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Research Article

Comparison of the effectiveness of cognitive rehabilitation treatment and metacognitive therapy on perceived anxiety, depression and cognitive skills

Behnoosh Hamedali[1*]; Saied Malihialzuckerini[2]; Javad Khalatbari[3]; Mohamadreza Seirafi[4]

[1]Department of health psychology of Islamic Azad University-University in Dubai, United Arabe Emirates.
[2]Department of Post Graduate Studies in psychology Islamic Azad University Karaj Branch I. R. Iran.
[3]Islamic Azad University, Tonekabon Branch, Iran.
[4]Department of Health Psychology, Islamic Azad University, Karaj Branch, Iran.

Abstract

Background and Objective: The aim of this study was to compare the effectiveness of cognitive rehabilitation treatment (NB software) and metacognitive therapy (MCT) on depression and perceived anxiety and cognitive skills (attention and working memory) of adolescents living in boarding schools.

Method: This research was conducted in Tehran as a semi-experimental type of research with control group and follow-up stage. The statistical population includes all adolescents living in welfare boarding schools in the age group of 15 to 18 years and in the city of Tehran in 1398. In the first stage, 100 volunteers were selected as available to participate in the research. 60 people were selected through purposive sampling and randomly drawn in three groups of 20 people.

Results: The first group underwent cognitive rehabilitation treatment in 8 individual sessions. The second group was treated with 8 metacognitive group sessions and the third group was not treated as a control group. From these 60 people, pre-test and post-test were taken and in the last stage, about six months later, in the follow-up stage, the first and second groups were followed up again and the data were compared. Mankova and Bonferroni alpha statistical models were used to analyze the results.

Conclusion: The outcomes of data analysis showed that depression and anxiety in the group undergoing metacognitive therapy had a greater reduction than the other group and also improved memory function and attention, after 8 sessions of training with NB software more improvement than treatment has metacognition. Also, the data in the follow-up stage show the persistence of the treatment effect on the subjects.

Keywords Cognitive rehabilitation treatment, metacognitive therapy, depression and anxiety, attention, working memory and adolescents living in welfare boarding schools.

Background and Objective

Over the last two decades, cognitive and metacognitive quests have been one of the most important concepts in education, and since efforts in educating children and adolescents lead to a better future for them, with the help of cognitive rehabilitation and treatment services. Metacognition can achieve this important[1]. Cognitive functions of the brain cover a wide range of cognitive capacity and processes, including verbal reasoning, problem solving, planning, ordering, the ability to retain attention, benefit from feedback, multitasking, cognitive flexibility, and the ability to manage new situations. Another part of these functions is the cognitive executive functions that exist in the child from birth and this force also grows with the growth of the child and at the age of 12 the executive functions of the child have the same function as adults [2].

*Corresponding Author: Behnoosh Hamedali
Email: behnoush.hamdel@gmail.com

Executive functions have different tasks and roles that affect all people of all ages and genders according to age, power of functions, health of functions in life. In fact, this force, which is considered as a cognitive construct, has tasks such as problem solving, attention, reasoning, organizing, planning, memory, inhibitory control, impulse control, preservation, stimulus change, and response inhibition, and in fact executive functions such as The conductor works in the brain, as a result of which the defect in this field is disrupted in daily functions [3].

The subject of emotions and behaviors should be evaluated from childhood and adolescence. Under-20s are very sensitive and key, and in this period, people act on their future, skills and choice of fields of study. Familiarizing children, families and educators with this subject and testing the talents, interests and motivations of children will solve many problems and future confusions of people in their youth [4].

Due to the vulnerability of children and adolescents living in boarding schools and concerns about their future careers, the study of this group is very important. The psychological condition and the unfavorable parenting style of the parents are the reason for sending their children to these centers. In addition to the effect that the absence of parents and life in welfare centers has on the formation of personality and development of children and adolescents, it changes their mental image of family and relationships of its members and can affect lifestyle, relationships with others and jobs and their future profession is effective. Since living in the conditions of welfare centers can have a huge impact on the mental and personality states of children and adolescents and predispose them to psychiatric and emotional disorders, so identify and evaluate anxiety and depression, and cognitive skills (attention and Working memory) and improving and enhancing the abilities of adolescents in these centers can provide a way to provide a suitable emotional and cognitive environment and solve the future educational and professional problems of this group [5].

