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Systematic Review

Effectiveness of eye movement desensitization and reprocessing (EMDR) for trauma-related psychological disorders in disaster and epidemic settings: A systematic review

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Abstract

Natural disasters and epidemics frequently result in significant psychological trauma, including post-traumatic stress disorder (PTSD) and depression, particularly among affected populations with limited access to mental health services. Eye movement desensitization and reprocessing (EMDR) has been proposed as an effective trauma-focused intervention; however, evidence regarding its effectiveness in disaster and epidemic contexts remains heterogeneous. The aim of this systematic review was to summary the available evidence on the effectiveness of EMDR in reducing trauma-related psychological disorders among disaster- and epidemic-affected populations. A systematic search of PubMed, Scopus, and SciLit was conducted on March 5, 2024, following PRISMA guidelines. Randomized controlled trials involving disaster- or epidemic-exposed populations treated with EMDR were included. Comparators comprised other traditional cognitive behavioral therapies, treatment as usual, or delayed treatment. Primary outcomes included validated trauma and PTSD instruments (Impact of Event Scale–Revised (IES-R), Post-traumatic Stress Disorder Checklist–Civilian Version (PCL-C), Post-traumatic Stress Disorder Checklist for DSM-5 (PCL-5), International Trauma Questionnaire (ITQ), and the Parent Report of Post-traumatic Symptoms. Risk of bias was assessed using the Cochrane Risk of Bias 2.0. Six studies out 1,802 identified studies were included involving 813 participants (approximately 75% female; age range of 10–58 years). EMDR was consistently associated with clinically and statistically significant reductions in trauma symptoms. Following EMDR treatment, IES-R scores decreased significantly among the disaster-affected individual. EMDR led to significant reductions in ITQ scores and PCL-C scores compared with usual care. Among adolescents affected by natural disaster, EMDR reduced Chinese version of IES-R scores significantly demonstrating superiority over treatment as usual. EMDR also showed comparable reductions across PTSD, anxiety, and depressive symptom measures compared with cognitive behavioral therapy (CBT). Treatment timing (early versus delayed EMDR) did not substantially affect outcomes. Overall risk of bias was low to moderate. In conclusion, EMDR is an effective and feasible intervention for reducing trauma-related psychological symptoms in disaster- and epidemic-affected populations. EMDR represents a valuable component of post-disaster mental health response strategies, although further large-scale comparative trials are warranted.

Keywords: Disaster, disease outbreak, mental health, PTSD, EMDR

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Introduction

Many individuals experience trauma and psychological disorders that substantially impair mental well-being in the aftermath of disasters [1]. Traumatic events associated with disasters can lead to significant emotional distress, including depression, anxiety, and post-traumatic stress disorder (PTSD) [2]. Survivors often encounter significant challenges during the recovery process, particularly those with limited access to or resources for psychological care [2]. Consequently, targeted interventions that provide timely psychological support are essential in post-disaster settings to facilitate trauma recovery and mental rehabilitation. The involvement of mental health service providers is crucial in delivering structured, evidence-based interventions that support recovery, promote healing, and ultimately restore holistic mental well-being among disaster-affected populations.

One of the major challenges in managing post-disaster patients is the limited feasibility of delivering effective therapeutic interventions to address trauma and associated psychological disorders. Inadequate availability of psychosocial services may contribute to feelings of hopelessness and social isolation among affected individuals, thereby exacerbating psychological distress and impairing recovery [3]. Addressing these barriers is essential to ensure that post-disaster populations can access appropriate mental health care. Strategies are therefore needed to increase awareness of psychological therapies, expand the availability and accessibility of mental health services in post-disaster settings, and foster inclusive environments that encourage affected individuals to seek and receive psychological support, ultimately improving mental health outcomes.

