The Effect of Cognitive-Behavioral Therapy Training on Resilience and Psychological Hardiness in Students during COVID-19 Pandemic Situation

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Abstract

Background: With the spread of COVID-19, the restriction strategies happened in the educational organizations to the direction of virtual education, causing several challenges in the psychological and social components for students. The main purpose of the study was to examine the effect of cognitive-behavioral therapy (CBT) on resilience and psychological hardiness in the students during the COVID-19 pandemic.

Methods: The current study was a quasi-experimental design with pre-test/post-test scheme along with a follow-up with intervention and control groups. It was performed on 200 students of Dezful University of Medical Sciences (n=100, per each group) selected through stratified random sampling method in 2020. The intervention group was exposed to a four-month intervention based on CBT (nine interventional session). Data were collected using Connor-Davidson Resilience and Kobasa hardiness questionnaire. Data were analyzed through SPSS software version 27 using descriptive statistics same as mean and standard deviation, repeated *measures* ANOVA, and Bonferroni's post-tests.

Results: The mean age of the students was 21.93±2.52 years reported as 22.21±2.89 in the intervention group and 21.61±2.62 in the control group (P=0.3115). Before the intervention, there were no differences between the intervention and control groups in the score mean of resilience (P=0.2770) and psychological hardness (P=0.1038). In the post-training period of cognitive-behavioral therapy, there was a statistically significant difference between the mean scores of resilience (P=0.0018), hardiness (P=0.0194), and their dimensions in the two groups. These differences were also observed in the follow-up after four months of intervention.

Conclusions: The results revealed that the application of cognitive-behavioral intervention in student counseling and psychological counseling centers increases the rate of resilience and happiness of students and could be employed to improve mental health and academic status of students.

Keywords: Cognitive-behavioral therapy, Resilience, Psychological, Students

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Introduction

With the worldwide spread of SARS-CoV-2 (COVID-19), isolation, contact tracing, and quarantine have been employed as the main preventive strategies to control the COVID-19 pandemic. Subsequently, many countries conducted restrict polices, such as closing schools and colleges, due to which the adolescents and students spent most of their time at home (1). These restriction strategies in educational organizations, such as schools and colleges, to turn to online and virtual education, resulting in a shock in general education and causing several challenges in psychological and social components for students and families (1, 2).

Resilience, as defined by experts, includes the concept of flexibility, recovery, and returning to the original state after facing adverse and difficult conditions. These conditions are created due to life situations, such as disasters, deaths, illnesses, social harms, or changes in job and educational opportunities (3, 4). Resilience is one of the personality traits that is highly related to mental health and quality of life (4). Resilience is also defined as the process of overcoming the negative effects of exposure to risk, successful adaptation to traumatic experiences, and avoidance of negative effects associated with risk (5).

One of the important cases studied in resilience is the change of educational position from school to university in students. Particularly, in the first years of university, students experience social challenges, namely separation from family and upgrading a network of friends and other educational challenges, such as the need to complete homework successfully, which may be accompanied by emotional turmoil,

feelings of loneliness, homesickness, mental health problems, and increased risk of drug use (6, 7). According to research, the highest rate of probation, dropout, psychological, and social problems occur in students in the early years courses. In addition, the pandemic of students have made this issue even more important with entrance of virtual education during the COVID-19 pandemic (2, 8).

One of the important personality factors, highly correlated to the other psychological ones, which can be effective in promoting the mental health of students is psychological hardness. Psychological hardness is defined as a combination of attitudes and beliefs that motivate a person to dare to work hard and strategically in the face of stressful and difficult situations and to adapt to them (9, 10). This characteristic makes an individual efficient and capable to be able to deal with logical, reasonable, and effective confrontation in the most critical situations. Indeed, an inner motivation and factor results in psychological stubbornness and therefore has a lot of stability (10, 11). Attitudinal hardness is a combination of the three sub-components of commitment, control, and coping with problems that help to resolve stress successfully by turning critical situations into a growing experience (10).

