

## Comparative of Efficacy of CBT and EMDR in Treating PTSD in Covid-19

### Abstract

Post-traumatic stress disorder (PTSD) is an anxiety disorder in individuals exposed to psychologically terrifying events. This study compared the effectiveness of eye movement desensitization and reprocessing (EMDR) and cognitive-behavioral therapy (CBT) in treating PTSD in patients who recovered from Covid-19 in Tabriz (Iran). The present study was quasi-experimental based on a pretest-posttest design with a control group. The statistical population included all female patients recovered from Covid-19 aged 25 to 60 years in Tabriz in 2021. Thirty-six patients sampled using the purposeful sampling method and diagnosed with PTSD were randomly assigned to two experimental groups and one control group. Participants in EMDR sessions were treated individually in six 45 min sessions. Similarly, those who took part in the CBT sessions were treated in groups in 45 min sessions. All participants were evaluated in two pre-test and post-test stages by a post-traumatic stress disorder checklist.

Data were analyzed in SPSS software (version 22) using the analysis of covariance. Post-test PTSDA scores were significantly reduced in both experimental groups ( $P < 0.05$ ). Additionally, a reduction in PTSD scores in the EMDR group was substantially more significant than in the CBT group. Both EMDR and CBT psychotherapies relieved the symptoms in PTSD patients. However, according to the post-test results, EMDR intervention was more effective than CBT psychotherapy in reducing PTSD symptoms.

**Keywords:** *Eye movement desensitization and reprocessing (EMDR), Cognitive-behavioral therapy (CBT), Post-traumatic stress disorder (PTSD), Covid-19*

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### Introduction

SARS-CoV-2 is a newly emerged and genetically modified virus belonging to Coronaviruses (CoVs) family, causing the Covid-19 disease [1]. The psychological effects of Covid-19 on people's mental health in different social classes are of paramount importance. Concerning its pathogenicity, fast spread, and the resulting mortality rate, Covid-19 may differently threaten the mental health of individuals throughout the community. In the present risky situation, identifying individuals inclined to psychological disorders at different social classes is crucial to maintaining their mental health by employing proper psychological strategies and techniques. According to studies, Covid-19 patients possess a low psychological tolerance capacity. Under this highly distressing situation worldwide, they are remarkably exposed to psychological disorders such as anxiety, fear, depression, and negative thoughts. One of the most influential psychological disorders hurting the mental health of Covid-19 patients is post-traumatic stress disorder (PTSD) [2, 3].

PTSD is a common and influential psychiatric condition where a person is exposed to a severe, terrifying event with varying severity. In PTSD, extreme fear, generalized anxiety, and helplessness influence the person's response. The frightening events can be experiences of war or natural disasters or severe accidents, and so on [4]. PTSD is associated with re-

experiencing an event in dreams, imagination, or wakefulness, continued avoidance of remembering the event and narcohypnia when responding to such reminders, continuous and excessive arousal at least for a month, and eventually, severe discomfort or disturbance in social and occupational performance or other critical affairs [5]. PTSD is more prevalent following events such as war, earthquakes, floods, and volcanoes. It can cause and trigger different symptoms such as depression, anxiety, and post-traumatic stress in individuals and impose severe outcomes and burdens on families and the community [1]. According to valid psychological sources, eye movement desensitization and reprocessing (EMDR) is effective psychotherapy in assisting those suffering from psychiatric damages caused by traumatic experiences, anxiety, terror, unpleasant memories, PTSD, grief, and other emotional conditions [6]. EMDR is further employed to treat psychological damage and symptoms of disorders such as anxiety, depression, panic, sleep disturbance, sense of guilt, rage, and involuntary autobiographical memories (IAMs). EMDR and cognitive reconstruction seem to have a physical effect that accelerates reprocessing of information and memories stored in a disturbed manner [7]. EMDR is exposure therapy for patients who have experienced traumatic stress. It includes visual flooding, cognitive reconstruction, rapid and balanced use of eye movements, and

bilateral stimulation [6]. EMDR was first introduced by Francine Shapiro (1989), emanated from behavioral interventions, and aims to help PTSD patients. This psychotherapy method has targeted various populations, including children, couples, victims, and those battling anxiety, panic, depression, grief, addiction, and morbid fears [8]. EMDR works based on eye movements, aiming to draw the patient's attention to an external stimulus while concentrating on the distressing event. Eye movements in EMDR impair functional memory and reduce associated excitement by lowering sharpness [9]. According to studies, the EMDR treatment course is shorter than other complementary therapies. It results in more therapeutic effects than other therapies such as CBT and the emotional freedom technique (EFT) [10-13].

