

# MITIGATING ADOLESCENT POST-TRAUMATIC STRESS DISORDER THROUGH INDIVIDUAL COUNSELING USING EYE MOVEMENT DESENSITIZATION REPROCESSIN TECHNIQUES: A STUDY ON SURVIVORS OF TRAIN ACCIDENTS

Ahmad Wahid<sup>1</sup>, Herman Nirwana<sup>2</sup>, Rezki Hariko<sup>3</sup>, Miftahul Fikri<sup>4</sup>, M. Fadlan Choiri<sup>5</sup>, Kanaya  
Yose Putri<sup>6</sup>, Nurul Fazria<sup>7</sup>

<sup>1,2,3,4,5,6,7</sup>Universitas Negeri Padang

Corresponding Email: [ahmadwahid@student.unp.ac.id](mailto:ahmadwahid@student.unp.ac.id)

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## Abstract

Diverse individual experiences and problems often lead to painful psychological disorders, one of which is the traumatic experience of individuals who have been involved in train accidents, which can lead to post-traumatic stress disorder. This condition requires responsive and serious attention, as it can have negative and long-lasting effects. One effort that can be made to overcome this problem is the implementation of individual counseling using the eye movement desensitization reprocessing technique. This study focused on empirically testing the effectiveness of individual counseling using the eye movement desensitization reprocessing technique in reducing PTSD in adolescents who have experienced train accidents. The research method used was an experiment with a single subject research design. The sample in this study consisted of two students who had experienced a train accident and had high levels of PTSD. The results showed that individual counseling using the eye movement desensitization reprocessing technique was effective in reducing PTSD in adolescents who had experienced a train accident. Visual analysis shows a consistent and significant decline in clients. Both clients who were initially identified as having PTSD no longer showed signs of PTSD after undergoing 3 and 4 sessions of intervention. However, the findings of this study should not be generalized to samples with different characteristics. The researchers recommend that future researchers apply individual counseling using eye movement desensitization reprocessing techniques to populations and samples with broader characteristics, as well as other relevant issues.

**Keywords:** : *individual counseling, eye movement desensitization reprocessing, post-traumatic stress disorder, adolescents, train accidents*

## Introduction

Every individual has a wide variety of life problems. Some of the difficulties faced often bring horrible experiences and impressions. Events with high intensity and magnitude that are threatening to individuals can lead to a condition known as post-traumatic stress disorder (Bisson et al., 2015; Wang et al., 2024). PTSD is a psychological disorder that arises in individuals as a result of events that are extremely significant, shocking, and threatening to their physical or psychological well-being. In line with this, according to Yehuda et al. (2015) PTSD is a psychopathological consequence that may arise as a result of exposure to traumatic events that threaten an individual's psychological and/or physical well-being.

This condition of PTSD requires responsive and appropriate treatment. According to Şahin & Sevil (2023) it is crucial to identify individuals at risk of developing PTSD and implement appropriate intervention methods for them to prevent disability. This is because PTSD can have adverse and diverse effects. One of the impacts experienced by individuals with PTSD is impaired physical health (Friedman et al., 2007; Gupta, 2013; Pacella et al., 2013; Pagotto et al., 2015). Some physical effects of PTSD based on empirical research are hypertension, angina pectoris, tachycardia, other heart diseases, stomach ulcers, gastritis, and arthritis (Pietrzak et al., 2012). In addition to physical effects, psychological effects are also impacted by this condition, where some of the effects that arise when a person experiences PTSD are extreme anxiety, emotional instability, poor concentration, and depression (Mobbs & Bonanno, 2017; Rogozhan et al., 2025; Zairul-Nizam et al., 2024) and even the risk of suicide (LeBouthillier et al., 2015).