There are various theories in psychology and psychotherapy on dealing with psychological problems and improving indicators related to psychological resilience. Among these therapies, cognitive-behavioral therapy (CBT) has grown and developed in the field of psychotherapy. The process of CBT through group counseling includes group training and discussion in which most cognitive-behavioral strategies are used. The main purpose of this method is to help group members to identify and experience their feelings and to understand the ways in which their beliefs and assumptions affect the way they feel and behave and to experience other alternative behaviors (11, 12). Although the formation of these methods in the treatment of mental health problems and diseases is not long, but it has been able to attract a lot of interest among clinicians (13). CBT has also found wider applications related to cases that cannot be treated easily and effectively through other methods (14). In CBT, intervention applies training based on reducing and solving psychological problems. Moreover, according to some previous studies, CBT could affect resilience and psychological hardness in students (10-12).

The importance of the subject and improving the resilience and hardness of students are effective in improving educational performance and contributing to the acceptance of social and individual responsibilities in students (13, 14). Considering this fact, in this study we aimed to investigate the impact of CBT training on resilience and hardiness in students was performed during the COVID-19 pandemic. Another objective of the study was to develop recommendations on how to reduce some of educational and psychological problems in the impact of COVID-19 on education and to evaluate digital learning.

Methods

This study was a quasi-experimental design with pre-test/post-test scheme and four-month follow-up with intervention and control groups. The statistical population of the study was the students of Dezful University of Medical Sciences in 2020. The students (n=200) were selected using a stratified random sampling. In the first stage, two variables of school types (school of medicine, para-medicine and nursing) and the students' fields of study were considered as the two groups of the current work. Afterwards, based on the total number of students in each group, the proportion number of samples in each groups was determined. In the last stage, with simple random sampling, 200 samples were included in the study. The samples were selected with simple random method using *random number table* to the intervention (n=100) and control (n=100) groups.

