The Effectiveness of Cognitive Behavioral Therapy (CBT) on Students' Test Anxiety

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Abstract

This study was carried out aimed to investigate the effectiveness of Cognitive Behavioral Therapy (CBT) on elementary and secondary school students' test-anxiety in Baladeh. This study was a semi-experimental research with control group pretest-posttest design. In this study, statistical population included all the male and female elementary and secondary school students for academic year 2019-2020 in Baladeh (N=200), among which 45 students who earned a score lower than 40 were randomly selected and randomly assigned into two experimental and one control group (15 subjects in each group). Test anxiety Scale (FTAS) by Friedman & Bendas. Jacob (1997) [1] was used to collect data during two pre-test and post-test stages. Experimental group received cognitive behavioral therapy, but the control group did not receive any treatment. According to the results of the ANCOVA, there was a significant difference between the test anxiety scores earned by the subjects of two groups. It can be concluded that Cognitive behavioral Therapy has had a significant effect on students' test-anxiety.

Keywords: Cognitive behavioral therapy; Test anxiety; Students

Introduction

Exams and tests are considered as an integral part of people's life. The results of tests affect all aspects of life significantly [2]. One of the common educational problems is test anxiety that students face, which affects their learning and academic achievement. Test anxiety is defined as a type of self-obsession that manifests itself through self-concept and doubt, and generally causes negative cognitive assessment, lack of concentration, adverse physiological reactions, and decline in students' academic performance [3].

They have defined test anxiety as a set of behavioral, physiological, and phenomenological responses that is associated with worry about possible negative consequences or failure in a test or similar assessment situation [4]. Soysa & Weiss (2014) [5] have defined test anxiety as a form of self-obsession that is associated with self-deprecation, atheism, doubt about your abilities, and lack of self-confidence, which leads to academic failure and endangers the mental and physical health of the individual.

Therefore, several treatments have been developed to treat it. Cognitive behavioral therapy is considered as one of the treatment methods to reduce students' test anxiety. This treatment is designed to address spontaneous negative thoughts and assumptions and beliefs in emotional disorders. According to this method, individuals are taught how to review and evaluate their negative thoughts. The therapist encourages clients to evaluate their negative thoughts and hypotheses in a real and objective way through behavioral assignments. According to cognitive behavioral therapy, maladaptive thoughts are the cause of maladaptive behavior and people must learn new ways of thinking. Therapists are able to help people rebuild their thought patterns to better cope with stress [6].

A significant number of children and adolescents are recruited each year by schools and over a period of time are required to nurture the scientific and practical capabilities of these individuals and finally provide the community them as trained individuals. The course is a stressful one due to the presence of many factors. Given that students are exposed to new teaching methods and unpredictable demands and given that they do not have the necessary information and preparation for this encounter, probably, their controlling power has been weakened and can't adapt themselves

to the environment [4]. Therefore, given that students are exposed to new teaching methods and unpredictable demands at this stage, and given that they lack the necessary information and preparation for this encounter, their controlling power has been weakened and can't adapt themselves to the environment, and sometimes this situation causes students to experience test anxiety. Exam anxiety is considered as a field that has been widely studied since the early twentieth century and has always attracted much attention of researchers as one of the serious issues in the field of education of children, adolescents and even adults [7].

On the other hand, test anxiety and its dimensions as one of the broadest fields of research has attracted much attention of many researchers in recent years. Anxiety disorders is considered as one of the most common emotional and psychological disorders in children and adolescents and test anxiety is one of the serious problems of today's society [8]. It has been reported that the prevalence of test anxiety among students is between 10 and 30% [4]. Therefore, test anxiety threatens students' mental health and has negative and significant effect on their efficiency, talent development, personality and social identity formation, and as one of the pervasive and problematic phenomena affects their academic achievement and optimal performance, especially when evaluating negatively.

Researchers have always emphasized in choosing therapies with lower cost, more effectiveness, less time and with richer research support, which can be referred to cognitive-behavioral therapy and especially cognitive-behavioral therapy, because this treatment has research support and background, it is rich and can provide group medical and psychological services to a large number of people, especially students. As mentioned earlier in relation to the widespread effects of test anxiety and the fact that self-confidence in students can reduce test anxiety and reduce the negative effects of test anxiety on academic performance, this study can be very important in order to provide an effective and accessible intervention, and according to the possible results of the present study, it can be used in medical and educational models to reduce students' anxiety and finally is affective on their academic quality and academic performance positively.

