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Comparing the effectiveness of schema therapy with cognitive behavioral therapy on negative emotions in women with MS

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ABSTRACT

Background and Aim: Negative emotions are one of the things that a person with MS is dealing with and it reduces their opportunities to establish social interactions, and this issue threatens their social relationships, quality of life, and as a result, their mental health. The purpose of this study was to compare the effectiveness of schema therapy with cognitive behavioral therapy on negative emotions in women with MS in Kermanshah. **Methods:** The current research was of applied purpose type and in terms of methodology, it was quasi-experimental with a pre-test-post-test design, a control group and a two-month follow-up. The statistical population of the research included all women with multiple sclerosis (MS) in Kermanshah during 2019-2020 who had referred to the Imam Reza Educational-Therapeutic Center. In this research, in order to select the research sample, first of all, among the female patients with multiple sclerosis who were referred to the Imam Reza Educational-Therapeutic Center (AS) in Kermanshah to receive medical services, the research questionnaires were distributed (taking into account the observance of all health principles in the face of the corona virus disease), the data collection tool included the DASS-21 questionnaire. Analysis of variance with repeated measurements and SPSS software were used for statistical analysis of data. **Results:** The findings showed that there was a statistically significant difference in the overall negative emotions scores of the participants in the control group compared to the negative emotions scores of the participants in the first intervention group (schema therapy) and the participants in the cognitive behavioral therapy group. This is while there was no significant difference in the score of negative emotions between the two intervention groups of schema therapy and cognitive behavioral therapy. This situation applies to the two components of depression and stress. That is, the level of depression and stress of the people in the two educational intervention groups has decreased significantly compared to the people in the control group, but there was no difference between the two intervention groups. Regarding the anxiety component, the results of the follow-up test indicate that although the anxiety of the two intervention groups has a mean difference (2.27 and 2.07) with the control group, this difference is not significant. **Conclusion:** Based on the available findings, it can be concluded that there was no difference between the effects of schema therapy and cognitive-behavioral therapy on reducing negative emotions.

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Introduction

Chronic diseases are a growing international concern, and people with chronic diseases often experience a heavy burden of the disease, which has a negative effect on the quality of life related to the health of these people and limits their daily activities (Ysrraelit et al., 2018). One of the chronic diseases is multiple sclerosis (MS). Multiple sclerosis is a progressive and destructive disease of the central nervous system that causes destruction of the myelin of the central nerves (brain and spinal cord). MS causes disturbances in the conduction of nerve and electrical currents and affects sensory and motor functions (Faissner & Gould, 2019). The prevalence of MS in the medical research database has increased by 2.4 percent every year (McKinsey et al., 2014). In the past, Iran was considered a region with a low prevalence of MS, but recent research has shown that the prevalence of MS in Iran has increased significantly (Golchobian and Hosseini al-Madani, 2021). Preliminary researches show that there are approximately 5000 patients with MS in Iran (Golchobian and Hosseini al-Madani, 1400). This disease is more common in people aged 16-40 and is more common in women than men (Yazdi et al., 2014). MS affects the behavioral characteristics and lifestyle of patients and causes various sensory, motor, cognitive disorders, reduction of mental, physical and social performance (Jaafari et al., 2018).

Negative emotions are one of the things that a person with MS is dealing with, and it reduces their opportunities for social interaction, and this issue threatens their social relationships, quality of life, and as a result, their mental health (Zawari-Zare et al., 2016). Emotions are an important factor in MS disease; Patients with MS have higher levels of mental disorders such as depression, stress and anxiety compared to healthy people (Lancaster et al., 2022). These people experience symptoms of anxiety, stress and depression in the first year after diagnosis (Pompili et al., 2018; Moradi Shahrbabek et al., 2015). Studies have shown that about 50-60% of MS patients suffer from depression (Lancaster et al., 2022; Trevisi et al., 2021); About 25 to 40 percent also suffer from anxiety, which strongly affects the quality of life of these patients (Erin, Demir, and Ozkan, 2021; Saadat et al., 2019; Moradi Shahrbabek et al., 2017). In general, it can be said that people with chronic psychological and physiological diseases such as MS experience many psychological imbalances such as suicide, depression and hopelessness due to limited social relationships and interactions resulting from the disease. (Müller & Shiyus, 2019; Moqtadari et al., 2019) that there is a need to help reduce psychological problems and improve their quality of life by using effective psychological interventions.

