

“A Differential Therapeutic Effects of EMDR on Symptom Clusters in War Induced PTSD Revealing Persistent Hyperarousal Resistance”

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Highlights of the Study:

- EMDR significantly reduces re-experiencing and avoidance symptoms among war-wounded PTSD patients.
- Hyperarousal symptoms show no significant improvement following standardized EMDR intervention.
- Study identifies a critical intervention gap in symptom-specific PTSD treatment outcomes.
- EMDR demonstrates superior overall effectiveness compared to conventional psychological treatment methods.
- Findings support the necessity of integrated, multimodal approaches for comprehensive PTSD management.

Abstract

Post-Traumatic Stress Disorder (PTSD) is highly prevalent among individuals injured by war and is often marked by complex and persistent symptoms. Eye Movement Desensitization and Reprocessing (EMDR) is widely accepted as an effective trauma-focused therapy; however, its effects across specific PTSD symptom clusters remain insufficiently explored in severely injured, conflict-affected populations. This study examined the differential impact of EMDR on re-experiencing, avoidance, and hyperarousal symptoms among war-wounded individuals in Lebanon. Using a quasi-experimental pre-test/post-test methodology, 100 individuals with PTSD diagnoses were divided into two groups: one receiving regular psychological therapy and the other receiving an EMDR intervention. PTSD symptom severity was measured using the Davidson Trauma Scale. The results showed significant reductions in re-experiencing and avoidance symptoms among participants who received EMDR, whereas no significant improvement was observed in hyperarousal symptoms. Demographic and injury-related factors did not significantly influence treatment outcomes. These findings highlight a symptom-specific intervention gap, suggesting that while EMDR effectively addresses cognitive and behavioral trauma responses, it may be insufficient for resolving physiological hyperarousal. The results underscore the need for integrated, multi-modal treatment approaches to enhance PTSD care in war-wounded populations.

Keywords: Post-Traumatic Stress Disorder; Eye Movement Desensitization and Reprocessing; War-related trauma; Symptom clusters; Hyperarousal; Lebanon

1 Introduction

Armed conflict is commonly known as one of the most significant sources of psychological trauma among individuals and communities¹. In Lebanon and other countries that have undergone long periods of conflict, one of the effects has been a high number of war-wounded people who are victims of (PTSD)². The PTSD is linked to the continuous psychological discomfort that leads to severe deterioration of daily functioning, physical injury recovery, and reintegration into society³. The challenges underscore the need to employ evidence-based psychological interventions, which can be effective in tackling the complicated mental health requirements of people who have been exposed to war-related traumas⁴.

EMDR is a trauma-oriented treatment of PTSD and has been proven to be a first-line intervention that has received an increasing amount of empirical evidence⁵. Its efficacy in lowering the overall severity of PTSD symptoms in varied populations has been proven in several studies⁶. Nevertheless, in very complicated cases, like the war wounded, clinical observations indicate that the standard EMDR protocols do not necessarily result in the full recovery of symptoms⁷. More specifically, some group of patients still has persistent physiological and emotional symptoms even after they have had a complete course of EMDR treatment⁸.

Although there is a good amount of evidence that EMDR is generally effective, little focus has been put on its difference effects on specific symptoms clusters of PTSD⁹. The available literature does not often make any distinction between the symptoms that can be easily treated by using EMDR and those that might not be cured at all, especially when dealing with the population with serious physical injuries¹⁰. The absence of such symptom-specific evidence provides a critical vacuum in the clinical knowledge base, and a practitioner is at a loss because of how they can treat any residual symptoms after EMDR¹¹. To provide more targeted and efficient care for the communities affected by war, this gap must be filled.¹².

Accordingly, this study applies to the symptom-specific efficacy of EMDR with war-wounded population in Lebanon with special interest to the variation in response to treatment between re-experiencing, avoidance, and hyperarousal symptoms.

1.1 Research Objectives

The aims of this study is given below:

- To identify baseline levels of (PTSD) symptoms among war-wounded individuals in Lebanon prior to intervention.
- To investigate how a standardized EMDR session affects the three main clusters of PTSD symptoms: avoidance, hyperarousal, and re-experiencing.
- To compare changes in PTSD symptom severity between participants receiving EMDR and those receiving standard psychological treatment.

1.2 Research Questions

The research attempted to provide responses to the following primary and secondary questions:

- Primary Question: How well does EMDR help war-wounded people with the three main PTSD symptom clusters of avoidance, hyperarousal, and re-experiencing?