Cognition primarily refers to things like memory, the ability to learn new information, speech, reading and comprehension. In most healthy people, the brain is able to learn new skills in any of the special areas in childhood. In fact, cognitive functions refer to an individual's ability to process thoughts, and the most important cognitive domains in neuropsychological assessments include intelligence, memory, attention, working memory, perception, language, and information processing speed[6, 7].

At the core of metacognitive therapy is the study of common errors such as bias in information gathering or overconfidence in knowledge and information, or underestimation or inadequacy of information integration. Therefore, creating complete cognitive capabilities through learning through experience in everyday life is one of the main goals of metacognitive therapy [8].

Because mental disorders do not occur suddenly, and are the product of gradual changes in the cognitive assessment system and environmental assessment methods, strengthening metacognitive abilities can prevent mental well-being from adolescents

living in welfare, and this can help. Be great to these teens in their future lives[9].

Every year, due to economic and social pressures, parents leave a large number of children in the community, and the most common form of care for rejected children around the world is care in welfare centers. Parental death, physical and mental problems, parental divorce, family and financial problems are some of the most important reasons for sending children to orphanage[10]. Studies show that children who spend the first part of their lives in day care centers are largely deprived of supportive environments and are more at risk for behavioral problems, including: hyperactivity, aggression, antisocial behaviors, and emotional problems such as anxiety, depression, and Lack of emotional regulation, and physical problems such as anemia, oral disorders, and skin problems[11-12] as well as the group's career prospects are unclear. On the other hand, children and adolescents living in welfare boarding schools have significantly lower developmental areas, especially performance in behavioral and intelligence tests[13] and speech abilities[14] compared to normal children. Act. Delays in cognitive development and social adjustment lead to academic problems in the school years for them[15]. Even if these children and adolescents are adopted after living in welfare centers for some time, they will have problems such as: delay in the development of social skills and avoidance behaviors[16].

One of the variables that can affect the educational and professional future of these children is executive functions. Therefore, by evaluating the attention and concentration as well as the level of depression and anxiety of these adolescents, effective treatment steps can be taken to achieve a better future for these adolescents and ultimately the future of society by treating cognitive and metacognitive rehabilitation. Therefore, it can be concluded that cognitive rehabilitation services and metacognitive services can help motivate and have a better and brighter future for children and adolescents living in welfare centers to experience a more comfortable and safer life in adulthood. The practical purpose of the present study is to assess the needs and design the necessary protocols according to the children and adolescents living in welfare centers in need of special rehabilitation services or cognitive or metacognitive empowerment, in order to have a more secure and secure future. Therefore, this study seeks to answer this question and whether cognitive rehabilitation and metacognitive therapy improve anxiety and depression, strengthen cognitive skills in adolescents living in welfare centers? And more fundamentally, the effectiveness of cognitive rehabilitation therapy and metacognitive therapy (MCT) on perceived anxiety and depression and cognitive skills (attention and working memory) of adolescents living in boarding centers in Tehran, how and How much is it?

In research of Prata and Mechelli[17] investigated the effectiveness of teaching metacognitive self-learning strategies on the components of academic procrastination and negative academic emotions. The design of this study was quasi-experimental with pre-test and post-test with control group. The statistical population of this study included male high school students in Tabriz who were studying in the academic year of 1996-

97. The statistical sample consisted of 80 students with academic procrastination and high academic excitement who were selected through pilot study and screening and using multi-stage cluster sampling and purposeful alternative method in the experimental and control groups. Were. The results of this study showed that the strategic training of metacognitive self-students reduces the components of academic procrastination and negative academic emotions. In Roy study [18] examines the effect of metacognitive beliefs and self-efficacy on students' happiness. The research design was relational and the statistical population of the study consisted of all female high school students in Aligudarz in the academic year of 1993-92, of whom 56 were selected by simple random sampling and formed a sample group. The results of this study showed that there is a significant relationship between the dimensions of metacognitive beliefs (negative metacognitive beliefs, positive metacognitive beliefs, low cognitive efficiency) and self-efficacy with happiness.