Identifying effective interventions to alleviate trauma in post-disaster populations is a critical component of psychological recovery. Adverse psychological conditions, including post-PTSD, substantially impair quality of life among disaster survivors. Therefore, there is a clear need for targeted, evidence-based interventions that can effectively address trauma-related symptoms. Such interventions should adopt a comprehensive and holistic approach, tailored to the individual needs of post-disaster patients. Addressing this need requires rigorous research and interdisciplinary collaboration to develop and implement effective strategies that support mental health recovery in disaster-affected populations.

Evidence demonstrates that eye movement desensitization and reprocessing (EMDR) is an effective approach for addressing trauma and trauma-related psychological disorders following disasters [4]. In individuals with maladaptive processing of traumatic experiences, therapy involves structured recall of distressing memories accompanied by guided bilateral eye movements, which facilitates adaptive information processing and symptom reduction. Available evidence indicates that EMDR is associated with meaningful improvements in trauma-related symptoms and psychological distress among affected populations [5]. As part of a comprehensive and integrated therapeutic framework, EMDR has been applied to support psychological recovery and restore mental well-being in post-disaster settings [5]. However, the existing evidence remains fragmented, with variations in study design, populations, outcome measures, and disaster contexts, limiting the generalizability of findings and the formulation of clear evidence-based recommendations. Therefore, this systematic review aims to evaluate the existing evidence on the effectiveness of EMDR in alleviating trauma-related psychological disorders among post-disaster victims and to clarify its potential role in post-disaster mental health recovery.

Methods

Search strategy

A systematic literature search was conducted in three major scientific databases—PubMed, Scopus, and SciLit—on March 5, 2024. The search strategy targeted terms appearing in the title, keywords, and abstract fields. Boolean operators (“OR” and “AND”) were applied as appropriate to combine search terms. The detailed keyword combinations used for each database are presented in **Table 1**.

Table 1. Keyword combinations used in the literature search for studies assessing the effectiveness of EMDR in the management of trauma- and epidemic related psychological disorders with respect to the database

Database	Combination keyword
PubMed	(EMDR OR "Eye movement desensitization and processing") AND (PTSD OR "Post traumatic stress disorder" OR Depression)
Scopus	TITLE-ABS-KEY (EMDR OR "Eye movement desensitization and processing" AND (PTSD OR "Post traumatic stress disorder" OR Depression))
SciLit	(EMDR OR "Eye movement desensitization and processing") AND (PTSD OR "Post traumatic stress disorder" OR Depression)

Inclusion and exclusion criteria

Inclusion criteria of the included studies were based on the PICOS framework: population (P), victims of natural disasters or epidemics; intervention (I), studies using EMDR; control (C), comparison groups receiving cognitive behavioral therapy (CBT), traditional interventions, or delayed treatment. CBT included activities aimed at changing maladaptive thought patterns, while traditional interventions included response- and recovery-focused activities. The primary outcomes (O) of this study were PTSD and depression. Eligible study (S) included randomized clinical trials testing the effect of EMDR on one or more outcomes in post-disaster victims. Review articles, case reports, conference abstracts, and editorials were excluded. Non-English written papers were also excluded.

Screening and selection of the records

The literature screening and selection were guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Duplicate records were removed automatically using Mendeley Desktop v1.19.8 (Elsevier, Amsterdam, The Netherlands) after importing all retrieved records into the software. Screening was first conducted based on titles and abstracts, followed by full-text assessment according to the predefined eligibility criteria. The entire screening and selection process was performed independently by two reviewers (A.B.F. and R.A.G.). Any discrepancies were resolved through re-evaluation of the articles, discussion, and consultation with a third reviewer (K.Z).