In order to treat psychological problems, in addition to drug treatments, many psychological treatments have been invented over the years. Studies have shown that cognitive behavioral therapy is one of the effective interventions for psychological structures in chronic patients (Gilen et al., 2019; van den Acker et al., 2017). In cognitive-behavioral therapy, therapeutic progress occurs following changes in cognitive schemas. Especially when the patient's false beliefs are directly corrected or disabled by using other schemas (Kale and Ayach, 2018). This approach provides the opportunity for the person suffering from the disease to be freed from the constraints of dos and don'ts and idealistic thoughts, to accept his illness and to face it logically through the challenge with negative spontaneous thoughts, identifying and correcting the cognitive errors of the person. In addition, by changing the person's cognitions and correcting his irrational beliefs, his attitude toward himself, the world, and the future changes, and after that, the patient can adopt a new and flexible perspective instead of focusing on disabilities and despair toward the future. This treatment is effective in improving self-efficacy in pain, life expectancy, fatigue and depression of MS patients (Shareh and Rabati, 2020; Singsokun et al., 2020; Nazarbland et al., 2017). Casio et al. (2017) showed the effectiveness of cognitive behavioral therapy on improving depression symptoms and quality of life of 127 patients with MS. Also, the results of studies have shown that cognitive behavioral therapy is effective in increasing the quality of life (Haji Lu et al., 2018; Al Yassin and Khaloui, 2016) of patients with MS.

On the other hand, due to the fact that many people suffering from chronic diseases with psychological symptoms, especially in the follow-up studies, suffer a decline in the healing process, schema therapy has been chosen as a comparison for the present study. One of the advantages of the schema model is its brevity as well as its complexity and depth, and this

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treatment is exclusive. In other words, schemas show specific coping styles and mentalities (Beck, Davis, and Freeman, 2015). Based on the pattern theory proposed by Yang, schemas are developed in childhood and are used as templates for processing later experiences. Unconditional beliefs about the person are often created by reflecting inconsistent schemas (Pugh, 2015). The review of studies shows that schema therapy is an effective intervention to reduce anxiety, depression, stress and increase self-efficacy in patients with multiple sclerosis (Rezaei, Ghazanfari, and Rezaei, 2016).

Although progress has been made regarding the expansion of psychosocial interventions for patients with multiple sclerosis, their effectiveness has not been investigated in practical terms. Appropriate methods not only increase skills and increase resilience, but also increase the efficiency of the immune system and reduce the health-economic consequences of the disease; Therefore, studying as much as possible and comparing various treatment methods can help a lot in recovery. On the other hand, it seems that no research has been done on comparing the effectiveness of schema therapy with cognitive-behavioral therapy on the negative emotions of people with MS. Therefore, it is necessary to conduct research in this area in order to clarify the most efficient intervention. Therefore, the present study was conducted with the aim of comparing the effectiveness of schema therapy with cognitive behavioral therapy on negative emotions in women with MS.

Method

The current research was of applied purpose and in terms of methodology, it was quasi-experimental with a pre-test-post-test design, a control group and a two-month follow-up. The statistical population of the research included all the women suffering from multiple sclerosis (MS) in Kermanshah during 2019-2020 who had referred to the Imam Reza Educational-Therapeutic Center. In this research, in order to select the research sample, first the research questionnaires were distributed (according to the observance of all health principles in the face of the corona virus disease); Then, 45 people were selected from among the patients who met the entry criteria with the available and targeted sampling method; They were randomly assigned in three groups (schematic therapy=experiment group #1, cognitive behavioral therapy=experiment group #2 and control group). After the determination and random placement of the test and control groups, therapeutic interventions were applied to the test groups each in the form of two sessions per week and each session lasted for 1.5 hours (90 minutes); A week after the completion of the treatment sessions, the experimental and control groups were given a post-test. The content of group psychotherapy sessions was implemented in an organized manner, and finally, the entire treatment program in each of the two treatment methods consisted of a pre-session, 8 treatment sessions and a follow-up session.

Materials

1. Depression, anxiety and stress questionnaire - short form. This scale was compiled by Levy Band and Lovibond in 1995 and includes 21 items, 7 of which measure depression, 7 anxiety items and 7 stress items. It is scored on a 4-point Likert scale (3=completely similar to me to 0=completely different from me). This scale has an internal reliability of 0.81 for depression, 0.82 for anxiety, 0.90 for stress, and 0.93 for the overall scale (Behruz et al., 2016).

