model, cognitive therapy is most effective when the therapist amends these structural assumptions in the patients and replaces these thought distortions with positive rational and non-extreme thoughts (Majeed & Sudak, 2017). Cognitive reconstruction, which is also known as logical empiricism, helps individuals use logical reasoning for practical testing of the content of anxious thoughts against the realities of life experiences to diagnose the flow of anxious thoughts and even to test them behaviorally (Borji et al., 2017).

In this way, cognitive training of the events affects the reaction to those events and will be a preliminary for changing cognitive activity. CBT has a great influence on generating or changing understanding and attitude in individuals. Given that followers of CBT believe that the existence of some common mental errors can confuse our interpretation and perception of reality and generate further inappropriate behaviors and moods, CBT can be effective in improving anxiety, which depends on their ability to clearly, correctly, and effectively transfer their thoughts, emotions, needs, and requests.

The results also indicated that after controlling the pretest, there was a significant difference between experimental and control groups in terms of perceived stress. In other words, CBT has been effective on the perceived stress of patients with cancer. The results of this study show congruence with the results of the study by Serid, Burger, and Segal-Anglechine, which indicated that cognitive-behavioral intervention is effective on perceived stress and moods of nurses (Borji et al., 2017).

To describe these findings, it can be said that CBT decreases the perceived stress of patients. Based on the cognitive-behavioral model, peoples' beliefs affect their feelings and behaviors. Understandings and attitudes of patients greatly affect their attitudes. Negative attitudes toward and understandings of controlling the disease improve perceived stress. The fundamental principle of the cognitive-behavioral model is the effect and continuous and mutual interaction between the understandings and beliefs of an individual regarding the disease (thought), emotions, behaviors, and relationships with others. The cognitive-behavioral approach increases individuals' awareness of irrational beliefs and documents. Furthermore, through performing the practices and assignments given in the training sessions, wrong beliefs and documents are amended (Abad et al., 2016).

The results also indicated that after controlling the pretest, there was a significant difference between experimental and control groups in terms of coping strategy. In other words, CBT has been effective on the coping strategies of patients with cancer. The results of this study were in line with the results of the study by Majeed and Sudak (2017), which indicated that CBT is effective on chronic pain. Moreover, it was consistent with the study by Mozafari et al. (2020) that indicated that CBT is effective in the management of chronic pain in patients with breast cancer.

In addition, the results of the current study indicated that ACT is effective on the anxiety of patients with cancer. These results were consistent with the findings of Jennings et al. (2017) and Melo et al. (2015). To explain these findings, it can be stated that ACT is a treatment method which includes acceptance and transformational variables in such a way that the position of this treatment method against unchangeable problems is acceptance and against changeable problems and behaviors is a commitment to alignment with change (Karekla & Constantinou, 2010). Another key component in acceptance and commitment-based therapy is values. In ACT sessions, participants are asked to identify their values, specify their objectives towards those values in their life, and commit to themselves that live to realize these value-oriented objectives, and this value and objective clarification can lead to the determination of an individual route of life, and in turn, decrease their anxiety. Indeed, this part of the treatment helps patients find their motivation again for living a rich and valuable life, which is basically the objective of acceptance and commitment-based therapy. The results indicated that after controlling the pretest, there was a significant difference between the experimental and control group in terms of perceived stress. In other words, CBT was effective on the perceived stress of patients with cancer. The results of this study were in accordance with the results of the studies by Jennings et al. (2017) and Karekla and Constantinou (2010). In addition, these findings were in line with that of Pankowski, Adler, Andersson, Lindefors, and Svanborg (2017), which reported that CBT is effective on psychological flexibility. The findings of the present study were also in line with that of Mohabbat-Bahar, Maleki-Rizi, Akbari, and Moradi-Joo (2015); they found that ACT is effective on anxiety and depression in patients with breast cancer. To explain these findings, it can be said that stress and disability (imaginary or real) in facing a threat is understandable. Cognitive stress emphasizes the perception and organism assessment of probable damage from confronting motivating environmental experiences. When people assess the demands of their surrounding environment and consider them to be beyond their total contrastive resources, they will experience stress, and this will consider their desirable physical, mental, emotional, or spiritual conditions as threatening (Sklenarova et al., 2015).

Of the limitations of this study the following items can be noted. The study results are limited to patients with leukemia. This study was conducted only on patients with leukemia in Isfahan, and thus, generalization of results to other areas and cities should be done with caution. It is recommended that this study be conducted in other cities and their results be compared, and this study is followed after group training as individual counseling.

Conclusion

It can be concluded that CBT and ACT are effective on anxiety, perceived stress, and pain coping strategies and can be used for patients with cancer.

Conflict of Interests

Authors have no conflict of interests.

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