Data extraction and synthesis

Data extracted from the included studies comprised patient characteristics, details of the intervention, and outcome measures. Patient characteristics included age and gender. The interventions were EMDR–based therapies or other interventions for the controls. Outcome measures were classified according to validated trauma and PTSD instruments, including the Impact of Event Scale–Revised (IES-R), Post-traumatic Stress Disorder Checklist–Civilian Version (PCL-C), Post-traumatic Stress Disorder Checklist for DSM-5, International Trauma Questionnaire (ITQ), Chinese version of the Impact of Event Scale–Revised (C-IES-R), and the Parent Report of Post-traumatic Symptoms. All outcome data were presented as mean±standard deviation (SD). When studies reported data as median and interquartile range, these values were converted to mean±SD.

Quality appraisal

The risk of bias assessment was assessed using the Cochrane Risk of Bias 2.0 (RoB 2.0) framework that evaluates the methodological domains. The quality appraisal was conducted independently by one reviewer (M.A.M.N.). Risk-of-bias judgments were assigned according to the RoB 2.0 algorithm and categorized as low risk, some concerns, or high risk. Studies assessed as having a high risk of bias were excluded to maintain the quality of the data presented in this review.

Results

Characteristics of the included studies

The PRISMA flow diagram illustrating the study selection process is presented in **Figure 1**. A total of 1,802 records were identified from PubMed (n=688), Scopus (n=872), and SciLit

(n=242). After removal of 436 duplicates, 1,366 records were screened by title and abstract, of which 1,348 were excluded for irrelevance. Eighteen full-text articles were assessed for eligibility, with no exclusions due to lack of full-text access. Following full-text screening, 12 studies were excluded because of the absence of a control group (n=9) or because they were study protocols (n=3). A total of six studies met the inclusion criteria and were included in this review, comprising 813 participants, of whom approximately 75% were female [6-11]. The number of participants per study ranged from 25 to 400. All included studies were randomized controlled trials or cohort studies. The mean age of participants across studies ranged from 10 to 58 years. The studies were conducted in Italy, the United Kingdom, Ireland, Taiwan, and the Netherlands. A summary of the characteristics and outcomes of the included studies is presented in **Table 2**.

