# Evaluating the Effectiveness of Eye Movement Desensitization and Reprocessing Therapy for Post-Traumatic Stress Disorder in Grieving Girls

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**Abstract:**

**Background and Objective: Grief therapy poses a significant challenge in clinical and mental health practice. Given the considerable emotional and economic burdens associated with grief, it is essential to review the existing literature to identify the most effective therapeutic interventions. The present study aims to evaluate the efficacy of eye movement desensitization and reprocessing (EMDR) therapy in alleviating post-traumatic stress disorder (PTSD) symptoms among girls experiencing grief.**

**Materials & Methods: This semi-experimental study employed a pre-test and post-test design, incorporating both experimental and control groups. The research population consisted of all female students enrolled in schools within District 5 of Tehran during the 2023-2024 academic year. Thirty eligible volunteer participants were selected through purposive sampling and subsequently assigned to two equal groups of 15 participants each. Data were collected using the Lovibond and Lovibond Depression-Stress Questionnaire (1995) and the Tedeschi and Calhoun PTSD Questionnaire (1996). The experimental group received EMDR therapy following Shapiro's established protocol, which was administered across six weekly 60-minute sessions. Data analysis was performed using multivariate analysis of covariance (MANCOVA), with a significance threshold set at 0.05.**

**Results: Results from the MANCOVA indicated a statistically significant reduction in post-traumatic stress scores for the experimental group after controlling for pre-test effects (P=0.002). In particular, girls with grief-related disorders who underwent EMDR therapy demonstrated a marked decrease in symptoms of PTSD. The effectiveness of EMDR therapy was quantified at 30.8% in terms of alleviating post-traumatic stress.**

**Conclusion: The findings of this study suggest that therapists working with individuals exhibiting personality vulnerabilities and those navigating experiences of grief may benefit from incorporating EMDR therapy into their clinical practice. This therapeutic approach has the potential to enhance clients' capabilities to confront and manage negative emotions while simultaneously reducing symptoms of post-traumatic stress.**

***Keywords: Eye Movement Desensitization Reprocessing, Mental Health, Stress Disorders, Post-Traumatic, Grief***

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## Background and Objective

Annually, disasters and traumatic events cause loss of life, disability, and significant financial damage, affecting millions of individuals worldwide.[1] Among the most profound losses a child can experience is the death of a parent, particularly when witnessed firsthand.[2] While it is natural for individuals to exhibit grief responses following such a loss, these reactions generally do not necessitate therapeutic intervention. However, when grief persists beyond six to twelve months and develops into a complicated form, it can severely impair an individual's overall functioning, often leading to post-traumatic stress disorder (PTSD) and other psychological challenges that require intervention.[3]

Research has consistently demonstrated that grieving children and adolescents often struggle with a range of distressing symptoms, including persistent rumination, intrusive memories, heightened physiological arousal, and avoidance behaviors related to reminders of their loss.[4] Such experiences can contribute to the development or exacerbation of PTSD, complicating coping mechanisms of individuals within an already stressful environment. According to the International Classification of Diseases (ICD-10) and the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), PTSD encompasses acute psychological reactions to severe traumatic experiences. For a formal diagnosis of PTSD, these reactions must persist for at least one month and include three core symptom clusters: re-experiencing the trauma, avoidance of reminders, and emotional numbness, along with hyperarousal.[5]

The manifestations of PTSD can vary significantly, including the development of depression, difficulties in interpersonal relationships, and cognitive impairments.[6] Although much of the existing research on PTSD has predominantly centered on adults, notable cases have been documented among children and adolescents who have either witnessed traumatic deaths or experienced severe stress.[7] Due to the developing nature of their coping mechanisms, children and adolescents may be particularly vulnerable to severe PTSD symptoms and mood disturbances following trauma compared to adults.[4]

Although grief is a universally recognized human experience, its psychological consequences—particularly during critical developmental stages—require specialized therapeutic intervention. Eye Movement Desensitization and Reprocessing (EMDR) has recently emerged as an effective psychotherapeutic approach for addressing stress- and trauma-related injuries.[8] EMDR is designed to assist individuals process traumatic memories and alleviate associated symptoms. This therapeutic modality facilitates the processing of unresolved memories to mitigate their negative psychological impact. By directing patients' attention to distressing memories while administering bilateral stimulation—such as rapid eye movements, gentle taps, or alternating auditory stimuli—EMDR promotes a more adaptive reconstruction of the neural connections associated with memory and emotion. This innovative mechanism supports healthier processing of memories, thereby reducing the intensity of emotional distress.[9,10] Nonetheless, the specific effectiveness and underlying mechanisms of EMDR in aiding grieving girls who confront the complexities of grief and trauma merit further scientific investigation and clarification.