2. Cognitive behavioral therapy. In the present study, in order to implement cognitive behavioral therapy, the extended model of the common materials of the cognitive approach was used, which includes 8 group intervention sessions (90 minutes).

Table 1. Content of cognitive behavioral therapy sessions

Session	Content
1	Introduction; introducing cognitive behavioral training and the structure of meetings and group rules; Setting individual tasks
2	Activities: reviewing the individual work of the previous session; introducing the main concepts; logical errors; automatic thoughts; beliefs; basic schemas and beliefs; Capturing automatic thoughts: ABC reminders and recording them in three separate columns; Individual tasks: collecting ABCs in daily life; A review of the individual works of the previous session; Speech: logical errors; Exercise: recognition and classification of logical errors; Setting individual tasks
3	Activities: A review of the individual works of the second session; Speech (class discussion): use of proportional logic; Practice: using appropriate logic to generate logical thoughts; arranging individual tasks; speech (class discussion): opposition; Practice: Developing your personal objections; Speech (class discussion): Enhancing defiance through perception; Set up individual

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	work for the next meeting
4	Activities: review of individual works of the third session; lecture (class discussion): generic model; Setting individual tasks
5	Activities: review of individual work related to the previous session; Lecture: Explanation of the vertical arrow method; vertical arrow practice; Setting individual tasks
6	Activities: reviewing the individual work of the previous session; Speech (discussion topic of advanced vertical arrows content); Practice: more vertical arrows; Speech: Grading of mental distress; Speech: Grading of beliefs; Setting individual tasks
7	Activities: reviewing the individual works of the sixth session; Speech: conceptualization of your negative thoughts and cognitive formulation; Exercise: classification of beliefs and adjustment of cognitive maps; Practice: setting the main list of negative beliefs; Exercise: filling in the cognitive formulation worksheet; Setting individual tasks
8	Activities: reviewing the individual work of the previous session; An introduction to the third part; Speech: Beliefs can change; arranging individual tasks; Speech, continuity of change: cognitive techniques, experimental techniques and behavioral techniques; Exercise: preparation of a sustainability plan; program review; Necessary settings for post-treatment evaluation and follow-up; ending meetings; implementation of the distress tolerance questionnaire; implementation of the high-risk behavior questionnaire; Implementation of academic procrastination questionnaire

3. Schematic therapy. In this research, in order to implement schema therapy, an intervention based on Young and Klosko (2007) schema therapy guidelines and techniques was used, which was organized in 8 weekly sessions of 90 minutes.

Table 2. Content of group schema therapy sessions

Session	Content
1	Purpose: Familiarization and familiarization with the concepts of schema therapy Familiarization and introduction, reviewing the structure of the meetings, stating the rules and regulations, emphasizing confidentiality, talking about the duration of the meetings, answering the questions of the participants, explaining the schema therapy model in simple language, introducing the primary incompatible schemas and how they are formed. Introducing the fields related to each one, explaining the transformational roots of the schema, explaining and teaching about the functioning of the schemas.
2	Purpose: teaching schemas Explaining and teaching the types of schema mentalities and identifying the experiences of their mentalities, conceptualizing the patients' problems according to the schema-based approach and collecting all the information obtained and providing feedback, familiarizing people with their schemas and identifying the disturbed areas. Conducting and teaching mental imagery technique, group discussion about schemas and the impact of each on patients' lives. Homework: Encouragement to read the book Re-create your life as homework (each person should read and summarize the section related to their schemas and bring it to the next meeting).
3	Purpose: to start the process of changing schemas Examining the homework of the previous meeting, creating motivation to change schemas, preparing for changing schemas, introducing cognitive, emotional, and behavioral pattern-breaking strategies, joining forces with the group members to fight schemas on three cognitive, emotional, and behavioral pattern-breaking fronts. Teaching two techniques of schema therapy cognitive techniques including schema validity test and new definition of schema determining evidence, evaluation of advantages and disadvantages of schemas, evaluation of advantages and disadvantages of coping styles. Homework: write objective evidence confirming and refuting your schemas based on past and current evidence.
4	Purpose: to start the process of changing schemas by using cognitive strategies Checking the homework of the previous session, teaching and practicing establishing a dialogue