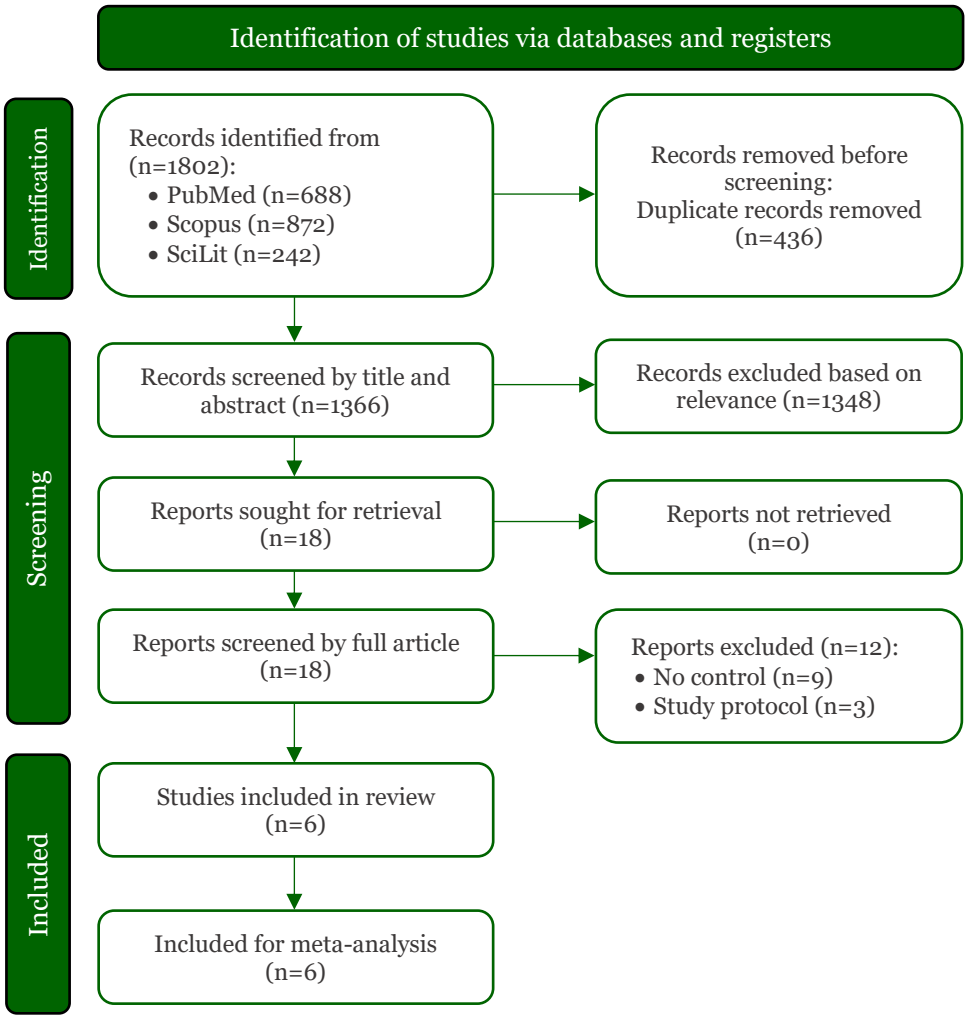

Figure 1. PRISMA diagram for the screening and selection process of the studies assessing effectiveness of EMDR in the management of trauma- and epidemic-related psychological disorders.

Risk of bias

The summary of the risk-of-bias assessment, prepared using the Risk-of-bias VISualization (robvis) RoB 2.0 tool, is presented in **Figure 2**. Overall, most included studies were judged to have a low risk of bias across the five RoB 2.0 domains [6-11]. All studies demonstrated low risk of bias arising from the randomization process (Domain 1), deviations from intended interventions (Domain 2), measurement of the outcome (Domain 4), and selection of the reported result (Domain 5). Two studies did not blind participants [6,10]. All included studies reported complete outcome data and applied appropriate outcome measurement methods, with no evidence of differential outcome assessment between intervention and control groups [6–11].

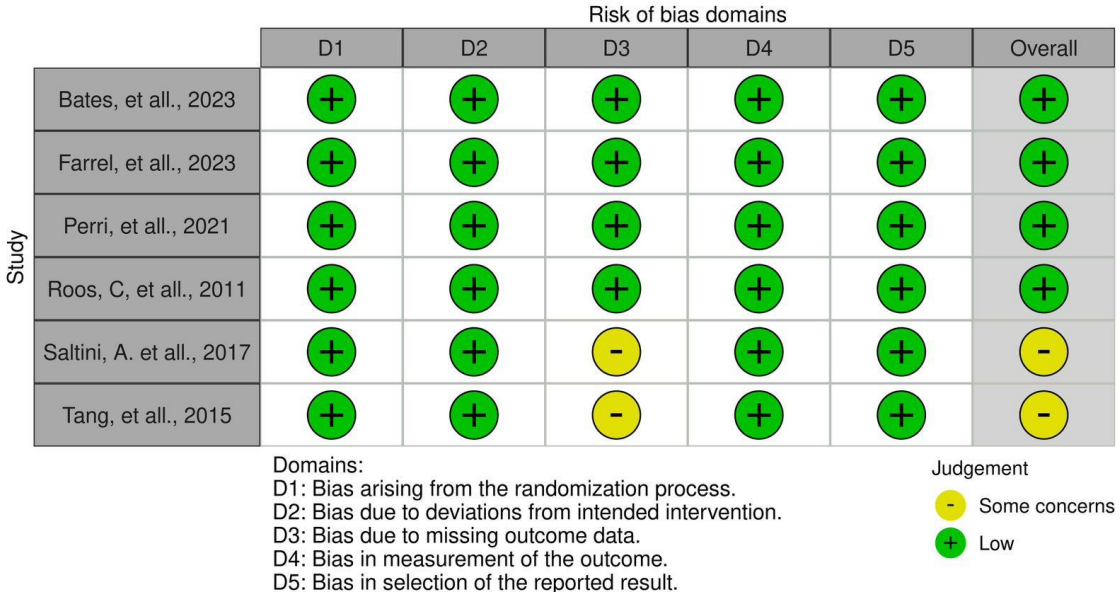

Figure 2. Summary of the risk-of-bias assessment based on the Risk-of-bias VISualization (robvis) Cochrane RoB 2.0 tool.

