Trends
in Psychiatry and Psychotherapy

JOURNAL ARTICLE PRE-PROOF
(as accepted)

Review Article

Efficacy and Safety of Eye Movement Desensitization and Reprocessing (EMDR) in Patients with Psychosis: A Systematic Review of Randomized Controlled Trials

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http://doi.org/10.47626/2237-6089-2025-1099

Original submitted Date: 12-May-2025

Accepted Date: 16-Sep-2025

Efficacy and Safety of Eye Movement Desensitization and Reprocessing (EMDR) in Patients with Psychosis: A Systematic Review of Randomized Controlled Trials

Short Title: Efficacy and Safety of EMDR in Psychosis

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Abstract:

Background: Recent evidence regarding the multifactorial etiology of psychosis suggests that it can be trauma-induced. Therefore, there is a growing interest in using trauma-focused interventions to treat patients with psychosis and a history of traumatic events. Eye Movement Desensitization and Reprocessing (EMDR) is an approved, effective therapy for post-traumatic stress disorder (PTSD), but its use in the presence of psychotic features is still under scrutiny.

Objectives: To assess the safety of EMDR in individuals with psychosis and co-morbid PTSD and evaluate its effectiveness in reducing psychotic and trauma-related symptoms.

Methods: Relevant randomized controlled trials (RCTs) were obtained from six databases using an extensive search strategy. Eligible studies were identified based

on our inclusion and exclusion criteria, and then quality was assessed. Data was extracted from each study and narratively synthesized.

Results: Four RCTs were included in our review, with an additional report for one. EMDR was generally superior to TAU and the WL condition in improving symptoms of psychosis and PTSD. It led to consistent improvements in clinician and patient-rated PTSD symptoms and was particularly effective in reducing psychotic negative symptoms (PANSS-N) and paranoid thinking (GPTS). However, improvements in delusions and auditory hallucinations (PSYRATS-D and AH) were mostly insignificant. No serious adverse events related to the therapy itself were reported in any of the trials.

Conclusion: Overall, EMDR promises to be a safe and effective therapy in people with psychosis and PTSD. Large-scale trials with longer follow-up periods are needed to confirm our findings.

Keywords: EMDR, psychosis, PTSD, trauma, systematic review.

Introduction

Psychosis is a mental health condition which results in an impaired relationship with reality. This impairment can manifest as delusions, hallucinations, disorganized thinking, and significant functional impairment.[1] The median point prevalence of psychotic disorders was found to be 3.89 per 1000 persons, and the excess economic burden of schizophrenia alone was $343.2 billion in 2019.[2,3] But despite its prevalence and the significant financial burden it poses, the exact pathophysiology of psychosis remains unclear to this day. For long years, genetics and brain abnormalities have been the traditional culprits behind the development of psychotic conditions such as schizophrenia,[4] but a role of environmental and psychosocial factors has also been proposed.[5,6] One of those factors is traumatic events, which are defined in the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (DSM-5) as exposure to death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence.[7] Overall, the relationship between traumatic events and psychosis is complex and multifaceted, but various research reports confirm that trauma, particularly in childhood, increases the likelihood of developing psychosis.[8–13] Moreover, trauma does not only trigger psychosis, but it can also be a consequence of experiencing psychotic events.[14–16] This bidirectional relationship has led to the hypothesis that trauma-focused interventions can be helpful for patients with psychosis and a history of traumatic experiences. If proven to be effective, these interventions can become a potential adjuvant to antipsychotic medications, which only address the biological aspect of psychosis and are notorious for their multisystem side effects.[17,18]

One promising intervention in this regard is Eye Movement Desensitization and Reprocessing (EMDR), which was developed for post-traumatic stress disorder

(PTSD) in the late 1980s.[19] EMDR is a unique psychotherapy technique in which the patient recalls distressing memories, while simultaneously engaging in side-to-side eye movements, or other forms of bilateral sensory input such as tapping, or auditory tones.[20,21] This process is believed to facilitate the reprocessing of traumatic memories, reducing their emotional intensity and helping patients integrate these experiences into their broader life narrative.[22] Over the years, EMDR has been adapted to treat a wider range of conditions besides PTSD, including anxiety disorders, depression, and complex trauma resulting from prolonged exposure to distressing situations.[23–26] In terms of psychosis, EMDR can be used in individuals with the condition to reprocess their traumatic memories, thus addressing an integral yet overlooked aspect of its etiology. Moreover, it can be adapted to target psychotic symptoms themselves, such as recurrent hallucinations.[27] But despite this potential, only a limited number of randomized controlled trials (RCTs) attempted to investigate the use of EMDR in psychosis. Psychosis is one of the most common reasons for exclusion in trials of psychotherapy for PTSD,[28] so there are no clear conclusions about the efficacy and safety of EMDR in the presence of psychotic conditions. Overall, it is an area of emerging evidence, which we aimed to evaluate in this systematic review.