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	between the healthy side and the schema side, teaching the group members how to compile and make educational cards and how to use these cards, teaching how to complete the schema registration forms, checking the time when the schemas are triggered. Homework: making educational cards as homework.
5	Purpose: to start the process of changing schemas by using experimental strategies Reviewing homework, re-introducing experimental strategies, presenting the logic of using experimental strategies, teaching how to use mental strategies and implementing them in the meeting, teaching the technique of conducting an imaginary conversation and implementing it in the meeting, writing a letter to parents and explaining the logic of using this technique. Homework: providing homework with the topic of writing a letter to the source of schema (parents).
6	Purpose: to start the process of changing schemas by using behavioral pattern breaking strategies Examining the homework of the previous session, re-explaining and teaching various coping styles and their effect on the continuity of schemas, determining the specific and problematic behaviors of group members as possible research targets, prioritizing behaviors in order to break behavioral patterns. Finding New Ways to Communicate and Do Homework: Practicing Overcompensation and Avoidance Coping Styles.
7	Purpose: to continue the process of changing schemas through the use of behavioral pattern breaking strategies Examining the homework of the previous session, creating motivation to change the behaviors of the continuation of the schema and examining its impact on people's lives, teaching the practice of healthy behaviors through the technique of mental imagery, examining and teaching how to overcome obstacles to changing behavior, teaching how to use educational cards to break behavioral patterns. Homework: doing exercises related to breaking behavioral patterns, writing factors that overcome the obstacles to changing behavior.
8	Purpose: Summing up the meetings Group discussion about the effects of changing schemas, summarizing and final conclusions and answering patients' questions and evaluating the entire sessions, thanking and appreciating exemplary people for participating in the sessions.

Implementation

In order to comply with the ethical principles of the research in order to protect the rights of the participants, the necessary clarifications regarding the objectives of the research and the procedure of its implementation were presented to all the participants. The absence of coercion and the right to participate or not to participate in the research was specified for all participants. Also, all of them were assured that the obtained personal information will remain confidential and the data that will be published will be analyzed without including private identifiers and will be analyzed as a group and with individual details remaining confidential. After obtaining oral consent and consent, self-report questionnaires were distributed among the subjects and collected after completion. In this research, pre-test and post-test group designs with follow-up were used, and in these designs, the effect of one (independent) variable on another (dependent) variable is measured; Therefore, what is important is the control of simultaneous variables, the statistical method in this research was analysis of variance, Sheffe's post hoc test and LSD (least significant difference) test, which was done with SPSS version 25 software; The effect of the control variable and post-test on the dependent variables was removed and then the groups were compared. In this analysis, group membership is the independent variable, pre-test scores are the moderating variable, and post-test scores are the dependent variable. Also, any variable related to the pre-test will be controlled. Also, in the post-test, group A was compared with the control group and group B was compared with the control group and the difference between A and B was discussed. The same procedures were performed in the 2-month follow-up phase. Also, it should be mentioned that the Kolmogorov-Smirnov (K-S Z) test was reported to check the normality of the distribution of demographic variables in the groups.

Results

In this quasi-experimental research, 45 people participated as subjects, of which 15 people were in the control group, 15 people were in the intervention group of the first type (schema therapy) and 15 people were in the intervention group of cognitive behavioral therapy. The mean and standard deviation of age for the schema therapy group was 42.07±8.91 and for

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the control group was 42.6±97 and for the whole sample was 42.03±7.86. Education 20 people (66.7%) had diploma and post-graduate degrees and 10 people (33.3%) had master's education. In the following, the descriptive findings of the research variables are presented.

Table 3. Descriptive indicators of the total score of negative emotions and its dimensions in three groups and three stages

Component	Group	N	Pre-test		Post-test		Follow-up	
			Mean	SD	Mean	SD	Mean	SD
Depression	Control	15	14.67	1.35	14.73	1.53	14.93	1.71
	Schema Therapy	15	14.87	2.07	11.73	1.49	11.87	1.60
	CBT	15	14.80	2.14	12.33	1.45	12.53	1.36
	Total	45	14.78	1.85	12.93	1.96	13.11	2.03
Anxiety	Control	15	14.93	4.15	14.73	3.58	14.67	3.74
	Schema Therapy	15	14.73	2.71	11.27	1.83	11.53	2.07
	CBT	15	13.67	2.77	12.13	1.55	12.33	2.58
	Total	45	14.44	3.25	12.71	2.85	12.84	3.12
Stress	Control	15	16.87	3.09	17.33	2.61	17.60	2.10
	Schema Therapy	15	16.60	3.14	13.47	3.18	13.27	2.37
	CBT	15	14.07	2.81	12.53	2.70	13.07	2.25
	Total	45	15.84	3.21	14.44	3.48	14.64	3.05
Total score	Control	15	46.47	5.05	46.80	4.84	47.20	4.57
	Schema Therapy	15	46.20	4.59	36.47	3.83	36.67	3.15
	CBT	15	42.53	4.31	37.00	3.23	37.93	3.53
	Total	45	45.07	4.90	40.09	6.21	40.60	6.03

