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„Effectiveness of Cognitive Behaviour Therapy and Eye Movement Desensitization and Reprocessing for Post-Traumatic Growth in Individuals with Post-Traumatic Stress Disorder: A Systematic Review“

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Effectiveness of Cognitive Behaviour Therapy (CBT) and Eye Movement Desensitization and Reprocessing (EMDR) for Achieving Post-Traumatic Growth (PTG) in Individuals with Post-Traumatic Stress Disorder (PTSD): A Systematic Review

Post-traumatic stress disorder (PTSD) is a mental health disorder that may develop after a directly or indirectly experienced or witnessed traumatic event that involves exposure to actual or possible death, severe injury or sexual violence, according to the last edition of the Diagnostic and Statistical Manual (DSM-5; American Psychiatric Association [APA], 2013). PTSD is associated with higher mortality rates compared to the rates among people without PTSD (Roberts et al., 2020; Fox et al., 2021) and also poses an increased risk for physical health impairments (Coughlin, 2011).

In addition, PTSD symptoms may markedly interfere with people's daily functioning, affecting problem-solving, communication, confidence, functional attachment (U.S. Department of Veterans Affairs [VA], 2022) and associated with cognitive decline (Roberts et al., 2022), occupational difficulties, poor social connections and intimate relationship problems (Taft et al., 2011).

Moreover, PTSD is shown to be a prevalent condition (Teshome et al., 2023). A cross-sectional study of Teshome et al. (2023) on the general population indicates that the prevalence of PTSD varies between 1 and 5%, whereas in high-risk groups like those living in conflict zones, the prevalence has been documented to range from 3 to 58%**.** Yet, all statistics may not entirely capture the actual extent of PTSD, as numerous cases remain undiagnosed or untreated (VA, 2022).

Furthermore, the diagnosis of PTSD and its treatment are often challenged and complicated by the presence of psychiatric comorbidities, such as depression (Flory &

Yehuda, 2015), substance use disorder (SUD) (Roche & Foster, 2023) and borderline personality disorder (BPD; Mauritz et al., 2013). About 50% of individuals diagnosed with PTSD report comorbid Major Depressive Disorder (MDD) (Flory & Yehuda, 2015). PTSD is associated with a nearly four times higher mortality risk for women with comorbid depression (Roberts et al., 2020). In addition, manifold trauma sources (Kessler et al., 2014; Sareen, 2014) may supply multiple traumatic experiences in a person's life, which is linked to the co-occurrence of SUD (Roche & Foster, 2023). The history of a traumatic experience elevates the risk for alcohol and drug use. According to Roche and Foster (2023), 42% to 95% of individuals seeking treatment for SUD present with histories of traumatic exposure. The co-existent condition requires dual diagnosis and complicates treatment. Besides that, several characteristics of complex PTSD (CPTSD) are shared with borderline personality disorder (BPD), which can make it difficult for clinicians to distinguish CPTSD from BPD (Knefel et al., 2016; Mauritz et al., 2013).

Ultimately, PTSD may remain chronic despite psychopharmacological treatment (Perez Benitez et al., 2013) and have high relapse rates (Berge et al., 2020; Steenkamp et al, 2015). A longitudinal study of Berge et al. (2020) researched the course of PTSD for more than 14 years in a clinical sample of a non-combat population, revealing that from the initial 90 patients, only 13 recovered. In addition, a systematic review of Steenkamp et al. (2015), which included 36 randomised clinical trials scrutinising psychological therapy for military-related PTSD, revealed that about two-thirds of patients did not recover.

Consequently, research evidence indicates that people do not recover from PTSD uniformly and at a consistent pace, and no approach can treat trauma by eradicating all PTSD symptoms and comorbidities in all affected individuals (Joseph

et al., 2012; Kessler et al., 2017; Rosellini et al., 2018) despite the established long-term effects of psychological treatment at the follow up of 12 months (Weber at al., 2021). A WHO cross-national epidemiological study of a PTSD course found a considerable amount of people remit within half a year, a majority within two years, and a substantial minority persists for many years (Rosellini et al., 2018). The research mentions that 27% of people recovered within 6 months, 50% within 24 months and 77% within 10 years that are the longest duration allowing stable estimates (Rosellini et al., 2018). Thus, it is crucial to develop more effective interventions for trauma survivors in their path to recovery. To inform these interventions, it is essential to understand the nature of psychological trauma and its impact.

Psychological Trauma and Phenomenology of PTSD

Psychological trauma is seen as a response to either a specific sole traumatic event or multiple traumatic incidents over one's lifetime (Sareen, 2014). PTSD manifests as the complex behavioural, affective, cognitive and somatic consequences of psychological trauma (Kessler et al., 2014). Many different types of traumatic experiences can lead to PTSD, including sudden medical condition, demise of a loved one, severe physical injury, childhood emotional and sexual abuse, natural disasters, physical or sexual assault and military combat. A population-based study of Perrin et al. (2014) indicates that 20-90% of the general population has experienced one or more traumatic events in their life. Typically, the natural path of reaction to trauma is for the person to adapt and recover over time; yet, some people undergo acute stress disorder (ASD), which lasts up to 4 weeks (Fanai & Khan, 2023) and varies in intensity based on the event's severity and duration, exposure level and personal significance to the individual. Among individuals with ASD, 1.3% to 11.2% develop

long-term symptoms of PTSD (Fanai & Khan, 2023). However, some people achieve post-traumatic growth on their path of recovering from trauma. PTG can be an outcome of psychological trauma or PTSD but can also be achieved independently on PTSD symptom dynamics (Jeon et al., 2021).

Diagnostic Criteria of PTSD

The latest editions of the diagnostic manuals, used for diagnosing mental disorders are the fifth edition of the Diagnostic and Statistical Manual (DSM-5; APA, 2013) and the eleventh edition of the International Classification of Diseases (ICD-11; World Health Organisation [WHO], 2022). Three groups of primary PTSD symptoms are shared in both the ICD-11 and DSM-5 criteria: (a) intrusions or reexperiencing, often through vivid flashbacks and persistent nightmares highlighting key moments of the traumatic incident, (b) avoidance of cues of the event, including specific situations, objects or people which may trigger memories of the event, (c) hyperarousal, which includes hypervigilance, sleeplessness, diminished concentration and exaggerated startling (APA, 2013; WHO, 2022).

ICD-11 contains separate diagnostic criteria for complex PTSD (CPTSD), which is marked by enduring and severe disruptions in managing emotions, negative self-perception and challenges in maintaining interpersonal connections, alongside the three primary symptoms of PTSD (Gaebel et al., 2020). DSM-5 does not list CPTSD separately but extends PTSD criteria to include CPTSD symptoms (Lehrner & Yehuda, 2020).

Earlier research utilises previous diagnostic editions, DSM-IV and ICD-10, which were published in 1994 and have undergone several significant revisions in PTSD diagnosis up to the current editions (Gaebel et al., 2020; Pai et al., 2017). As these

diagnostic frameworks evolved, so too did the treatment approaches and understanding and evaluation of the treatment efficacy of PTSD.

Treatment of PTSD

Both pharmacological and psychological treatment have shown effectiveness in reducing PTSD symptoms (Storm & Christensen, 2021). However, major systematic reviews indicate that psychotherapy, including eye movement desensitization and reprocessing (EMDR) and cognitive behavioural therapy (CBT) approaches, such as cognitive processing therapy (CPT), imaginal exposure (IE); prolonged exposure (PE), prolonged exposure with cognitive restructuring (PE/CR), trauma-focused and non-trauma-focused cognitive behavioural therapy, results in advances that are longer lasting and more extensive compared to pharmaceutical treatment (Lee et al., 2016; Storm & Christensen, 2021; Weber et al., 2021). Moreover, it outperforms other psychotherapies for PTSD, such as non-directive, supportive, person-centred counselling, hypnotherapy and psychodynamic therapy (Bisson & Lewis, 2013; Hoppen et al., 2022)

CBT and EMDR are endorsed across a wide range of demographics, including different age groups, cultures, genders, military populations and types of trauma (Schnurr, 2017). CBT approaches and EMDR are recommended by PTSD treatment guidelines from organisations like the American Psychological Association (APA, n.d.) and the Department of Veteran Affairs (VA)(Department of Veterans Affairs and Department of Defense [VA/DOD], 2023; Watkins, Sprang, & Rothbaum, 2018; Schnurr, 2017). However, a substantial body of research evidence demonstrates that individuals do not recover from PTSD in a uniform or consistent manner (Rosellini et al., 2018) despite sustained long-term effects of psychological PTSD treatment at 12 months of follow-up (Weber et al., 2021). Furthermore, no trauma intervention was

shown to completely eliminate all PTSD symptoms and comorbidities in all affected individuals (Joseph et al., 2012; Kessler et al., 2017).

Psychological Treatment of PTSD

CBT

CBT emerged in the 1960s and was initially developed as a therapy for depression (Beck, 2020). It has been adapted to the treatment of a wide range of disorders and conditions, including PTSD (Nakao et al., 2021). CBT is built around the concept of faulty (irrational) thoughts. It acknowledges the interconnectedness of thoughts, emotions, and behaviours triggered by a person's perception of a situation. Those interconnected thoughts, emotions and behaviours form a self-perpetuating vicious cycle. CBT seeks to break this cycle and transform it into a more rational, constructive virtuous loop (Beck, 2020).Ehlers and Clark (2000) posit that individuals with PTSD employ dysfunctional cognitive and behavioural strategies that underlie negative appraisals or interpretations of the situations in the present. This tends to feed trauma memories and fuse the past with the present. Cognitive-behavioural theory asserts that the previous knowledge, core beliefs and experiences of people regulate their way of perceiving and interpreting various external stimuli in the present (Shubina, 2015). In PTSD, the traumatic event represents that core experience that underlies the irrational interpretation of later events and situations, which elicits (a) maladaptive behaviour, such as avoidance of trauma-related thoughts and cues, (b) somatic (physical) and (c) psychological (anxiety) symptoms, which is all maintaining PTSD symptoms. The following CBT techniques are typically employed for treating PTSD: education, relaxation training, cognitive restructuring, behavioural experiments, exposure techniques and homework. The goals of CBT for PTSD include correcting negative appraisals, revising autobiographical memory and

modifying maladaptive behaviours alongside restructuring irrational thoughts (Watkins et al., 2018). CBT typically comprises 12-16 sessions in either individual or group format (APA, 2017).