Methods

Protocol and registration

Our review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines.[29] It followed a predefined protocol registered with PROSPERO under the registration number (CRD42024615708).

Literature search

The articles in our systematic review were obtained from the following electronic databases: PubMed, Scopus, Web of Science, Cochrane, EMBASE, and PsycINFO. The following search strategy was developed by the members of our research team and used to identify relevant articles across the aforementioned databases: ("Eye Movement Desensiti*ation and Processing" OR EMDR) AND (Psychosis OR "Psychotic feature*" OR "Psychotic symptom*" OR "Psychotic disorder*" OR Schizo* OR Delusion* OR Hallucination*) AND (Trauma OR "Post-traumatic stress disorder" OR PTSD OR "Post-traumatic stress" OR "Post-traumatic neurosis").

Inclusion/ Exclusion criteria

We included randomized controlled trials (RCTs) that investigate the efficacy of EMDR in patients of any age diagnosed with a psychotic disorder or exhibiting psychotic symptoms, and who either report post-traumatic stress symptoms, or have an established diagnosis of PTSD. The outcomes of the included studies had to report on psychotic symptoms, trauma-related symptoms, or any adverse effects. Non-original articles, editorials, reviews, conference abstracts, and articles published in non-peer-reviewed journals were excluded from our review. There were no language restrictions on the searches. Based on the predetermined criteria, and after duplicate removal, articles were independently evaluated by two reviewers in a two-step process. The titles and abstracts were screened for inclusion eligibility at first, then the two reviewers proceeded with full-text screening. Any conflicts arising in the process were resolved by a third reviewer.

Quality Assessment

The quality of the included articles was assessed by two independent researchers using version 2 of the Cochrane risk-of-bias tool for randomized trials (RoB 2).[30] This critical appraisal tool had five fixed domains with signaling questions for each one of them. Based on answers to those questions, each domain was judged as having a low or a high risk of bias, or invoking some concerns. Then a judgment of the overall quality of each paper was subsequently made. Throughout the process, discrepancies between the two authors were resolved through discussion, with a third senior researcher consulted when consensus could not be reached. It is important to note that in the quality assessment process, we accounted for several key factors in each domain. For example, blinding was assessed in the domain ‘bias due to deviations from intended interventions,’ while protocol adherence was assessed through the same domain in addition to ‘bias due to missing outcome data.’ Assessment of the randomization process was used to examine how potential baseline imbalances were addressed in each trial, as proper randomization is important for minimizing confounding at baseline. Additionally, the use of appropriate imputation methods was considered in trials that had missing outcome data.

Data Extraction and Synthesis

Two independent reviewers performed data extraction using a standardized Excel sheet. The extracted data included data: author names, publication year, trial registration number, country, study design, participant demographics such as age and gender, baseline characteristics of the population, sample size, study duration, details of the intervention and the comparator groups, primary and secondary endpoints, information for assessing the risk of bias, and outcomes. Any discrepancies between the two reviewers were resolved by discussion. The data, then, was narratively synthesized.

Results

Study selection

A total of 369 relevant papers were obtained by searching the different databases (PubMed, WOS, Cochrane, Scopus, EMBASE, and PsychINFO). After excluding duplicates, 162 citations and abstracts were evaluated for relevance. At this phase, 137 records were removed, leaving 25 papers to be reviewed in full-text screening for inclusion in the review. Twenty papers were excluded for reasons stated in Figure 1, which left four studies that fully met the inclusion criteria of this review. It should be noted that two publications originated from the same trial population.[31,32] We determined they were not separate studies but different reports of the same one. van den Berg et al.[31] reported the outcomes related to PTSD, whereas de Bont et al.[32] focused on those of psychosis. To avoid double-counting and bias, we included the more recent report of this trial. However, data was extracted from both of them to ensure the full inclusion of all relevant outcomes.

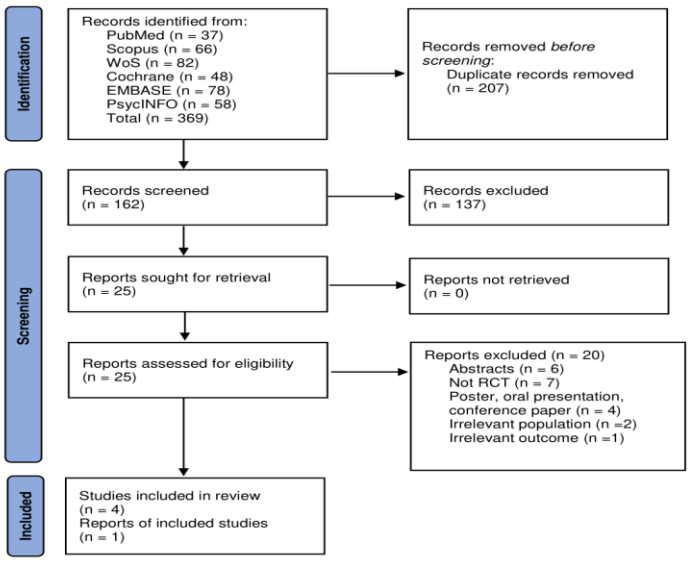

Figure 1: PRISMA flow diagram showing the study selection process.