Based on the contents of the above table, the overall average score of negative emotions among women with MS at the beginning of the research (i.e. the pre-test stage) was 45.07, which is lower than the average. Among the groups, the highest emotion score was observed in the control group with an average of 46.47. By conducting interventions in the test groups, in the post-test stage, the score of negative emotions for the first intervention group, i.e., schema therapy, reached 36.47, and for the second group (cognitive-behavioral therapy), it decreased to 37. The scores of this variable remained stable in the follow-up phase compared to the post-test phase in almost all groups. In other words, the scores of the follow-up phase were equal to the post-test phase. Also, the score of the depression component in the pre-test stage was equal to 14.78, which reached 12.93 in the post-test stage and 13.11 in the follow-up stage. This finding shows that the level of the depression component in the post-test and follow-up stages has decreased compared to the pre-test stage. This situation is also true in the two components of anxiety and stress, and the level of these two components has also decreased in the post-test and follow-up stages compared to the pre-test stage. The level of all three components in the follow-up stage compared to the post-test stage has increased slightly, and the significance level of these changes should be checked through a suitable statistical test.

Table 4. Results of normal distribution of scores and homogeneity of variances test

Variable	Stage	K-S		Levene	
		Statistics	p	F	p
Total score	Pre-test	0.82	0.51	0.494	0.614
	Post-test	0.75	0.62	1.314	0.28
	Follow-up	0.94	0.34	2.197	0.124

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Depression	Pre-test	1.21	0.10	0.79	0.46
	Post-test	0.86	0.45	0.10	0.90
	Follow-up	0.72	0.68	0.48	0.62
Anxiety	Pre-test	0.72	0.68	2.52	0.09
	Post-test	0.94	0.34	9.12	0.00
	Follow-up	0.76	0.61	2.72	0.08
Stress	Pre-test	1.02	0.25	0.04	0.96
	Post-test	0.74	0.64	0.40	0.67
	Follow-up	1.15	0.14	0.14	0.87

According to the results obtained in the above table, considering that the significance level of this test is more than 0.05 in all variables, the claim of normality of data distribution is accepted and all variables have normal distribution; Therefore, parametric methods can be used to investigate the research hypothesis. Also, the results of Lune's test were not significant to check the homogeneity of the variance of the errors of all research variables in the three stages of pre-test, post-test and follow-up (except for the post-test stage of the anxiety component); That is, the null hypothesis that the homogeneity of variance of the data of these three stages is equal in different groups is not rejected, and it can be said that with 95% confidence, the variability of the relevant data is equal and have the same variance. It should be noted that due to the large number of variables in this research, the low significance level of the post-test anxiety variable can be ignored. The third assumption of the mixed variance analysis test is the equality of the covariance matrix of the factors entered in the model. In order to check compliance with this assumption, the Box test is used, the Mbox index should be above the significant level (0.05). The Mbox index value of this test for the total score model of negative emotions (according to Table 5-4) is equal to 12.93 and its significance level is 0.480 more than 0.05; The Mbox value for the three sub-components model is equal to 124.69 and the significance level is equal to 0.62. Therefore, the null hypothesis means that the covariance matrix of dependent variables (i.e. internal factors of pre-test, post-test and follow-up) are equal both for the model of the total score of negative emotions and for the model of three sub-components (depression, anxiety and stress) in all groups. In this way, the assumption of the equality of the covariance matrix is established to perform the mixed variance analysis test.