EMDR

EMDR was initially devised as a technique for treating PTSD (Shapiro, 2001). It has been adapted to many other psychiatric conditions (Menon & Jayan, 2010). EMDR therapy is an integrative process based on the adaptive information processing (AIP) model that rests on the assumption that mental health problems stem from traumatic or adverse experiences in the past, memories of which are unprocessed as stored in the neural network that is distinct from the adaptive memory network (Shapiro, 2007). According to the EMDR approach, a disturbing or traumatic incident can be locked into the brain through bodily sensations, emotions, images, sounds and thoughts. EMDR stimulates information processing and allows the brain to integrate adverse memories (Shapiro, 2007). Visual, auditory or tactile bilateral stimulation techniques (bilateral eye movements, alternating sounds or taps) used by a therapist in EMDR help people unlock, process and integrate troubling traumatic memories. The EMDR treatment procedure is based on an eight-phase and three-prong protocol (Shapiro, 2017). The three prongs refer to (a) past events that contribute to the current disturbance, (b) current triggers that cause the disturbance and (c) behaviours promoting future functioning. The eight-step therapy process comprises history taking, preparation, assessment, desensitization, installation, body scan, closure, and re-evaluation (Shapiro, 2017). The EMDR theory claims that our mind can cure psychological traumas, much like the body recovers from physical injury (Shapiro & Maxfield, 2002). EMDR is typically delivered in 6-12 sessions; however, some individuals benefit from a shorter course (Shapiro, 2017).

Effectiveness of CBT Versus EMDR for PTSD Treatment

Findings of several major meta-analytic studies comparing the effectiveness of CBT and EMDR for treating PTSD are inconsistent. Seidler and Wagner (2006) suggested that both therapy methods tend to be equally efficacious for the treatment of PTSD. A Cochrane review of Bisson et al. (2013) reported no statistically significant differences between CBT and EMDR in their effects on PTSD treatment. Yet, EMDR and CBT were more effective than other therapeutic modalities, including psychodynamic therapy, hypnotherapy, person-centred counselling and supportive interventions. Chen et al. (2015) in their systematic review and meta-analysis demonstrated that EMDR was slightly better than CBT. Khan et al. (2018) reported that EMDR was better than CBT in reducing post-traumatic symptoms and anxiety. Jericho et al. (2021) in their systematic review and meta-analysis indicated that the effect sizes of CBT treatment for PTSD were about twice as big as those of EMDR. Hoppen et al. (2022) revealed that CBT is better for PTSD than EMDR in terms of both short-term and long-term efficacy.

Both CBT and EMDR therapy aim to decrease subjective suffering and boost helpful thoughts related to the traumatic incident; yet, they differ in several critical aspects (Shapiro, 2014). CBT targets negative thoughts and behaviours (Beck, 2020), while EMDR concentrates on processing traumatic memories (Shapiro, 2017). EMDR employs EMDR-specific eye movements and other bilateral stimulation techniques, and, unlike CBT, it does not involve the direct challenging of negative beliefs and homework (Shapiro, 2014). The duration of CBT for PTSD is typically about twice as long as EMDR (APA, 2017; Shapiro, 2017). CBT therapists are more directive in teaching coping skills and behaviour modification. The choice of which therapy to use often depends on the availability of therapy and the individual's specific needs and

preferences. Client preferences are strongly related to better treatment outcomes (Cooper et al., 2023). While considering these preferences, it is also important to recognise the potential for post-traumatic growth, which may develop alongside treatment progress or independently of symptom changes (Jeon et al., 2021).

Post-Traumatic Growth (PTG)

Historically, trauma-based literature highlighted the adverse outcomes of trauma, emphasising the psychological and emotional distress individuals might undergo (Dye, 2018). Research on post-traumatic growth has gained significance as it offers an alternative perspective to the predominantly negative outcomes associated with trauma (Tedeschi & Calhoun, 2012). The concept of post-traumatic growth implies that adversity can act as a catalyst for enhanced psychological health, manifesting as the constructive psychological transformations that happen following trauma (Roepke et al., 2017). Those positive psychological changes account for the five key domains of PTG, comprising changed priorities and better appreciation of life, improved relationships with others, a better realisation of own strengths, recognition of new potentials for one's life and spiritual growth (Tedeschi & Calhoun, 2004). PTG is defined as positive psychological changes resulting from the struggle with highly challenging or traumatic situations (Tedeschi et al., 2018). Post-traumatic growth (PTG) represents a distinct phenomenon from the conventional treatment approach. While treatment modalities are primarily aimed at the reduction of PTSD symptoms, PTG evolves amidst suffering and psychological struggles that follow trauma (Tedeschi & Calhoun, 2004).

PTG is typically measured using the Posttraumatic Growth Inventory (PTGI; Tedeschi and Calhoun, 1996) at different time points in trauma survivors. The inventory includes 21 items, each falling under one of the five categories of the key

PTG domains. The PTGI does not measure objective changes in behaviour. Rather, it subjectively evaluates changes in the concept of the world, relationships with other people, and the self (Josefiakova et al., 2022).

The diagnostic and treatment challenges associated with PTSD (Flory & Yehuda, 2015; Mauritz et al., 2013; Roche and Foster, 2023), along with its chronic nature (Perez Benitez et al., 2013), highlight the inherent unfeasibility of eradicating all post-traumatic symptoms and comorbidities. Thus, an alternative approach of focusing on the possible benefits of post-traumatic growth is important. PTG and symptoms of PTSD or other mental disorders can co-occur or co-exist in individuals (O'Donovan & Burke, 2022), and PTG can be achieved even when the PTSD symptoms remain (Jeon et al., 2021). Moreover, post-traumatic growth has been observed to strongly positively correlate with PTSD symptom alleviation over the long term. This adds to the advantages of PTG as a focus of therapeutic interventions to treat people with PTSD (Jeon et al., 2021).

Factors Promoting PTG

According to Jeon et al. (2021), time, absence of a comorbid psychiatric condition and a less severe nature of the trauma play an important role in achieving PTG. Furthermore, factors promoting PTG outside therapy, yet which may be useful to be considered in therapy may include interpersonal variables, such as supportive attitudes of close others towards trauma disclosure (Wagner et al., 2016), the presence of a supportive intimate relationship (Wagner et al., 2016) and a sense of belonging (Henson et al., 2021). In addition, personality traits of agreeableness (Henson et al., 2021), openness to feelings and ideas (Zoellner et al., 2011), personality characteristics such as self-confidence, self-efficacy (O'Donovan & Burke, 2022), resilience, optimism and spirituality (Henson et al., 2021) may facilitate PTG.

Moreover, some factors that may be relevant to specific therapeutic techniques of CBT include rumination as cognitive processing (O'Donovan & Burke, 2022; Henson et al., 2021), challenging core beliefs (O'Donovan & Burke, 2022), making meaning of the traumatic experience and modifying dysfunctional beliefs about the experience (Wagner et al., 2016).

Research into factors contributing to PTG presents scarce evidence for the role of therapeutic factors in PTG. The possible role of therapeutic factors in promoting PTG is important as both common and specific therapeutic factors account for psychotherapeutic change in treating PTSD, although the proportion of their contribution remains unclear (Cuijpers et al., 2019). Common (non-specific) therapeutic factors include therapeutic alliance, therapy setting, and therapist's competence, whereas specific therapeutic factors include techniques specific to therapy (Chatoor & Krupnick, 2001), such as challenging core beliefs in CBT (Watkins et al., 2018) or memory reprocessing in EMDR (Shapiro, 2017). Assuming that post-traumatic growth may be facilitated by a therapeutic change, it is useful to recognise whether and which therapeutic factors may contribute to PTG while comparing CBT and EMDR.

Both CBT (Wagner et al., 2016) and EMDR (Nijdam et al., 2018) have shown the potential to facilitate PTG. Yet, the difference in their effects is unknown. Their essential dissimilarities in techniques, therapist role and duration, challenge the possibility of them having an identical effect on PTG and pose the probability of one of them being more effective.

Factors hindering PTG

Factors that hinder post-traumatic growth include psychological conditions, such as alcohol or substance abuse, depression, psychotic symptoms, chronic stress

and anxiety (Henson et al., 2022). Moreover, PTG tends to be hindered in survivors of interpersonal traumas, such as domestic violence and childhood abuse (Henson et al., 2022).

Present Systematic Review

The existing research gap leaves it uncertain which therapy is more effective for facilitating PTG. Knowing which approach is more effective is important due to several considerations. Firstly, CBT and EMDR are completely dissimilar in their techniques, timing and theoretical underpinnings (Beck, 2020; Shapiro, 2017), and this may have a different impact on PTG. Secondly, trauma sources are highly heterogeneous (Kessler et al., 2014) and PTG may be hindered in survivors of certain types of trauma (Henson et al, 2022). By comparing CBT and EMDR effects on PTG, we may gain insight into the effect of these therapies on PTG, depending on the type of trauma, as, especially in post-traumatic growth, the nature of trauma may play an essential role (Zoellner et al., 2011). Thirdly, PTSD is highly comorbid with depression (Farley et al., 2004) and SUD (Flory & Yehuda, 2015), and these conditions are shown to hinder PTG. Fourthly, client preferences for therapy are shown to be significant in treatment choice for achieving enduring treatment outcomes (Cooper et al., 2023). Finally, by comparing PTG in CBT versus EMDR, we will also attempt to enquire into the possible contribution of therapeutic factors to PTG. That may shed light on a better understanding of why one therapy might be more effective than another. Ultimately, comparing the effects of CBT and EMDR on post-traumatic growth may aid in the development of more effective therapeutic interventions for trauma survivors on their path to recovery.

The research gap we address by raising the following question:

Which therapy, CBT or EMDR, is more effective in fostering post-traumatic growth (PTG) among individuals diagnosed with PTSD?