Sub-Questions:

- Does EMDR significantly reduce re-experiencing symptoms associated with traumatic events?
- Does EMDR significantly reduce avoidance symptoms in response to trauma reminders?
- Does EMDR significantly reduce hyperarousal symptoms, including physiological and emotional reactivity?

- Do demographic characteristics like age, gender, or marital status affect the effectiveness of EMDR, or do injury-related characteristics like the kind and length of the injury?
- Are participants receiving EMDR and those receiving normal psychological care significantly different in their reduction of PTSD symptoms?

The research offers an empirical analysis of the symptom-specific efficiency of EMDR during a war-wounded group, which is an essential gap in present clinical literature¹³. It concentrates on the differences in response of re-experiencing, avoidance and hyperarousal symptoms to pinpoint where EMDR works best and where there are still residual symptoms especially the physiological hyperarousal¹⁴. The results provide a forecasting model to help clinicians develop more specific stepwise treatment plans with complex trauma victims. Moreover, this study demonstrates the value of multi-modal interventions to be used in cases when EMDR is not enough, and it adds to the more personalized and effective trauma treatment. On the whole, the study has not only established a substantial intervention gap but also provided an evidence-based basis to the subsequent clinical protocols and has served to enhance the development of the trauma-oriented approach towards the conflict-affected populations.

2. Literature Review

This review offers a theoretical and empirical base of the study and places it in the context of the greater academic debate of EMDR and PTSD¹⁵. Through a thorough analysis of the body of current literature, it reveals a very definite gap in extant research that the current study aims to fill hence justifying the methodology and research questions adopted.

2.1 Theoretical Foundations of EMDR.

EMDR is a psychotherapy treatment model that is a structured psychotherapy with its basis on the Adaptive Information Processing (AIP) model¹⁶. According to the AIP model, the emergence of PTSD symptoms occurs due to poor processing and storage of traumatic memories in dysfunctional memory networks¹⁷. These primordial memories are full of the original emotive intensity, the physical sensations, and the negative thoughts and are easy to be evoked by current experiences¹⁸. Such activation is the root cause of PTSD symptoms. EMDR enables the brain to process naturally the information in the best way by assisting people to reprocess such maladaptive memories and incorporate them in more appropriate memory networks to minimize the symptoms of psychological distress and symptoms of trauma¹⁹.

(PTSD) is a psychological condition that may develop following a single experience of a severe or life-threatening incident²⁰. It is usually described to have three main groups of symptoms:

- Re-experiencing/Intrusion: This cluster includes intrusive and distressing memories, flashbacks, and trauma-related nightmares.
- Avoidance: Individuals engage in efforts to avoid thoughts, emotions, people, or situations that are associated with the traumatic experience.
- Hyperarousal: This refers to a persistent state of heightened physiological activation, manifested through irritability, sleep disturbances, hypervigilance, and an

exaggerated startle response. Together, these symptoms significantly disrupt social functioning, occupational performance, and overall quality of life.

2.2 Making Assessments of Recent Empirical Research.

EMDR has a large amount of international evidence in favor of it being an effective management of trauma-related conditions like PTSD in people from different cultural backgrounds. Research on military veterans in the United States ²¹ and displaced Syrian refugees in neighboring countries ²² is also concurring that the symptoms decrease significantly after the implementation of EMDR. The same has been reported in the Arab world, among the groups who have been exposed to war in Iraq ²³ and Algeria ²⁴. When this is combined, it makes EMDR a primary intervention in PTSD. But, although its general efficacy has been well-reported, there are fewer studies that have investigated whether EMDR yields similar results in certain groups of PTSD symptoms, specifically in war-wounded groups. This drawback underlines the necessity of the more specific study of the symptom-specific treatment responses.

2.3 Formulating the Identified Knowledge Gap.

Although there is substantial evidence on the general effectiveness of EMDR, the literature on how EMDR affects various clusters of PTSD symptoms is still severely lacking. Most of the literature that is currently accessible focuses on overall treatment outcomes, providing a minimal information on the symptoms most effective to treat with the help of EMDR and those which might remain after the interventions. This shortcoming is more pronounced especially when conducting a study on war-wounded who have severe physical cases. Psychological trauma commonly comorbid with physical trauma and chronic pain in this population and may affect the treatment response in some special manners. Though, such complexities have not been fully examined in existing EMDR studies. To fill this gap, the current research aims at determining the most and least responsive PTSD symptom clusters in the case of war-wounded to EMDR to inform more specific and informed clinical interventions to trauma treatment.