Given the widespread prevalence of grief in societal contexts and the detrimental effects of PTSD on both mental health[7] and the developmental trajectory of girls, conducting research to assess the efficacy of EMDR within this demographic is of paramount significance. Such investigations hold substantial scientific value and practical implications, particularly considering the unique vulnerabilities of bereaved girls to chronic psychological disorders. This research aims to provide empirical validation for effective therapeutic interventions while empowering mental health professionals to utilize the neurocognitive reprocessing mechanisms of EMDR to alleviate the psychological distress experienced by this population. In doing so, the study aspires to prevent the

**emergence of long-term adverse effects on their mental well-being and quality of life. The findings will serve as a foundational framework for advancing therapeutic protocols, health policy initiatives, and the development of supportive programs within affected communities. Consequently, this study was conducted to evaluate the effectiveness of EMDR therapy in addressing PTSD among girls experiencing complicated grief.**

## Materials and Methods

**This study employed a quasi-experimental design with both pre-test and post-test measures for experimental and control groups. The target population comprised female students enrolled in schools located in District 5 of Tehran during the 2023-2024 academic year. From these adolescent girls, 30 eligible volunteers diagnosed with grief disorder by a psychologist or counselor affiliated with a mental health center within the education department were selected through purposive sampling. These participants were then randomly assigned to two equal groups: 15 individuals in the experimental group and 15 in the control group.**

**The following formula was used to calculate the sample size:**

$$n = \frac{(Z_{1-\alpha/2}+Z_{1-\beta})^2(\sigma_1^2+\sigma_2^2)}{(\mu_1-\mu_2)^2}$$

**The sample size was calculated using a formula based on research conducted by Rahimi-Sadeghi and colleagues. Considering a variance difference of 0.8 between the two groups, a mean post-test score difference of 4.82, a statistical power of 0.9, and a Type I error rate of 0.05, the required sample size was determined to be 15 participants for each group. Following this calculation, participants were randomly assigned to the experimental and control groups.**

**The inclusion criteria for this study were as follows: obtaining informed written consent from participants; a confirmed diagnosis of grief disorder by a qualified psychologist; female participants, aged between 12 and 18 years; residing with at least one surviving parent or primary caregiver if both parents were deceased; completion of all self-report assessment tools during various study phases; and the capacity to consistently attend scheduled therapeutic sessions and complete related exercises. The exclusion criteria included: attendance at more than two sessions of the intervention program; symptom deterioration requiring hospitalization; presence of comorbid physical or chronic psychiatric conditions; substance abuse; existing diagnoses of depression, bipolar disorder, or schizophrenia; occurrence of psychotic episodes; or participation in another treatment program during the intervention period.**

## Research Tools

### Depression Anxiety Stress Scales–Short Form (DASS-21)

**The DASS-21, developed by Lovibond and Lovibond in 1995, is a self-report instrument consisting of 21 items categorized into three subscales: seven items assess stress, seven evaluate depression, and seven measure anxiety. All items are scored on a 4-point Likert scale ranging from 0 to 3, with responses ranging from "does not apply to me at all" (0) to "applies to me very much, or most of the time" (3). Each subscale yields raw scores between 0 and 21, which are subsequently multiplied by 2 for standard interpretation, resulting in a range from 0 to 42. In their foundational research, Lovibond and Lovibond reported Cronbach's alpha coefficients of 0.94 for the depression subscale, 0.87 for anxiety, and 0.91 for stress within the short form of the DASS-21. Exploratory factor analysis confirmed the questionnaire's three-dimensional structure, providing strong evidence for its construct, convergent, and discriminant validity.[12] The psychometric properties of this instrument have been validated in numerous national studies; for instance, Hafez et al. reported Cronbach's alpha coefficients of 0.77 for depression, 0.79 for anxiety, and 0.78 for stress. Their concurrent validation, using the Beck Depression Inventory and the Perceived Stress Scale, revealed significant correlations: 0.70 for the depression subscale with the Beck scale, 0.67 for anxiety, and 0.49 for stress, all significant at the 0.05 Type I error level.[13]**