We hypothesise that CBT is more facilitative of PTG due to the employment of cognitive tasks such as challenging core beliefs, cognitive restructuring and modifying maladaptive beliefs, which are shown as the factors promoting PTG (O'Donovan & Burke, 2022).

This study is the first systematic review comparing the effects of CBT and EMDR on PTG and it does not aim to control for trauma types or comorbidities; rather, we sought to evaluate them to a possible extent.

The study aims to systematically consolidate and compare the current body of evidence on the influence of CBT compared to EMDR on the promotion of post-traumatic growth in individuals with a diagnosis of PTSD. 1996). In addition, it aims to evaluate the effects of CBT and EMDR on PTSD symptom reduction.

Methods

Reporting Guidelines

This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Page et al., 2021), developed to facilitate transparent and complete reporting of systematic reviews.

Identification of Studies

A systematic database search was performed in Medline/Ovid, psychARTICLES/Ovid, Eric/Ovid, Google Scholar and Google Search databases, up to date. Search in all three Ovid databases using non-MeSH terms comprised of two steps, employing the following search strings: (1) ((posttraumatic growth or post traumatic growth) and (posttraumatic stress disorder or post traumatic stress disorder or PTSD) and (cognitive behav$ therap$ or CBT)), (2) ((posttraumatic growth or post

traumatic growth) and (posttraumatic stress disorder or post traumatic stress disorder or PTSD) and ((eye movement desensiti#ation and reprocessing) or EMDR)). Search in the Medline/OVID database using MeSH terms comprised two steps employing the following search paths: (1) (Stress Disorders, Post-Traumatic and Cognitive Behavioral Therapy and Posttraumatic Growth, Psychological and Randomized Controlled Trial), (2) (Stress Disorders, Post-Traumatic and Eye Movement Desensitization Reprocessing and Posttraumatic Growth, Psychological and Randomized Controlled Trial). Reference lists from selected studies and forward citation tracking were used to identify additional sources of information.

The search produced 355 records. Subsequently, the filters of a randomised controlled trial and study with the body in English were applied. After an initial screening of the title and abstract of relevant studies, 28 records were considered eligible. The full text of 28 records was screened for further eligibility and 4 records were included in this review.

Inclusion and Exclusion Criteria

Inclusion criteria were based on the most broadly used standard of the acronym PICO (Caldwell & Bennett, 2020; Linares-Espinós et al., 2018), embracing the details on population, intervention, comparison and outcome of a study and include (1) the PTSD diagnosis according to the DSM-IV, V and ICD-10, 11 and subsyndromal PTSD, (2) CBT approaches and EMDR therapy being PTG-assessed based on the post-traumatic growth inventory (PTGI; Tedeschi and Calhoun, 1996) (3) compared to any psychotherapy, waitlist or no intervention. Inclusion criteria comprise all types of published peer-reviewed randomised controlled trials. Non-RCTs, studies that do not report the PTG outcome measure and studies published in languages other than English are excluded.

Outcome and Data Collection

The primary outcomes are the effects of CBT and EMDR on PTG based on PTGI (Tedeschi and Calhoun, 1996). The secondary outcomes are the effects of CBT and EMDR on PTSD symptom reduction based on PTSD clinical inventories.

The following data elements were collected: the primary outcome baseline PTGI total score, post-treatment PTGI total score, baseline PTGI score of each PTG domain, post-treatment PTG score of each PTG domain (Table 1), the secondary outcome (PTSD severity measure, baseline PTSD severity score, post-treatment PTSD severity) (Table 2), participant characteristics (diagnosis, type of trauma, sample size, gender, age, comorbid conditions) (Table 3), study design, interventions being examined, recruitment details, duration of interventions, post-treatment and follow up timing, dropout rates and missing data, therapeutic factors contributing to PTG, key results (Table 4), randomisation and blinding (Table 5).

Table 1

The effect of the intervention on PTG scores: the primary outcome

Reference	Nijdam et al., 2018		Bal and Ucar, 2023			Zoellner et al., 2011		Wagner et al., 2016	
Intervention	EMDR	BEP	EMDR	CBT	No	CBT	WLC	CBT	WL
PTG domain									
PTGI (M, SD) total baseline	42.12 (17.93)	36.86	14.50 (8.00)	10.96 (14.50)	15.23 (11.50)	39.10 (18,68)	38.15 (18.57)	46.88	43.47
PTGI (M, SD) total midtreatment	-	-	-	-	-	-	-	51.33	44.37
PTGI (M, SD) total posttreatment	-	-	58.60 (9.78)	55.16 (10.96)	10.33 (6.36)	42,6 (14.37)	40.68 (16.88)	60.80	46.37
PTGI (M, SD) total Follow up	54.93 (23.77)	53.73	-	-	-	42,88 (14,85)	-	-	-
PTGI (M, SD) personal strengths baseline	6.84 (4.54)	5.90 (4.70)	-	-	-	5.80 (4.25)	6.10 (3.74)	-	-
PTGI (M, SD) persoal strengths posttreatment	-	-	-	-	-	8.35 (3,00)	6.85 (3.53)	-	-
PTGI (M, SD) persoal strengths Follow up	11.47 (5.06)	10.38 (4.90)	-	-	-	8 (3.18)	-	-	-
PTGI (M, SD)new opportunities baseline	9.37 (5.14)	7.80 (5.78)	-	-	-	7.30 (5.21)	7.70 (5.56)	-	-
PTGI (M, SD) new opportunities posttreatment	-	-	-	-	-	9.20 (3.59)	8.20 (4.88)	-	-
PTGI (M, SD) new opportunities Follow up	12.70 6.92	12.81 (6.26)	-	-	-	9.53 (3.41)	-	-	-
PTGI (M, SD) relating to others baseline	15.09, 7.84	14.00 (8.16)	2.46 (2.66)	1.26 (1.70)	2.46 (2.77)	13.85 (7.38)	14.00 (8.30)	-	-
PTGI (M, SD) relating to others posttreatment	-	-	13.73 (3.47)	10.93 (5.91)	1.30 (1.95)	14.00 (5.62)	14.63 (7.52)	-	-
PTGI (M, SD) relating to others follow up	17.95, 8.94	18.11 (8.23)	-	-	-	14.59 (7.05)	-	-	-
PTGI (M, SD) appreciation of life baseline	8.40 (3.07)	8.29 (4.11)	-	-	-	9.99 (2.20)	8.75 (3.13)	-	-
PTGI (M, SD) appreciation of life posttreatment	-	-	-	-	-	8.35 (2.80)	8.25 (2.15)	-	-
PTGI (M, SD) appreciation of life follow up	9.74 (3.94)	9.43 (3.97)	-	-	-	8.06 (2.19)	-	-	-
PTGI (M, SD) spirituality baseline	2.42 (2.64)	2.69 (3.03)	-	-	-	3.15 (3.25)	1.60 (2.04)	-	-
PTGI (M, SD) spirituality posttreatment	-	-	-	-	-	2.70 (2.90)	2.75 (2.31)	-	-
PTGI (M, SD) spirituality follow up	3.07 (3.27)	3.00 (3.02)	-	-	-	2.71 (2.64)	-	-	-

Note. PTGI: post-traumatic growth inventory. M: mean. SD: standard deviation. EMDR: eye movement desensitisation and reprocessing. BEP: brief eclectic

psychotherapy. CBT: cognitive behavioural therapy. WLC: waitlist condition. WL: waitlist.

Table 2

The effect of the intervention on PTSD scores: the secondary outcome

Reference	Nijdam et al., 2018				Bal and Ucar, 2023			Zoellner et al., 2011		Wagner et al., 2016	
PTSD assessment tool	SI-PTSD		IES-R		IES-R			CAPS		CAPS	
intervention	EMDR	BEP	EMDR	BEP	CBT	EMDR	Control	CBT	WLC	CBT	WL
PTSD Score baseline M (SD)	39.05 (6.12)	40.24 (6.38)	76.23 (19.59)	80.98 (16.80)	48.56 (11.84)	50.53	48.06 (9.5)	46.0 (18.1)	41.1	69.45	74.80 (14.96)
PTSD Score Midtreatment M (SD)	-	-	-	-	-	-	-	-	-	50.72	63.72 (23.58)
PTSD Score posttreatment (M,SD)	-	-	-	-	31.66 (8.47)	30.93	46.03	29.35	-	32.31	63.11 (26.02)

Note. M: Mean. SD: Standard Deviation. PTSD: post-traumatic stress disorder. SI-PTSD: the Structured Interview for PTSD. CAPS: Clinician-Administered PTSD Scale for DSM-IV. IES-R: the Impact of Event Scale Revised. EMDR: eye movement desensitisation and reprocessing. BEP: brief eclectic psychotherapy. CBT: cognitive behavioural therapy. WLC: waitlist condition. WL: waitlist.