Table 5. The results of Mauchly's test to check the sphericity for the variable of negative emotions and its three dimensions

Variable	Source	W	Chi-square	df	p	Epsilon
Total score	Time	0.911	3.842	2	0.146	-
Depression	Time	0.73	12.83	2.00	0.00	0.79
Anxiety	Time	0.91	3.75	2.00	0.15	-
Stress	Time	0.60	20.97	2.00	0.00	0.71

According to the data and figures in the above table, the result of Mauchly's test indicates that the assumption of sphericity is established for the overall score of negative emotions (sig = 0.146 and Chi-Square = 842.3). Also, the assumption of sphericity is respected for the anxiety component and there is no need to use alternative values such as Geisser greenhouse epsilon. For the two components of depression and stress, according to the significant level of less than 0.05, the results of analysis of variance were reported according to Geisser Greenhouse epsilon criterion.

Table 6. Results of mixed variance test to investigate the effect of time, group and their interaction on the total score of negative emotions

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Source	SS	df	MS	F	p	Eta^2
Time	674/859	2	337/430	179/69	0/000	0/811
Time*Group	520/741	4	130/185	69/329	0/000	0/768
Error (time)	157/733	84	1/878	-	-	-
Group	1631/837	2	815/919	16/79	0/00	0/444
Error (group)	2040/93	42	48/59	-	-	-

According to the data in the above table, the results of the mixed variance analysis show that the main effect of the within-subject factor (that is, the time or the pre-test, post-test and follow-up stages) on the overall score of negative emotions is statistically significant. The eta square for the within-subject effect is equal to 0.811, which is a large and significant effect. In this way, the score of minimum emotions of two levels of stages (or time) is different from each other, and the amount and type of difference between the levels of stages are explained in the post-tests section.

Also, the results related to the interactive effect of intra-subject and inter-group factors on the score of negative emotions (sig = 0.000 and F = 16.79) were statistically significant. The effect size with a value of 0.768 indicates a high and strong effect of the interactive effect of intra-subject and inter-group factors. In this way, the change in the score of negative emotions over time is different in different groups.

The effect of the intergroup factor (with three levels: control group, first intervention and second intervention) on the score of negative emotions is also significant at a level of less than 0.001. The effect size of 0.444 of this factor indicates that this factor has a moderate effect on the score of negative emotions. In this way, the score of negative emotions is different in at least two levels of the intergroup factor, and in order to accurately express this difference, a follow-up test is needed, which is explained below. In other words, in the pairwise comparison, it is determined whether the difference in the level of negative emotions is greater in the intervention groups or not, and whether this difference is influenced by the schema training and cognitive behavioral therapy. The trend of changing data points for the values attributed to negative emotions according to the interaction of the within-subject and between-subject factor levels, both linearly and non-linearly, has been statistically significant. Therefore, statistical significance is established for the interactive effect.

Table 7. Results of mixed variance test to investigate the effect of time, group and their interaction on negative emotions

Source	Var.	Correction	SS	df	MS	F	p	Eta^2
Time	Depression	Greenhouse-Geisser	93.17	1.58	59.11	54.65	0.00	0.57
	Anxiety	-	83.73	2.00	41.87	53.07	0.00	0.56
	Stress	Greenhouse-Geisser	51.60	1.43	36.13	63.41	0.00	0.60
Time*Group	Depression	Greenhouse-Geisser	57.90	3.15	18.36	16.98	0.00	0.45
	Anxiety	-	49.33	4.00	12.33	15.63	0.00	0.43
	Stress	Greenhouse-Geisser	75.56	2.86	26.45	46.42	0.00	0.69
Error (time)	Depression	Greenhouse-Geisser	71.60	66.21	1.08			
	Anxiety	-	66.27	84.00	0.79			
	Stress	Greenhouse-Geisser	34.18	59.98	0.57			
Group	Depression	-	96.06	2.00	48.03	7.38	0.00	0.26

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	Anxiety	-	141.73	2.00	70.87	3.00	0.06	0.12
	Stress	-	387.24	2.00	193.62	9.05	0.00	0.30
Error (group)	Depression	-	273.47	42.00	6.51			
	Anxiety	-	992.93	42.00	23.64			
	Stress	-	898.36	42.00	21.39			

According to the above table, the results show that the scores of the three components of depression, anxiety and stress were affected by the within-subject effect (pre-test, post-test and follow-up stages). The effect sizes of all three components have almost the same value and are more than average. In this way, the score of at least two levels of stages (pre-test, post-test and follow-up) are different in each of the components. In the follow-up tests section, the details of the difference in the level of the steps are stated.

