

AN UPDATE ON THE EFFICACY OF COGNITIVE-BEHAVIORAL THERAPY, COGNITIVE THERAPY, AND EXPOSURE THERAPY FOR POSTTRAUMATIC STRESS DISORDER

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ABSTRACT

Objective: Even though cognitive-behavioral therapy (CBT) is the current treatment of choice for posttraumatic stress disorder (PTSD), it is still unclear which components of its protocol are more important for clinical improvement. This study aims to replicate a previous review, updating findings on the efficacy of CBT, cognitive therapy (CT), and exposure therapy (ET) for PTSD when compared with other well-established treatments or conditions without active treatment. *Method:* The search was performed in the databases Cochrane, Embase, and Medline. Studies were required to be randomized controlled trials published between 2006 and 2012 comparing CBT, CT, or ET with (1) each other, (2) other active treatments (e.g., EMDR, counseling, supportive therapy), or (3) assessment-only conditions. The main outcome measures were diagnostic and symptomatic remission. *Results:* The final sample contained 29 articles. CBT, CT, and ET were shown to be efficacious treatments individually when compared to assessment-only conditions, with no difference found between treatments. Comparison with other active treatments favored ET. Both included

studies comparing CBT and EMDR favored the latter. *Conclusions:* CBT and its components still appear to be equally efficacious in improving PTSD symptoms and diagnosis. Even so, a current tendency of researchers to focus on ET exists. EMDR shows interesting results compared to CBT. Further research should clarify the lasting effects, efficiency, and other comparative benefits of each protocol.

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Key Words: cognitive behavioral therapy, cognitive therapy, exposure therapy, post-traumatic stress disorder, systematic review

INTRODUCTION

Posttraumatic stress disorder (PTSD) is a mental disorder that can be developed after exposure to a traumatic event, such as interpersonal violence or natural catastrophes. The symptoms include flashbacks, avoidance of stimuli associated with the traumatic event, and hyperarousal. Patients with PTSD have a constant idea that the event might happen again and may sometimes relive it as intensely as when it happened [1, 2]. All those symptoms and beliefs might cause important damage to those afflicted with PTSD, and highlights the necessity of improving therapeutic strategies that lead to patient recovery.

The efficacy of cognitive-behavioral therapy (CBT) was already demonstrated in many researches since the early 1960s. CBT protocols for PTSD have been developed by many authors through manuals and papers [3-7]. These protocols have in common certain therapeutic strategies, such as:

1. relaxation techniques, used for controlling the psychophysiological anxiety symptoms;
2. exposure techniques, composed of exercises designed for the patient to confront and reorganize the traumatic memory; and
3. cognitive restructuring techniques, which aim to change dysfunctional beliefs. As far as we know, these strategies promote clinical improvement and relieve suffering [8-13]; however, the same techniques vary in different protocols, and may be utilized individually and compared against several treatments.

A systematic review on the effectiveness of CBT for PTSD was published in 2008 [14], confronting CBT's clinical results with those achieved by other forms of therapy. The results of articles published up to 2006 indicated that CBT, exposure therapy (ET), and cognitive therapy (CT) were equally efficacious in ameliorating PTSD symptoms, with better results than other active treatments.

We sought to replicate the review's procedures focusing on updating its results, given that efficacious treatments for PTSD are increasingly researched.

METHODS

A systematic review was conducted through the databases Medline, Embase, and Cochrane with a set of keywords, presented on Appendix A, based on the research strategy used in a previous systematic review [14]. The keywords were terms associated with CBT, ET, CT, PTSD, and randomized clinical trials. Boolean operators (i.e., AND, OR) were used in an attempt to find only randomized trials with PTSD patients that contained at least one of the treatments mentioned above. Only articles published from 2006 to 2012 were included. In this first search, 2020 articles were found and were refined by excluding studies with non-human animals, children, and persons not diagnosed with PTSD according to DSM-IV criteria, as well as reviews, case studies, and repeated articles. Studies that did not contain CBT, CT, or ET, or that did not compare these treatments with (1) one another, (2) other well-established treatments, or (3) assessment-only conditions were also excluded.

After applying the exclusion criteria above, 53 eligible studies remained. The papers were then read by two investigators that classified them individually according to the Jadad Scale [15]. Finally, the grades given to each article were compared. Articles with poor methodological quality (score below 3 on the Jadad Scale) were excluded. There were no disagreements. This process excluded 28 trials, leaving 25 studies in the sample. The search was conducted between August 2011 and January 2012 and data analysis was performed between March 2012 and June 2012. Two more searches were conducted in December 2012 and in September 2013, with the purpose of adding more recent articles to the review. The same procedures were followed, except that only studies published in 2012 were included: 173 papers were found and 13 remained after the initial screening; 9 were considered of low methodological quality and were also excluded; 4 articles were added to the previous sample, resulting in a final sample of 29 studies.