Table 3

Participant Characteristics

reference	PTSD Criteria, Assesment Tool	number. of participants, allocation	age years (M, SD), gender (number.of participants)	trauma type	time since trauma (M, SD)	comorbid mental health conditions (number.of participants, %)
Nijdam et al., 2018	DSM-IV: diagnosed PTSD; SI-PTSD, IES-R	EMDR 57 BEP 58	EMDR: Age: 39.53 (11.74); Gender: female (28), male (29) BEP Age 37.56 (10.93) Gencder: female (33), male (25)	EMDR Group: Assault 27 (47.4%) Sexual assault 8 (14.0%) Accident 12 (21.1%) Disaster 5 (8.8%) War-related 3 (5.3%) Other 2 (3.5%) Complex trauma 10 (17.5%) BED Group: Assault 32 (54.2%) Sexual assault 5 (8.5%) Accident 11 (18.6%) Disaster 4 (6.8%) War-related 4 (6.8%) Other 3 (5.1%) Complex trauma 14 (23.7%)	EMDR: months since trauma 31.02 (67.95) BEP: months since trauma 32.81 (54.21)	EMDR: pharmacological medication, 22 (38.6%) Major depressive disorder, 29 (50.9%) Anxiety disorder other than PTSD 7 (12.2%) BEP: pharmacological medication 24 (40.7%) Major depressive disorder 40 (67.8%) Anxiety disorder other than PTSD 11 (18.6%)
Zoellner et al., 2011	DSM-IV: dignosed PTSD and subsyndromal PTSD; CAPS	CBT 20 WLC 20	CBT: Age: 40,2 (11,0) Gender: female (18), male (2) WLC: Age: 42.2 (10.6) Gender:female (8), male (12)	Major motor vehicle accident survivors with PTSD.	CBT: years since MVA 7 (8,6) WLC: years since MVA 5.4 (3.1)	Comorbid conditions of current substance dependence, of psychotic or bipolar disorders were excluded . The presence of other diagnoses is not mentioned
Wagner et al., 2016	DSM-IV: one partner of each couple diagnosed with PTSD; CAPS	CBT 20 WL 20	Participants with PTSD (CBT, WL) Age: 37.10 (11.26), Gender: female (30), male (10)	Traumatic events heterogeneous but not specified,interpersonal (e.g., sexual assault), combat and others.		Comorbid conditions of current substance dependence were excluded . The presence of other diagnoses is not mentioned
Bal and Ucar, 2023	IES-R score more than 33, only self assesment	CBT 30 EMDR 30 Control (no interv.) 30	CBT Age: 30.70 (4.83) ; Gender: female (30), EMDR Age: 30.86 (5.09) ; Gender: female (30) No intervention Age: 32.50 (5.58) ; Gender: female (30)	Psychological trauma due to infertility.	CBT: duration of infertility years 15 (50.0) EMDR: duration of infertility years 13 (43.3) Control: duration of infertility years 12 (40.0)	No diagnoses of neurological, psychiatric or ophthalmic diseases.

Note. DSM-IV: the fourth edition of the Diagnostic and Statistical Manual (APA, 1995). PTSD: post-traumatic stress disorder. SI-PTSD: the Structured Interview for PTSD. CAPS: Clinician-Administered PTSD Scale for DSM-IV. IES-R: the Impact of Event Scale Revised. EMDR: eye movement desensitisation and reprocessing. BEP: brief eclectic psychotherapy. CBT: cognitive behavioural therapy. WLC: waitlist condition. WL: waitlist.

Quality Assessment of the Included Studies

The Cochrane risk-of-bias tool for randomised trials was used to assess the risk of bias (Higgins et al., 2023). Each of the domains of Selection Bias, Performance Bias, Detection Bias, Attrition Bias, Reporting Bias and Other Sources of Bias was rated and categorised into low, unclear or high risk of bias (see Appendix A). The overall risk was rated as (1) low if all of the above-mentioned domains were rated as having a low risk, (2) raising some concerns if at least one domain raised some concerns and (3) high if at least one domain was judged to be at a high risk or some concerns were raised for multiple domains in a way that markedly reduces the certainty of the findings.

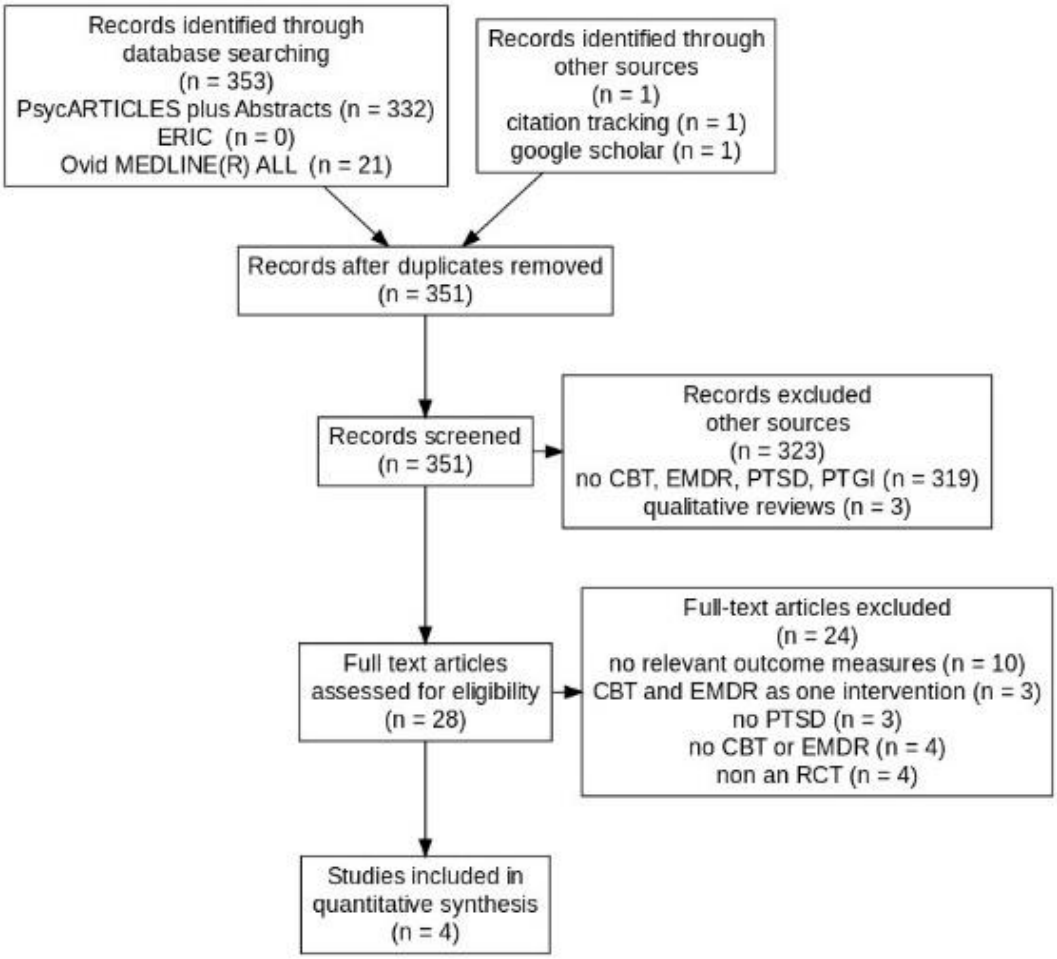
Results

Selection of Studies

The Medline/Ovid search identified 21 records of which 2 records were generated by search using MeSH Terms. The search in PsychARTICLES identified 332 records and no records were identified through Eric/Ovid search. Google Scholar and citation tracking identified 2 more records. A total of 355 records were identified. After duplicate removal and an initial screening of the title and abstract of studies with relevant outcomes, 28 records were considered eligible. After full-text screening, the final eligibility of each study was assessed and 24 studies were excluded. Ten studies were excluded because they did not contain relevant outcome measures, 3 studies were excluded because CBT and EMDR were studied as one intervention, 4 studies did not include either CBT or EMDR, in 3 studies PTSD was not assessed or diagnosed, and, ultimately 4 studies were not randomized controlled trials. Hence, four RCTs were eligible for inclusion. An overview of the selection process is presented in the PRISMA flow diagram in Figure 1.

Figure 1

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Flow Diagram



Characteristics and Results of the Studies

A summary of study characteristics is presented in Table 3 and Table 5. The studies of Wagner et al. (2016) and Zoellner et al. (2011) compared the effects of CBT or EMDR with waiting list conditions. The studies of Nijdam et al. (2018) and Bal and Ucar (2023) compared the effects of CBT and EMDR with each other or with another treatment.

Table 5

Characteristics and Results of the Included Studies

Reference	Type of	Treatments Assessed	Recruitment	Treatment Details		Post-Treatment Assesssment	Drop Out Rates	Missing Data	Follow up	Key Findings	Contributing Therapeutic Factors
Nijdam et al., 2018	RCT	EMDR, BEP	Outpatients diagnosed with PTSD who sought treatment at the Academic Medical Center at the University of Amsterdam. They agreed to participate in RCT.	EMDR: a weekly session of 90 min, 7 weeks	BEP: a weekly session of 45 min, 15 weeks	-	24% (N=28)	-	at 17 weeks after the start	EMDR showed significant increases with medium to large effect sizes in total PTGI and for each PTG domain except spititual growth. In terms of PTSD symptom reduction, in the EMDR a negative correlations	personal history, receiving support from the therapist, actively reflecting on beliefs and experiences, and cognitive restructuring techniques.
Zoellner et al., 2011	RCT	CBT, WLC	German survivors of severe motor vehicle accidents (MVAs) were recruited through selfreferral via localmedia coverage and advertising.	CBT: 10 weekly sessions - 10 weeks	WLC	done after the treatment	-	Two participants one of each group were excluded from three months follow-up assessments	3 months after the treatment	No significant effect of CBT on overall PTG. However, CBT treatment was shown to be highly effective in terms of reduction in PTSD symptom severity	CBT: reduction of dysfunctional cognitions and avoidance behaviour.
Wagner et al., 2016	RCT	CBT for PTSD, WLC	Recruited from a U.S. Veteran's Affairs outpatient clinic in Massachusetts, and a university-based research center in Canada, via posters and postings online	CBT 15-sessions - 10 weeks, twice a week and once a week	WL - 3 months	within one month after CBT treatment /12 weeks in WLC	-	Missing data for one participant on baseline CAPS and two on PTGI.	-	CBT for PTSD promoted PTG showing a moderate effect-size increase in PTG scores.	CBT: Reducing avoidance, meaning-making, interpersonal nature of the couple intervention based on the presence of supportive intimate relationships.
Bal and Ucar, 2023	RCT	CBT, EMDR, NO	Women who sought treatment for infertility at a hospital obstetrics and gynaecology clinic in a city in eastern Turkey.	CBT: 6 session of 45 min, 3 weeks	EMDR: 6 sessions, 3 weeks, flexible session duration	3 weeks after the intervention		-	-	Overall PTG and all its subdomains increased significantly in women after the CBT or EMDR intervention. CBT performed better in terms of PTSD symptom reduction whereas EMDR performed better in terms of increases in PTG.	CBT: Homework, focusing on alternative thoughts to replace automatic negative thoughts; EMDR: strengthening positive beliefs and conducting body scanning.

Note: PTSD: post-traumatic stress disorder. EMDR: eye movement desensitisation and reprocessing. BEP: brief eclectic psychotherapy. CBT: cognitive behavioural therapy. WLC: waitlist condition. WL: waitlist.