## Post-Traumatic Growth Inventory (PTGI)

**The PTGI, developed by Tedeschi and Calhoun in 1996, consists of 21 items across five dimensions: relating to others, new possibilities, personal strength, spiritual change, and appreciation of life. Respondents rate their level of agreement using a 6-point Likert scale ranging from 0 to 5, leading to total scores that range from 0 to 105, where higher scores signify greater psychological growth following traumatic experiences. In the original study, the overall Cronbach's alpha for the scale was reported as 0.90, and the two-month test-retest reliability coefficient was 0.71. Cronbach's alpha values for the various dimensions ranged from 0.67 to 0.85.[14]**

**The Persian adaptation of the PTGI has demonstrated strong psychometric properties in validation studies conducted in Iran, with overall Cronbach's alpha values ranging from 0.87 to 0.94 and subscale coefficients between 0.65 and 0.86. Moreover, confirmatory factor analysis supported the five-dimensional structure of the instrument, offering robust evidence of content validity, construct validity, as well as convergent and divergent validity.**

***Table 1- Summary of the content of regular eye movement desensitization therapy sessions based on the Shapiro protocol***

| *Meeting* | *Meeting Content* |
|---|---|
| *1* | *Obtaining the necessary information for treatment design from the client; planning the treatment process; reviewing family and clinical history; examining symptoms of post-traumatic stress; providing social support to the client; and determining treatment goals and expectations for the session.* |
| *2* | *Preparing the treatment environment involves providing the necessary training and setting up the appropriate atmosphere. This includes explaining how to enter and progress through the various stages of treatment, along with their challenges and benefits. Additionally, it is important to offer relevant metaphors to help manage the treatment process and to teach specific concepts such as creating a safe space and practicing deep breathing.* |
| *3* | *Assessing familiarity with the concept of negative emotions when selecting a target memory; choosing a target image; exploring the individual's internal dialogue; examining the individual's beliefs about the traumatic experience; selecting an unhealthy negative cognitive construct related to the target image and trauma; and identifying a positive cognitive construct that is both related to and contrary to the trauma.* |
| *4* | *Desensitization was the most difficult and longest stage of treatment. During this phase, Joe's therapy focused on addressing his negative beliefs, emotions, and physical stressors by visualizing painful scenes while simultaneously following bilateral stimulation through eye movements and tracking the therapist's hand movements.* |
| *5* | *Brokerage: In this stage, the goal is to establish a positive schema rather than a negative one and to strengthen it through reciprocal stimulation. During this phase, a set of target images and positive schemas was developed. Once the assessment reached the desired level and the client experienced acceptable relief, the topic of mental distress was addressed, and its management was explained.* |
| *6* | *The achievement of treatment goals was reviewed, and based on this, a plan was made to continue the exercises at home. Coping skills were practiced and discussed, and a summary of previous sessions was provided.* |

## EMDR Protocol

**EMDR protocol employed in this study consisted of six therapeutic sessions, each lasting one hour and scheduled weekly, in accordance with Shapiro's established protocol (2001).[16] In adherence to ethical research principles, all participants received, comprehensive explanations of the research process. Additionally, individuals in the control group were assured free mindfulness therapy sessions following the conclusion of the study. A detailed summary of the content addressed during the therapeutic sessions is presented in Table 1.**

**The statistical methodology employed for data analysis was multivariate analysis of covariance (MANCOVA). Prior to this analysis, key assumptions pertinent to covariance analysis were evaluated, including normality, homogeneity of variance, and homogeneity of regression slopes, utilizing appropriate testing methods. The Chi-square test was applied to compare demographic data between the two groups, with a significance level established at 0.05. Data were analyzed using IBM SPSS Statistics, version 26.0**

## Findings

**Demographic data indicated that within the experimental group, 53% (8 participants) were aged 17 to 18 years; 27% (4 participants) were aged 15 to 16 years; and 20% (3 participants) were aged 12 to 14 years. In the control group, 46% (7 participants) were aged 17 to 18 years; 40% (6 participants) were aged 15 to 16 years; and 14% (2 participants) were aged 12 to 14 years. Table 2 presents descriptive statistics, including the mean and standard deviation of the dependent variables for both groups. The results demonstrated a reduction in mean scores for PTSD symptoms among participants in the experimental group following the EMDR sessions, as observed during the post-test phase.**

**To evaluate the effectiveness of the EMDR intervention, a MANCOVA was conducted. Prior to this analysis, the assumptions for MANCOVA were verified. Levene's test indicated no significant heterogeneity of variance for the PTSD variables (P=0.828), confirming the homogeneity of variances. Given that the sample sizes in both groups were lower than 40, the Shapiro-Wilk test was utilized to examine the normality of the post-test scores for the two variables, which revealed no significant deviations from normality for the PTSD variables' post-test scores (P>0.05). Additionally, a non-significant interaction effect between group and pre-test scores confirmed the homogeneity of regression slopes for both PTSD variables (P>0.05). Results from MBox's test further supported the assumption of an equal covariance matrix (P>0.05).**