In study of Tan et al[19] in a study entitled Metacognitive Beliefs and Their Relationship to Anxiety and Depression in Physical Illness: A Systematic Review. Negative metacognitive beliefs about lack of control and risk after controlling for factors including age, sex, disease factors, and cognition (perceived illness and intolerance of uncertainty) significantly and positively predicted the symptoms of anxiety and depression. The results show that the metacognitive model of psychological disorder can be used for the psychological symptoms of anxiety and depression in a wide range of chronic medical conditions, which means that metacognitive therapy may improve outcomes in several diseases including poor mental and medical health, be useful. In research of Khodadad et al[20] examined the role of metacognitive beliefs and maladaptive aspects of perfectionism in depression and anxiety. The results of structural equation modeling show that positive metacognitive beliefs about repetitive negative thinking increase the likelihood of understanding uncontrollable thinking, and that consistent behaviors are predicted by all metacognitive beliefs. In addition, the study of partial correlations showed that both negative metacognitive beliefs predict repetitive negative thinking behaviors and persistence behaviors, anxiety, and depression. However, negative metacognitive beliefs were the strongest predictors in both cases. In Research of Capobianco et al[13] entitled Group Metacognition for Adolescents with Anxiety and Depressive Disorders: An Experimental Study. It was reported that in this study, 9 participants participated in all six treatment sessions and one session was interrupted after four sessions. After treatment and follow-up, most participants no longer have diagnostic criteria for anxiety or depressive disorders and demonstrate a clinically significant or reliable change in metacognitions.

Method

The aim of the research at first objective is comparing the effectiveness of cognitive rehabilitation treatment and metacognitive therapy for perceived anxiety and depression in adolescents living in Tehran's day care centers. Then in the second objective is trying to compare the effectiveness of cognitive rehabilitation treatment and metacognitive therapy on cognitive skills

(attention and working memory) of adolescents living in Tehran welfare centers. The practical purpose of this study is that if children and adolescents living in welfare centers need special rehabilitation services or emotional and cognitive empowerment, assess the need and the necessary protocols to treat and improve emotions and cognition, and design accordingly

Cognitive rehabilitation

Cognitive rehabilitation is a way to restore lost cognitive capacity. Which is done by exercises and providing purposeful stimuli and its purpose is to improve the performance of the person in performing activities. In this method, the therapist considers the information obtained from the evaluation of the sessions and based on it designs tasks to strengthen the cognitive functions of the brain and increases the difficulty of the task with the patient's progress.

N-Back software

N-Beck software is a computer program that helps people who have impaired working memory and attention and concentration in cognitive ability to regain their cognitive ability. N-Beck can also help adolescents with cognitive impairments, such as attention-deficit. hyperactivity disorder, or memory impairment, and can also indirectly reduce anxiety and worry, such as test anxiety, by improving memory and attention. Memory and attention can also help anxiety disorder to correct the disorder or even improve their cognitive ability level.

Metacognitive therapy

Metacognitive therapy is a method of treatment that is considered as the third generation of therapy that based on metacognitive knowledge and experience, a person can gain insight into their mental and behavioral functions, correct their behavioral errors and cognitive deficits. This treatment method is the product of cognitive behavior therapy approach in addition to knowledge gained in the field of cognition, education and neuroscience [12].

Anxiety

Anxiety or worry or anxiety is a widespread, unpleasant, and vague feeling of panic and anxiety of unknown origin, which affects a person and includes uncertainty, helplessness, and physiological arousal. The recurrence of situations that have previously been stressful or in which the person has been harmed causes anxiety in individuals. All people experience anxiety in their lifetime, but chronic and severe anxiety is abnormal and problematic. Research shows that anxiety is more common in women, the low-income classes, and middle-aged and older people than others.