There are several types of exposure to events that can be said to influence individuals with PTSD, namely: individuals who have directly experienced serious and urgent physical danger; individuals who have witnessed traumatic tragedies experienced by others; indirect exposure to traumatic experiences such as violence or accidents experienced by close family members or close friends; and repeated and extreme exposure to highly unpleasant traumatic details, such as healthcare workers collecting human remains (American Psychiatric Association, 2013). Some symptoms that subsequently appear in individuals with PTSD are persistent memories, avoidance of stimuli associated with trauma (Vieweg et al., 2006), negative changes in cognition and mood, and hyperarousal (American Psychiatric Association, 2013).

The current situation requires serious attention, as indicated by the results of a study conducted by Benjet et al. (2016) involving 24 countries worldwide with a sample size of 68,894 people. The results of the study show that more than 70% of respondents reported traumatic events. More than half of the traumatic events experienced were related to witnessing death or serious injury, sudden death of a loved one, being a victim of robbery, being involved in a life-threatening car accident, and experiencing a life-threatening illness or injury. Furthermore, research conducted by Kilpatrick et al. (2013) on 2,953 people in the United States found that 8.3% of individuals experienced PTSD during their lifetime. Similarly, in Indonesia, where this research was conducted, after natural disasters in Sumatra and Java, 20.9% of individuals experienced PTSD (Downs et al., 2017).

Based on this data, it can be seen that quite a number of individuals experience this condition. The urgent need to address PTSD has led to the selection of appropriate and responsive solutions. Based on previous research, there are various efforts that can be made to overcome this problem. Research shows that PTSD can be treated with psychological therapy (Gehringer et al., 2020; Hoppen et al., 2024) and also pharmacologically. However, based on the results of an analysis conducted by Martin et al. (2021), 36% of researchers agree that pharmacological therapy should be the second choice after psychological therapy. One psychological approach that can be taken is the provision of counseling services. Previous studies have shown that counseling using psychological therapy techniques can reduce PTSD in individuals (Nakimuli-Mpungu et al., 2013; Nursalim & Pratiwi, 2020; Ogbanga & Sobeye, 2024).

Several psychological therapy techniques that have been proven effective in treating PTSD are Psychoeducation, Systematic Desensitization (Çiller et al., 2022), Cognitive Behavior Therapy (Kar, 2011; Öst et al., 2023), Trauma-Focused CBT (Bianjiang et al., 2025; Rakhmasari et al., 2021), Systemic Therapy (Watkins et al., 2018), Play Therapy, Eye Movement Desensitization and Reprocessing (Meinhausen et al., 2025), Exposure

Therapy (Huang et al., 2022; McLean et al., 2022), Relaxation Techniques, Narrative and Psychodynamic Psychotherapy (Gkintoni et al., 2024).

One technique that has been proven effective in reducing PTSD levels in individuals is Eye Movement Desensitization and Reprocessing (North et al., 2018; Yurtsever et al., 2022). According to Hamblen et al. (2019) eye movement desensitization reprocessing is one of the most recommended techniques for treating PTSD. In a systematic review conducted by Novo Navarro et al. (2018), it was stated that for 25 years, this technique has been an effective and useful intervention for the treatment of PTSD, as proven scientifically. As in the latest study conducted by Hafkemeijer et al. (2025), which concluded that eye movement desensitization reprocessing therapy effectively reduces PTSD symptoms in individuals with personality disorders. This is also supported by research conducted in Indonesia by Susanty et al. (2022) on 91 PTSD patients in Jakarta, Bandung, and Cimahi, which stated that the implementation of eye movement desensitization reprocessing therapy can be used to reduce PTSD symptoms.

Based on the presentation of the research results, it can be observed that counseling with eye movement desensitization reprocessing therapy is effective when applied as an intervention to reduce PTSD in individuals. This study will implement this intervention to test its effectiveness in reducing PTSD in adolescents who have experienced a train accident in the city of Padang. In this case, accidents can be one of the causes of individuals experiencing PTSD (Alshahrani et al., 2022; Pacella et al., 2013). This is one of the novelties of this study, as there has been no research applying individual counseling with the eye movement desensitization reprocessing technique to reduce PTSD in adolescents who have experienced train accidents. This study can provide empirical evidence of how this intervention can contribute. Based on previous studies and data analysis, the researchers formulated several research questions that will provide direction and focus for this study.

