



Comparing the Effectiveness of Cognitive-Behavioral Therapy and Eye Movement Desensitization and Reprocessing on Migraine Attacks (Number, Duration, and Intensity)

[Elaheh Mehrmanesh](#)^{1D}

Department of Health Psychology, Islamic Azad University, Khorramshahr International Branch, Khorramshahr, Iran

Corresponding Author: Elaheh Mehrmanesh; *Department of Health Psychology, Islamic Azad University, Khorramshahr International Branch, Khorramshahr, Iran*
Email: mehrmaneshelahe@yahoo.com

Quantitative Study

Abstract

Background: Patients with migraine show resistance to drug treatments due to their side effects; therefore, identifying and using effective psychological interventions can be important in improving their condition. The present study was conducted to compare the effectiveness of cognitive-behavioral therapy (CBT) and eye movement desensitization and reprocessing (EMDR) on migraine attacks.

Methods: This was a semi-experimental research with a pretest-posttest design, a follow-up period, and a control group. Forty-five women who had been referred to the Future Vision Clinic in Tehran, Iran, in 2019, and were diagnosed with migraine were randomly divided into 2 experimental groups and a control group (each group of 15 people). Then, the CBT was performed according to the protocol of Otis and the EMDR was performed according to the protocol of Shapiro. No intervention was applied in the control group. All participants in the study responded to the headache diary and visual analog scale (VAS) at the beginning, end, and one month after the end of the treatment. The data were analyzed by SPSS software and by multivariate analysis of variance (MANOVA).

Results: These two treatments led to a greater reduction of migraine attacks compared to the control conditions, and in the meantime, the effectiveness of EMDR was higher than CBT ($P < 0.05$).

Conclusion: Based on the results of this research, it can be said that the effectiveness of EMDR has been higher than CBT in reducing migraine attacks.

Keywords: Cognitive behavioral therapy; Eye movement desensitization and reprocessing; Migraine; Women

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Introduction

Migraine is a severe and recurring disease that is felt as a headache and often on one side of the head. But sometimes the pain is experienced bilaterally, in the back and front of the head, and sometimes rarely in the whole body and face. The pain is general throbbing and occasional throbbing which typically increases with any movement of the body or head (Mamindla, Mogilicherla, Enumula, Prasad, & Anchuri, 2019). Migraine can be accompanied by an aura (such as a flashing optical illusion or partial blindness) or without an aura, and the severe pain it causes may last for several hours or even days (Kikkeri & Nagalli, 2021). Moreover, its prevalence has increased in the world (Zivoder, Martic, & Vodanovic Kotic, 2018) and it is reported to be 20% in women and 8% in men (Diener et al., 2019). Although the prevalence of migraine in adolescence is equal among girls and boys, in adulthood, migraine in women is two to three times more than in men, and women report a longer duration of attacks. Specific hormonal phenomena in women have been reported as the reason for the higher prevalence of this disorder in women after puberty, which decreases after menopause (Boubacar et al., 2017).

Although medications can help manage migraine, they are not effective for everyone, do not have long-lasting effects, and some people experience side effects (Sharpe et al., 2019). Therefore, patients with migraine often show resistance to medical treatments, and the reason is partly due to drug side effects. Thus, patients may need other strategies to manage their pain and symptoms (Malik, Singh, & Arumugam, 2017). Because chronic pain can cause maladaptive cognitions and behaviors, in turn, it can destroy people's daily functioning, increase psychological stress, and even prolong pain (Wallace et al., 2021). Therefore, psychological treatments can be effective in reducing migraine symptoms by providing skills and coping strategies to help these patients change their thoughts and beliefs (Sharpe et al., 2019).

Meanwhile, cognitive-behavioral therapy (CBT) and eye movement desensitization and reprocessing (EMDR) are two psychological treatments that are effective on chronic pain, including migraine (Onur, Ertem, Uluduz, & Karsidag, 2017; Nahman-Averbuch et al., 2021; Tesarz et al., 2014). CBT is a sequential type of psychotherapy that is evidence-based and focuses on developing coping strategies and changing cognitive structures to change the experience of pain. This treatment helps patients become aware of their incorrect or negative thinking in a structured way and with a limited number of sessions. Therefore, they can see challenging situations more clearly and respond to those situations more effectively (American Psychological Association, 2017).

There is evidence that chronic pain is often associated with information processing and certain thoughts related to the interpretation of events and experiences. Although many evaluations and thoughts related to pain contain reality, the thoughts of pain sufferers are distorted to some extent, and thus lead to increased pain. Therefore, CBT focusing on the beliefs and methods of coping with pain can be beneficial in understanding the implicit cognitive and emotional meanings of patients with pain (Turk & Meichenbaum, 2017).