2.4 Theoretical Framework

The study was guided by a theoretical framework which assumed that demographic factors (gender, age and marital status) and factors related to the injury (type of injury and duration of the same) could be used as moderating variables. It was assumed that these variables may be related to the connection between the EMDR intervention and the decrease of the PTSD symptoms in various symptom groups. Despite the fact that the study design and data collection method were guided by this framework, the final statistical analysis of the impact of the intervention on treatment outcomes did not reveal any significant moderating effect of these variables. Nonetheless, the result is instructive since it helps analyze how EMDR directly reduces PTSD symptoms and enhances comprehension of the study's primary hypotheses.

3. Methodology

This section describes the study research design, study sample, study procedures and data analysis procedures. In order to ensure transparency, reproducibility, and a rigorous evaluation of the study

hypotheses regarding the variability of the (EMDR) therapy with the diverse clusters of PTSD symptoms, a methodological framework was used.

3.1 Research Design and Rationale.

Using a non-equivalent control experimental pre-test/post-test design, the difference in symptoms of PTSD between the effect of (EMDR). This design was deemed suitable in measuring intervention related changes through comparison of the outcome of individuals who underwent EMDR against those individuals who underwent standard psychological care. The post-intervention and pre-intervention tests provided the opportunity to analyze the changes of the symptoms with the time and to consider the non-specific effects of the therapy.

3.2 Population and Sampling of the study.

The selection of the participants in the study was based on the following criteria:

- **Population:** War-wounded adults permanently residing in Lebanon who had been clinically detected with (PTSD).
- **Sample Size:** The 100 individuals were split into two groups: a control group (N = 50) and an experimental group (N = 50) that underwent Eye Movement Desensitization and Reprocessing (EMDR) therapy that received standard psychological treatment.
- **Age Range:** The age of the participants ranged between 18 and 50 years.
- **Sampling Method:** To make sure the sample was representative of important demographic and injury-related traits of the war-wounded population, a stratified random sampling procedure was used.

3.3 Data Collection Procedures and Intervention.

The study was carried out between the years 2024-2025 in Beirut Lebanon. The experimental group received a standardized EMDR intervention by the qualified clinicians. The members of this group were given ten separate sessions of EMDR, every session took approximately 45-60 minutes. The control group was given normal psychological treatment as a part of their normal clinical practice. The data of both groups were taken at two-time intervals, before the start of the intervention (pre-test) and after finishing the ten treatment sessions (post-test).

3.4 Instruments and Measures

Data collection methods were conducted using the following methods:

- **PTSD Symptoms:**
- **Instrument:** The frequency and severity of PTSD symptoms were measured with the help of the (DTS).
- **Items:** The DTS is a self-report measure with 17 items.
- **Subscales** The scale measures three main clusters of symptoms of PTSD which were the major dependent variables in this study:

- “Re-experiencing of the Traumatic Event.”
- “Avoidance of trauma-related stimuli.”
- Hyperarousal
- Demographic and Injury Variables: A questionnaire was used to provide some data about the participants, namely their gender, age, marital status, the nature of physical injury, and the period of time when he or she was injured.

3.5.1 Data Analysis Plan

A detailed statistical plan was used in the analysis of the collected data. The methods used were the following:

Descriptive Statistics: The sample's demographic characteristics and the initial PTSD symptom scores were described using frequencies, percentages, means, and standard deviations.

- **Regression Analysis:** Simple and multiple regression tests were also carried out to test the main hypotheses regarding the impact of the (EMDR) treatment on each of the three clusters of PTSD symptoms.

Subgroup Comparisons: (ANOVA) was used to compare the treatment outcomes of the demographic and injury-related subgroups. The entire inferential statistical testing was done at a significance level of $\alpha = 0.05$. These analyses formed the basis of evaluating the study hypotheses using the results obtained.

4. Results

The empirical findings of the statistical analysis of the information collected on the participants who were injured in the conflict are presented in this section. The output directly answers research questions and hypotheses of the study and the findings are grounded on the descriptive statistics and regression analyses performed on the analyzed data.

4.1 Descriptive Characteristics of the Sample

The sample ($N = 100$), which included the equal number of people in the experimental and control group, was mostly male and rather young. The major respondents were aged between 20 and 30 years and were single. Lower and upper limbs injuries were the most common and a significant number of participants had sustained injuries in the past five years. Table 1 is a summary of detailed demographic and injury-related characteristics.