- RQ1. What is the level of Post-Traumatic Stress Disorder in adolescents who experienced a train accident before and after receiving treatment?
- RQ2. How effective is individual counseling using Eye Movement Desensitization Reprocessing techniques in reducing Post-Traumatic Stress Disorder in adolescents who experienced a train accident?

## Method

This study used a quantitative approach with an experimental method and a single-subject research design. This design is an effective experimental design for testing the effects of intervention (Lobo et al., 2017) using a small number of patients (usually one to three) (Krasny-Pacini & Evans, 2018). The sample in this study was taken using a purposive sampling procedure so that the intervention could be given specifically to individuals who had experienced a train accident. The sample criteria in this study were: a) students who had experienced a train accident; b) students who had a high level of PTSD. The process of identifying these criteria used the PCL-5 instrument. Based on these criteria, initially, five students had experienced a train accident, but after measuring their PTSD levels, only three students were identified as having PTSD. The research will be conducted using an A-B-A design, beginning with initial observation (pre-test), followed by individual counseling using the eye movement desensitization reprocessing technique, and then observation of the results of the treatment (post-test). The collected data will then be analyzed using visual analysis tests and the percentage of non-overlapping data (PND). To better understand this research design, the following diagram is presented.

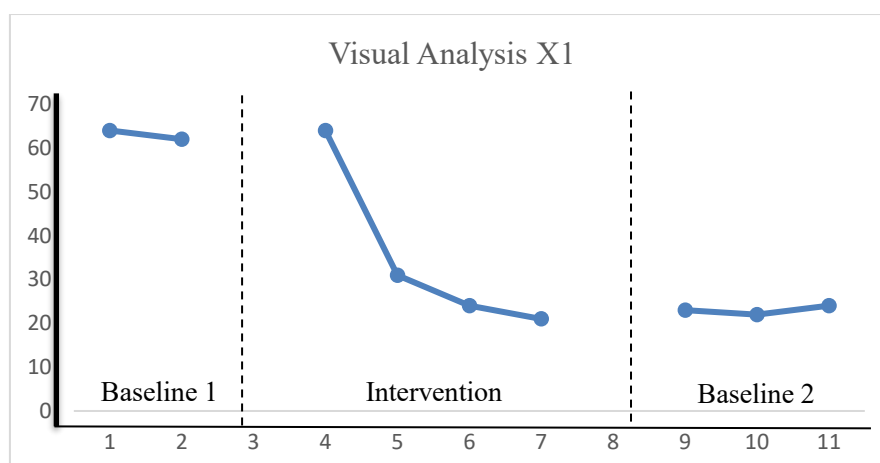


**Figure 1** *Research Design*

## Result and Discussion

### Description of PTSD in adolescents who survived a train accident

Based on the A-B-A research design used, this study began with baseline 1, also known as the pretest. This stage was conducted over three meetings to assess the consistency of the clients' PTSD symptoms. Treatment was then administered to the sample in the form of individual counseling using the eye movement desensitization reprocessing technique for three sessions. At each meeting, the client filled out the PTSD instrument again to see their progress. After that, baseline 2 was carried out again to see whether the changes that occurred were indeed the result of the intervention provided and were consistent. To see the changes that occurred in the level of PTSD in client 1, refer to the following visual analysis.



**Figure 2** *Visual Analysis of Client 1*

Figure 2 shows that client 1 experienced a significant decrease in PTSD levels, where at baseline 1, the client's PTSD condition was high, as measured in two meetings with scores of 64 and 62. After four sessions, there was a consistent decrease in each meeting, with scores of 64, 31, 24, and 21. After the intervention, measurements were taken again at baseline 2 to see the consistency of the decline, and it is clear from the figure that the student's PTSD condition had consistently declined with scores of 23, 22, and 24. The results then showed that the student was no longer identified as having PTSD.