Depression

Depression is a disorder that is affecting more and more people. Depression is seen in any form, it defines the way a person sees himself, others and the world. Depression weakens judgment and leads to irrational behaviors. In any case, the patient can not have a normal daily life. The main feature of this disorder is a period of at least two weeks during which there is depression or apathy or lack of pleasure in almost everything. The person must also have at least four other symptoms, including changes in appetite or

weight, sleep and mental activity, movement, loss of energy, feelings of worthlessness or guilt, difficulty thinking, concentrating or making decisions, or recurring thoughts about death and suicide, plotting or Attempt suicide [5].

Cognitive skills

Cognitive function is a term that refers to a person's ability to process (thoughts) that must be Present in a healthy person, which is "a person's ability to perform various mental activities that are more relevant to learning and problem solving." Is defined. Examples include verbal, environmental, psychological, and rapid processing skills. Cognition usually refers to things like memory, the ability to learn new information, speech, comprehension of written material. Mostly human beings have an innate capacity for cognitive skills from birth, so everyone is able to learn and remember. However, there are tests for these cases, such as tests such as Intelligence quotient (IQ) tests that may have problems with their complete accuracy. In these tests, the applicant or patient is asked or asked a series of questions to perform tasks, each measuring the level of a cognitive skill such as level of awareness, memory, awareness, problem solving, motor skills, analytical abilities, or other similar concepts[6].

Research Hypotheses

1- There is a significant difference between the effectiveness of cognitive rehabilitation treatment (N-Beck software) and metacognitive therapy on perceived anxiety and depression in Adolescents living in the welfare of Tehran.

2- There is a significant difference between the effectiveness of cognitive rehabilitation treatment (software-back) and metacognitive therapy on cognitive skills (attention and working memory) of adolescents in Tehran.

The present study is based on the purpose of this research, this research is a non-descriptive and applied research. The purpose of such research is to develop knowledge. Based on the research category based on how the research data is collected, this design is a quasi-experimental research. The design of this research is pre-test and post-test semi-educational with control and follow-up group (unequal control group design). The statistical population includes all adolescent girls and boys living in welfare boarding centers in the age group of 15 to 18 years in Tehran in 2019. The sample size is 100 adolescents living in welfare boarding centers who were selected in the first stage and all of them were taken to fulfill the condition of entering the Wechsler IQ test to make sure that the subjects have normal intelligence. Then a pre-test was performed which was actually a kind of screening and 60 people with depressive and anxiety disorders and attention deficit or memory impairment were selected and this group of 60 people were randomly divided into three groups by lottery. And randomly the first group underwent at least 8 sessions of cognitive rehabilitation treatment with software-back. The second group underwent 8 sessions of group metacognitive therapy and the third group as a control group did not receive any treatment. At the end of these 60 subjects, post-test was taken and pre-test and post-test and in the next stage post-test was followed up and the results were also compared. The instruments used in the present study were

computer N-back test, computer IVA test, Beck Anxiety Pen and Paper Questionnaire, Beck Depression Inventory pen and paper questionnaire. In this study, 8 sessions of metacognition workshop, each session lasting about 45 minutes to 1 hour, are as follows.

The results of Kolmogorov-Smirnov and Shapiro - Wilk tests for the normality of control and experimental group data are given in Table (1).

Table 1. Check the normality of data distribution

Kolmogorov-Smirnov test			Shapiro Wilk test			Variables
Significance level	K-S	Group	Significance level	SH-W	Group	
%138	%169	control	%18	%952	control	Depression
%114	%132	experiment	%23	%953	experiment	
%200	%133	control	%51	%714	control	Anxiety
%200	%094	experiment	%27	%982	experiment	
%200	%095	control	%10	%946	control	Memory
%200	%084	experiment	%18	%972	experiment	
%200	%089	control	%15	%940	control	attention
%145	%189	experiment	%34	%957	experiment	

Since according to the results of Table (1), the value of significance level for the variables in the control and experimental groups is greater than the error (significance level) of 0.05, as a result, the data has a normal distribution. As a result, parametric tests are used to test research hypotheses.