Nijdam et al. (2018)

An RCT of Nijdam et al. (2018) studied the effects of EMDR and brief eclectic psychotherapy (BEP) on posttraumatic growth and PTSD symptom reduction. This was the first study to examine the longitudinal relationship between posttraumatic growth and PTSD symptom change for BEP and EMDR. A total of 115 patients were randomised to EMDR (n=57) or CBT (n=58) with mixed trauma types but predominately with trauma due to assault (EMDR Group 47.4%, BED group 54.2 %). All participants had a PTSD diagnosis according to the fourth edition of the Diagnostic and Statistical Manual (DSM-4; APA, 1995) which was assessed using the clinical diagnostic tool the Structured Interview for PTSD (SI-PTSD; Davidson et al., 1997) and additionally using a self-report measure The Impact of Event Scale Revised (IES-R; Creamer et al., 2003). Both EMDR and BED group participants had a similar amount of time passed since trauma, with a mean of 31 and 32 months respectively.

The mean age of participants in the EMDR and BED groups was 39 and 37 years respectively with slightly more females than males in the BED group (n=33) compared to the EMDR group (n=28) Comorbid psychiatric conditions included Major depressive disorder (yes), 29 (50.9%), Anxiety disorder other than PTSD (yes), 7 (12.2%) in EMDR group and Major depressive disorder (yes), 40 (67.8%) Anxiety disorder other than PTSD (yes), 11 (18.6%) in BED group, while the use of pharmacological medication was reported at a similar rate accounting for 22 (38.6%) in the EMDR group and 24 (40.7%) in the BED group. The EMDR treatment comprised a weekly 90-minute session for 7 weeks and the BED treatment comprised a weekly 45-minute session for 14 weeks. Follow-up assessments were conducted at 17 weeks after the start of each treatment. A total of 28 dropped out (24%) with completer (n=88) and drop-out rates did not significantly differ across BEP and EMDR treatment settings. Both EMDR and BED included unveiling one's personal history, getting a therapist's support, exposing experiences and beliefs and cognitive restructuring procedures, which all may promote posttraumatic growth (Roepke, 2015). Notably, those factors are not purely EMDR-specific besides history taking and exposure to experiences, as identifying beliefs and cognitive restructuring are also CBT-specific techniques. In conclusion, both EMDR and BED treatments showed significant increases with medium to large effect sizes in a total PTGI score and for the post-traumatic growth subdomains of appreciation of life, new possibilities, personal strength and relating to others but not spiritual growth. In terms of PTSD symptom reduction, both therapies are shown to reduce the symptoms with BED outperforming EMDR.

Zoellner et al. (2011)

An RCT of Zoellner et al. (2011) studied the effects of CBT compared to a waiting list condition (WLC) on PTSD symptom reduction and PTG. A total of 40 participants with psychological trauma resulting from major vehicle accidents were randomised to CBT (n=20) or WLC (n=20). The participants were diagnosed with PTSD and subsyndromal PTSD (the CBT group 11/9 and the WLC group 6/14 respectively) according to the DSM-4 (APA, 1995)) using CAPS-IV (Blake et al., 1995) clinical assessment. The CBT group participants had a mean of 7 years passed since the vehicle accident that resulted in trauma and the WLC group had a mean of 5,4 years passed since the vehicle accident that precipitated trauma. The mean age of participants in the CBT and WLC groups was 40 and 42 years respectively with more females than males in both the CBT group (n=18) and WLC group (n=12). Comorbid conditions of psychotic or bipolar disorders, current alcohol and/or substance abuse or dependence were excluded whereas other psychiatric conditions (e.g. depression or anxiety disorders) were not mentioned. The CBT treatment comprised 10 sessions with a weekly session for 10 weeks. Post-treatment assessment was conducted after the treatment course and follow-up assessment was conducted at 3 months after the treatment. No dropouts were reported. Reduction of avoidance behaviour and maladaptive cognitions comprised CBT-specific factors that were highly effective for PTSD symptom reduction yet less effective for PTG. In conclusion, the results of the study showed no significant effect of both CBT and WLC on overall PTG from pre- to post-assessment. Only in the domains of personal strength and new possibilities, the CBT group showed medium-sized rises in post-traumatic growth. Nevertheless, CBT treatment was shown to be highly effective in terms of reduction in PTSD symptom severity.

Wagner et al. (2016)

An RCT of Wagner et al. (2016), tested the effects of CBT versus the waiting list (WL) on PTG for couples in which one of the partners was diagnosed with PTSD according to the DSM-4 (APA, 1995) using CAPS-IV (Blake et al., 1995) clinical assessment, and the data of the affected person was evaluated. A total of 40 participants with psychological trauma due to heterogeneous traumatic occurrences, including interpersonal (e.g., sexual assault), combat,
or other types of trauma but with no further details, were randomised to CBT (n=20) or WL (n=20). Of 40 couples, 30 (75%) were couples with a female partner with PTSD. The participants with PTSD had a mean age of 37.10 years. Comorbid conditions of current substance dependence were excluded whereas other psychiatric conditions (e.g. depression or anxiety disorders) were not mentioned. The CBT treatment comprised 15 sessions delivered within 7 weeks and the duration of the waiting list condition was 3 months. Post-treatment assessment was conducted within one month after CBT treatment and at 12 weeks of waiting. No dropouts were reported. CBT-specific factors, reducing avoidance and the process of meaning-making mentioned by the authors as contributors to the increases in PTG are indeed attributable to challenging maladaptive beliefs and cognitive restructuring
Other therapeutic factors that contributed to PTG during this CBT intervention for couples with PTSD in one partner are specific to couples therapy of any approach, due to the interpersonal nature of the couple intervention based on the presence of supportive intimate relationships, which tend to promote improvement and progress in various types of life hardships. In conclusion, the results of this study revealed that CBT for PTSD promoted PTG showing a moderate effect-size increase in PTG scores.

Bal & Ucar (2023)

Bal and Ucar (2023) studied in their RCT the effects of programmes based on CBT and EMDR techniques on PTSD and PTG. The participants with a score above 33 on the IES-R (Creamer et al., 2003) self-assessment scale were included in the study. A total IES-R score of 33 or over indicates the likely presence of posttraumatic stress disorder (Creamer et al., 2003). A total of 90 female participants with psychological trauma due to long-term infertility were randomised to the CBT-based programme (n=30), EMDR-based programme (n=30) or control group of no intervention (n=30). The participants in the CBT and EMDR groups had a mean age of 31 years and the no intervention group of 32,5 years. The duration of infertility in CBT, EMDR and no intervention groups was 15, 13 and 12 years respectively. The inclusion criteria indicated no diagnoses of neurological, psychiatric or ophthalmic diseases. The CBT-based programme involved 6 sessions each of 40-45 minutes with two sessions per week for 3 weeks. The duration and frequency of sessions in the EMDR-based programme were the same, with the duration of each session kept flexible. The post-treatment assessment was conducted at 3 weeks after the intervention. No dropouts were reported. The authors mention that CBT-specific therapeutic factors that may have contributed to PTG were sharing experiences related to homework and identifying alternative thoughts to challenge and substitute negative automatic thoughts. In the current study, the EMDR-specific factors reducing the trauma-related subjective units of disturbance(SUDS) level and contributing to PTG were strengthening positive beliefs in the installation phase and conducting body scanning in the body-scan phase. In conclusion, the study revealed the levels of overall PTG and all its subdomains increased significantly in women after the CBT or EMDR intervention. Moreover, both treatments resulted in PTSD symptom reduction. As regards the two treatment programmes separately, CBT performed better in terms of

PTSD symptom reduction, yet, non-significantly, whereas EMDR performed significantly better in terms of increases in post-traumatic growth.

Discussion

Our hypothesis that CBT is more facilitative of PTG due to the employment of cognitive tasks such as challenging core beliefs, cognitive restructuring and modifying maladaptive beliefs, which are shown as the factors promoting PTG (O'Donovan & Burke, 2022) and are the core therapeutic factors of CBT (Beck, 2020) was not supported by the results of the current study. Increases in posttraumatic growth were found for both CBT and EMDR with EMDR performing slightly better. The both studies testing EMDR reported its moderate effectiveness for promoting PTG, whereas one of two studies that tested CBT found it not promotive of PTG. The included studies show that the contribution of cognitive tasks such as challenging core beliefs, cognitive restructuring and modifying maladaptive beliefs are not purely CBT-specific and may be attributable to both CBT and EMDR. Moreover, the effects of therapy on PTG may be influenced by the type of trauma and the presence of comorbid conditions (Nijdam et al., 2018) that may require an accent on meaning making; however, these postulations should be tested in an appropriate longitudinal design with long-term assessments.

Post-Traumatic Growth

The literature reporting the effects of CBT or EMDR on PTG is sparse. The included four RCTs are the only RCTs to this date that assessed the effect of the therapies on PTG and they slightly favour EMDR approaches. Nijdam et al. (2018) found medium to large effect sizes in a total PTGI score and for all post-traumatic growth domains except spiritual growth. This is in line with previous studies conducted in the Netherlands (Jaarsman et al., 2006; Hagenaars & van Minnen, 2010

as cited by Nijdam et al., 2018), which have noted that the degree of spiritual transformation was initially low and resistant to change during treatment.. Zoellner et al. (2011) found a small effect of CBT on the total PTGI score. However, in the domains of new possibilities and personal strength the CBT group showed medium-sized increases in the post-traumatic. Nevertheless, authors doubted that these effects mirror posttraumatic growth per se, rather increases in these domains might just reflect typical effects of PTSD therapy. An RCT of Bal and Ucar (2023) found that the total PTGI score and all subdomain scores increased significantly in women after the EMDR or CBT intervention. Moreover, post hoc analysis revealed that EMDR performed significantly better in terms of increases in overall post-traumatic growth. That might be due to the possibility that EMDR-specific processing of traumatic memories of women traumatised due to long-term infertility was more effective in promoting PTG compared to working on thoughts and behaviours in CBT. Wagner et al. (2016) indicated that CBT for PTSD facilitated PTG demonstrating an increase in PTG scores with a moderate effect size. This is may reflect the effects of cognitive reprocessing combined with a highly supportive environment not just in therapy but in a spousal relationship on the heterogenous type of trauma; yet not complex. Outcomes of EMDR on PTG in the included studies were slightly better than outcomes of CBT; however, the differences in treatment duration, follow-up, trauma types, dropout rates and reporting effects sizes make it difficult to make conclusions across studies. Furthermore, two trials excluded from this review because of being non-RCTs also favoured EMDR. Schubert et al. (2019) found that CBT treatment could not directly enhance PTG with PTG levels remaining stable despite PTSD severity declining during therapy. Jeon et al. (2017), on the other hand, found that EMDR therapy for trauma processing facilitates PTG in disaster survivors. This EMDR outperforming

can be related to the effects of EMDR therapy partly overlapping with the concept of PTG. EMDR helps move traumatic recollection to semantic memories and aids people in understanding the meaning of their traumatic encounters and making sense of them (Jeon et al., 2017).