Effectiveness of EMDR in alleviating trauma-related psychological disorders

The results of all six studies assessing the effectiveness of EMDR in alleviating trauma-related psychological disorders are presented in **Table 2**. Saltini *et al.* [6] evaluated the effectiveness and feasibility of early EMDR intervention in reducing post-traumatic stress symptoms among individuals exposed to a natural disaster within a disaster mental health care setting, particularly by comparing early versus delayed EMDR treatment in routine clinical practice. The study reported that post-treatment Impact of Event Scale–Revised (IES-R) mean scores in the early-treated group were slightly lower than those in the later-treated group; however, no statistically significant difference was observed between the early-treated and later-treated groups ($p>0.1$). When pre-treatment and post-treatment IES-R scores were compared within each group, both groups demonstrated a significant reduction in scores, with a greater decrease observed in the early-treated group ($p<0.0001$).

Bates *et al.* [7] evaluated patients randomized to receive either EMDR or usual care alone, with outcomes assessed using the PTSD Checklist–Civilian version (PCL-C). From baseline to 6-month follow-up, the EMDR group demonstrated a mean reduction in PTSD scores of 8 points, whereas the control group showed a mean increase of 0.75 points. The between-group difference did not reach statistical significance ($p=0.126$) [7]. Perri *et al.* [8] compared the effectiveness between EMDR and Trauma-Focused Cognitive Behavioral Therapy and assessed the outcomes using the Beck Depression Inventory–II, the Post-traumatic Stress Disorder Checklist for DSM-5, and the State-Trait Anxiety Inventory, Form Y-1 (STAI-Y1). Post-treatment analyses demonstrated significant symptom reductions in both groups across all outcome measures, with sustained improvements from pre-treatment to follow-up (all Bonferroni-corrected $p<0.0001$). However, no significant differences were observed between EMDR and Trauma-Focused Cognitive Behavioral Therapy in treatment effectiveness [8].

Farrell *et al.* [9] evaluated participants who received either early EMDR intervention or delayed treatment after one month post disaster and trauma symptoms were assessed using the ITQ. In the delayed-treatment group, no significant difference was observed between pre- and post-treatment ITQ scores. In contrast, participants receiving early EMDR showed a significant reduction in ITQ scores from a mean of 36.8 at baseline to 21.2 post-treatment ($p<0.001$), indicating a statistically significant improvement in trauma-related symptoms [9].

Table 1. Clinical effectiveness of EMDR in the management of trauma- and epidemic-related psychological disorders