The first hypothesis

There is a significant difference between the effectiveness of cognitive rehabilitation treatment and metacognitive therapy on depression and perceived anxiety of adolescents living in welfare in Tehran.

Results

Table 2. Test results of the effect of rehabilitation treatment on depression and perceived anxiety in adolescents living in welfare.

Follow-up stage			Effect size (N)	SIG	F	MS	df	SS	Sources of changes
Effect size	SIG	F							
0.15	0.000	231.81	0.16	0.000	238.71	238.71		120.050	
						26.964		48.50	Error
0.35	0.000	337.65	0.41	0.000	374.835	174.050		174.050	Anxiety
						13.917	18	25.50	Error

Table 3. Test results of the effect of metacognitive therapy on depression and perceived anxiety in adolescents living in welfare.

Follow-up stage			Effect	SIG	F	MS	df	SS	Sources of
Effect size (N)	SIG	F	%19	0.000	385.23	125.000	1	125.000	Depression
%17	0.000	35.05				9.32	18	16.80	Error
			%42	0.000	466.538	22.050	1	22.050	Anxiety
%33	0.000	433.92				8.583	18	15.50	Error

According to the contents of Tables (2) and (3) in the relevant column, a significant level is observed that the difference between the experimental and control groups in terms of depression and perceived anxiety variables is significant at the level of P. 0.001. Accordingly, it can be said that the effect of rehabilitation and metacognitive therapy has reduced the symptoms of depression and perceived anxiety in adolescents living in welfare, in the post-test stage. Also, according to the table in the follow-up column, it is observed that the difference between the experimental and control groups is significant in terms of the variables of depression and perceived anxiety at the level of P 00 0.001. Based on this, it can be stated that rehabilitation and metacognitive therapy has reduced the symptoms of depression and perceived anxiety in adolescents living in welfare, in the follow-up phase. The squared values of Eta seen in the above tables are the proportions of variance that correspond to the variable. The general rule is that if this value is greater than 0.14, the effect is large. Eta parabolic square shows the intensity of this effect in table (2) for the variables in rehabilitation treatment (0.16 and 0.41) and in table (3) for the variables in metacognitive therapy (0.19 and 0.42), which indicates the intensity of the effect is high. And in the follow-up stage, in rehabilitation and metacognitive treatment, the Eta contribution square for the variables (0.15, 0.35, 0.17 and 0.33) shows that the intensity of the effect is high.

Table 4. Post hoc test the effect of rehabilitation treatment with metacognitive therapy on reducing depression and perceived anxiety

Significance level	standard error	Mean difference	Training group
0.001	1.09	-6.89	Metacognitive therapy - rehabilitation treatment

The results of the post hoc test comparing the mean difference between metacognitive therapy and rehabilitation therapy on the reduction of depressive symptoms and perceived anxiety show that the mean difference (-6.89) is statistically significant (P 00 0.001); Therefore, it can be concluded that metacognitive therapy is more effective than rehabilitation therapy in reducing the symptoms of depression and perceived

anxiety. Therefore, based on the above statistical results, the first hypothesis is confirmed.

The second hypothesis

There is a difference between the effectiveness of cognitive rehabilitation treatment and metacognitive therapy on cognitive skills (memory and -attention) of adolescents living in boarding centers in Tehran.

Table 5. Test results of the effect of rehabilitation treatment on cognitive skills of adolescents living in welfare.