Also, the results of the interaction between subjects in all three components of depression (F=16.98), anxiety (F=15.63) and stress (F=46.42) were significant at a level less than 0.05 (sig=0.000). Considering that the effect size of the stress component is equal to 0.69 and it shows the strong effect of the interactive effect. In this way, the interactive effect of time and group in this component is more than the two components of depression and anxiety. In other words, the stress level of MS patients in different stages and groups has changed more than the other two components.

Also, the between-subject effect (three control groups, first and second intervention) in the two components of depression and stress has become significant at a level of less than 0.001. Of course, the effect size of these two components (0.26 and 0.30, respectively) shows the low effect of the group on the changes of these two components. For the anxiety component, the significance level of the between-group factor is greater than 0.05, and it shows that the anxiety score in the three groups of control, first intervention and second intervention is not significantly different. Therefore, it can be said that the interventions of schema therapy and cognitive-behavioral therapy did not have an independent effect on the level of the anxiety component of my patients.

It should be noted that due to the low effect size of the between-group factor of the three sub-components and the high effect size of the within-subject factor and the interaction (time and group) in the three components, it can be concluded that the changes of the three components are independently the effect of the within-subject factor. The factor between different groups interacts with the effect of time on the amount of the three components and does not have much of a variable effect independently.

Table 8. Pairwise comparisons of scores over time for the variable of negative emotions and its three dimensions

Variable	Comparison between	Mean diff.	SE	Sig.
Total	Pre-test – Post-test	4.98	0.31	0
	Pre-test – Follow-up	4.47	0.31	0
	Post-test – Follow-up	0.51	0.24	0.12
Depression	Pre-test – Post-test	1.84	0.22	0.00
	Pre-test – Follow-up	1.67	0.22	0.00
	Post-test – Follow-up	0.18	0.14	0.59
Anxiety	Pre-test – Post-test	1.73	0.21	0.00
	Pre-test – Follow-up	1.60	0.17	0.00
	Post-test – Follow-up	0.13	0.17	1.00
Stress	Pre-test – Post-test	1.40	0.10	0.00
	Pre-test – Follow-up	1.20	0.17	0.00

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	Post-test – Follow-up	0.20	0.13	0.38
Total	Control – Schema	7.04	1.47	0.00
	Control – CBT	7.67	1.47	0.00
	Schema- CBT	0.62	1.47	1.00
Depression	Control – Schema	1.96	0.54	0.00
	Control – CBT	1.56	0.54	0.02
	Schema- CBT	0.40	0.54	1.00
Anxiety	Control – Schema	2.27	1.03	0.10
	Control – CBT	2.07	1.03	0.15
	Schema- CBT	0.20	1.03	1.00
Stress	Control – Schema	2.82	0.98	0.02
	Control – CBT	4.04	0.98	0.00
	Schema- CBT	1.22	0.98	0.65

The results of the above table showed that the difference between the average scores of participants' negative emotions in the pre-test stage and their average scores in the post-test (mean difference=4.98) and follow-up (difference=4.47) is statistically significant. However, the results related to the mean pairwise comparisons of post-test scores with follow-up (mean difference=-0.51) were statistically insignificant. This situation for each of the three components of depression, anxiety and stress is similar to the changes in the overall score of negative emotions. As a result, the overall scores of negative emotions and each of its three dimensions have decreased in the post-test phase compared to the pre-test phase, and this decrease in scores has remained almost stable and constant in the follow-up phase compared to the follow-up phase and has not changed. Finally, the overall negative emotions scores of the participants in the control group were statistically significantly different from the negative emotions scores of the participants in the first intervention group (schema therapy) and the participants in the cognitive behavioral therapy group. However, the score of negative emotions was not significantly different between the two intervention groups of schema therapy and cognitive behavioral therapy. This situation applies to the two components of depression and stress. That is, the level of depression and stress of the people in the two educational intervention groups has decreased significantly compared to the people in the control group, but there was no difference between the two intervention groups. Regarding the anxiety component, the results of the follow-up test indicate that although the anxiety of the two intervention groups has a mean difference (2.27 and 2.07) with the control group, this difference is not significant.

Conclusion

The present study was conducted with the aim of comparing the effectiveness of schema therapy with cognitive-behavioral therapy on negative emotions in women with MS in Kermanshah. The results of the statistical analysis of the data showed that there was no difference between the effects of schema therapy and cognitive-behavioral therapy on reducing negative emotions.