According to the results of studies carried out by Hamidi, Sarvaghd, Rezaei and Baqoli (2019) [9]; Mohammadifar, Yasmani and Najafi (2018) [10]; Farsinejad, Karami and Asadzadeh (2018) [11]; Sud (2020) [12]; Marrero, Carballeira, Martin, Mejías & Hernández (2017) [13]; Kaur & Kumaran (2016) [14]; Prasko, Hruby, Holubova, Latalove, Vyskocilova & et al (2016) [15]; Davis (2013) [16]; Holroyd (2012) [17]; Latas, Pantic & Obradovic (2010) [18], cognitive-behavioral therapy is effective on test anxiety. In this regard, the present study seeks to examine the following question: Is cognitive-behavioral therapy effective on students' test anxiety?

Research Proposal

This study (with ethics code: IR.IAU.BABOL.REC.1399.028 and IRCT code: IRCT20190817044550N3) is considered as a quasi-experimental study with pretest-posttest control group design, which is shown in Table 1.

Statistical population, sample size and sampling method

In the present study, the statistical population includes all male and female high school students in Baladeh region in the academic year 2019-2020 (N=200). First, all male and female high school students in Baladeh responded to the FRIDMAN Test Anxiety Scale (FTAS) online. The number of people who scored less than 40 was determined to determine the main samples, which were 73 people. Then, 30 of them were selected using random sampling method and divided in three groups of 15, which are described in Table 2. Then, one group was randomly selected as the control group and one group as experimental group. Experimental group received cognitive-behavioral therapy in 8 sessions of 60 minutes, but the control group received no intervention. At the end of the intervention, subjects in three groups participated in the post-test.

Research Tools

Exam anxiety questionnaire

The test anxiety questionnaire (23 questions) was designed by Friedman IA & Bendas-Jacob O (1997) [1]. The FRIDMAN Test Anxiety Scale (the FTA) is a 23-item scale consisting of the following three subscales: (a) Social Derogation, (b) Cognitive Obstruction, and (c) Tenseness. The items in this questionnaire are scored on a 4 point Likert scale from 0 (strongly agree) to 3 (strongly agree). Questions 1 to 8 are related to Social Derogation, questions 9 to 17 are related to Cognitive Obstruction, and questions 18 to 23 are related to Tenseness. In this questionnaire, high scores indicate low test anxiety and low scores indicate high test anxiety.

In a study conducted by Friedman IA & Bendas-Jacob O (1997) [1], Cronbach's alpha coefficient in a sample of 3700 people for each of the above subscales was 0.86, 0.85 and 0.81, respectively, and for the whole scale was 0.91. The reliability of this scale in this study using Cronbach's alpha method for the subscales of Social Derogation, Cognitive Obstruction and Tenseness is 0.89, 0.77 and 0.84, respectively, and for the whole questionnaire is 0.90. According to the results of Friedman and Bandas Jacob (1997) [1] the validity of the questionnaire by calculating the correlation coefficient of this test with the Test Anxiety Inventory (TAI; Spielberger) was 0.84 for boys and 0.82 for girls.

Factor analysis test and structural validity were used in the study conducted by Baezzat, Sadat Sadeghi, Izadifard and Rubenzadeh (2012) to evaluate the validity of this test. All 23 items were analyzed in factor analysis and none of the species had a correlation of less than 0.30. As a result, the test has acceptable validity and its face validity has been approved by the relevant professors and experts. Also, the reliability of the questionnaire with its reliability was calculated using Cronbach's alpha measurement method. It has reported that Cronbach's alpha coefficient of Social Derogation component was equal to 0.90, Cognitive Obstruction was equal to 0.85, Tenseness was equal to 0.83 and total was equal to 0.91 [3].

After a permit from Baladeh Education Department was obtained, the number of male and female high school students in Baladeh in the academic year 2019-2020 was determined and an exam anxiety questionnaire was sent to all female and male first and second high

Table 1: Quasi-experimental study with pretest-posttest control group design.

Groups	How to appoint	Test	Intervention	Test
Experimental Group 2	Random (R)	Pre-Test (T1)	Cognitive-behavioral Therapy (X)	Post-Test (T2)
Control group	Random (R)	Pre-Test (T1)	-	Test after (T2)

Table 2: Distribution of the main sample by education level and gender.

Groups	The first level		The second level		Total
	Male	Female	Male	Female	
Cognitive behavioral Therapy	4	4	4	3	15
Control	5	3	4	3	15
Total	9	7	8	6	30

Table 3: Summary of group cognitive-behavioral group therapy sessions.