According to the US National Institute of Mental Health (NIMH), in recent research, EMDR has been equal to eight sessions of fluoxetine treatment [14]. CBT is the next psychotherapy to treat anxiety disorder in PTSD patients. CBT deals with cognitions that alter emotions, thoughts, and behaviors [15]. This approach focuses on the practical teaching of concepts and the empirical validation of the therapy plan. Therefore, this entails providing an opportunity for new adaptive learning and making changes outside the clinic.

Most importantly, the well-established technique in treating PTSD is creating and maintaining a suitable environment for cognitive-behavioral intervention [16]. CBT is real-time, structured, and purposeful and employs cognitive and behavioral techniques to relieve symptoms by targeting defective cognitive structures and PTSD maintenance processes [17]. According to experimental findings, CBT is an empirical evidence-based treatment method known as a short-term booming therapeutic approach in terms of prevention and amelioration of PTSD symptoms [18]. Therefore, developing more effective and thorough therapies than CBT is interesting in today's studies.

Numerous studies have been conducted using EMDR and CBT techniques among different populations and walks of life. However, the programmed and scheduled employing both interventions separately and studying their effectiveness on the mental health of PTSD patients who have recovered from Covid-19 allows for evaluating the effectiveness of these two therapies in relieving specific PTSD symptoms. It further improves individual efficiency in dealing with stressful life events and circumstances. Accordingly, this study aims to determine the effectiveness of EMDR and CBT treatments separately and compare their outcomes in alleviating symptoms in PTSD patients who recovered from the Covid-19 disease.

## Materials and Methods

A quasi-experimental study was conducted based on a pretest and posttest design with a control group. The study's target population included female Covid-19 patients with negative PCR results aged 25 to 60 years in the health centers of Tabriz (East Azarbaijan, Iran). After reviewing their files and screening them by structured clinical interview for DSM-5 (SCID-5) and post-traumatic stress checklist, participants were selected from those referring to Tabriz health centers. Thirty-six individuals were chosen by the purposive sampling method and randomly assigned to EMDR (n=12), CBT (n=12), and control (n=12) groups. All participants were first evaluated for post-traumatic stress symptoms, and participants in the experimental groups were then treated. All the three groups' participants were eventually assessed with the post-traumatic stress disorder checklist. All the participants were asked to sign the written consent before interventions.

### Research tools

#### Post-Traumatic Stress Disorder Checklist (PCL)

PCL is a self-report scale and serves as a diagnostic tool to assess the disorder rate and discriminate PTSD patients from normal and other patients. Well known as a short checklist having 17 items, PCL was coined by Weathers et al. [19] based on the DSM diagnostic criteria for the US National Center for PTSD (NCPTSD). Items are scored based on a Likert scale in five points, from not at all (1) to very high (5), and the total score varies from 17 to 85. The checklist's cut-off point for diagnosing PTSD is 50. Foa et al. [20] reported test-retest reliability of 0.97, the internal consistency with Cronbach's alpha of 0.94, the sensitivity of 0.93, and the efficiency of 0.90 for the checklist. In Iran, the checklist reliability has been estimated at 0.92 (based on the internal consistency), 0.92 (based on the split-half method), and 0.91 (based on the test-retest method). In addition, its validity has been estimated at 0.82 using the concurrent validity with equivalence tests (PTSD invoice) [21].

### Procedure

The model of interventions was conducted individually for patients in the EMDR group in six 45 min sessions and groups for patients in the CBT group in six 45 min sessions. During these experiments, controls did not receive any intervention. Concerning ethical issues, controls were assured to undergo interventions after ending sessions intended for those in experimental groups. In this study, EMDR psychotherapy intervention (Shapiro et al., [22]) and CBT psychotherapy (Dugas and Robichaud, [23]; Young and Black, [24]; Bieling, McCabe, and Antony [25]) were carried out in six 45 min sessions once a week. The EMDR and CBT protocols are given in Tables 1 and 2, respectively.