Effects of CBT and EMDR on PTSD Symptom Reduction

Existing research findings on CBT vs EMDR on PTSD are inconsistent (Bisson et al., 2013; Chen et al., 2015; Hoppen et al., 2022; Jericho et al., 2021; Khan et al., 2018; Seidler & Wagner, 2006). Both CBT and EMDR are shown to be effective for PTSD. However, research does not explicitly assess for trauma types and comorbid conditions, as different trauma types may require different treatment approaches (Seidler & Wagner, 2006) and are linked to comorbidities (Storm & Christensen, 2021). Therefore, if trauma types are studied distinctly, the result may favour one of the therapy approaches (Seidler & Wagner, 2006; Zoellner et al., 2011). All RCTs included in this review mentioned PTSD symptom reduction as a result of either CBT or EMDR; yet, not all assessed the effects of CBT or EMDR on PTSD in more detail, specifying post- or follow-up assessment results. As to comparing CBT effects on PTSD symptoms with EMDR, in the only RCT that compared that (Bal & Ucar, 2023), the outperformance of CBT vs EMDR on PTSD symptoms was not significant.

Contributing Therapeutic Factors

Nijdam et al. (2018) explicitly reflect on therapeutic techniques as contributing therapeutic factors (not intrapersonal qualities or personality predispositions), facilitating post-traumatic growth, that led to medium-sized effects of EMDR. Those therapeutic factors include revealing one's personal history, getting a therapist’s support, dynamically reflecting on experiences and beliefs, and techniques

of cognitive restructuring. However, those therapeutic techniques are not exclusively attributed to EMDR. Cognitive restructuring and receiving a therapist's support are also key techniques of CBT. Nevertheless, active reflection on experiences and beliefs accompanied by bilateral stimulation that helps process and integrate traumatic memories into the memory network (Shapiro, 2017) may be the reason for EMDR success for complex trauma combined with depression. The findings of Wagner et al. (2016) on the effects of CBT on PTG were consistent with prior research positing that therapy that emphasises making meaning of the traumatic experience and changing dysfunctional beliefs about the traumatic occurrence and related behaviours are crucial for post-traumatic growth. Furthermore, in line with previous studies, post-traumatic growth may be related to the interpersonal nature of this couples therapy, such as supportive intimate relationships that promote making meaning and reducing avoidance associated with trauma-centred intervention. Zoellner et al. (2011) do not endorse PTG as a helpful concept worthwhile to be focused. CBT in their study had a small, not significant effect on overall PTG. However, CBT led to medium-sized increases in PTG in the domains of new opportunities and personal strength. Yet, the authors tend to downgrade these effects of PTG and attribute pure CBT impacts to growth in these domains, such as the reduction of avoidance behaviour and maladaptive cognitions that had restricted life previously. In a study of Bal and Ucar (2023), both CBT and EMDR resulted in post-traumatic growth. Yet; EMDR performed significantly better in terms of increases in overall PTGI scores. The study suggested that the improvement in post-traumatic growth may result from reducing the SUDS levels, firming positive beliefs and doing the body scan, one of the concluding phases of EMDR. All factors are the attributes of the therapeutic factors of EMDR.

Trauma Type

Research into PTSD treatment points to the importance of focusing on specific trauma types while assessing treatment effects (Seidler & Wagner, 2006; Zoellner et al., 2011). Complex Trauma types are related to more comorbidities, such as substance use disorder (Roche and Foster, 2023) and may require integrative treatment. A study of Nijdam et al. (2018) includes a sample of mostly assault and also complex trauma, for which EMDR has a medium effect size on post-traumatic growth. That effect may be related to the impact of EMDR on severe trauma and complex trauma that is accompanied by depression, which was diagnosed in half of the participants. EMDR helps shift traumatic recollection to semantic memory and helps people realise the meaning of their traumatic encounters and make sense of them. These EMDR-specific effects partly overlap with the construct of PTG (Jeon et al., 2017). Zoellner et al. (2011) studied German major motor vehicle accident survivors with PTSD and established no significant effect of CBT on overall PTG. CBT involves working on dysfunctional and irrational thoughts and beliefs which is highly beneficial for reducing PTSD symptoms (Zoellner et al., 2011). Yet PTG requires contemplating and ruminating which may lead to finding meaning and psychological growth. However, contemplation of certain types of trauma does not necessarily result in finding meaning. In this relation, Silver et al. (1983) in their research on incest trauma mention a particularly expressive quote of a trauma survivor, “I can’t make sense of it – but I can’t make sense of a tornado either. They occur, they are devastating, they go away. Do they serve a useful purpose? No.” As the sample of Zoellner et al. (2011) comprised only survivors with psychological trauma due to major vehicle accidents, the authors note that especially in post-traumatic growth, the trauma type may play an imperative role. Additionally, culture

may impact the readiness to recognise PTG after trauma. Nevertheless, the medium-sized effect in the PTG domains of new possibilities and personal strength shows that growth in these PTG areas may happen in different types of trauma, as the treatments that assessed PTG domains separately, all showed increases in these domains, including CBT for MVA trauma. The study of Wagner et al. (2016) does not provide details about the types of trauma. Traumatic events were heterogeneous, including interpersonal (e.g., sexual assault), combat, and others. Nevertheless, PTG in the heterogeneous type of trauma may be strongly related to the interpersonal nature of couples' treatment where one partner is diagnosed with PTSD (Wagner et al., 2016). In a study of Bal and Ucar (2023) psychological trauma due to infertility was not clinically diagnosed as PTSD, yet high IES-R scores, above 33, indicated that the participants most likely had PTSD (Creamer et al., 2003). In contrast to homogeneous MVA trauma in the German population with a non-significant effect of CBT improving overall PTG, CBT and EMDR were both highly effective for PTG in the homogenous infertility trauma in Turkish women; yet, EMDR outperformed with a significant difference in terms of PTG increases. That may imply the possibility of EMDR being more effective for homogenous trauma in a homogenous population, but this needs to be appropriately tested in longitudinal research.

Risk of Bias

A high risk of publication bias was identified in the study of Wagner et al. (2016) where the outcome was not prespecified in methods. This selective disclosure of information might introduce reporting bias and represent misleading findings (Viswanathan et al., 2017). Reporting bias arises when only selective observations are conveyed or published. Thus, for instance, while reporting that CBT for PTSD promoted PTG showing a moderate effect-size increase in PTG scores, Wagner et al.

(2016) do not reveal details on each separate domain which is important for understanding how PTG was promoted and clarifying which PTG areas might not grow.

A high risk of attrition bias was assigned to a study of Nijdam et al. (2018) due to a high drop-out rate of 24% (Bankhead et al., 2017), with no reasons for missing outcomes being stated (Higgins et al., 2023). In addition, although drop-out and completer rates did not significantly differ across treatments, significant differences in age and origin between non-completers and completers were reported. These differences can introduce attrition bias into study results (Higgins et al., 2023).

A high risk of selection bias was identified in a study of Bal and Ucar (2023) due to randomisation based on the order of participants' arrival at the clinic (Higgins et al., 2023). It was augmented by a high risk of detection bias as data collection through face-to-face interviews and both CBT and EMDR were performed by one of the authors. Therefore, even though they showed that CBT performed better than EMDR for PTG, no valid conclusion may be made from this study.

A high-risk rating in those three studies points to a probability of a significant bias that may discredit the results. The results of a study with a high risk of bias are as likely to have flaws in the design as to suggest true differences between the treatments compared (Viswanathan et al., 2017).

Furthermore, the recruitment of the participants was handled differently across the included studies. In the studies of Nijdam et al. (2018) and Wagner et al. (2016) participants were recruited from outpatient clinics. In the study of Zoellner (2011), recruitment took place through local media advertising, whereas Bal and Ucar (2023) recruited their participants through inpatient intake. Thus, the concern additional to a high bias is the heterogeneity of the involved studies. Different groups of participants

were compared even though they may not be clinically comparable (Storm & Christensen, 2021).

Despite an overall high risk of bias assigned to most studies, excluding these studies from the systematic review poses dangers because we can never know whether a trial is truly biased (Harvey & Dijkers, 2019). We can only suggest that it is vulnerable to bias. Moreover, following all critical directions of design is not always feasible, rendering some studies innately more susceptible to bias. For example, it is not always possible to blind assessors or participants in research that employs outcome measures that are based on self-report, because the assessor is considered also an unblinded participant. The utilisation of any principles to exclude trials from systematic reviews will always be a simplistically chosen approach to a complex matter. Thus, the best solution is probably to encourage researchers to be more knowledgeable of all the possible sources that might introduce bias with the purpose of minimising biases when designing and conducting their trials (Harvey & Dijkers, 2019).