Sessions	Objective	Solutions and assignments
Session 1	Welcoming and introduction, overview of the sessions structure: Training : Introduction of the underlying logic of Cognitive Behavioral Group Therapy program; Discussion about the relationship between thoughts, feelings, and behaviors and ABC model training in relation with exam anxiety	Providing an assignment based on writing the expectations and goals of the training until the next session .
Sessions 2, 3	Identifying automatic test anxiety-related thoughts, Cognitive-behavioral model training for psychological disorders; Training and trying to make relationship between thoughts, emotions and behaviors; Teaching the role of using alternative thoughts in changing behaviors and emotions	Reminders of several events related to recent test anxiety and their replacement byABC model; Homework
Session 4	Homework Assessment (related to previous session); Attempting to identify fundamental thoughts and beliefs using the downward arrow technique; Introduction and recognition of logical errors and its relationship with test anxiety; Relaxation training	Practice inidentification and classification of logical errors; Applying the technique of alternative thoughts and challenging with automatic thoughts; Homework
Session 5	Homework Assessment : Discussion about Logical Thoughts and Mistakes; Cognitive Triangle Training in Exam Anxiety; Training the evidence of affirmative and negative evidence to deal with automatic thoughts and logical errors and fundamental beliefs; Relaxation training	Using the technique of affirmative and negative evidence to counter automatic thoughts and logical errors and fundamental beliefs; Homework
Session 6	Homework assessment; Analysis of recorded thoughts and how to challenge them; Discussion about identified assumptions and core beliefs; Training : Challenging basic assumptions and beliefs using evidence-seeking practice and empty seats; Training : problem solving skills	Challenge with basic thoughts and beliefs using the empty seat technique; Problem solving training and applying it to everyday problems; Homework
Session 7	Homework assessment; Discussion about the use of problem solving techniques Training : Practice mental imagery in order to challenge imaginary with basic assumptions and beliefs	Applying mental imagery practice ; Using problem-solving techniques for everyday problems and registering a special sheet,
Session 8	Homework assessment; Overview of practice and skills learned; Comparison of coping thoughts and strategies before treatment with thoughts and strategies and skills learned in treatment sessions to integrate treatment	-

school students online through WhatsApp. Then, the number of students who earned the score below 40 was determined (73 people) and 30 people were randomly selected and replaced in three groups of 15 people. One group was randomly selected as the control group and another group as experimental group.

The purpose, nature of the research, as well as the advantages and disadvantages of cognitive-behavioral therapy were explained to subjects and their parents, and informed consent to participate in the study was obtained from individuals; The subjects were assured that the information was kept confidential and confidential by the researcher and the researchers in this study accepted any responsibility for possible events. Cognitive-behavioral therapy was performed on the experimental group and at the end post-test was performed on subjects in the three groups after the intervention.

Beyzaei's Cognitive Behavioral Therapy (CBT) (2012) [19] was used in 8 sessions of 60 minutes in this study, which is described in Table 3.

Results

As shown in Table 4, mean and standard deviation of test anxiety in the experimental group (cognitive-behavioral therapy) in pre-test-post-test was equal to 32.73+5.67 and 45.53+6.80, respectively, and in the control group 32.07+5.75 and 32.20+5.80, respectively. According to the results, the subjects' scores in terms of test anxiety decreased significantly after the intervention. It should be noted that higher scores in the Exam Anxiety Questionnaire indicate lower anxiety and lower scores indicate higher test anxiety. Thus, increasing the scores from pre-test to post-test in the treatment groups indicates reducing the level of test anxiety after the experimental intervention.

Table 4: Descriptive indicators of test anxiety scores of subjects in three groups in pre-test and post-test.

Groups	Cognitive behavioral therapy		Control	
	Average	Standard deviation	Average	Standard deviation
Pre-test	32.73	5.67	32.07	5.75
Post-test	45.53	6.80	32.20	5.80

According to the results of the Shapiro-Wilk test, the statistical values obtained in the pre-test and post-test of the experimental groups and the control group are more than the critical value ($\alpha=0.05$), therefore the null hypothesis (often denoted H0) of a normal distribution is confirmed and the hypothesis 1, there is no normal distribution, is rejected. Also, given that the values of skewness and kurtosis are between -2 to 2, it can be concluded that the data distribution is normal. Also, according to the findings of Levene's Test, the significant level of test anxiety $p=0.687$ is greater than the alpha level of 0.05 and therefore the same assumption of variance error has been met for test anxiety.