Quality Assessment

Of the included studies, Varese et al.[33] had the best quality and the lowest risk of bias across all domains. All four of the included studies exhibited a low risk for bias due to deviation from intended interventions, bias in measuring the outcome and selecting the reported result. In 75% of the articles, appropriate randomization techniques were used. However, only two included trials had no missing outcome data. Figure 2 and Figure 3 were created using Robvis, an online web tool, to visualize the quality assessment of the included studies.[34]

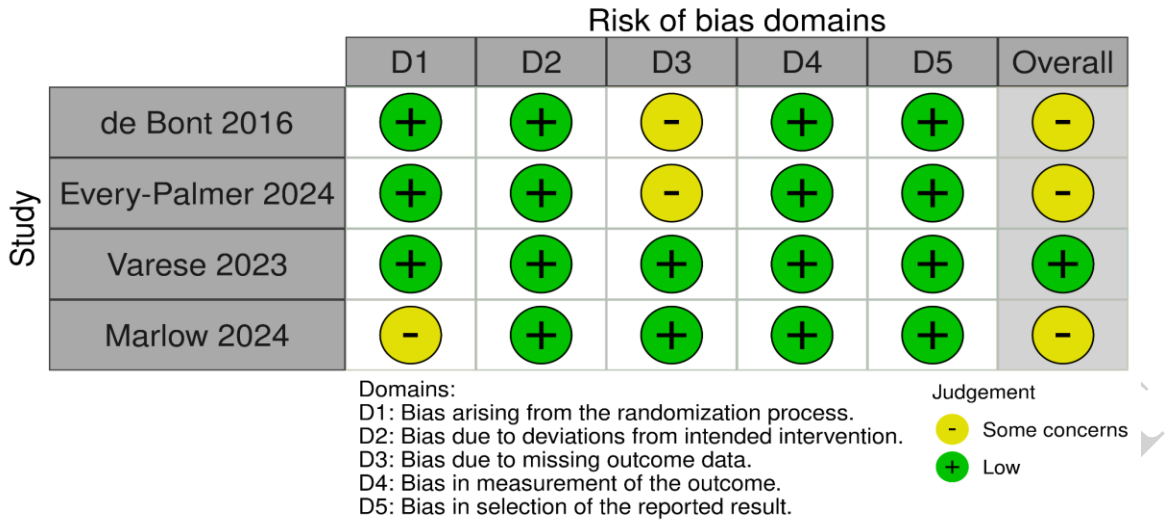

Figure 2: Risk of bias traffic light plot summarizing the domain-level judgments for each included study.

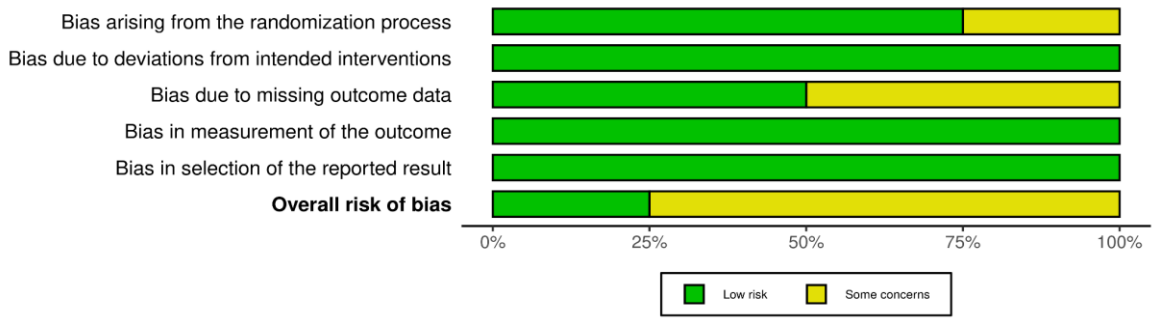

Figure 3 Risk of bias weighted bar plot of judgements within each domain.