Inclusion criteria were not receiving any other psychological intervention at the same time and not using psychotropic drugs. Exclusion criteria were the absence of more than one session during the interventions and the unwillingness of participants to continue the research. After meeting the entry criteria, the students were randomly assigned to the intervention and control groups. During the initial session of the objectives, the rules of the study method were explained to the participants. Due to the COVID-19 pandemic situation, the interventions (CBT) were performed through virtual online learning program, including *Navid* Virtual *Education* System (Navid) and online session with adobe connect software (Enterprise 10.8). At the beginning of the study, informed consent was obtained from all the participants. Additionally, before the intervention, all the participants completed the standard questionnaires of resilience and psychological hardness. The experimental group was then trained in the nine sessions of 60-90 minutes using CBT intervention-Bieling PJ, 2009-(15). The steps of the study are depicted in Figure 1.
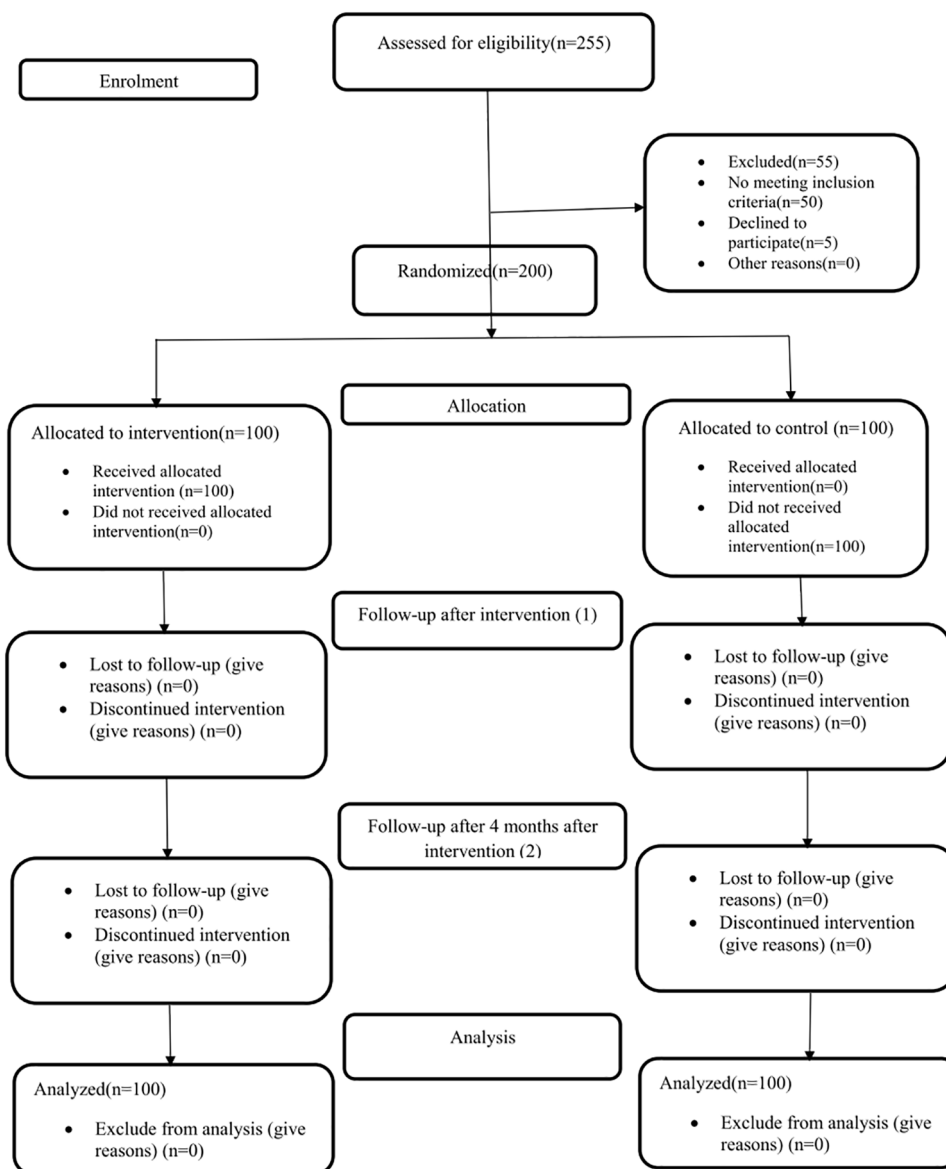
Figure 1: The figure shows the design of the study.

The outcomes of the study, resilience, and psychological hardness were assessed by use of standard questionnaires after four months (Table 1).

Herein, the sample size was estimated according to the data from Happer and colleagues (16) presenting a decrease in the resilience score of 15% in the control and 31% in the intervention groups. Simulations using proportions formula for calculation of sample size, estimated that 100 samples per group, n=200 in total, would be required to highlight the differences between the two groups with a power of 80% and an alpha error at the level of 5%. The dependent variables in this study included resilience and psychological hardness.

The Connor-Davidson Resilience Scale (CD-RISC) consists of 25 questions, assessed on a five-factor components with a Likert scale ranging from 0-4 scores. These ratings result in a number between 0–100 and higher scores indicate higher resilience. This questionnaire includes five dimensions: perception of individual competence; trust in individual instincts; positive acceptance of change and safe relationships; and control and spiritual effects, the validity, and reliability of which have been proven in previous studies (17, 18). In Iran, the psychometric properties of this questionnaire have been confirmed and the content validity demonstrated that the content validity index (CVI) was 0.80 and the content validity ratio (CVR) was 0.78. The Cronbach's alpha coefficient for the questionnaire was 0.74 and for its subscales ranged from 0.65 to 0.78. Additionally, the five-factor components explained 61.3% of the variance of resilience (18, 19).