Table 1: Demographic and injury-related characteristics

Variable	Category	Percentage (%)
Gender	Male	82.0%
	Female	18.0%
Age	20–30 years	50.0%

	31–40 years	32.0%
	41–50 years	18.0%
Marital Status	Single	52.0%
	Married	30.0%
	Divorced	12.0%
	Widowed	6.0%
Type of Injury	Legs	26.0%
	Hands	24.0%
	Digestive System	16.0%
	Burns	10.0%
	Jaw	10.0%
	Chest	10.0%
	Back	4.0%
Duration of Injury	Less than 5 years	46.0%
	6–10 years	34.0%
	11–15 years	10.0%
	15–20 years	10.0%

4.2 Main Results on Hypothesis Tests.

- The major findings of the research were generated through regression analysis that was done to determine the impact of the (EMDR) intervention on the three major groups of PTSD symptoms. The results reveal a difference in the effect of treatment and distinctly show a field of resistance to therapy.
- Substantial Effect on Reduction of Re-experiencing Symptoms: The regression analysis showed the statistical significance of the impact of EMDR intervention on the lowering of re-experiencing signs. The model was very meaningful (Sig. =.000), which means that the therapy was effective in the reduction of intrusive memories, nightmares, flashbacks associated with the traumatic event.
- Major Improvement in Avoidance Symptoms: The analysis showed that there was a statistically significant effect of the EMDR on avoiding symptoms. The model itself was significant (Sig. =.001), which demonstrated that participants receiving EMDR were more capable of working with thoughts, feelings and external reminders of their trauma without the need to avoidance behaviors.
- Absence of a Significant Difference in Hyperarousal Symptoms (The Intervention Gap): The opposite is also true, as the EMDR intervention did not lead to statistically significant decrease in hyperarousal symptoms (Sig. = 0.072), which was more significant than the predetermined significance level ($\alpha = 0.05$). This result shows that hypervigilance, exaggerated startle response, and sleep disturbances were highly resistant to EMDR when performed as an independent treatment.
- Better Overall Efficacy of EMDR than Control Group: The superiority of the EMDR intervention was confirmed by comparing the two groups' pre-test and post-test results. The

experimental group greatly outperformed the control group, which received conventional treatment, in terms of the total decrease in PTSD symptoms.

- Impact of Injury-Related and Demographic Factors: The multiple regression model that examined the impact of injury-related and demographic variables (gender, age, marital status, injury type, and injury duration) did not reveal statistically significant impact on the outcome of the treatment. Not significant (Sig. =.684) was the overall model, which showed that the characteristics of the participants were not predictors of the extent to which the symptoms would be reduced. These various subgroups had the same level of the effectiveness of the intervention.

Overall, the findings suggest that EMDR had a varied therapeutic impact on war-wound soldiers, which proved to be impactful in the reduction of re-experiencing and avoidance signs and not so effective in the reduction of hyperarousal. This trend shows a research gap in clinical significance that is worth the inclusion of alternative treatment strategies.

5. Discussion

This part is not the presentation of the statistical findings but an interpretation of the findings, their clinical implications, and the place of the findings in the larger literature on the topic of trauma psychology. The insights shed more light on the appropriateness and the constraints of the (EMDR) treatment on the war-wound individuals who are typified by long-term and multiple traumatic experiences. The main value of the study is the empirical detection of a specific gap in the current intervention in dealing with hyperarousal symptoms in war-wounded people with PTSD. Although the (EMDR) therapy was found to be very effective in reducing the re-experiencing and avoidance symptoms, it did not result in statistically significant change of hyperarousal. This observation indicates that EMDR which is constructed on (AIP) model is quite effective in terms of cognitive and emotional elements of traumatic memory but not much when it comes to highly embedded physiological dysregulation.

EMDR aids in reprocessing and integrating maladaptively stored traumatic experiences resulting in lessening intrusive memories and avoidance behaviors which disrupt daily functioning. But hyperarousal symptoms include hypervigilance, sleep disorders, excessive startle reflexes, etc.--they seem more difficult to change through cognitively oriented therapy. The symptoms are commonly heightened in war affected communities by continued pains, serious physical harm, and an extended experience of danger, which causes long-lasting autonomic nervous system stimulation. The fact that hyperarousal is persistent suggests that maybe physiological trauma reactions are not as available with memory-based reprocessing. As a result, the results confirm the necessity of the combined treatment methods that can incorporate EMDR with interventions aimed at the improvement of physiological regulation which can be conducted through somatic therapies or complementary pharmacological measures. These multimodal procedures can improve the outcome of therapy on people subjected to exposure to complicated and extended trauma.