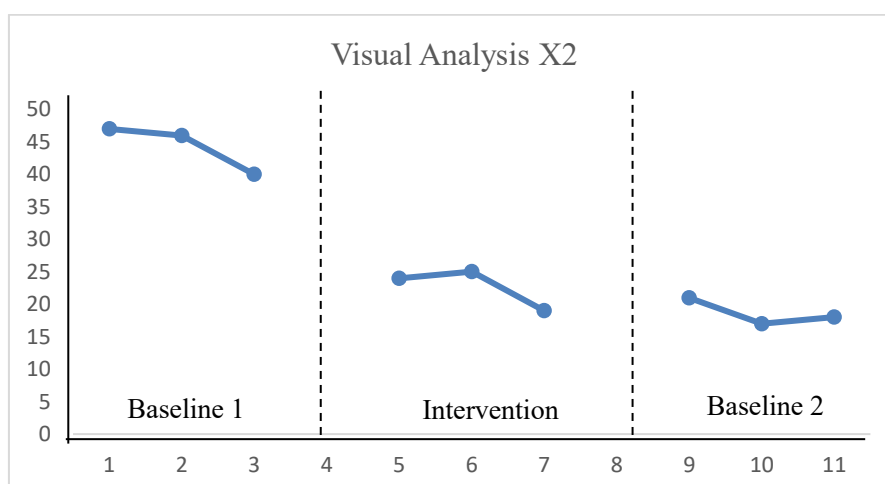
Furthermore, to see the effectiveness of individual counseling using the eye movement desensitization reprocessing technique in reducing PTSD in adolescents who survived a train accident, a percentage of non-overlapping data test was conducted. This method has been widely proposed by researchers to synthesize data in single-subject research designs (Petersen-Brown et al., 2012; Scruggs et al., 1987). In this case, the analysis website developed by Tarlow & Penland (2016) was used, making it easier and more practical.

**Table 1** Percentage of Non-overlapping Data on Client 1

Client	PND	p-value
X1	$\frac{3}{4} \times 100\% = 75\%$	0.1426

Based on Table 1 above, it can be observed that the results of data analysis using PND show that the intervention given to client 1 has an effectiveness of 75%, which is classified as effective. This conclusion is drawn from the categories proposed by Scruggs et al. (1987) in interpreting the results of the percentage of non-overlapping data. Thus, individual counseling services using the eye movement desensitization reprocessing technique can be said to be capable of reducing PTSD in adolescent survivors of train accidents.

Next, to see the condition of PTSD before and after intervention in client 2, it can be observed in the following image.



**Figure 3** Visual Analysis of Client 2

Based on Figure 3, it can be clearly seen how PTSD affects client 2. Starting at baseline 1, the pretest clearly shows that client 2 consistently identified as having PTSD after three measurements, with scores of 47, 46, and 40. Following this, an intervention was conducted in the form of individual counseling using eye movement desensitization reprocessing (EMDR) over three sessions. Measurements were also taken at each session to assess the client's PTSD condition after receiving the service. A significant decrease in the client's PTSD was clearly seen, with scores of 24, 25, and 19. To ensure the consistency of this decrease, measurements were also taken during three sessions, and the client's PTSD scores remained consistent at 24, 17 and 18. Therefore, based on this, it can be concluded that the client no longer has PTSD.