Table 1. A summary of sessions' content for participants in the EMDR group	
Contents of sessions	
Session 1	Building a therapeutic coalition, describing the EMDR process and its impacts on PTSD, presenting treatment expectations, and preparing clients
Session 2	Preparing the patient to undergo EMDR psychotherapy
Session 3	Evaluation is the third phase of the therapy, where clients specify the memory the participant wants to investigate and chooses the most upsetting visual image associated with that event. The therapist assists the participant in recognizing the current thoughts and feelings recalled by this visualization.
Session 4	Concentrating on the patient's negative feelings, moving the therapist's left and right fingers quickly and coincidentally in front of the participant, asking the client to track the movement of the fingers, and repeating until the client's frustration is reduced to one or zero.
Session 5	This session is called working therapy due to the goal they are pursuing, i.e., working to improve the power of positive belief specified by the individual to replace the original negative thought. Physical examination is another goal during the session. When the positive cognition is strengthened, the therapist asks the person to recall the main event and see if stress is left in the body.
Session 6	Ending the meeting and re-evaluating goals are the final steps. These include summarizing the treatment process and changes, re-examining positive and negative beliefs, and training coping skills. Typically, participants will leave the session in a better way than they were before the session.

Table 2. A summary of sessions' content for participants in the CBT group	
Contents of sessions	
Session 1	Describing the course objectives and conducting the pre-test
Session 2	Describing PTSD and its variables
Session 3	Introducing and training cognitive and behavioral techniques to deal with PTSD symptoms
Session 4	Teaching problem-solving and interpersonal and communication skills
Session 5	Teaching how to avoid and alleviate PTSD symptoms
Session 6	Analyzing the previous sessions assignments, outlining and giving feedback to the participants, and post-test

## Results

The mean age of participants in CBT, EMDR, and control groups was 41.32, 39.81, and 40.78 years, respectively.

Table 3. Pretest-posttest PTSD scores by groups								
Group	Pre-test				Post-test			
	Mean	SD	Kolmogorov–Smirnov	p-value	Mean	SD	Kolmogorov–Smirnov	p-value
CBT	61.42	3.872	0.605	0.858	43.92	2.875	0.509	0.958
EMDR	61.33	4.579	0.762	0.608	35.58	7.204	0.797	0.549
Controls	62.83	5.458	0.559	0.913	63.67	5.499	0.454	0.986

As can be seen, the post-traumatic stress has been reduced in intervention (CBT and EMDR) groups, though its significance is determined following statistical tests. Kolmogorov–Smirnov

test results showed normal data distribution ( $p > 0.05$ ). Additionally, the hypothesis of the homogeneity of regression slopes was valid (Table 3) ( $P > 0.05$ ). Levene's test further evaluated the homogeneity of the variance of the groups in the

dependent variable. The results showed a homogeneous variance of the groups ( $p= 0.64$ ).

Table 4. The homogeneity of regression slopes and analysis of variance (ANOVA) of comparing post-test scores following adjusting pre-test among groups						
Source of variations	SS	DoF	Mean squares (MS)	F-value	p-value	Eta squared (ES)
Pre-test	535.641	1	535.641	37.355	0.001	0.539
Homogeneity of regression slopes	121.46	2	60.73	2.95	0.128	0.08
Group membership	4420.535	2	2210.268	154.140	0.001	0.906

According to Table 4, the difference between groups will be significant when excluding the effect of pre-test results on the post-test results ( $F=154.14$ ;  $p=0.001$ ). Bonferroni's post hoc analysis revealed the efficacy of EMDR and CBT psychotherapies in treating PTSD in patients who recovered from Covid-19 disease. However, the efficacy of EMDR psychotherapy was much higher than EFT-based therapies in the treatment of PTSD (Table 1).