Study characteristics

Overall, our review included four randomized controlled trials that investigated Eye Movement Desensitization and Reprocessing (EMDR) therapy for individuals with psychotic disorders (e.g., schizophrenia, schizoaffective disorder, or bipolar disorder with psychotic features) and co-morbid PTSD. Overall, a total of 275 individuals were recruited across the four trials. One trial took place in the Netherlands,[32] two in the United Kingdom,[33,35] while one was conducted in New Zealand.[36] Three trials centered on EMDR as a standalone intervention,[32,35,36] while one used its psychosis variety (EMDRp) in combination with treatment as usual (TAU).[33] In two trials,[32,35] patients received 8 EMDR sessions, and the number of sessions was 9 in another.[36] However, as many as 16 sessions of EMDRp+TAU were delivered in a single trial.[33] Table 1 presents the characteristics of the four trials in detail.

Characteristics of the included studies											
Study ID	Study Objective	Study Design and Recruitment setting	Sample Size	Inclusion Criteria	Exclusion Criteria	Intervention	Comparator	Duration	Location	Dropout Rate (%)	Reasons for Dropout

de Bont[32] (2016)	Evaluate the efficacy and safety of Prolonged Exposure (PE) and EMDR for PTSD in patients with co-morbid psychotic disorders vs. a waiting list (WL).	Single-blind randomized controlled trial (RCT), outpatient setting	n= 155	- Diagnosis of a psychotic disorder (e.g., schizophrenia). - PTSD confirmed via Clinician-Administered PTSD Scale (CAPS).	Intellectual disability. - Severe suicide risk (MINI Plus "high suicide risk" + BDI-II score >35 + serious suicide attempt within 6 months).	PE: 8 weekly 90-minute sessions. (n= 53) EMDR: 8 weekly 90-minute sessions (standard protocols). (n=55)	Wait-list condition (WL) (n=47)	6 months	the Netherlands	Post-treatment: 16.1% (25/155) 6-month follow-up: 17.4% (27/155)	Loss to follow-up
Varese[33] (2024)	Assess the feasibility and efficacy of EMDR for psychosis (EMDRp) in early psychosis patients.	Single-blind randomized controlled trial (RCT), early intervention services	n= 60	- Age ≥16. - ICD-10 schizophrenia-spectrum diagnosis or early intervention criteria. - Recent psychosis onset (<3 years). - Trauma history (TSQ ≥6). - PANSS score ≥3 (delusions, hallucinations, suspiciousness).	- Primary substance dependence. - Need for an interpreter. - Intellectual disability. - Prior EMDR treatment (last 12 months).	EMDRp + TAU: 16 sessions of EMDR for psychosis. (n=31)	Treatment As Usual (TAU) (n=29)	12 months (baseline, 6-month, and 12-month assessments).	the United Kingdom	6-month follow-up: 25% (15/60) 12-month follow-up: 30% (18/60)	Loss to follow-up
Every-Palmer[36] (2024)	To assess the efficacy and safety of EMDR for PTSD in individuals with psychotic disorders receiving forensic care	Single-blind Randomized Controlled Trial (RCT), inpatients and prisoners	n= 24	- Age 18–65. - Diagnosis of psychotic disorder/mood disorder with psychotic features (ICD-10). - PTSD confirmed via Clinician-Administered PTSD Scale (CAPS). - Capacity to consent.	- High suicide risk: MINI-Plus "high suicide risk" category, recent suicide attempt (<6 months), or concurrent EMDR treatment.	EMDR (n=12)	Wait-list condition (WL) (n=12)	10 weeks (treatment) + 6-month follow-up.	New Zealand	N/A	N/A
Marlow[35] (2023)	To explore the effectiveness of EMDR for psychotic disorder patients with trauma histories in community mental health	Randomized exploratory trial, community mental health services	n = 36	Age 18–64. - Diagnosis of schizophrenia, bipolar disorder type 1 with psychosis, delusional disorder, or schizoaffective disorder (ICD-10). - Self-reported	- Non-English speakers. - Intellectual disability (IQ <70). - Inpatients in secure wards or	EMDR (n=24)	TAU (n=12)	10 weeks (treatment) + 6-month follow-up.	the United Kingdom	Did not receive treatment: 5.5% (2/36) At 10 weeks: 20.5% (7/34) 6-month	Withdrawal, loss to follow-up

	settings.			trauma history.	deemed high-risk without social support.					follow-up: 20.5% (7/34)	

Table 1 showing the characteristics of the included studies

Participant characteristics

The mean age of participants across all trials ranged between 36 to 41 years. In terms of gender, 53.8% of the included population were females. The type of experienced trauma was described by the patients in three studies,[32,33,36] with physical, sexual, and childhood abuse being the most frequently encountered. An established diagnosis of PTSD was a prerequisite for participation in two trials,[32,36] but in the other two adopting broad inclusion criteria of subsyndromal posttraumatic symptoms, many participants still met the diagnostic criteria for PTSD.[33,35]