The first partial finding of the research indicated that schema therapy is effective in reducing the negative emotions of women with multiple sclerosis. This finding is consistent with the results of studies by Bahadri et al. (2022), Rezaei et al. (2016), Rahmati et al. (2021), and Izadi et al. (2019). In explaining this finding, it can be said that negative emotions are a risk factor for many psychiatric disorders because people with MS are under the pressure of physical-emotional correlations that cannot be expressed in words. This failure prevents emotional regulation in patients and causes the occurrence of negative emotions such as anger, stress and anxiety, and ultimately leads to inconsistent emotional responses (Fling et al., 2015). There is this explanation that a wide range of emotions starts in a person and the person realizes his own excitement. Then he considers emotions as a problem and shows his negative emotional schemas; The person believes that emotions are incomprehensible to him and feels ashamed of his anxiety and

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sadness. Client believes that emotions are out of control and will continue for a long time, blames others for his feelings, insists on one emotion all the time. The client does not consider this range of emotions as normal and does not realize that many people have similar feelings, the mixture of emotions is unbearable for him and he constantly thinks why he has such feelings. This is while, during the schema therapy of clients when they experience negative emotions, evaluations about emotions are identified with the strategies used by the person. At first, by strengthening and increasing awareness about emotions, patient avoidance is also targeted so that the person considers his emotional experience in a universal way. This recognition and description of negative emotions helps to accept them instead of judging, suppressing, escaping or avoiding emotions. The basic logic of schema therapy is that emotions are not troublesome in themselves, but interpretations and coping strategies are decisive. In this regard, schema therapy tries to correct negative emotional beliefs by identifying emotionally troublesome beliefs and therapeutic strategies (Bahadri et al., 2022). In this research, by using the imaginary conversation technique, the therapist prepared the ground for the emotional discharge of the patients by making it possible for the main emotions such as anger to appear and distanced them from the harmful schemas. Mental imagery in order to break the pattern also reduced depression and on the other hand, by using the letter writing technique, patients found an opportunity to express their rights and recognize their feelings, which had an effect on reducing their stress. Re-creating the initial incompatible schemas and incompatible coping styles aggravates the problems of these people and finally endangers their mental health, which manifests itself in the form of symptoms of stress, anxiety and depression; Therefore, it can be said that schema therapy can be useful to reduce their negative emotions.

Another finding of this research indicates that cognitive-behavioral therapy is effective in reducing negative emotions in women with multiple sclerosis. This finding is in line with the results of the studies of Izanlou et al. (2021), Mohammad et al. (2021), Share and Rabati (2020), Khaloui et al. (2016), Irzo et al. (2019) and Casio et al.

In explaining this finding, one should pay attention to the assumptions of cognitive-behavioral therapy, which is based on changing cognition, emotion, and behavior. This means that the intervention of cognitive-behavioral therapy in the present study has caused the participants to correct their wrong perceptions in terms of thinking and emotion, and by using it in relation to others, they can have a positive view of their conditions. Also, by correcting their beliefs and perceptions of their emotions, they should implement the areas of reducing negative emotions during the intervention. This has caused cognitive and behavioral therapy to affect emotion regulation. In cognitive-behavioral therapy, by using a combination of cognitive and behavioral strategies, a person is able to make serious efforts towards behavioral changes and evaluate the consequences of these changes. Then, by changing the thoughts and understanding the purpose of the treatment, it will transfer the learned skills to the daily life of the person; Therefore, the patient himself becomes a therapist and is able to manage his emotions better (Irzo et al., 2019). Thompson (2012) states that cognitive-behavioral therapy, due to its focus on modifying thoughts, reduces depression so that it makes the depressed person more active and coherent.

Among the limitations of the present study, the following can be mentioned: this study was conducted on patients with multiple sclerosis; Therefore, the obtained results cannot be generalized to other clinical communities or should be done with caution. This research has only been conducted on women with multiple sclerosis. Failure to control the effect of variables such as the economic and social status of the research participants. The tool for collecting information in this research was a self-assessment questionnaire, which can be effective in the research results. According to the results of this research, it is suggested that psychologists, counselors and psychotherapists take appropriate measures and take advantage of the results of schema therapy and especially cognitive-behavioral therapy to improve their negative emotions.

Conflict of Interest

According to the authors, this article has no financial sponsor or conflict of interest.

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