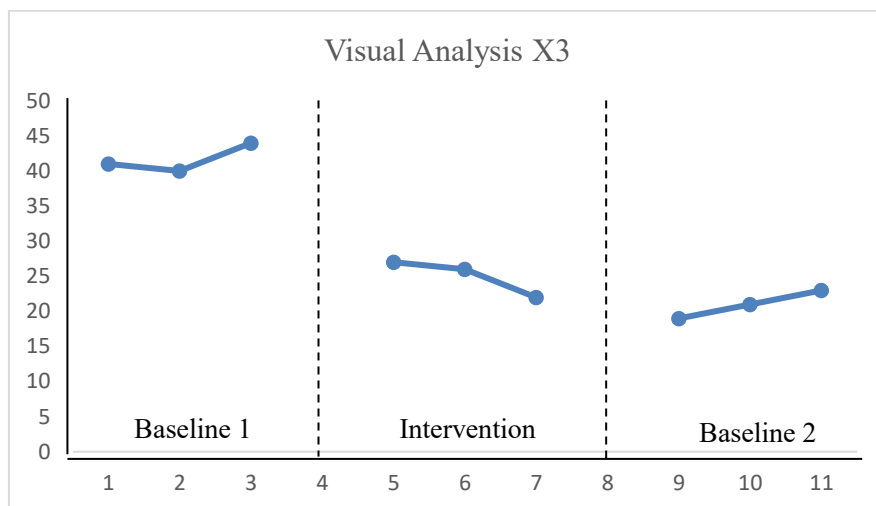
Furthermore, the effectiveness of the intervention in reducing PTSD in client AH can be seen in the following PND scores.

**Table 2** Percentage of Non-overlapping Data on Client 2

Client	PND	p-value
X2	$\frac{3}{3} \times 100\% = 100\%$	0.0309

Based on the table above, it can be clearly seen how the PND test results for client 2 turned out. The results show that the intervention given to client 2 was 100% effective, which in this case falls into the highly effective category. Thus, it can be clearly stated that the intervention given was highly effective in reducing PTSD in adolescents who survived the train accident.

The third client also showed positive results after undergoing treatment. Details can be seen in the following visual analysis.



**Figure 4** *Visual Analysis of Client 3*

Based on Figure 4, the condition of PTSD in client 3 can be clearly observed. In general, a downward trend can be seen after treatment was administered. At baseline 1, it is clear that client 3 was consistently identified as having PTSD after 3 measurements, with scores of 41, 40, and 44. Following up on this, the same intervention as the previous client was carried out during 3 meetings, where measurements were also taken at each meeting to see the client's PTSD condition. During the intervention period, a clear decrease in the client's PTSD was observed, with scores of 27, 26, and 22. Then, to ensure the consistency of this decrease, measurements were taken again during three meetings, and the student's PTSD scores were consistent at 19, 21, and 23. Based on this data, it can be concluded that the client no longer exhibits symptoms of PTSD.

To see the results of testing the effectiveness of the intervention with PND, refer to the following table.

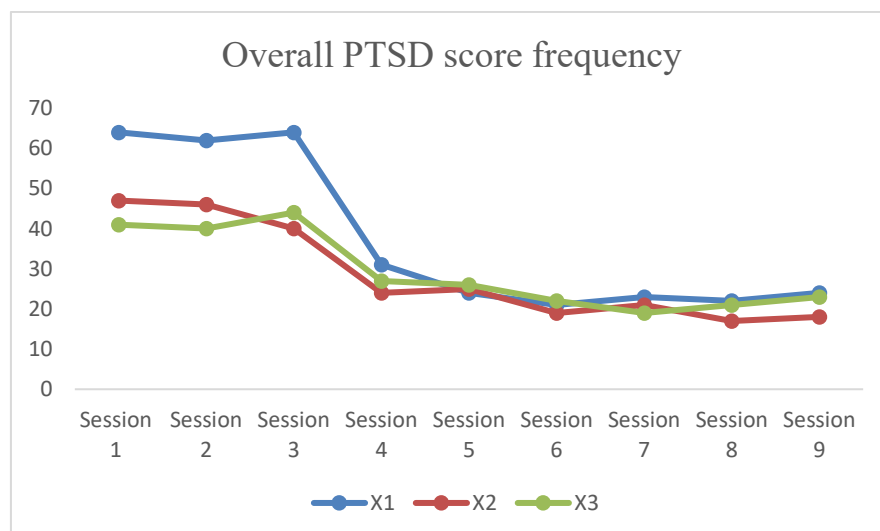
**Table 3** *Percentage of Non-overlapping Data on Client 2*

Client	PND	p-value
X3	$\frac{3}{3} \times 100\% = 100\%$	0.0309

The PND test results for client 3 also showed the same trend as the previous client. Based on Table 3, it can be analyzed that the PND test results show that the intervention given to client 3 was 100% effective, which in this case is also classified as highly effective. Thus, it can be clearly stated that the intervention provided is highly effective in reducing PTSD in adolescent survivors of train accidents.