PTSD outcomes

Table 2 summarizes the baseline characteristics of the participants, and the clinical outcomes reported across the four clinical trials. In various study groups and with varying EMDR therapy goals, all trials discovered that EMDR was associated with a reduction in PTSD symptoms. Varese et al.[33] demonstrated that EMDRp had encouraging signals of efficacy on PTSD symptoms. Based on the 80% CIs, there was a possible indication of a treatment effect at the 6-month assessment of post-traumatic symptoms as measured by the Post-traumatic Stress Disorder Checklist for DSM-5 (PCL-5) and the and the International Trauma Questionnaire for PTSD (ITQ-PTSD). EMDR showed potential for PTSD symptoms and general health status at 12-month follow-up, but efficacy for other outcomes was less pronounced compared to the 6-month follow-up. Receiving EMDRp + TAU was associated with decreased odds of fulfilling PTSD criteria on the ITQ and PCL-5 at 6 and 12 months, and of fulfilling the Complex PTSD (CPTSD) criteria at 12 months. Every-Palmer et al.[36] summarized that the EMDR group had significantly lower Clinician-Administered PTSD Scale (CAPS) scores (p= 0.028) than the control group. After 6 months, 2/12 (16.7%) of participants in the EMDR group still had PTSD, compared to 4/11 (36.4%) in the wait-list group. In the earlier report of the trial by de Bont et al.,[32] van den Berg et al.[31] concluded that EMDR is practicable for patients with psychosis and PTSD and can be used safely and effectively without requiring stabilizing psychotherapy interventions. In this study, the EMDR group had significantly lower CAPS and PTSD Symptom Scale – Self-Report (PSS-SR) scores than the WL control post-treatment and at 6-month follow-up. The same finding was supported by Marlow et al.,[35] whose trial showed significant score reductions for the EMDR group on the Impact of Events Scale (IES), as well as the Post-traumatic Stress Disorder Checklist - Civilian Version (PCL-C).

Psychosis Outcomes

Based on post-treatment and 6-month follow-up scores, the results of de Bont et al.[32] demonstrated the superiority of EMDR to the wait-list (WL) control in reducing paranoid thoughts. Participants allocated to the EMDR group showed an obvious reduction in Green Paranoid Thoughts Scale (GPTS) scores, which was statistically significant at post-treatment ($t_{200} = –2.68$, $p = 0.008$). On the other hand, Auditory Hallucinations Rating Scale (AHRS) scores remained unchanged. Varese et al.[33] also reported that EMDRp had promising effectiveness on psychotic symptoms. According to the 80% CIs, there may have been a treatment effect favoring the EMDRp + TAU arm at the 6-month follow-up evaluation of the severity of all psychotic symptoms as evidenced by reduced total Positive and Negative Syndrome Scale (PANSS) scores, and of subjective recovery from psychosis using the Questionnaire about the Process of Recovery (QPR). However, the trial did not show a significant difference in either the Auditory Hallucinations (AH) or the Delusions (D) subscales of the Psychotic Symptom Rating Scales (PSYRATS). Similarly, Every-Palmer et al.[36] did not report a significant difference in auditory hallucinations or delusions on both PSYRATS subscales. At initial follow-up, Marlow et al.[35] did not find a substantial difference between EMDR and TAU groups in PANSS and its Positive (P) and Negative (N) Symptom subscales. However, EMDR significantly reduced PANSS-N ($p = 0.03$) at 6-month follow-up.

Adverse events

Varese et al.[33] documented the occurrence of 60 adverse events (AEs), with 13 categorized as serious (1 pre-randomization, 8 in the control group, and 4 in the treatment group of EMDRp + TAU). On the other hand, non-serious events, such as mild symptom exacerbations, were encountered more frequently in the treatment group compared to the TAU arm (33 versus 14). However, those adverse events were expected and temporary, coinciding with the beginning of the reprocessing activity of traumatic memories. It should be noted that no serious AEs related to the trial procedures or treatments themselves were reported. In the Every-Palmer et al. trial,[36] no participants suffered any serious AEs, and no significant differences in minor adverse effects were documented by the authors. van den Berg et al.[31] reported a single severe AE, however, to the authors' judgement, the trial itself did not induce this event. Finally, neither adverse reactions nor symptom exacerbations were reported by Marlow et al.[35] during treatment or after receiving it.