Table 1: Summary of cognitive-behavioral therapy sessions (Bieling PJ, 2009)

Content of the meeting	Issue	Sessions
Introduce the participants and the reasons for the decision to participate in cognitive-behavioral group meetings Supply elementary evidence about cognitive-behavioral psychotherapy Explain the reason for holding these sessions and the purpose of cognitive-behavioral group therapy Explain the principles of confidentiality and reassure the clients whose information stays completely confidential Describe the procedures and procedure of treatment sessions	- Introduce the participants - Supply elementary evidence about cognitive-behavioral psychotherapy	First session
Explain the association between thoughts, feelings, and behaviors Express differences in thoughts, feelings, and behaviors Explain dysfunctional thinking styles Expressing common cognitive errors Distribution of worksheets reconstruct thoughts.	Thoughts, feelings, behaviors	Second session
Review and explain the assignment of the previous session Explain the more important steps for reconstructing thoughts (recognizing, evaluating, and changing thoughts and determining the effects of modified thoughts) Redistribution of Thought Reconstruction Worksheets	Reconstruction of thoughts	Third session
Examining the chain of cause, response, and consequence Explain the consequences of putting oneself in a larger behavioral chain Express plans to interrupt the destructive chain	Signs and chains	Fourth session
Define daring behavior Imagine a situation where it is difficult to behave boldly Suggested self-talk to increase courage The difference between passive, aggressive, and assertive behavior An example of negative thoughts and self-talk that hinders courage	Daring	Fifth session
Define impulses and discuss impulse management and strategies for greater self-control Solutions to boost mood and increase fun events Distribute worksheets for enjoyable activities	Impulsivity, self-control, and uplifting mood	Sixth session
Explain about stress, stressors, and stress management Stress management Solutions to the problem Muscle relaxation training	Stress management and problem solving	Seventh session
Definition of self-esteem How negative self-assessments leads to the lack of self-esteem Strategies to improve self-esteem Distribute your idea worksheet	Self-esteem	Eighth session
Plan to prevent recurrence Explain the need to practice the skills acquired during the sessions Evaluate work progress and acquired skills	Relapse prevention	Ninth session

The Kobasa (1979) Hardiness Questionnaire is a 50-item questionnaire calculated on a four-point Likert scale from 0-3 for the three subscales of commitment, control, and challenge. The total hardness score is 100. Reliability of the questionnaire was confirmed by Kobasa with a Cronbach's alpha 0.78 (20). In the Iranian population, the face and content validity of hardiness has been obtained by Janani with a Cronbach's alpha coefficient of reliability for the components of control, commitment, and struggle, which respectively were reported to be 0.7, 0.52 and 0.52. These coefficients were calculated to be 0.75 for the overall hardness scale. The content validity indexes were excellent with CVI=0.76 and CVR=0.71 (21, 22).

Data were analyzed with SPSS software version 27 using descriptive (frequency table, mean and standard deviation) and inferential statistics, including parametric test same as T-test, Chi square, repeated *measures* ANOVA, and Bonferroni's post-tests.

Results

The mean age of the students was 21.93±2.52 years, which was reported to be 22.21±2.89 in the experimental group and 21.61±2.62 in the control group (P=0.3115). Additionally, 51.5% (n=103) of the students were male, which was 52% (n=52) in the experimental group and 48% (n=48) in the control group (P=0.7784). Based on these results, before the test, there were no statistically significant difference between the age and sex of students with their allocation in the experimental and

control groups and the two groups were homogeneous in terms of age and sex. Before the intervention, there were no correlations between the experimental and control groups in the mean score of resilience (P=0.2770) and psychological hardness (P=0.1038).

In Tables 2 and 3, descriptive statistics indices, including mean and standard deviation, resilience, and their dimensions in students before and after the intervention and in the follow-up stage are reported.

Table 3 represents that the status of descriptive indices

of hardiness and its dimensions in the experimental group after the experiment and follow-up is more favorable than that of the control group (Table 3).