Drop Outs

A study of Nijdam et al. (2018) is the only one reporting the dropout rate. The study indicated that 24% of participants discontinued. Research into PTSD treatment underscores different factors that predict treatment discontinuation, including PTSD symptom severity and trauma type (Storm & Christensen, 2021). In the studies included in this review, participants treated with EMDR with predominate trauma due to assault in 47% of participants, and also having complex trauma in 18% of participants, and with MDD in 50% of people were more likely to drop out than those treated with EMDR without psychiatric comorbidities or complex trauma and with a homogeneous type of trauma (due to infertility). To comprehend the reasons for

participants discontinuing, it should be understood which parts of the therapy fail to function for them. For instance, people receiving psychotherapeutic treatment may withdraw due to high discomfort (Storm & Christensen, 2021). A comprehensive and individualised approach with a qualified psychotherapist may be essential to reduce participants dropping out. Participants with PTSD often suffer from various comorbid psychiatric and somatic conditions, which may affect their adherence to therapy (Storm & Christensen, 2021). Furthermore, PTSD patients have often faced repeated, multiple and prolonged exposures to traumatic events, which qualify as complex trauma. These types of experiences make it difficult for people to adhere to exposure therapy as it typically targets the patients' most horrible encounters (Storm & Christensen, 2021).

Generalisability

Certain limitations and high risk of bias of the included studies affect their generalizability (Kukull & Ganguli, 2012). The generalizability of a study of Bal and Ucar (2023) is limited by its overall high risk of bias due to the high risk of selection and detection bias as well as the homogeneity of the sample as only Turkish females referred to a hospital in Turkey were encompassed in the study; thus, the results cannot be generalized to women with trauma of infertility or to other trauma populations (Bal & Ucar, 2023). The generalizability of a study of Zoellner et al. (2011) to a broader population is limited due to (1) the homogeneity of the sample as only the German population and only survivors with PTSD due to MVAs were included in the study sample; (2) small and gender-imbalanced sample size; (3) unclear overall risk of bias. The results may not be generalisable to trauma survivors with dissimilar cultural backgrounds or to populations with other types of trauma (Zoellner et al., 2011). Furthermore, the small and gender-imbalanced sample may

limit what can be declared about post-traumatic growth as the outcome (Zoellner et al., 2011). The generalizability of a study of Wagner et al. (2016) to a broader population of couples where one of the partners is diagnosed with PTSD is affected by a small sample size, unclear overall risk of bias and homogeneity of the sample because of no racial, ethnic and gender diversity of the included participants. The randomised controlled trial (RCT) of Nijdam et al. (2018) emerges as the most generalisable to people with PTSD among all the RCTs encompassed within this systematic review as it reports the least limitations that would impede its generalizability, such as those pertaining to ethnicity, type of trauma, and sample size (Kukull & Ganguli, 2012). Nevertheless, despite these strengths, its generalizability remains somewhat limited due to an overall high risk of bias, based on a high risk of attrition bias (Higgins et al., 2023). Overall, the limited generalisability of the included trials makes it difficult to make conclusions across the studies.

Strengths and Limitations of This Study

The findings of this systematic review should be considered in the context of certain limitations and strengths. A limitation of this review is that the number of available trials on the effects of EMDR and CBT on PTG is relatively small with small sample sizes involved, which limits the power of the study. The small sample size, homogeneous samples and trauma types are also a limitation that restricts the generalisability of this study to a broader population. Another limitation is an overall high risk of bias, which threatens the correctness of the findings (Higgins et al., 2023).

Nevertheless, the strength of this study is in its systematic review format, because (1) a systematic review aims to gather and assess all relevant empirical evidence that meets predefined eligibility conditions and uses explicit and systematic methods to reduce bias (Higgins et al., 2023); (2) systematic reviews of RCTs provide

the uppermost level of evidence in the hierarchy of evidence (Ahuja, 2019) by ensuring random assignment to treatment conditions, administration of treatments in a standardised mode and independent assessment of outcome. (Nijdam et al., 2018).

Future Perspectives

More higher-quality randomised control trials of CBT and EMDR effects on PTG are needed. High-quality RCTs are the foundation of systematic reviews, and without such trials, the conclusions of systematic reviews in our domain of interest will stay inconclusive or insufficient (Peters et al., 2014).

Furthermore, a meta-analysis, which generates a precise estimate of the effect size, can considerably increase statistical power and yield more conclusive results (Lee, 2018) on the effects of CBT and EMDR on PTG in people with PTSD. Moreover, more high-quality RCTs testing the effects of EMDR and CBT on PTG would certainly augment the power of the meta-analysis (Seidler & Wagner, 2006) and would also allow for more fine-tuned analyses, including the detailed investigation of the therapeutic factors involved in promoting PTG, which was inconclusive in this SR. At this stage, I expect limited opportunities for conducting a meta-analysis due to the diversity of outcomes measured across a relatively small pool of existing trials. Heterogeneity between the studies in effect measures must be assessed using both the χ^2 test and the I^2 statistic (Free et al., 2010) to avoid potentially comparing “apples with oranges” in a meta-analysis (Higgins et al., 2023) as this will cause real differences to be hidden. In cases where studies employ identical samples, methods and outcome measures, I will suggest utilising Stata v11.0 [31] to combine results from randomised controlled trials (Free et al., 2010).

The next perspective to take is to study the trauma types separately, based on their nature and severity as this may influence treatment (Seidler & Wagner, 2006), as

treatment of homogenous traumas may have different effects on PTG (Zoellner et al., 2011) compared to heterogenous traumas with comorbidities (Nijdam et al., 2018). Furthermore, more research needs to address PTSD with comorbidities but not exclude them, as PTSD is often accompanied by comorbid psychiatric conditions (Storm & Christensen, 2021). In addition, future research should not limit its emphasis to issues related to the effectiveness of these therapies but should also attempt to find out which people are more likely to benefit from one method or the other (Seidler & Wagner, 2006), as, for instance, the cultural background may impact the readiness to appreciate PTG after trauma (Zoellner et al., 2011).

Implications

The implication of this review is an enhanced understanding of how PTG is fostered within the frameworks of CBT and EMDR. This knowledge may contribute to providing trauma survivors with better-tailored support on their route to recovery, considering the complications of PTSD treatment.

Conclusion

The treatment of PTSD remains a challenging task. PTSD, a potentially fatal condition affects both the physical and mental health of people, interferes with daily functioning and severely reduces the quality of life. It is a highly comorbid, chronic and highly prevalent condition. PTSD development is linked to a wide variety of subjectively perceived adverse experiences, or psychological traumas, which cannot be treated by any therapy consistently eradicating all PTSD symptoms and comorbidities in all affected individuals. Thus, it is crucial to develop more effective interventions to enhance the recovery of trauma survivors. Post-traumatic growth, a positive psychological change that may occur in trauma survivors independently of symptom reduction is, thus, the focus as an enhancement or an independent outcome

that can be promoted by EMDR or CBT, the therapies known to be highly effective for PTSD treatment. By comparing the effects of CBT and EMDR on PTG for people with PTSD, this study established both therapy methods tend to promote PTG, with EMDR slightly outperforming CBT considering the available clinical trials. In all studies that studied the effects of EMDR on PTG, the therapy was shown to be facilitative of PTG, whereas CBT for homogeneous trauma did not promote PTG in one study. PTG requires suffering, contemplating and ruminating, which may lead to finding meaning and psychological growth. However, contemplation of certain situations does not result in finding meaning.

It is worth noting that comorbid conditions were excluded in most studies. The only study that included depression and complex trauma showed that EMDR-specific therapeutic techniques that are based on exposure, facilitate PTG in people with complex trauma and depression by promoting meaning-making, alongside PTSD symptom reduction. The RCTs included in the present systematic review show that the contribution of cognitive tasks to PTG, such as challenging core beliefs, cognitive restructuring and modifying maladaptive beliefs are not restricted to CBT and are attributed to both CBT and EMDR.

Overall, the results showed that both CBT and EMDR promote PTG with EMDR performing slightly better; however, no accurate suggestions can follow those results at this stage. The outcomes must be interpreted cautiously due to the overall high/unclear risk of bias of the included RCTs, which renders the conclusion inconclusive or insufficient. More and higher-quality RCTs on the effects of EMDR and CBT on PTG are needed.

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Appendix A

Risk of Bias Assessment

While RCTs are considered the highest evidence in the hierarchy of evidence (Ahuja, 2019), it is not sufficient to assume the credibility of the evidence, based merely on the type of study, such as unquestioning the evidence of randomised controlled trials or systematic reviews (Viswanathan et al., 2017). Bias refers to influences that can systematically affect the examinations and conclusions of the trial and cause them to be deviant from the truth (Higgins & Green, 2011) and inaccurate. This, in turn, may result in inappropriate suggestions. Risks of bias are the probability that some aspects of the study design or implementation will give misinforming outcomes. This can result in misused resources or maltreatment of patients. Once concluded, the assessment of the risk of bias can be applied to inform the synthesis of the findings and incorporated into the total assessment of the certitude of evidence.

The risk of bias assessments for the studies included in this systematic review is presented in Table 4. The domains of (1) selection bias (random-sequence generation and allocation concealment), (2) performance bias (blinding of participants and personnel), (3) detection bias (blinding of outcome assessment), (4) attrition bias (incomplete outcome data), (5) reporting bias (selective reporting) and (6) other sources of bias were assessed in all included studies employing the standard approach described in the Cochrane Handbook for Systematic Review of Interventions (Higgins et al., 2023). Each domain was rated to have a 'high', 'low' or 'unclear' risk of bias. Three studies were judged as having an overall high risk of bias and one study was rated as having an unclear risk of bias. Most studies were rated to have a low risk of reporting bias and detection bias and all studies were rated as having a low risk of performance bias.