Study ID	Age Mean (SD)	Gender (N)	Trauma category N. (%)	Psychiatric diagnosis N. (%)	Medication Mean (SD)	PTSD at Baseline mean (SD)	PTSD Outcome (MD)	Psychosis at Baseline mean (SD)	Psychosis Outcome (MD)	Statistical significance and summary of findings
de Bont[32] (2016) *	EMDR: 40.4 (11.3) PE: 42.6 (10.3) WL: 40.3 (9.7)	EMDR: M: 25 F:30 PE: M: 23 F: 30 WL: M: 23 F: 24	Physical abuse: 82 (52.9%) Sexual abuse: 94 (60.7%) Childhood abuse: 10 (6.5%) Others: 84	Schizophrenia: 95 (61.3%) Schizoaffective: 45 (29.0%) Depression: 29.6 (11.7%) Bipolar: 7	Chlorpromazine-equivalent: EMDR: 253.2 (250.5) PE: 227.3(187.9) WL: 250.7	CAPS total score: 72.1 (17.6) PSS-SR score: 30.3 (7.8) PTCI score: 147.6 (32.6)	-Post-treatment: CAPS: -31.8 PSS-SR: -14.2 PTCI: -27.2 - 6-month follow-up: CAPS: -33.3 PSS-SR: -14.1	GPTS: 82.7 (29.2) AHRS: 12.04 (14.8)	- Post-treatment: GPTS: -14.7 AHRS: 4.76 - 6-month follow-	In the linear mixed model analysis, EMDR led to significantly decreased CAPS scores post-treatment ($t_{193} = –3.26$, $p= 0.001$) and at 6-month follow up ($t_{193}= –2.66$, $p = 0.009$). Significant reductions were also found in PSS-SR across both time points ($t_{187} = –4.26$, $p< .001$, and $t_{187} = –3.51$, $p = 0.001$). For psychosis, EMDR led to a significantly greater

			(54.2%)	(4.5%) Others: 8 (5.1%)	(232.8)		PTCI: -27.8		up: GPTS: -12.5 AHRS: 4.06	reduction in paranoid thoughts as measured by GPTS compared to WL (t_{200} = −2.68, p = 0.008). At 6-month follow-up, this reduction was no longer statistically significant (t_{201} = −1.48, p = 0.140). But across all time points, EMDR remained significantly more effective than WL (t_{129} = −2.38, p = 0.019). Auditory verbal hallucinations and social functioning were unchanged.
Varese[33] (2024) **	EMDR+TAU: 36.25 (13.86) TAU only: 35.75 (12.58)	EMDR+TAU: M:11 F:20 TAU only: M: 13 F:16	Physical abuse: 53 (88.3%) Sexual abuse: 39 (65.0%) Childhood abuse: 59 (98.3%) Others: 26 (43.3%))	N/A	Haloperidol-equivalent: EMDR+TAU: 6.16(5.50) TAU only: 6.50(5.04)	ITQ PTSD: 16.8 (5.2) PCL-5: 54.3 (12.8)	- 6-month follow-up: ITQ PTSD: -6.2 PCL-5: -18.5 - 12-month follow-up ITQ PTSD: -6.7 PCL-5: -22.8	PANSS: 66.8 (11.3) PSYRATS-AH: 18.5 (15.0) PSYRATS-D: 15.8 (4.6) GPTS: 91.0 (34.2) QPR: 32.1 (8.3)	- 6-month follow-up: PANSS: -10.4 PSYRATS-AH: -5 PSYRATS-D: -5.5 GPTS: -26 QPR: 5.2 - 12-month follow-up: PANSS: -16.1 PSYRATS-AH: -2.5 PSYRATS-D: -8.8 GPTS: -29.6 QPR: 7.1	At 6 months, EMDRp+TAU showed moderate effect sizes and clinically meaningful reductions compared to TAU in PCL-5 (*d* = −0.6), and ITQ PTSD (*d* = −0.4). 80% Confidence intervals were (−20.9 to −3.6) and (−6.3 to 0.0) respectively, suggesting statistical significance of the findings. At the same time point, PANSS scores were also significantly reduced (80% CI: −12.5 to −2.8), with a moderate effect size (*d* = −0.6). At 12-month follow-up, effect sizes for PCL-5 and ITQ PTSD were both maintained (*d* = −0.5), while effects on psychotic symptoms were decreased (PANSS, *d* = −0.3). Across both time points, the improvements in PSYRATS (AH and D) and GPTS were minimal and not statistically significant.
Every-Palmer[36] (2024)	EMDR: 40.7 (13.2) WL: 38.4 (9.8)	EMDR: M: 9 F:3 WL: M: 7 F: 5	Physical abuse: 3 (12.5%) Sexual abuse: 3 (12.5%) Childhood abuse: 6 (25%) Others: 12 (50%)	Schizophrenia: 14 (58%) Schizoaffective: 2 (8%) Depression: 1 (4%)) Bipolar:4 (17%) Others: 3 (13%)	N/A	CAPS: 40.5 (11.7) PSS: 42.2 (16.9) PTCI: 143.3 (22.7)	-10 weeks: CAPS: -13.5 PSS: -9 PTCI: -20.5 -6-month follow-up: CAPS: -18.7 PSS: -13.7 PTCI: -18.5	PSYRATS-D: 3.8 (6) PSYRATS-AH: 8.8 (13.6)	-10 weeks: PSYRATS-D: -1.7 PSYRATS-AH: -3.6 6-month follow-up: PSYRATS-D: -2.5 PSYRATS-AH: -5.5	For CAPS, EMDR showed statistically significant improvements at both timepoints with an MD of -11.4 (95% CI: -21.4 to -1.3, *p* = 0.028), favoring EMDR over TAU. PTCI scores were significantly reduced at 10 weeks (*p* = 0.047), but the effect was not significant at 6 months (*p* = 0.12). However, for PSYRATS-D and AH no statistically significant differences between EMDR and TAU were observed at either 10 weeks or 6 months (*p* = 0.24).
Marlow[35] (2023)	EMDR: 42 (14.5) TAU: 34.4 (11.3)	EMDR: M: 10 F: 14 TAU: M:6 F: 6	N/A	Schizophrenia: EMDR: 14 (58%) TAU: 9 (75%) Schizoaffective: EMDR: 3 (13%) TAU: 1 (8%) Bipolar: EMDR: 6 (25%) TAU:1 (8%)	N/A	IES-R total: 53.8 (14.5) IES-A: 18.9 (6.9) IES-I: 19.7 (7.3) IES-H: 15.2 (4.7)	-10 weeks: IES total: -19.2 IES-A: -7.2 IES-I: -7.6 IES-H: -4.6 PCL-C: -13.9	PANSS total: 73.9 (22.5) PANSS-P: 17.4 (6.2) PANSS-N: 16.8 (7.5) PANSS-G: 39.7 (11.3)	-10 weeks: PANSS total: -8.4 PANSS-P: -2.3 PANSS-N: -1.1 PANSS-G: -4.9 -6-month follow-up:	There was a statistically significant improvement associated with EMDR treatment vs TAU on the total IES scale, with an effect size of 1.49 (*p* = 0.03) at 10 weeks and 1.22 (*p* =0.04) at 6 months. PCL-C scores also fell more in the EMDR group with an MD of -14.7 (95% CI: -27.4 to -2.2, *p* = 0.02) at 10 weeks. However, at 6 months, the findings were only close to significance (p = 0.06). PANSS