Desensitization with eye movements and reprocessing is another experimental approach in the field of psychology that therapists use to treat the consequences of psychological trauma and other negative life experiences. The clinical applications of this treatment include a wide range of psychological problems of patients and their family members, as well as physical disorders caused by stress and unexplained medical symptoms (Shapiro, 2014).

In this treatment, while the patient is focused on the traumatic memory or thought, following the movement of the therapist's finger, he simultaneously moves his eyes back and forth, and since active memory has a limited capacity, when a traumatic memory is triggered in the active memory, and at the same time the patient must focus on the movement of the therapist's fingers, the power of that memory is reduced. Gradually, this faded and unclear memory is recovered in long-term memory, resulting in less emotional response when it is activated in the future. In addition, the therapist teaches clients to rate their positive beliefs as well as the intensity of their negative emotions. In this way, when using cognitive processing, the client focuses on his image, negative thought, and physical feelings by using a set of bilateral stimuli. These sets may include eye movements, taps, or sounds (Jeffries & Davis, 2013).

In general, according to the stated content and the need to pay attention to psychological treatments in reducing the symptoms of patients suffering from pain, the present study intends to compare the effectiveness of CBT and EMDR on migraine attacks (number, duration, and intensity) in women suffering from this disease.

Methods

The present study was semi-experimental with a pretest-posttest design and a follow-up period with a control group, in which two separate experimental groups and one control group were used. The statistical population of the research was women who had been referred to the Future Vision Clinic in Tehran, Iran, in 2019, due to headaches. 70 patients were diagnosed with migraine after a diagnostic interview by a doctor based on the criteria of the International Classification of Headache Disorders, Second Edition (ICHD-II). Then, 45 of them were randomly selected and assigned equally (15 people in each group) in two experimental groups (CBT and EMDR) and a control group.

All participants in the research responded to the headache diary and visual analog scale (VAS) at the beginning (pre-test stage), at the end (post-test stage), and one month after the end of the treatment (follow-up stage). People in the CBT group were treated as a group for 11 sessions and 90 minutes each week, and people in the EMDR group individually received 3 sessions of 90 minutes once a week. During this period, no intervention was applied in the control group.

Headache diary and VAS: A diary record book was used based on a VAS during the intervention period to collect information related to headache indicators including frequency of headache attacks (number of headaches per week), the average duration of headache attacks (in minute), and headache intensity (from 0 to 10). The therapist is asked to mark the number of times a headache occurs in a week, the duration of the pain, and the intensity of the pain each time in a diary form and continue this work until the headache reaches zero (Ahmadi, Tadibi, & Razazian, 2015).

CBT protocol: CBT was derived from the protocol of Otis (2007) and performed for 11 sessions and 90 minutes each week. The meetings and their contents are briefly presented in table 1.

EMDR was performed according to the protocol of Shapiro (2014) for 3 sessions of 90 minutes once a week (Table 2).

To analyze the data in this research, descriptive statistics methods such as frequency, mean, and standard deviation (SD) were used, and in inferential statistics, multivariate analysis of variance (MANOVA) was used using SPSS software (version 25, IBM Corporation, Armonk, NY, USA). Besides, the significance level in this research was considered as $\alpha = 0.05$.

Table 1. Cognitive-behavioral therapy (CBT) protocol

Session	Content
First	Establishing therapeutic relationship, assessment of factors affecting pain, pain cycle, agitation, and disability, general goals of treatment
Second	Examining theories of pain, abdominal breathing, steps to abdominal breathing, homework
Third	Relaxation of progressive muscles, visual imagery, homework
Fourth	Spontaneous thoughts, thoughts, emotions and pain, cognitive errors and ABC model, homework
Fifth	Negative thoughts and pain, reconstruction of negative thoughts, homework
Sixth	What is stress? Fight or flight response, stress, pain, ways to reduce stress, homework
Seventh	Timed activity, steps of the timed activity, planner technique, homework
Eighth	Planning pleasant activities, choosing pleasant activities, homework
Ninth	What is anger? Anger and pain, the reason for anger, homework
Tenth	The necessity of sleep, ways to improve sleep, homework
Eleventh	Planning to prevent recurrence of pain, how to manage pain, reviewing progress, ending sessions

Results

The mean and SD of the women’s age in the CBT group was 43.81 ± 4.57, in the EMDR group, 47.43 ± 6.13, and in the control group, 42.97 ± 6.08. There were 5 single people and 10 married people in the CBT group, 6 single people and 9 married people in the EMDR group, and 5 single people and 10 married people in the control group. The mean and SD of migraine attacks in the experimental and control groups in the pre-test, post-test, and follow-up stages are presented in table 3.