## The effectiveness of individual counseling using EMDR techniques to reduce PTSD in adolescents who survived train accidents

It is also necessary to see the frequency of PTSD scores for these three clients, so that variations in scores can be clearly observed. To see the overall picture, the following graph is presented.



**Figure 5** Overall PTSD Score Frequency

Based on the data presented from the three clients, it can be observed that both experienced a positive trend, namely a decrease in the level of PTSD experienced after the train accident. After the intervention, the three clients were no longer identified as having PTSD based on the instrument criteria. Therefore, in order to conclude the effectiveness of this intervention, we will look at the percentage of non-overlapping data as a whole.

**Table 4** Overall Percentage Non-overlapping Data Score

Client	PND	p-value
X1	75%	0.1426
X2	100%	0.0309
X3	100%	0.0309

Based on the non-overlapping data percentage scores presented in Table 4 above, it can be observed that of the three clients, the intervention given to client 1 had an effectiveness rate of 75%, which falls into the effective category, while the other two clients had an effectiveness rate of 100%, which falls into the highly effective category. Therefore, it can be concluded that individual counseling using the eye movement desensitization reprocessing technique is generally effective and shows a consistent reduction in PTSD levels in all clients.

The results of the presentation of all the research findings above show that the condition of PTSD experienced by adolescents who had been involved in a train accident before receiving treatment was very poor and alarming, as indicated by high PTSD scores. This was undoubtedly due to train accidents being life-threatening events. Several studies have also clearly proven that vehicle accidents cause PTSD. Research conducted by Ursano et al. (1999) on individuals who experienced motor vehicle accidents found that

these individuals had the potential to develop chronic and acute PTSD. Relevant to this, research by Daddah et al. (2022) also concluded that individuals who experienced traffic accidents had a high prevalence of PTSD. Similarly, several other studies over the years have consistently stated that vehicle and traffic accidents can indeed cause PTSD in individuals (Arora et al., 2021; Blanchard et al., 1996; Kertzman et al., 2022; Kim et al., 2022; Mekonnen et al., 2022; Trajchevska & Jones, 2025). In a study conducted by Shahsavarinia et al. (2025) the prevalence of PTSD among traffic accident survivors was found to be 20.3%.

Based on this, it is clear that teenagers who experience train accidents have a high potential for developing PTSD. After conducting a pretest on the sample, treatment was provided in the form of individual counseling services using eye movement desensitization reprocessing techniques to reduce the PTSD experienced. The results of the study presented above conclude that this treatment can effectively reduce PTSD in adolescents who have experienced a train accident.

This reduction in PTSD levels certainly occurred due to the treatment given to the sample. In this case, individual counseling using the eye movement desensitization reprocessing technique is highly recommended to reduce PTSD (Wright et al., 2024). This technique allows clients to process painful memories and replace them with new adaptive memories by focusing on memories, current disturbances, and future actions. In the last decade, several trials have been conducted on this therapy and have shown promising results, although they cannot yet be generalized (Hudays et al., 2022). Much research and literature support the effectiveness and efficacy of this technique in providing appropriate treatment for individuals with PTSD (Haddad et al., 2024). Based on this, the WHO recommended eye movement desensitization reprocessing as the psychotherapy technique of choice for treating PTSD in children, adolescents, and adults (Acarturk et al., 2015; Valiente-Gómez et al., 2017; Wilson et al., 2018).