The new study's findings are largely consistent with earlier research showing how well EMDR therapy works to reduce PTSD avoidance and re-experiencing symptoms²⁵. These results support the already existing position of EMDR as a primary intervention in the trauma-related conditions. The study is, however, a contribution to the literature that explicitly outlines a treatment gap in hyperarousal symptoms regarding a complex and under-researched population of war-wounded people. Although earlier research has established the general effectiveness of EMDR, there is scant research on the

systematic study of its different effects in respondents with comorbid severe physical and psychological trauma on PTSD symptom clusters. The current results help to develop a more complex perception of the particular strengths and limitations of the therapeutic means of EMDR. The main input of the study is change of the general outcome validation to symptom specific treatment responsiveness. Instead of merely determining whether or not the EMDR can be effective in war-wounded individuals, this study is able to answer the clinically important question of which spheres of PTSD symptoms they respond best to, and which have to be addressed further. These results have significant implications on clinical practice. EMDR cannot be idealized as a complete isolated therapy to all the symptoms of PTSD among populations affected by war. Even after successful EMDR treatment, clinicians should expect to continue with overarousal symptoms such as sleep problems, irritability and hypervigilance. In this connection, therapy is to be provided in a staged and integrative model, in which EMDR is applied in the first phase to treat the memories and avoidance associated with the trauma, and the second phase, which involves somatic therapies, mindfulness-based therapies, neurofeedback, or specific pharmacological interventions, would be applied to overcome the traumatic dysregulation of physiological conditions. Despite the useful insights presented in this work, there are a number of limitations that the research has:

- Lack of Long-Term Follow-Up: The data were measured as soon as the intervention was completed. Thus, it was impossible to establish whether the EMDR effects in the long-term on hyperarousal symptoms were sustainable or not, and the natural course of hyperarousal symptoms.
- Quasi-Experimental Design: Though this population was appropriate to use the quasi-experimental design, it has drawbacks with a fully randomized controlled trial (RCT). Lack of full randomization can permit uncontrolled variability in the experimental and control groups which might have an impact on the results observed.

Findings and limitations of this study bring to the fore several directions of a study in the future. To evaluate the sustainability of the EMDR effects on the symptoms of PTSD, longitudinal studies are required, especially whether the decreases in re-experiencing and avoidance symptoms are sustained or increase or decrease over time, and whether hyperarousal symptoms decrease, stay the same, or change with time. Also, there should be well-designed RCTs (randomized controlled trials) regarding the efficacy of integrated treatment approaches involving the combination of EMDR and complementary interventions of mindfulness-based stress reduction or somatic therapies to specifically target hyperarousal. The outcomes of such studies would be strong evidence that particular symptoms are to be treated with a specific treatment plan and were to be used in the development of clinical guidelines, which would eventually lead to the creation of more effective and multimodal intervention strategies specific to the population with complex trauma, particularly, those who experienced war and those who experienced conflict exposure.

6. Conclusion

A critical clinical problem is inconsistent therapeutic results of (EMDR) in the treatment of PTSD in war-wounded communities in Lebanon. Instead of assessing the overall outcomes in a broad sense, the emphasis was put on evaluating certain clusters of PTSD symptoms that were responding to the EMDR and those that were not-responding to it. The results showed that a large treatment gap was detected: EMDR was effective in reducing the re-experiencing and avoidance symptoms but not hyperarousal. As

a clinical point, that demonstrates the necessity of a multimodal approach with EMDR being supplemented by specific secondary therapies, like somatic therapies or mindfulness-based methods, to deal with physiological dysregulation. The personalized and evidence-based treatment protocols in complex populations with trauma can be developed based on empirical definitions of these gaps, no longer generalized. This is the kind of accuracy in the planning of interventions so that the trauma treatment to be provided to the victims of the conflict is not only effective but also responsive to the subtle needs of different symptom domains.

Conflicts of interest

The authors have no conflicts of interest to declare.

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Data availability

Data will be made available from corresponding author upon reasonable request.

Author contributions

Ahmad Rislan Chekeir: Conceptualization, Data curation, Formal analysis, Writing–original draft, Methodology.

Muhammad Jaber: Visualization, Writing–review & editing, Resources, Validation, Investigation, Supervision

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