**With all requisite assumptions established for the use of MANCOVA, the results are presented in Tables 3 and 4.**

**The outcomes of Wilks' Lambda, Pillai's trace, Hotelling's trace, and the largest root concerning differences in the dependent variables were statistically significant (Table 3). Consequently, significant differences were observed between the experimental and control groups concerning at least one of the post-test research variables. The partial eta squared was approximately 0.43, suggesting that 43% of the variance in post-traumatic stress scores among girls with grief disorder was attributable to the EMDR treatment. Additionally, the statistical power of 0.996 underscored the adequacy of the sample size and the robustness of the analysis.**

*Table 2- Mean and standard deviation of research variables by group and measurement stages*

| Dependent variable | Group | Number | Pre-test | Post-test |
|---|---|---|---|---|
| | | | Standard deviation±mean | Standard deviation±mean |
| PTGI Post-Traumatic Growth Inventory | Test | 15 people | 63.73±7.67 | 57.60±7.03 |
| | Control | 15 people | 63.60±7.76 | 63.13±9.19 |
| DASS-21 | Test | 15 people | 41.20±4.42 | 35.67±4.85 |
| | Control | 15 people | 41.73±4.35 | 40.04±4.26 |

*Table 3- Results of multivariate analysis of covariance for research variable score*

| Test Type | Value | F-Statistic Value | Probability Value | Effect Size | Test power |
|---|---|---|---|---|---|
| Pilapi's effect | 0.434 | 602.9 | <0.001 | 0.434 | 0.996 |
| Wilkes' lambda | 0.566 | 602.9 | <0.001 | 0.434 | 0.996 |
| Hotelling's effect | 0.768 | 602.9 | <0.001 | 0.434 | 0.996 |
| The largest root of zinc | 0.768 | 602.9 | <0.001 | 0.434 | 0.996 |

**The findings of the MANCOVA, as illustrated in Table 4, illustrated that the EMDR treatment, after controlling for pre-test effects, significantly reduced post-traumatic stress scores according to the PTGI (*P* = 0.002) and decreased DASS-21 scores (*P*=0.004). Consequently, post-traumatic stress symptoms were significantly reduced among bereaved girls participating in EMDR sessions, yielding a 30.8% reduction in PTSD symptoms and a 26.3% decrease in DASS-21 scores.**

***Table 4- Between-subject effects of multivariate analysis of covariance in post-test scores of research variables with adjustment for pre-test effect***

| *Source of variation* | *Variable* | *Sum of squares* | *df* | *Mean of squares* | *F-statistic value* | *Probability value* | *Effect size* |
|---|---|---|---|---|---|---|---|
| *Pre-test* | *PTGI Post-Traumatic Stress* | *6.582* | *1* | *6.582* | *0.095* | *0.760* | *0.004* |
| | *DASS-21* | *134.048* | *1* | *134.048* | *8.039* | *0.009* | *0.229* |
| *Group Membership* | *PTGI Post-Traumatic Stress* | *830.744* | *1* | *830.744* | *11.990* | *0.002* | *0.308* |
| | *DASS-21* | *160.976* | *1* | *160.976* | *9.654* | *0.004* | *0.263* |
| *Error* | *PTGI Post-Traumatic Stress* | *1870.751* | *27* | *69.287* | - | - | - |
| | *DASS-21* | *450.219* | *27* | *16.675* | - | - | - |
| *Corrected Total* | *PTGI Post-Traumatic Stress* | *2709.467* | *29* | - | - | - | - |
| | *DASS-21* | *729.467* | *29* | - | - | - | - |

## Discussion

**The present study aimed to evaluate the effectiveness of EMDR treatment in reducing PTSD symptoms in bereaved girls, revealing significant symptom reductions among participants undergoing EMDR therapy. A review of the existing literature confirms that these findings are consistent with previous studies conducted by Hofmeister et al.,[8] Van der Kolk and Van Der Linden,[9] and Daniels et al.[10] Additionally, research by Nina et al.[17] demonstrated that children participating in eight EMDR sessions experienced decreased intensity and frequency of PTSD symptoms, as well as diminished anger. Findings by Beirman et al.[18] similarly indicated that EMDR treatment resulted in reductions in emotional distress and PTSD symptoms among adults, thereby reinforcing the current results.**

**The efficacy of EMDR treatment can be attributed to its foundation on the premise that traumatic memories are stored suboptimally within the brain, a retaining heightened emotional charge. During EMDR sessions, bereaved girls recall traumatic incidents while following bilateral eye movements. This dual engagement activates memory networks associated with those events, promoting emotional and cognitive processing and facilitating the reprocessing of traumatic experiences. The disruptive impact of traumatic memories gradually diminishes, evolving from a state of heightened intensity to one that is more processed and less threatening. This process ultimately leads to reduced physiological reactivity and a**

decrease in avoidance behaviors that are central to PTSD.