### Discussion

This study compared the effectiveness of EMDR and CBT psychotherapies on PTSD treatment in patients who recovered from Covid-19 disease. Both EMDR and CBT therapies efficiently treated PTSD patients who recovered from Covid-19, while EMDR showed more measurable outcomes than CBT. These findings agree with those reported by Sadat Madani et al. [26], Rezai and Khanjani [6], Abdi et al. [11], Mohammad Tehrani et al. [7], Clond [27], Church, et al. [28], Sebastian and Nelms [29], Perri et al. [30], Alamdar Baghini et al. [31] and Jamshidzadeh et al. [32]. Consistent with the study by Narimani and Rajabi [33], EMDR seems to reduce sensitivities to stimuli and destroys disheartening responses and anxious behaviors in individuals and participants. According to Mardpour and Rajabi [34], EMDR reprocesses memories, traumatic events, emotional experiences, and unprocessed information with associated thoughts, feelings, and bodily sensations that are blocked in the memory network. This is achieved through tactile or acoustic stimulation with bilateral left and right movements in the eye by activating and improving the activity of the left forehead cortex, which stores more functional memory. Accordingly, the participant's perceptions are appropriately processed, perceived, and altered, allowing the PTSD patients to interpret themselves cognitively, find more adaptive reasons for their traumatic experiences, and eventually achieve improved self-awareness. According to Capezzani et al. [12], one of the most critical processing stages happens during sleep and rapid eye movements, causing intermittent stimulation of the right and

left hemispheres. In prolonged psychological damage, hypothalamic activity is increased by excessive noradrenaline secretion, resulting in sleep interference. Therefore, information, processing of which brings better adaptation to the situation, is incompletely processed, and cognitive and emotional interpretations of the event are distorted. This deprives the person of realizing new ways to see the painful situation through EMDR psychotherapy. Sadat Madani et al. [19] found that EMDR reactivates the natural healing power of the mind and reprocesses that information by interacting between the brain's two hemispheres. In addition, according to Narimani and Rajabi [33], eye movements seem to gradually diverge anxiety from the eyes and allow the person to rethink the main event indifferently and impartially, similar to watching a movie and its ongoing events. The situation also brings more natural and automatic emotions by cognitively reorganizing the event.

According to the findings of this study, in theory, CBT underscores the fact that the event itself does not lead to various moods, but its interpretation forms different emotions [16]. Therefore, training about PTSD to participants and explaining how it develops and affects their health during interventions may reduce PTSD scores in the post-test. This finding agrees with previous research. To illustrate the results of this study, it can be declared that factors leading to anxiety, worry, and panic in PTSD patients are associated with their attitude and interpretation of physical symptoms such as chest pain, shortness of breath, and palpitations as unpredictable and uncontrollable phenomena. Cognitive distortions such as catastrophizing, excessive generalization, negative self-centered thoughts, dysfunctional negative views, the patient's evaluation of the impact of anxiety on his life, and the extreme irritability provoked by these negative thoughts cause more concern, anxiety, and panic than the disease itself. In addition, specific beliefs about stress lead to maladaptive coping strategies, trigger psycho-physical symptoms, and results in suffering and disability [35]. CBT first allows patients to willingly and intrepidly express their dysfunctional thoughts and feelings and cognitive distortions. Thoughts, underlying

beliefs, and cognitive distortions are then evaluated and corrected. According to Beck's cognitive therapy model [26], the efficacy of cognitive therapy is improved if the therapist corrects such underlying assumptions in patients and replaces intellectual distortions with positive, logical, and non-extreme thinking [36]. This study aimed to identify dysfunctional thoughts, beliefs, and cognitions associated with PTSD to allow patients gradually know about their dysfunctional thoughts and attitudes and correct their dysfunctional underlying ideas and assumptions through cognitive therapy techniques. The findings of this study confirm the efficacy of EMDR and CBT psychotherapies in alleviating anxiety, worry, and panic in PTSD patients.

However, there were some limitations in this study. The findings should not be generalized to the whole community, as the participants were females aged 25 and 60 years. In addition, the results were collected through self-assessment tools, implying the possibility of biasing the findings and a lack of control over other influential variables during the study.

### Conclusion

EMDR and CBT could be efficient psychotherapies to treat PTSD in patients who recovered from Covid-19. They assist PTSD patients in overcoming the injuries caused by past experiences and alleviate or treat worry, anxiety, and panic disorder by forming positive emotions and accepting their experiences. Furthermore, EMDR intervention brings more measurable results than CBT in treating PTSD. Future research is recommended to investigate the effects of EMDR and CBT on PTSD among other participants employing alternative techniques.

### Ethics

The authors confirm that the journal's position on issues involved in the ethical publication has been carefully read and affirm that this report is consistent with those guidelines under the ethical code: IR.IAU.PS.REC.1400.089.

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### Conflicts of interest

The authors declare no conflicts of interest.

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