Kolmogorov-Smirnov was applied to examine the defaults of the repeated measures analysis of variance, revealing that the default was the normal distribution of the evaluated variables (P=0.3024). Moreover, in Mauchly's test of Sphericity, the studied variables were correlated between the three follow-up measurements (P=0.1079), illustrating that the preconditions for equal correlations can be accepted. According to

Table 2: The resilience status and its components by group and stages in the students

Components	Groups	Pre-test	Post-test	Follow-up	(P-value) Post-hoc test		
		M±SD	M±SD	M±SD	Pre/ Post-test	Pre-test/ Follow-up	Post-test/ Follow-up
Perception of Individual competence	Experiment	22.35±4.09	25.39±4.012	27.59±4.10	0.0331	0.0002	0.0370
	Control	20.13±4.10	21.33±4.01	20.98±4.18	0.6448	0.3165	0.2914
	P value	0.2296	0.0382	0.0180	-	-	-
Trust in individual instincts	Experiment	17.11±3.66	19.90±4.77	21.87±4.12	0.0187	0.0236	0.0861
	Control	17.36±3.81	18.13±3.19	18.88±4.02	0.1736	0.1401	0.1074
	P value	0.5719	0.0295	0.0001	-	-	-
Positive acceptance of change and safe relationships	Experiment	15.80±3.85	17.44±4.28	17.79±4.21	0.0001	0.0013	0.6359
	Control	14.99±3.68	15.16±3.49	14.97±3.42	0.1180	0.1816	0.5493
	P value	0.1131	0.0430	0.0266	-	-	-
Control	Experiment	9.42±3.11	10.87±3.12	11.54±3.11	0.0447	0.0192	0.2028
	Control	9.02±2.73	9.12±3.03	9.48±2.81	0.3231	0.1815	0.2172
	P value	0.3234	0.0174	0.0001	-	-	-
Spiritual effects	Experiment	5.74±2.02	7.20±2.09	7.97±2.65	0.0217	0.0021	0.0290
	Control	5.41±2.84	5.90±2.12	5.86±2.14	0.1012	0.2457	0.7019
	P value	0.4288	0.0246	0.0196	-	-	-
Resilience	Experiment	68.13±8.58	77.59±10.12	84.94±10.47	0.0106	0.0001	0.0412
	Control	67.57±9.46	69.15±10.11	69.10±10.92	0.1522	0.0892	0.8704
	P value	0.2770	0.0018	0.0051	-	-	-

Bonferroni correction was used to indicate which time periods were statistical significant.

Table 3: The psychological hardiness and its components by group and stages in the students.

Components	Groups	Pre-test	Post-test	Follow-up	Post-hoc test (P value)		
		M±SD	M±SD	M±SD	Pre/ Post-test	Pre-Test/ Follow-up	Post-test/ Follow-up
Commitment	Experiment	32.19±4.84	38.05±5.20	41.18±5.47	0.0001	0.0328	0.0301
	Control	33.48±4.91	34.12±4.41	33.95±4.96	0.2930	0.5651	0.4178
	P value	0.0692	0.0001	0.0276	-	-	-
Challenge	Experiment	31.63±3.73	36.34±4.90	40.12±5.19	0.0315	0.0112	0.0408
	Control	32.15±3.51	32.49±4.01	33.12±3.79	0.5903	0.1707	0.4723
	P value	0.6259	0.0154	0.0041	-	-	-
Control	Experiment	33.93±5.44	43.10±5.45	42.72±5.47	0.0418	0.0021	0.2007
	Control	32.74±4.63	32.79±4.69	34.12±4.73	0.8143	0.2216	0.1375
	P value	0.4386	0.0001	0.0002	-	-	-
Psychological hardiness (total score)	Experiment	97.74±9.58	117.53±10.6	124.32±10.59	0.0130	0.0132	0.0280
	Control	98.63±9.69	99.31±10.64	101.19±9.94	0.1319	0.0734	0.1097
	P value	0.1038	0.0194	0.0011	-	-	-

Bonferroni correction was employed to indicate which time periods were statistical significant.

the results of Box's M test, the variables of resilience, hardiness, and their subscales were not statistically significant (P=0.1504), showing that the hypothesis of homogeneity of the variance matrix of covariance for the variables was established. Tables 4 and 5 reveal the results of the repeated measures analysis of variance test for resilience, rigidity, and their dimensions in the students.