Table 4

Application of Cochrane bias assessment to all included studies

Reference	Partici-pant number	Sequence Generation & Allocation Concealment: Selection Bias		Blinding of Participants and Personnel: Performance Bias	Blinding of Outcome Assessment: Detection Bias	Incomplete Outcome Data: Attrition Bias	Selective reporting: Reporting Bias	Other Sources of Bias	Summary Asssment at Outcome Level
Nijdam et al., 2018	115	some concerns (unclear risk) random assignment to treatment conditions; yet, sequence generation details are not mentioned	some concerns (unclear risk): allocation concealment is not mentioned	low risk: no blinding of participants and personnel mentioned but this was unlikely to introduce bias	low risk: trained assessors who were blind to treatment condition administered the assessments.	high risk: high drop-out rate (24%); significant difference between completers and non-completers; incomplete reporting of reasons for missing outcomes	low risk: outcome described in the methods sections were reported in the results section	low risk: funding is mentioned; the sponsor had no role in the study design, in the collection, analysis, and interpretation of data, in the writing of the report, and in the decision to submit the article for publication.	High Risk
Wagner et al., 2016	40	some concerns (unclear risk) random assignment to treatment conditions; yet, sequence generation details are not mentioned	some concerns (unclear risk): allocation concealment is not mentioned	low risk: no blinding of participants and personnel mentioned but this was unlikely to introduce bias	low risk: clinicians who were blind to treatment assignment conducted the assessments	some concerns (unclear risk): missing data for one participant on baseline CAPS and for two participans on PTGI; incomplete reporting of reasons for missing outcomes	high risk: outcome was not clearly prespecified in methods	low risk: supported in part by a grant from the National Institute of Mental Health to one of the authors. No conflict of interst reported	High Risk
Zoellner et al., 2011	40	some concerns (unclear risk) random assignment to treatment conditions; yet, sequence generation details are not mentioned	some concerns (unclear risk): allocation concealment is not mentioned	low risk: no blinding of participants and personnel mentioned but this was unlikely to introduce bias	low risk: Researchers were kept separate to clinicians at all assessment times and assessors were blind to intervention condition (CBT or wait list) of participants at second assessment.	some concerns (unclear risk): incomplete data at post-treatment assessment for 2 participants; incomplete reporting of reasons for missing outcomes	low risk: outcome described in the methods sections were reported in the results section	some concerns (unclear risk): funding is not mentioned	Some Concerns (Unclear Risk)
Bal and Ucar, 2023	90	high risk: randomization based on their order of arrival at the clinic.	some concerns (unclear risk): allocation concealment is not mentioned	low risk: no blinding of participants and personnel mentioned but this was unlikely to introduce bias	high risk: data collection through face-to-face interviews and both CBT and EMDR were conducted by one of the authors (Z.B.	low risk: no missing data	low risk: outcome described in the methods sections were reported in the results section	low risk, no fuding, free of other sources of bias.	High Risk

Note. CAPS: Clinician-Administered PTSD Scale for DSM-IV. IES-R: the Impact of Event Scale Revised. EMDR: eye movement desensitisation and reprocessing. BEP: brief eclectic psychotherapy. CBT: cognitive behavioural therapy. PTGI: post-traumatic growth inventory.

Sequence Allocation Randomisation

While mentioning a random allocation to treatment conditions, most studies did not provide full details of the sequence generation and we, therefore, judged sequence generation to be at unclear risk of bias in the studies of Nijdam et al. (2018),

Wagner et al. (2016) and Zoellner et al. (2011). The study of Bal and Ucar (2023) was judged as being at high risk of bias attributable to sequence allocation for randomisation as randomisation was based on the order of participants' arrival at the clinic.

Allocation Concealment

While mentioning a random allocation to treatment conditions, none of the studies provided details of the allocation concealment. Thus, we judged allocation concealment for randomization to be at an unclear risk of bias in all studies.

Blinding of Participants, Personnel and Assessors

It is not feasible to blind either personnel conducting psychological interventions or the participants (Bisson et al., 2013). Thus, blinding of participants and personnel was judged as having low risk in all studies as the absence of information on participant and personnel blinding was unlikely to introduce bias (Higgins et al., 2023). Outcome assessors, however, can be blinded (Bisson et al., 2013). The studies of Nijdam et al. (2018), Wagner et al. (2016) and Zoellner et al. (2011) in which assessors were blinded were described to be at low risk of bias. We judged the study of Bal and Ucar (2023) as being at a high risk of performance bias as data collection through face-to-face interviews and both CBT and EMDR interventions were conducted by one of the authors.

Incomplete Outcome Data (Attrition Bias)

A low risk of bias was assigned to a study of Bal and Ucar (2023) with no missing outcome data. A trial of Nijdam et al. (2018) was judged to have a high risk of attrition bias. In addition to a high dropout rate of 24% posing critical threats to validity (Bankhead et al., 2017), there was a systematic difference between completers and the participants who did not complete a trial (Higgins et al., 2023),

non-completers were significantly younger than completers and were predominantly originally non-Dutch despite the randomised selection and allocation in the Netherlands. Moreover, the reasons for missing outcomes were not reported (Higgins et al., 2023).

A study of Wagner et al. (2016) was described as being at an unclear risk of incomplete data bias because of missing data for one participant on the baseline Clinician-Administered PTSD Scale for DSM-IV (CAPS-IV; Blake et al., 1995) and two participants on PTGI (Tedeschi & Calhoun, 1996) and incomplete reporting of reasons for missing outcomes. Similarly, an unclear risk of incomplete data bias was assigned to a study of Zoellner et al. (2011) because of incomplete data at post-treatment assessment for 2 participants and incomplete reporting of reasons for missing data.

Selective Reporting

The studies of Nijdam et al. (2018), Zoellner et al. (2011) and Bal and Ucar (2023) were judged to be at low risk of bias as all prespecified outcomes were reported. We described the study of Wagner et al. (2016) as being at a high risk of bias attributable to selective reporting as the outcome was not prespecified in methods.

Other Sources of Bias

All included studies were assessed for other types of bias. The studies of Nijdam et al. (2018), Wagner et al. (2016) and Bal and Ucar (2023) were judged to be at low risk of other types of bias. Nijdam et al. (2018) reported no influence of external funding on any part of the study. Wagner et al. (2016) indicated partial support by a grant from the National Institute of Mental Health to one of the authors with no potential financial conflict of interest present (Vishwanathan et al., 2017)

Bal and Ucar (2023) reported no external finding involved and no other sources of risk of bias were identified in these studies. We designated the study of Zoellner et al. (2011) as having an unclear risk of other bias as information on funding was not mentioned.

Appendix B

Abstract

Post-traumatic stress disorder (PTSD) is a mental disorder that can develop after an experienced or witnessed traumatic event. PTSD is known to be a chronic, prevalent, highly comorbid and potentially fatal condition. Its treatment can be complicated and might not lead to eradicating all PTSD symptoms and comorbidities in many people. This systematic review sought to determine whether cognitive-behavioural therapy (CBT) or eye movement desensitisation and reprocessing (EMDR) was superior in its effects on promoting post-traumatic growth, a positive psychological change that may happen independently of PTSD symptom treatment dynamics. We hypothesised that CBT was more effective than EMDR. We performed a systematic review of randomised controlled trials up to date and identified 4 RCTs examining the effects of either CBT or EMDR on PTG. The slight superiority of EMDR over CBT in promoting PTG could be demonstrated, as one study found no effect of CBT on overall PTG. All studies reported PTSD symptom reduction as a result of either EMDR or CBT treatment. Involvement of therapy-specific factors is unclear as the CBT-specific cognitive tasks tend to be PTG-promoting in both CBT and EMDR; yet, not in CBT for homogeneous trauma. Our results suggest that both therapies are efficacious for PTG and symptom reduction, with EMDR slightly outperforming CBT in its effects on PTG. However, the results remain inconclusive due to the overall high/unclear risk of bias in the studies. More high-quality RCTs and meta-analyses testing the effects of EMDR and CBT on PTG are needed. This study contributes to knowledge on enhancing PTSD treatment and trauma recovery.

Keywords: post-traumatic stress disorder (PTSD), psychological trauma, post-traumatic growth, randomised control trial (RCT), cognitive behavioural therapy (CBT), eye movement desensitisation and reprocessing (EMDR), systematic review.

Anhang B

Abstract

Posttraumatische Belastungsstörung (PTBS) ist eine psychische Störung, die sich nach einem erlebten oder beobachteten traumatischen Ereignis entwickeln kann. PTBS ist bekanntermaßen eine chronische, weit verbreitete, hochgradig komorbide und potenziell tödliche Erkrankung. Die Behandlung kann kompliziert sein und führt bei vielen Menschen möglicherweise nicht zur Beseitigung aller PTBS-Symptome und Komorbidität. Mit diesem systematischen Review soll festgestellt werden, ob die kognitive Verhaltenstherapie (KVT) oder die Desensibilisierung und Verarbeitung durch Augenbewegung (DVA) hinsichtlich ihrer Wirkung auf die Förderung des posttraumatischen Wachstums, einer positiven psychologischen Veränderung, die unabhängig von der Dynamik der PTBS-Symptombehandlung auftreten kann, überlegen ist. Wir gingen davon aus, dass KVT wirksamer sei als DVA. Wir führten ein systematisches Review aktueller randomisierter kontrollierter Studien durch und identifizierten vier RKS, die die Auswirkungen von KVT oder DVA auf PW untersuchten. Die leichte Überlegenheit von DVA gegenüber KVT bei der Förderung der PW konnte nachgewiesen werden, da in einer Studie keine Auswirkung von KVT auf die Gesamt-PW festgestellt wurde. Alle Studien berichteten über eine Verringerung der PTBS-Symptome als Folge einer DVA- oder KVT-Behandlung. Die Beteiligung therapiespezifischer Faktoren ist unklar, da die KVT-spezifischen kognitiven Aufgaben sowohl bei KVT als auch bei DVA tendenziell PW-fördernd sind; noch nicht in der KVT bei homogenem Trauma. Unsere Ergebnisse deuten darauf hin, dass beide Therapien für die PW und die PTBS-Symptomreduktion wirksam sind, wobei DVA die KVT hinsichtlich seiner Wirkung auf die PW leicht übertrifft. Aufgrund des insgesamt hohen/unklaren Risikos einer Verzerrung in den

Studien bleiben die Ergebnisse jedoch weiterhin unschlüssig. Es sind weitere qualitativ hochwertige RKS und Metaanalysen erforderlich, die die Auswirkungen von DVA und KVT auf PW testen. Diese Studie trägt zum Wissen über die Verbesserung der PTBS-Behandlung und der Trauma-Recovery bei.

Schlüsselwörter: posttraumatische Belastungsstörung (PTBS), psychisches Trauma, posttraumatisches Wachstum, randomisierte kontrollierte Studie (RKS), kognitive Verhaltenstherapie (KVT), Desensibilisierung und Verarbeitung durch Augenbewegung (DVA), systematisches Review