Author, years	Location	Population			Intervention					Control	Outcome Score (±SD)
		Total patient (n)	Male/female	Mean age (year), ±SD	Treatment type	Treatment protocol	Duration (minute)	Frequency of treatment (time/week)	Length (weeks)		
Saltini, *et al.* 2017 [6]	Italy	Exp: 239 Con: 290	Exp: 47/192 Con: 49/241	Exp: 45.7±12.5 Con:46.9±13.2	Early EMDR	2–4 session	-	-	12 weeks	Later EMDR	IES-R Pre-treatment Exp: 54.31 (11.94) Con: 55.13 (12.28) Post-treatment Exp: 27.91 (16.16) Con: 28.57 (17.94)
Bates, *et al.* 2023 [7]	UK	Exp: 13 Con: 13	Exp: 8/5 Con: 8/5	Exp: 57.7±14.8 Con: 58.3±16.5	EMDR	8 phase session	60–90	-	-	Usual care alone	PCL-C Exp: 0.75 (15.17) Con: -8.00 (10.49)
Perri, *et al.* 2021 [8]	Italy	Exp: 19 Con: 19	Exp: 5/14 Con: 6/13	Exp: 48.3±13.6 Con: 52.4±10.6	EMDR	7-sessions therapy	-	2×/week	3 weeks	Cognitive-behavioral therapy (CBT)	PCL-5 Pre-treatment Exp: 38.2 Con: 33.3 Post-treatment Exp: 18.5 (12.3) Con: 13.4 (12.9)
Farrell, *et al.* 2023 [9]	Ireland	Exp: 46 Con: 39	Exp: 9/37 Con: 9/30	Exp: 46.4±9.78 Con: 45.5±11.9	Early EMDR	4 sessions	120	4×/week	1 week	Later EMDR	ITQ Pre-treatment Exp: 36.8 (14.8) Con: 36.8 (14.8) Post-treatment Exp: 21.2 (15.1) Con: 36.8 (14.8)
Tang, *et al.* 2015 [10]	Taiwan	Exp: 41 Con: 42	Exp: 19/22 Con: 15/27	Exp: 14.24±0.99 Con: 14.48±0.92	EMDR	4 sessions	Session 1: 60; session 2,3,4: 30–40	4×/week	8 weeks	Treatment as usual	C-IES-R Pre-treatment Exp: 34.02 (19.85) Con: 23.10 (18.21) Post-treatment Exp: 18.37 (19.60) Con: 21.36 (17.73)
Roos, *et al.* 2011 [11]	Netherland	Exp: 26 Con: 26	Exp: 13/13 Con: 16/10	Exp: 10.2±4 Con: 10.0±4.1	EMDR	6-8 sessions	60	1×/week	4–8 weeks	CBT therapy	PROPS Pre-treatment Exp: 30.3 (11.5) Con: 34.7 (12.8) Post-treatment Exp: 17.7 (9.6) Con: 19.5 (11.7)

IES-R: Impact of Event Scale–Revised; PCL-C: Post-traumatic Stress Disorder Checklist–Civilian; C-IES-R: Chinese version of the Impact of Event Scale–Revised; PCL-5: Post-traumatic Stress Disorder Checklist for DSM-5; ITQ: International Trauma Questionnaire; PROPS: Parent Report of Post-traumatic Symptoms.

Another study conducted in Taiwan compared adolescents exposed to Typhoon Morakot who receiving EMDR with those receiving treatment as usual [10]. Baseline C-IES-R scores were higher in the EMDR group (mean 34.02) than in the TAU group (mean 23.10). Following treatment, mean C-IES-R scores decreased to 18.37 in the EMDR group and to 21.36 in the treatment as usual group. The between-group difference in score reduction was statistically significant ($p<0.05$), indicating greater symptom reduction in the EMDR group [10]. In the study by Roos *et al.* [11], both groups treated with EMDR and CBT demonstrated significant improvements across all outcome measures (post-traumatic stress symptoms, measured using the Parent Report of Post-traumatic Symptoms, anxiety symptoms, depressive symptoms and behavioral problems following treatment after treatment among disaster-exposed children. No evidence of differential effectiveness between EMDR and CBT in reducing PTSD, anxiety, depression, or behavioral symptoms [11].

Discussion

This systematic review synthesized evidence from six studies involving a total of 813 participants who had directly experienced or witnessed mass traumatic events, including natural disasters and epidemic-related crises. Across the included studies, EMDR was consistently associated with significant reductions in trauma-related symptom severity when comparing post-treatment with pre-treatment outcomes, as measured by validated instruments such as IES-R, C-IES-R, PCL-C, Post-traumatic Stress Disorder Checklist for DSM-5, and ITQ [6–11]. These findings are consistent with broader trauma literature demonstrating that trauma-focused psychotherapies are among the most effective interventions for reducing PTSD symptoms across diverse trauma exposures [13,14]. Collectively, the results reinforce the role of structured psychological interventions in post-disaster mental health recovery.