						PCL-C: 56.5 (9.4)	-6-month follow-up: IES total: -18.2 IES-A: -4.5 IES-I: -6.1 IES-H: -5.7 PCL-C: -14.4		PANSS total: -16.8 PANSS-P: -4 PANSS-N: -3.2 PANSS-G: -9.6	score improvements did not reach significance at either timepoints. But there was a significant drop in the negative symptom subscale at 6 months (p = 0.03).
*Outcomes of PTSD were extracted from Van den Berg et al. (2015), an earlier report of this trial. ** The intervention used was EMDRp+TAU										

Table 2 summary of participant baseline characteristics and outcomes of EMDR therapy.

Discussion

The development of psychotic disorders is strongly linked to traumatic experiences in the past. The body of research on the interaction between trauma and psychosis is rapidly growing, with a shift towards using trauma-focused therapies in patients showing psychotic symptoms. These therapies include but are not limited to prolonged exposure (PE), written emotional disclosure, and eye movement desensitization and reprocessing (EMDR). However, due to the emerging nature of this topic, there are still reasonable concerns regarding the safety and efficacy of these interventions. Several past systematic reviews and meta-analyses presented an overview of the employment of various psychological interventions for individuals with psychosis.[37–39] The purpose of this review is to focus on EMDR, investigating its efficacy and safety in patients with psychosis and PTSD.

The findings of this review suggest that EMDR can be successfully and safely used in individuals with psychotic conditions and a history of trauma. Throughout the studies, PTSD symptoms were significantly improved across various measurement scales. In terms of psychosis, EMDR was also linked with improvements in certain psychotic symptoms, mainly paranoid thoughts, and negative symptoms of psychosis.[32,33,35] Additionally, the therapy was associated with higher remission rates than a wait-list condition.[32] However, no clinically significant differences in delusions or auditory hallucinations were reported.[32,33,36] Regarding the latter, this modest effect possibly stems from hallucinations being sensory experiences rather than faulty cognitions, which makes them less likely to be eradicated through psychotherapeutic interventions for psychosis.[40] In the earlier report of the largest RCT in this review, EMDR, PE, and WL were compared for individuals with a psychotic condition and PTSD.[31] Both active comparators, EMDR and PE, showed comparable improvements in trauma-related symptoms and paranoid thoughts, and both were thought to be safe. These results could be incorporated into a broader lens, which explores multiple varieties of trauma-focused therapies and opts for the one most suitable for the patient's psychiatric history and clinical needs. It should be noted that across the included studies, traumatic memories were the main target of EMDR. However, the therapy still led to reductions in negative psychotic symptoms, and we believe that this is a direct result of the relationship that exists between psychosis and psychosocial factors. The fact that certain psychotic symptoms

improved without being directly addressed by EMDR adds to the evidence that trauma is a major risk factor for psychosis.