This therapy consists of a standard protocol that includes eight phases accompanied by bilateral stimulation (usually horizontal eye movements) to help clients eliminate discomfort caused by traumatic memories, to reprocess and integrate these memories. In short, this technique encourages clients to bring up the most distressing images of traumatic events, then interrupts the client's emotional arousal using another stimulus (bilateral stimulation), which is assumed to reduce the psychological distress experienced (Jeffries & Davis, 2013; Rothbaum et al., 2005). The application of individual counseling using the eye movement desensitization reprocessing technique in this study was conducted over 3-4 individual counseling sessions, with an intensity of 1 session per week. This is because, based on the theory, this technique is an individual therapy given once or twice a week for a total of 3-12 sessions (Haddad et al., 2024).

The results of the treatment conducted in this study clearly showed a significant reduction in PTSD among students who had experienced a train accident. Visual analysis showed a consistent and significant decline in the clients. Both clients who were initially identified as having PTSD were no longer identified as having PTSD after undergoing 3 and 4 sessions of intervention. This is consistent with previous research findings that empirically tested the effectiveness of individual counseling using the eye movement desensitization reprocessing technique in reducing PTSD. Data collected by Boccia et al. (2015) shows that 77-90% of individuals who underwent therapy using the eye movement desensitization reprocessing technique were no longer identified as having PTSD. In other words, this technique has a fairly high success rate. Research conducted by Ališahovi-Gelo & Hasanovi (2021) on individuals who experienced PTSD due to car accidents. The eye movement desensitization reprocessing technique was administered after pharmacological therapy failed. The results of the case study concluded that the eye



movement desensitization reprocessing technique can reduce trauma in individuals who have experienced car accidents.

In addition, research conducted by Ribchester et al. (2010) on 11 children who experienced post-traumatic stress disorder after a traffic accident also produced relevant results. After applying eye movement desensitization reprocessing techniques to the clients, all of them improved, with none of them identified as having PTSD anymore. Similarly, several other studies concluded that eye movement desensitization reprocessing techniques can effectively reduce PTSD in individuals who have experienced traffic accidents (Yaşar et al., 2022; Yasar et al., 2025).

Based on the previous in-depth discussion, it can be concluded that individual counseling using eye movement desensitization reprocessing is effective in reducing PTSD in adolescents who have experienced train accidents. These results are certainly supported by and relevant to previous studies. This further strengthens the position and status of individual counseling using eye movement desensitization reprocessing as a highly recommended alternative for reducing PTSD. The findings of this study certainly have limitations in future practice, in that they cannot be generalized to samples with different characteristics. This is because the experiment was specifically conducted on adolescents with traumatic experiences of train accidents. Based on these results, the researchers recommend that future researchers apply individual counseling using eye movement desensitization reprocessing techniques to populations and samples with broader characteristics, as well as other relevant issues.

## **Conclusion**

Individual counseling using eye movement desensitization reprocessing techniques is one promising solution for treating PTSD. The findings of this study show that individual counseling using eye movement desensitization reprocessing techniques is effective in reducing PTSD in adolescents who have experienced train accidents. As seen from the visual analysis, there was a consistent and significant decrease in the clients. Of the three clients who were initially identified as having PTSD, after undergoing intervention for 3 and 4 sessions, they were no longer identified as having PTSD. Similarly, the percentage of non-overlapping data scores showed that the intervention given to client 1 had an effectiveness rate of 75%, which is classified as effective, while the other two clients had an effectiveness rate of 100%, which is classified as highly effective. Thus, it can be concluded that individual counseling using the eye movement desensitization reprocessing technique is generally effective and shows a consistent reduction in PTSD levels in all clients. These results reinforce the position of individual counseling using the eye movement desensitization reprocessing technique as a recommended therapy for reducing PTSD. However, the results of this study cannot be generalized to different sample characteristics. Researchers recommend that future researchers apply individual counseling using eye movement desensitization reprocessing techniques to populations and samples with broader characteristics, as well as other relevant issues.

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## Author Contributions Statement

All researchers contributed fully to the implementation of this study. AW, HN, and RH contributed to the development of the research concept, research framework, implementation of interventions, and writing of the research report. MF participated in developing the data analysis steps and their interpretation. MFC, KYP, and NF participated in proofreading and improving the grammar of this article.

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