In comparative analyses, EMDR demonstrated greater effectiveness than treatment as usual, suggesting that structured trauma-focused interventions offer additional benefits beyond routine supportive or recovery-focused care [9,10]. This finding aligns with prior research indicating that non-specific psychosocial support alone may be insufficient to address persistent trauma-related symptoms in disaster-affected populations [3,4]. In contrast, when compared with other evidence-based interventions such as CBT, EMDR showed comparable effectiveness, with no statistically significant differences observed in symptom reduction [8,11]. This equivalence suggests that EMDR may represent a viable alternative to CBT, particularly in contexts where resources, therapist training, or patient preferences influence treatment selection [15].

Notably, the timing of EMDR intervention (early versus delayed) did not appear to substantially influence treatment effectiveness. Studies comparing early and later initiation of EMDR reported similar reductions in trauma-related symptoms, indicating that EMDR may remain effective even when immediate post-disaster intervention is not feasible [6,9]. This finding is particularly relevant in humanitarian and disaster settings, where delays in service delivery are common due to infrastructural damage, workforce shortages, and competing health priorities [16,17]. This finding is clinically relevant in disaster settings, where logistical constraints often delay access to mental health services. The apparent temporal flexibility of EMDR supports its potential applicability across different phases of post-disaster recovery.

The therapeutic mechanism underlying EMDR is thought to involve facilitation of adaptive information processing through structured recall of traumatic memories combined with bilateral stimulation, which may reduce emotional distress and cognitive maladaptation [4]. A neurobiological study suggested that EMDR may modulate activity in brain regions associated with fear processing and emotional regulation, including the amygdala and prefrontal cortex [18]. While mechanistic explanations were not directly assessed in the included studies, the consistent clinical improvements observed across diverse populations and disaster contexts suggest a robust therapeutic effect.

Several limitations should be acknowledged. The number of included studies was limited, and heterogeneity in study populations, outcome measures, and intervention protocols precluded quantitative synthesis. Some studies employed small sample sizes or non-randomized designs, which may limit generalizability and introduce potential bias [6]. Variability in disaster type, age groups, cultural context, and comparator interventions may have influenced treatment effects

and limited cross-study comparability [19]. Additionally, long-term follow-up data were scarce, limiting conclusions regarding the durability of treatment effects [20]. Future research should prioritize large-scale randomized trials with standardized outcome measures, longer follow-up periods, and clearly defined control conditions to strengthen the evidence base for EMDR in disaster and epidemic contexts.

Conclusion

Exposure to natural disasters and epidemic-related events, including the COVID-19 pandemic, poses substantial psychological challenges for affected individuals and communities. This systematic review demonstrates that EMDR is an effective and feasible intervention for reducing trauma-related psychological symptoms among post-disaster and post-epidemic populations. Its effectiveness appears comparable to CBT and superior to treatment as usual, with benefits observed across age groups, disaster contexts, and timing of intervention. Improving post-disaster mental health outcomes requires enhanced access to structured psychological services, integration of evidence-based trauma therapies, and reduction of barriers to care. Incorporating EMDR into post-disaster mental health response frameworks may contribute meaningfully to psychological recovery. Further high-quality comparative studies are warranted to refine clinical guidelines and optimize mental health interventions for disaster-affected populations.

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Competing interests

There is no conflict of interest in the present study for any of the authors.

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Underlying data

All underlying data have been presented in the article.

Declaration of artificial intelligence use

Artificial intelligence (AI) tools (ChatGPT) were used solely for language refinement, including improving grammar, sentence structure, and readability of the manuscript. All AI-assisted processes were critically reviewed by the authors, and the final decisions and interpretations presented in this article were made exclusively by the authors.

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