According to the results of Table 4, there was a statistically significant difference between the two groups in the pre-test, post-test, and follow-up sections (P=0.0001). In addition, the results revealed that the interaction between the groups and stages was of significance (P=0.0315), demonstrating that cognitive-behavioral therapy intervention training has been effective in changing the dimensions of resilience in the three follow-up stages of the study.

According Table 5, there was a statistically significant difference between the two groups in the pre-test, post-test, and follow-up phases in the dimensions related to psychological hardiness (P=0.0173). The results also revealed that the interaction between the groups and stages was significant (P=0.0294), proving that CBT intervention training has been effective in changing the dimensions of rigidity in the three stages of the study.

Table 4: The analysis of repeated measurements of the resilience components in the three stages of study

Components	Variation	F	P value*	B coefficient**
Perception of individual competence	Time	6.12	0.0125	0.23
	Group* Time	9.63	0.0321	0.32
	Group	6.95	0.0374	0.39
Trust in individual instincts	Time	4.59	0.0001	0.25
	Group* Time	1.12	0.3936	0.15
	Group	5.12	0.0001	0.49
Positive acceptance of change and safe relationships	Time	7.37	0.0380	0.44
	Group*Stage	2.98	0.0445	0.24
	Group	3.78	0.0184	0.29
Control	Time	11.93	0.0021	0.50
	Group* Time	2.86	0.0346	0.23
	Group	4.69	0.0255	0.29
Spiritual effects	Time	9.68	0.0001	0.59
	Group* Time	4.18	0.0182	0.33
	Group	3.71	0.0001	0.39
Resilience	Time	11.18	0.0018	0.59
	Group*Stage	4.36	0.0315	0.27
	Group	6.12	0.0001	0.29

*P values for the intervention versus control groups were extracted from the repeated-measurement ANOVA of covariance adjusted for the pre-intervention scale. **B coefficient shows the proportion of variance in the assessed variable interpreted by another variable.

Table 5: The analysis of repeated measurement of hardness components in the three stages of study.

Components	Variation	F	P-value*	B coefficient**
Commitment	Time	8.12	0.0001	0.21
	Group* Time	4.11	0.0386	0.34
	Group	4.38	0.0218	0.39
Challenge	Time	3.82	0.0315	0.30
	Group* Time	1.42	0.2377	0.14
	Group	6.31	0.0161	0.49
Control	Time	7.31	0.0144	0.44
	Group* Time	1.23	0.3259	0.31
	Group	4.18	0.0264	0.26
Psychological hardiness	Time	8.43	0.0001	0.55
	Group* Time	5.12	0.0294	0.22
	Group	7.12	0.0173	0.27

*P values for the intervention versus control groups were extracted from the repeated-measurement ANOVA of covariance adjusted for the pre-intervention scale. **B coefficient shows the proportion of variance in the assessed variable interpreted by another variable.

Discussion

The main objective of this study was to examine the effect of CBT training on resilience and psychological hardiness in the students of Dezful University of Medical Sciences during the COVID-19 pandemic situation. One of the important findings showed that the educational intervention method of CBT in the post-test phase and the four-month follow-up on resilience and its dimensions, including the perception of individual competence, trust in individual instincts, positive acceptance of change and safe relationships, control, and spiritual effects of students, are effective. These results are consistent with those of the studies of Tabibzadeh and Sepehrianazar (23), Boolaghi and KianiMoghadam (24), Anjomshoaa and colleagues (25), and Yamamoto and co-workers (26). Reality testing and rejection techniques employed in the cognitive-behavioral interventions reduced the negative beliefs and perceptions of stress management in individuals, contributing to a reduction in negative mood and depression especially during the COVID-19 pandemic. Once these critical conditions have intensified, which in turn increases resilience and adaptability (15, 27).