As seen in table 3, the mean and SD of the number, intensity, and duration of migraine attacks in the test groups decreased in the post-test phase and this decrease remained in the follow-up stage. While confirming the normality of data distribution with the Kolmogorov-Smirnov test, Levene's test [F = 1.07, degree of freedom (df)1 = 1, df2 = 56, P = 0.37] was used to check the equality of variances. The non-significant Levene's test indicates the homogeneity of variances. MANOVA was used in order to investigate the effectiveness of CBT and EMDR on migraine attacks (Table 4).

As can be seen in table 4, the effect of treatments was significant. A pairwise comparison (Bonferroni test) was used in order to check the difference in the effectiveness of the treatments with each other and with the control group, the results of which are presented in table 5.

Table 2. Eye movement desensitization and reprocessing (EMDR) protocol

Session	Content
First	Creating a therapeutic union, explaining the EMDR process and its effects on migraine, explaining the client's expectations
Second	Preparing references for receipt of EMDR
Third	Past events that set the stage for the disorder are processed and make new connections with compatible information
Fourth	Current conditions that cause distress are targeted and internal and external triggers are desensitized
Fifth	The subject is evaluated and her interest is checked, which particular memory she likes is checked, and the most disturbing visual image is selected
Sixth	Imaginal patterns of future events are included to help clients acquire the skills necessary for adaptive functioning
Seventh	Focusing on the negative belief, moving the therapist's finger left and right in front of client, and asking the client to follow the therapist's fingers until the stress level reaches zero
Eighth	Working on strengthening positive beliefs
Ninth	Remembering the negative incident and checking the tension in the body
Tenth	Teaching coping skills
Eleventh	Closing the therapeutic sessions and reassessing the goals

EMDR: Eye movement desensitization and reprocessing

Table 3. Mean and standard deviation (SD) of migraine attacks in experimental and control groups in pre-test, post-test, and follow-up stages

Variable	Level	CBT	EMDR	Control group
Number of pain attacks	Pre-test	5.50 ± 2.32	5.00 ± 2.12	5.50 ± 2.84
	Post-test	3.00 ± 0.94	1.50 ± 0.54	5.00 ± 2.53
	Follow-up	3.50 ± 1.32	2.00 ± 0.61	5.50 ± 2.18
The severity of pain attacks	Pre-test	9.50 ± 1.21	9.50 ± 1.41	9.25 ± 1.41
	Post-test	4.75 ± 13.10	3.25 ± 0.98	9.00 ± 3.10
	Follow-up	5.50 ± 0.98	3.75 ± 1.10	9.50 ± 1.10
Duration of pain attacks	Pre-test	41.18 ± 12.45	40.45 ± 11.16	43.67 ± 10.12
	Post-test	29.73 ± 10.18	25.63 ± 9.69	42.54 ± 11.48
	Follow-up	32.52 ± 11.59	28.48 ± 10.21	42.76 ± 10.72

Data are presented as mean ± standard deviation (SD)

CBT: Cognitive-behavioral therapy; EMDR: Eye movement desensitization and reprocessing

Based on table 5, the effect of CBT and EMDR on migraine attacks in the post-test and follow-up stages was significantly different from each other and from the control group. In other words, these two treatments have resulted in less migraine attacks compared to the control conditions, and in the meantime, the effectiveness of EMDR has been higher than CBT.

Discussion

The present study was conducted to compare the effectiveness of CBT and EMDR on migraine attacks (number, duration, and intensity) in women suffering from this disease. The findings showed that both treatments were significantly effective on migraine attacks, and the effectiveness of EMDR was greater than CBT. This finding is consistent with the research of Garrigos-Pedron et al. (2022), Golovacheva et al. (2021), and Tehrani, Ghoreishi, Ghoreishi, Kalhor, & Khosravi (2021).