Follow-up stage			Effect size(N)	SIG	F	MS	df	SS	Sources of changes
Effect size(N)	SIG	F							
			0.20	0.000	1098.24	288.800	1	288.800	Working memory
0.19	0.000	919.19							
						65.222	18	11.00	error
0.22	0.000	112.01	0.23	0.000	1044.13	0.450	1	0.45	attention
						13.36	18	24.50	error

Table 6. Test results of the effect of metacognitive therapy on cognitive skills of adolescents living in welfare

Follow-up stage			Effect size(N)	SIG	F	MS	df	SS	Sources of changes
Effect size(N)	SIG	F							
0.16	0.000	220.06	0.18	0.000	240.88	110.450	1	110.450	Working memory
						151.73	18	27.30	error
0.21	0.000	222.75	0.21	0.000	237.53	42.050	1	42.050	attention
						0.895	18	84.70	error

According to the contents of Tables (5) and (6) in the relevant column, a significant level is observed that the difference between the experimental and control groups in terms of cognitive skills variables (working memory and attention) is significant at the level of P 00 0.001. Accordingly, it can be said that the effect of rehabilitation and metacognitive therapy has increased cognitive skills in adolescents living in welfare, in the post-test stage. Also, in the follow-up stage, according to the table in the significant column, it is observed that the difference between the experimental and control groups is significant in terms of cognitive skills variable at the level of P 00 0.001. Based on this, it can be stated that rehabilitation and metacognitive therapy has increased cognitive skills (working memory and attention) in adolescents living in welfare, in the follow-up phase. The squared values of Eta seen in the above tables are the share of variance that is related to the variable. The general rule is that if this value is greater

than 0.14, the effect is large. Eta parabolic squares show the severity of this effect in Table 4-14 for the variables in rehabilitation treatment (0.20 and 0.23) and in Table 4-15 for the working memory variable in metacognitive therapy (0.18) and for the attention variable (21). . 0) indicates that the intensity of the effect is high. And in the follow-up stage in rehabilitation and metacognitive treatment, the Eta contribution square for the variables (0.19, 0.22, 0.16 and 0.21) shows that the intensity of the effect is high.

Table 7. Post hoc effect of rehabilitation treatment with metacognitive therapy on cognitive skills (working memory and concentration-attention) of adolescents living in welfare.

Significance level	standard error	Mean difference	Training group
0.001	1.98	-8.11	Rehabilitation treatment - metacognitive therapy

The results of the post hoc test comparing the mean difference between metacognitive therapy and rehabilitation therapy on cognitive skills show that the mean difference (8.11-8) is statistically significant (P .0 0.001); Therefore, it can be concluded that rehabilitation treatment is more effective than metacognitive therapy in increasing and strengthening cognitive skills (working memory and attention). Therefore, based on the above statistical results, the second hypothesis is confirmed.

Discussion

According to the first hypothesis of the study, "there is a significant difference between the effectiveness of cognitive rehabilitation treatment with metacognitive therapy on depression and perceived anxiety of adolescents living in the welfare of Tehran." The results showed that the difference between the experimental and control groups was significant in terms of the variables of depression and perceived anxiety at the level of P .0 0.001. Accordingly, it can be said that the effect of rehabilitation and metacognitive therapy has reduced the symptoms of depression and perceived anxiety in adolescents living in welfare, in the post-test stage. Also, in the follow-up stage, according to the table in the significant column, it was observed that the difference between the experimental and control groups was significant in terms of the variables of depression and perceived anxiety at the level of P 00 0.001. Based on this, it can be stated that rehabilitation and metacognitive therapy has reduced the symptoms of depression and perceived anxiety in adolescents living in welfare, in the follow-up phase. Also, based on the size of the observed effect, it can be concluded that the presentation of the Eta parabolic square of the intensity of this effect for the variables in rehabilitation treatment (depression = 0.16 and perceived anxiety = 0.41) for the variables in metacognitive therapy (depression = 0.19 0 and perceived anxiety = 0.42) indicate that the intensity of the effect is high. And in the follow-up stage, in rehabilitation and metacognitive treatment, the Eta contribution square for the variables (0.15, 0.35, 0.17 and 0.33) shows that the intensity of the effect is high.