Accordingly, CBT education is a systematic psychological approach that results in an increase in self-control in the individual through relaxation, correction of cognition, and awareness of his thoughts and beliefs, which has a great impact on encouraging the person to accept existing facts and increases resilience (28). CBT can have positive effects on strengthening resilience, meaning that the people under this type of intervention can strengthen their adaptation to stress and cope better with adverse life changes and return to their original state after problems. Therefore, people do not lose hope when they fail and better control their unpleasant emotions, such as sadness, fear, and anger. People with low resilience, instead of empowering themselves to cope effectively and adaptably with the problems, often cultivate negative beliefs about themselves and engage in activities affecting their health (26-29). Lack of resilience in the student period specifically in the COVID-19 pandemic, is associated with problems, such as internalization, impulsivity, and poor reaction control. On the contrary, high resilience protects the individual against internalizing and externalizing behavioral patterns and negative emotions. High levels of resilience indicate low levels of development of behavioral problems, such as conduct disorder and depression (27, 30). Strengthening resilience in the student period could have positive effects if people learned that they have support systems

and internal characteristics that can help them cope with problematic situations, strengthen empowerment and resilience and protect them against life stressors, mental health, and academic problems. The principle of cognitive-behavioral therapy is ability, resilience, and resources of the client, which are important in helping to bring about change in the individual (27, 31, 32). Therapists strive to increase long-term resilience by increasing self-efficacy and self-esteem. Indeed, the most important goals of cognitive-behavioral therapy are to increase long-term resilience, quality of life, and other positive structures of individuals. This treatment emphasizes adaptive abilities, capabilities, resources, and personal strengths that are particularly important in helping to bring about change. The methods and questions used in cognitive-behavioral therapy help to improve the mental order of individuals (26, 31, 33).

One of the crucial findings of the present research found that the educational intervention method of CBT in the post-test phase and four-month follow-up period affects psychological hardness and its dimensions, including commitment, control, and challenges in the students. These results are in accordance with the studies of Abbasi and colleagues (34) Sahranavard and co-workers (35), Kowalski and colleagues (36), and Cohen and colleagues (37). Hardworking people are usually active and purposeful and their approach to life is passionate and exciting. These people believe that stress is changeable and that they can predict and control life events using knowledge, skills, and the power of choice (34, 37). Accordingly, CBT training is a systematic approach contributing to an increased self-control in the person through relaxation, correction of cognition, and awareness of his thoughts and beliefs, which has a great effect on encouraging the person to accept the existing facts (38). In cognitive-behavioral therapy, people learn to accept their feelings rather than distancing themselves from them, focus more on their thoughts and thought process, and link them to goal-oriented activities. Therefore, in treatment sessions after understanding the ineffectiveness of control, the concept of desire is introduced as an alternative to control, introduction, and related exercises. Hence, it is expected that CBT training be able to improve the level of control which is one of the main components of psychological rigidity in students. In this treatment, people are asked to be purposeful and work towards their goals and values and live in the present. Thus, this type of treatment can greatly strengthen the commitment of students by making them purposeful and meaningful (27, 38, 39).

One of the limitations of the present study was the unique community of students. The results and findings can only be generalized to this group and it is necessary to consider this limitation in generalizing the results to other target groups.

Conclusions

According to the findings, it can be concluded that CBT training is effective on the resilience and psychological resilience of students and by emphasizing the strengths and capabilities of individuals. Therefore, it is suggested that counseling centers and psychological services use it as an educational program to improve resilience and hard work, resulting in an increased level of mental health, quality of life, and improving the relevant components of the students' educational process. In addition, further research on the effectiveness of this type of intervention in various target groups seems necessary.

Acknowledgment

Ethical Approval

This research was approved by the Ethics Committee of Dezful University of Medical Sciences with the code of IR.DUMS.REC.1399.050. The participants voluntarily participated in the present study and written informed consent was obtained.

Conflict of interest: None declared.

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