In cases where complicated grief coexists with trauma, EMDR not only addresses the processing of traumatic memories but also aids in reconstructing meaning from loss by alleviating the emotional burdens associated with distressing mental imagery and correcting negative beliefs, such as feelings of guilt, powerlessness, or hopelessness. These changes promote emotional regulation and create healthier cognitive pathways. Neuroimaging studies have demonstrated decreased activity in the amygdala and increased functional connectivity between the hippocampus and prefrontal cortex following EMDR treatment. These biological transformations correlate with reductions in intrusive thoughts, nightmares, irritability, and hyperarousal associated with PTSD. Collectively, these mechanisms enable bereaved girls to develop improved coping strategies for managing memories and enhance emotional regulation, resulting in a significant decrease in PTSD symptoms.

Moreover, this study found that EMDR was effective in alleviating symptoms among adolescent girls experiencing complex grief, corroborating findings from prior studies, including those conducted by Chen et al.,[19] Agle,[20] and Brookman-Labianese.[21] Additionally, results from Blokhneh et al.[22] indicated a significant reduction in avoidance behaviors following eight EMDR sessions, further supporting these conclusions. Similarly, Paschar et al.[23] demonstrated that participation in EMDR sessions led to reductions in depressive symptoms, stress, and PTSD among drivers, lending additional support to the present findings.

In summary, the multifaceted pathways through which EMDR treatment and reprocessing affect bereaved girls suggest a significant impact on trauma memory processing. This approach facilitates a systematic re-examination and restructuring of stimuli linked to loss that typically perpetuate a state of threat. By implementing bilateral eye movements, the brain harmonizes emotional memory networks (e.g., the amygdala) with cognitive networks within the prefrontal cortex and hippocampus. Such integration facilitates the re-storage of painful memories as neutral representations, thereby diminishing the sense of danger associated with recollections of loss. This reprocessing effectively disrupts automatic responses to memory cues, enabling individuals to respond thoughtfully rather than instinctively.

At the physiological level, EMDR therapy promotes balance within the autonomic nervous system through anticipatory threat processing and emotional regulation. The bilateral movements utilized in EMDR stimulate the parasympathetic nervous system while reducing sympathetic activity linked to stress responses. Consequently, physiological markers such as heart rate, muscle tension, and breathing patterns become more regulated and calm. Additionally, the reorganization of neural networks between the amygdala-prefrontal cortex enables the brain to assess external threats more accurately, thereby reducing persistent hypervigilance. With decreased physical arousal, individuals can process grief-related emotions in a safe environment, enhancing their emotional self-regulation skills. This mechanism supports a healthier pathway toward emotional resilience and coping.

## Conclusion

The findings of this study demonstrate that EMDR treatment significantly alleviates post-traumatic stress symptoms in bereaved girls. Through the adaptive reprocessing of grief memories, along with emotional and physiological regulation, EMDR reduces arousal levels and enhances psychological functioning. Overall, EMDR emerges as an effective approach for restoring emotional equilibrium and alleviating distress following a loss.

It is important to acknowledge that the findings of this study are limited by the specific demographic of girls experiencing grief in Tehran and the small sample size, suggesting caution when generalizing the results to broader populations facing grief.

**A notable limitation of this research was the reliance on self-reporting tools for data collection. Adolescent participants may have been influenced by their social environment when responding to questions, potentially affecting the reliability of their answers. Furthermore, the purposive sampling method employed in this study restricts the generalizability of the findings. Future research should involve a more diverse population, including both adolescent girls and boys experiencing grief, and employ various methodological approaches, such as interviews in addition to questionnaires, to comprehensively assess the research variables. Additionally, due to the limitations encountered, the researchers were unable to conduct follow-up assessments with the participants, highlighting the need for future studies to incorporate a follow-up phase.**

## Conflict of Interest

**The authors declare that they have no conflicts of interest related to this research.**

## Authors' Contributions

**This article is derived from the master's thesis in psychology. The first author served as the principal investigator, while the second author functioned as the thesis supervisor.**

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