In addition, the results of the post hoc test comparing the mean difference between metacognitive therapy and rehabilitation therapy on the reduction of depressive symptoms and perceived anxiety showed that the mean difference (-6.89) was statistically significant (P 00 0.001); Therefore, it can be concluded that metacognitive therapy is more effective than rehabilitation therapy in reducing the symptoms of depression and perceived anxiety. Therefore, based on the statistical results of Tables 4-8 and 4-9 in the fourth chapter, the first hypothesis was confirmed. These results are consistent with the findings of [5, 8, 13]. As mentioned earlier, in the framework of the cognitive model, theoretical models and, consequently, several intervention strategies have been developed to treat depression as the most common mental disorder. Despite the relative effectiveness of most cognitive therapy methods in controlling or at least reducing depression, there are still shortcomings and consequently alternative theoretical models are emerging. Although it is too early to judge the extent and effectiveness of different therapies within the cognitive model, metacognitive therapy for depression seems to be concerned with its emphasis on the interplay between mental rumination of depression and metacognition (especially positive and negative beliefs about Ruminants) is in a better position than other theoretical models. Literally, the prefix "meta" means promotion and metacognition means knowledge and mastery of cognition, and knowledge at a higher level. Therefore, metacognition is cognitive, beyond normal cognition and thinking, and refers to a person's awareness of cognition, learning, and way of thinking. Metacognition means thinking about one's thoughts. Thinking can be about what one knows; It can be about what the person is doing; Or it could be about cognition and personal feeling. Metacognition can be called the "process of cognition of the cognitive system or reflection on the way of thinking." Reflective thinking also implicitly refers to the concept of metacognition. Reflection is a special type of thinking that involves organizing and relating ideas. Hence, metacognition is defined as "any kind of knowledge or cognitive activity that is the subject of any aspect of cognitive action and its regulation." "It is cognitive and its regulation" is defined. Therefore, metacognition is active monitoring of cognition and strategies through which cognition is used optimally. Metacognition causes one to ask oneself the following questions:

(1) What do I know about this topic? (2) How much time do I need to learn this? (3) What is the appropriate program to solve the problem? (4) How can I predict the outcome? How should I reconsider the methods I use? If I make a mistake, how can I correct it? Do I understand what I just read or not?

Conclusion

The aim of the research at first objective is comparing the effectiveness of cognitive rehabilitation treatment and metacognitive therapy for perceived anxiety and depression in adolescents living in Tehran's day care centers. In summary, many studies have examined the effects of metacognitive therapy and rehabilitation techniques and metacognitive therapy as a whole. These studies have used methods such as single case series, explicit experiment, and random

comparison experiment. The general conclusion that can be inferred from these studies is that metacognitive therapy is more effective than rehabilitation therapy. Therapeutic effects have been observed in a wide range of disorders, the effect size is very large and the results obtained remain stable for 6-12 months after treatment. The results also showed that metacognitive therapy, both in the post-test phase and in the follow-up phase, compared to rehabilitation treatment, reduces anxiety in adolescents living in welfare with different methods during sessions, improves anxiety-based thinking and reduces the vicious cycle of anxiety in And because treatment outcomes were consistent in follow-up, it is possible that improving metacognitive beliefs has helped patients form a new relationship with their thoughts and enable them to develop metacognitions that are inconsistent with repetitive negative thinking. Increase and modify while during the sessions the adolescents were also taught techniques to deal with in the future and in the event of an influx of disturbing thoughts.

Ethical Note:

Comparison of the effectiveness of cognitive rehabilitation treatment (NB software) and metacognitive therapy (MCT) on perceived anxiety and depression and cognitive skills (attention and working memory) of adolescents living in boarding centers in Tehran. 2019, IR.SBMU.RETECH.REC.1399.381

Functional Neurosurgery Research Center, Shohada Tajrish Neurosurgical Comprehensive Center of Excellence, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Competing interests

There is no conflict of Interests.

Authors' contributions

The authors are the same

Abbreviation

sum-of-squares (SS); Degree of Freedom (DF); Mean square (MS)

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