According to Table 5, the f-ratio from Analysis of Covariance (ANCOVA) indicates that after eliminating the effects of the auxiliary random variable (pre-test), there is a statistically significant difference between the adjusted scores in the post-test of test anxiety scores ($P<0.01;=F(1.27)$). In other words, cognitive-behavioral therapy have reduced students' test anxiety in different ways. According to the Eta-squared (η^2)[3] or effect size, 93.5% of the changes in post-test test anxiety has been caused by the effect of cognitive-behavioral therapy.

Discussion and Conclusion

This study was carried out aimed to determine the effectiveness

Table 5: Results of one-factor analysis of covariance to determine the effectiveness of cognitive-behavioral therapy in post-test.

Sources Change	Total squares	Degrees of freedom	Average squares	f Ratio	The significance level	Effect size
Group	13333.33	1	1333.33	387.05	0.001	0.935
Error	93.01	27	3.44	-	-	-
Total	2437.47	29	-	-	-	-

cognitive-behavioral therapy on students' test anxiety. According to the results, a statistically significant difference was observed between the adjusted scores in the post-test of anxiety test scores, that is, cognitive-behavioral therapy has reduced the test scores of students in the post-test. This result is consistent with the results reported by Hamidi et al. (2019) [9]; Mohammadifar et al., (2018) [10]; Farsinejad et al., (2018) [11]; Wiskermi, Adavi, Azadbakht and Amirian (2017) [20]; Pasandideh and Taheri (1994) [21]; Heidarian Fard, Bakhshipour and Faramarzi (2015) [22]; Jarareh and Mohammadi Gorgani (2013) [23]; Sud (2020) [12].

According to the basic assumption of cognitive-behavioral models, patients' emotions and behaviors are shaped by their thoughts and perceptions. Then, the thoughts, underlying beliefs, and cognitive distortions are examined and corrected, and therefore, in addition to emphasizing stressful thoughts in this therapeutic and educational period for students, the thoughts, attitudes, and beliefs that underlie anxiety in them were identified and then cognitive distortions such as negative, exaggerated prediction were challenged and which has a strong and close relationship with anxiety, thus, it seems that cognitive reconstruction ultimately leads to reduce the test anxiety of the students in the experimental group. Thus, given that cognitive-behavioral methods try to make people with anxiety aware of the disturbing and stressful thoughts that come from them. Students with test anxiety in the experimental group are clearly instructed to manage their time, improve failure tolerance, and be able to resist possible failures and change attitudes toward failure and not consider them as catastrophizing issues, and shape realistic and achievable goals in themselves, eliminate maladaptive self-talk that arises in anxious situations, and create relatively optimistic ways of interpreting for oneself that all these cases have finally been able to reduce the level of test anxiety in students [20]. Furthermore, according to cognitive-behavioral therapists, faulty cognitive processes and irrational beliefs are considered as the main cause of maladaptive behaviors, but not only pay attention to cognitive skills in the cognitive perspective in changing defective cognitive processes, but also pay attention to organized behavioral and coping skills. So, given that cognitive-behavioral training in this course has a significant effect on correcting maladaptive behaviors in different environments, especially in relation to academic materials and personality traits affecting test anxiety, finally has been able to play an important role in reducing test anxiety [21].

It was not possible to conduct the questionnaire in person due to the Covid-19 virus pandemic and following the essential health protocols that could have achieved better results. The present study did not control the role of factors such as socioeconomic class, education level of parents, cultural status etc., in determining the effectiveness of cognitive-behavioral therapy on test anxiety. The effectiveness of cognitive-behavioral therapy on students' test anxiety in the follow-up phase wasn't studied due to time constraints and it made impossible confirmation and proof of the durability and stability of cognitive-behavioral therapy. Also, it is recommended to follow up the effectiveness of cognitive-behavioral therapy on test anxiety in

post-treatment periods by considering the effectiveness of cognitive-behavioral therapy on students' test anxiety, it is recommended that school counselors take effective steps to reduce test anxiety by using group cognitive-behavioral therapy. It is recommended that therapists in the field of anxiety, especially test anxiety, use cognitive-behavioral therapy in order to make cognitive-behavioral therapy effective on students' test anxiety and also the cost-effectiveness of this treatment. Also, it is also recommended that the relevant authorities prepare a brochure and booklet on cognitive-behavioral therapy and distribute it among school counselors and teachers so that they can take practical steps by using the content of this training to reduce students' test anxiety and the principles of cognitive-behavioral therapy should be provided to students in the form of a brochure.

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