In terms of safety, EMDR did not result in serious adverse events such as suicide attempts, aggressiveness, or hospitalizations. The reported adverse reactions mostly consisted of transient or mild exacerbations coinciding with the start of trauma memory reprocessing activity,[33] or were concluded to be unrelated to the trial performed. Moreover, EMDR was associated with fewer adverse events than the control group in two trials.[32,36] And while Varese et al.[33] observed a higher number of non-serious AEs in EMDRp + TAU arm, the authors hypothesized that it may be due to the more intensive scrutiny of participants allocated to this arm, who had regular contact with EMDR therapists. Overall, these findings suggest that EMDR has a promising safety profile for use in patients with psychosis, contrary to what was previously thought. A previous systematic review has assessed the potential of EMDR use in psychotic conditions.[41] The authors included six studies in their review (1 RCT, 1 case report, 2 case series, and 2 pilot studies), and reported that EMDR was associated with less delusional symptoms, less negative symptoms, more remissions, and fewer hospital readmissions. However, mixed findings were found regarding hallucinations of auditory nature, and paranoid thoughts.

One of the strengths of this review is the extensive search approach and thorough search strategy, which ensured that no potentially relevant studies were omitted. To our knowledge, we are the first to date to use data from randomized controlled trials solely to systematically review the existing evidence for using EMDR in psychotic conditions. But while RCTs are considered the gold standard for determining the true effectiveness of interventions, the number of the trials we included remains very few. This is one of the main limitations of this review, although it could be justified by the previous deliberate exclusion of individuals with psychosis from trials where psychotherapeutic interventions for PTSD are used. It should also be noted that one of the trials included in this review was a feasibility study. [33] Owing to this, its findings, though promising, should be interpreted with caution. Another limitation is that apart from de Bont et al.,[32] the rest of the included studies had relatively small sample sizes. That is why we encourage future experimental studies to incorporate an acceptable sample size with longer follow-up periods to find statistically significant minor result differences, which may influence the outcomes.

One final consideration to highlight the necessity of exploring the potential of EMDR beyond PTSD is that this therapy can be delivered via the Internet. Although online EMDR sessions were mainly a byproduct of the COVID-19 pandemic restrictions, they proved cost-effective and convenient.[42] Bongaerts et al.[43] investigated the efficacy and safety of the remote application of an intensive trauma-focused therapy program for PTSD, which included EMDR. The authors' findings in this regard were promising, indicating the potential that home-based telehealth has to replace face-to-face delivered intensive trauma-focused interventions. In the context of psychosis, patients with this condition often exhibit avoidant behavior tantamount to agoraphobia.[44] In one survey of participants with non-affective psychosis, this severe level of anxious avoidance was identified in approximately 65% of them.[45] Therefore, accessing face-to-face care is an understandable challenge for such individuals, which makes the prospect of home-based therapy seem propitious.

The findings of this review suggest that EMDR is a promising therapy for individuals with psychosis and PTSD. In the four included trials, EMDR appears to be effective in reducing the intensity of both conditions, and to be generally safe with only a few reported adverse events. But given the limited number of trials, this evidence is still insufficient to conclude with confidence that EMDR can be used safely and successfully in those individuals, especially as a standalone therapy for trauma-related symptoms, or as an approved adjuvant therapy for psychosis. However, we believe that future trials will contribute to the answer.[46–48] Such therapy, which focuses on the underlying social aspect of psychosis, could be life-changing for those vulnerable patients, helping them and their families overcome the stigma and social isolation associated with their condition.[49] The co-existence of complex psychiatric morbidities in these individuals should not deter researchers, but rather prompt greater efforts to be made on their part. Mental health conditions often overlap at different levels of observation.[50] Therefore, addressing one condition with proper therapy may result in the inadvertent improvement of the other. Likewise, patients exhibiting symptoms of more than one psychiatric condition should not be discouraged from seeking active treatment to alleviate the distress caused by them.

Conclusion

Across the four trials included in this review, EMDR appears to be more effective than TAU and the WL condition in reducing trauma-related symptoms and certain psychotic symptoms in patients with psychosis and PTSD. The evidence also suggests that EMDR is safe for use in those individuals, with no serious adverse events that might deem them unfit for participation in future clinical trials of trauma-focused interventions. But given the small number of studies, conclusive results about the true efficacy and safety of EMDR in this population cannot be obtained. More vigorous trials should be carried out with larger sample sizes and longer follow-up periods to further assess the potential of EMDR in psychotic conditions, as well as its long-term efficacy. In the future, other trauma-focused interventions should be used as comparators to broaden the pool of non-pharmacological treatment options for patients with psychosis.

Conflict of interest: The authors pointed out no potential conflicts of interest.

Handling Editor: Dr. Joana Bücker

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