CBT is a therapy that helps people understand the thoughts and feelings that affect their behavior. This treatment is now used for a large number of disorders. In this treatment, the person is taught how to recognize and change destructive thought patterns that have negative effects on their behavior (Nakao, Shiotsuki, & Sugaya, 2021). When this treatment is applied to people with migraine, it helps them identify and treat the processes that lead to migraine attacks or prolong them. In addition, usually, people with migraine play a big role in the formation and creation of these attacks and their trauma by exaggerating the attacks and constant expectation and fear in the context of the recurrence of pain attacks. Therefore, CBT by creating self-monitoring skills and self-learning to recognize these ineffective thoughts and beliefs and replace them with positive and balanced cognitions can reduce migraine attacks to a very high extent and solve this problem to a large extent.

Table 4. The results of multivariate analysis of variance (MANOVA) to investigate the effectiveness of cognitive-behavioral therapy (CBT) and eye movement desensitization and reprocessing (EMDR) on migraine attacks

Source		SS	df	MS	F	P-value	Eta
CBT	Time	5467.01	1	4021.34	37.02	< 0.01	0.49
	Group	8321.76	1	8321.76	5.45	< 0.01	0.31
	Time*Group	6475.24	1	5234.17	41.12	< 0.01	0.30
EMDR	Time	3742.46	1	28934.23	36.54	< 0.01	0.49
	Group	6981.91	1	6981.91	13.15	< 0.01	0.31
	Time*Group	4637.38	1	3674.10	54.12	< 0.01	0.30

CBT: Cognitive-behavioral therapy; EMDR: Eye movement desensitization and reprocessing; SS: Sum of squares; df: Degree of freedom; MS: Mean squares

Table 5. Pairwise comparison of the effectiveness of the intervention groups on migraine attacks in the pre-test, post-test, and follow-up stages

Variable	Base group	Adjusted mean	Comparison group	Adjusted mean	SE	P-value	
Number of pain attacks	Post-test	CBT	EMDR	3.00	1.85	0.0310	
			Control	5.00	26.20	0.0220	
	Follow-up	EMDR	Control	1.50	-1.23	0.0020	
			CBT	3.50	2.00	0.87	0.0290
		EMDR	Control	2.00	5.50	1.26	0.0420
			Control	2.00	Control	-1.23	0.0020
The severity of pain attacks	Post-test	CBT	EMDR	4.75	0.87	0.0450	
			Control	9.00	2.36	0.0010	
	Follow-up	EMDR	Control	3.25	-1.65	0.0010	
			CBT	5.50	EMDR	3.75	16.10
		EMDR	Control	3.75	9.50	1.26	0.0190
			Control	3.75	Control	-2.41	0.0010
Duration of pain attacks	Post-test	CBT	EMDR	29.73	1.63	0.0490	
			Control	42.54	1.56	0.0020	
	Follow-up	EMDR	Control	25.63	2.13	0.0010	
			CBT	32.52	EMDR	28.46	0.69
		EMDR	Control	32.52	42.76	1.02	0.0280
			Control	28.46	Control	-1.59	0.0100

CBT: Cognitive-behavioral therapy; EMDR: Eye movement desensitization and reprocessing; SE: Standard error

Besides, recognizing and replacing underlying unpleasant emotions with more pleasant ones leads to better and more effective handling of difficult situations (Nakao et al, 2021).

On the other hand, EMDR is a step-by-step therapy that focuses on the person's symptoms and helps the person connect with all the mental images, thoughts, feelings, and sensations associated with the traumatic memory. It helps the brain tap into its inherent power to solve neuro-psychological problems and move towards an adaptive solution. This method is based on the idea that trauma and other negative and challenging experiences have weakened the mind's innate ability to solve its problems and can be facilitated and supplemented through bilateral brain stimulation (Marcus, 2008). It seems that by using this method of treatment, people with migraine are helped to gain more control over the memories and psychological damage caused by migraine pain attacks.

Regarding the greater efficiency of EMDR than CBT in reducing migraine attacks, it can be said that EMDR is an experiential therapy that directly confronts a person with negative memories of traumatic events and thus he/she can review the physical reactions to traumatic memories and relieve them. Therefore, it may be more effective in reducing the physiological tension of migraine headaches than CBT. In addition, in some other studies, the usefulness of this therapy has been shown compared to CBT in reducing stress (Nakao et al, 2021; Jeffries & Davis, 2013). Therefore, this treatment may work better than CBT in reducing migraine headaches indirectly by reducing the level of negative emotions and stress.

Conclusion

This research was conducted only on women, and therefore, future research can provide a basis for comparison between the two sexes by conducting studies on men.

In addition, considering the effectiveness of CBT and EMDR on migraine attacks, it seems that these treatments can limit the problems associated with migraine drug treatments and can be used as a trusted supplement alongside them.

Conflict of Interests

Authors have no conflict of interests.

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