RESULTS

Studies in the final sample contained a total of 2713 participants, 851 male and 1853 female, with a mean age of 39.49 years ($SD = 9.65$). The sex of nine individuals was not informed by Shalev et al. [16]. The most recurrently cited traumatic events were war-related ($n = 801$), followed by accidents ($n = 794$), physical ($n = 701$), and sexual ($n = 659$) violence, serious illnesses/surgeries ($n = 253$), terrorism ($n = 115$), natural disasters ($n = 81$), and other miscellaneous

Table 1. Methodological Characteristics and Findings of the Studies Reviewed

Reference	Group (n)	Sample, n (female + male)	Trauma	Sessions, n	Dropouts, n (%) ^a	Outcome measures	Findings
Asukai et al., 2010 [17]	PE and PE + TAU (12) vs. TAU only (12)	24 (21 F + 3 M)	Accident and sexual/physical assault	8 to 15	3 (25%) vs. 1 (8.33%)	CAPS, IES-R	Significant improvement in the PE condition, both within the group and between groups.
Basoglu, Salcioglu, & Livanou, 2006 [18]	SSBT (16) vs. RA (15)	31 (27 F + 4 M)	Earthquake	1	0	CAPS, GIS-A, GIS-S, FAQ, SCS	Significant improvement in the SSBT condition, both within the group and between groups.
Beck et al., 2009 [19]	GCBT (26) vs. MCC (18)	44 (36 F + 8 M)	Motor vehicle accident	14	9 (34.61%) vs. 2 (11.11%)	CAPS, IES-R	Significant improvement in the GCBT condition, both within the group and between groups.
Bichescu et al., 2006 [20]	NE (9) vs. PED (9)	18 (1 F + 17 M)	Political detention and torture	1 to 5	0	CIDI	Significant improvement in the NE condition, both within the group and between groups.
Cloitre et al., 2010 [21]	STAIR + PE (33) vs. SC + PE (33) vs. STAIR + SC (38)	104 (F)	Childhood abuse	16	5 (15.15%) vs. 13 (39.39%) vs. 10 (26.32%)	CAPS, SCID, PSS-SR, STAI-S, STAXI	Significant improvement in the STAIR + PE condition, both within the group and between groups.

Coffey et al., 2006 [22]	PE (16) vs. IBR (15)	31 (non-specified)	Physical/sexual abuse	6 clinical + 2 laboratory	8 (50%) vs. 6 (40%)	NWSPM, CAPS, DIS-IV, IES-R	Significant improvement in the PE condition, both within the group and between groups.
Cottraux, 2008 [23]	CBT (31) vs. SC (29)	60 (42 F + 18 M)	Mixed	10 to 16	4 (12.9%) vs. 14 (48.3%)	PCL, HAM-A, QLS	No relevant improvement or differences were found between groups.
Difede et al., 2007 [24]	CBT (15) vs. TAU (16)	31 (1 F + 30 M)	Terrorism	12	8 (53.3%) vs. 2 (12.5%)	CAPS, PCL, LES	Significant improvement in the CBT condition, both within the group and between groups.
Duffy, Gillespie, & Clark, 2007 [25]	CT (29) vs. WL (29)	58 (23 F + 35 M)	Mostly terrorism and civil conflict	Mean of 7.8 (SD = 5.1)	9 (31%) vs. 0	SCID, CAPS	Significant improvement in the CT condition, both within the group and between groups.
DuHamel et al., 2010 [26]	T-CBT (47) vs. RA (34)	81 (41 F + 40 M)	Transplant	10	5 (9.6%) vs. 3 (8.1%)	PCL-C, BSI, CAPS	Significant improvement in the T-CBT condition, both within the group and between groups.
Ertl et al., 2011 [27]	NE (29) vs. ACP (28) vs. WL (28)	85 (47 F + 38 M)	Military-related	8	1 (3.4%) vs. 1 (3.6%) vs. 0	VWAES, CAPS, MINI	Significant improvement in the NE condition, both within the group and between groups.
Falsetti, Resnick, & Davis, 2008 [28]	M-CET (22) vs. WL (31)	53 (F)	Mixed	12	8 (36.4%) vs. 8 (25.8%)	CAPS, SCID, ADIS-R, MPSS-SR, PRS	Significant improvement in the M-CET condition, both within the group and between groups.

Table 1. (Cont'd.)

Reference	Group (n)	Sample, n (female + male)	Trauma	Sessions, n	Dropouts, n (%) ^a	Outcome measures	Findings
Forbes et al., 2012 [29]	CPT (30) vs. TAU (29)	59 (2 F + 57 M)	Military- related	12	9 (30%) vs. 9 (31.03%)	CAPS, PCL, SCID, STAI, PTCI	Significant improvement in the CPT condition, both within the group and between groups.
Hien et al., 2009 [30]	SS-CBT (176) vs. WHE (177)	353 (F)	Mixed	12	73 (41.8%) vs. 81 (45.76%)	CAPS, PSS-SR	Significant improvement within each group, but no relevant difference between treatments.
Hinton et al., 2009 [31]	CBT (12) vs. WL (12)	24 (14 F + 10 M)	Military- related	12	0	CAPS	Significant improvement in the CBT condition, both within the group and between groups.
Karatzias et al., 2007 [32]	E + CR (21) vs. EMDR (27)	48 (20 F + 28 M)	Mixed	Mean of 7.1, 0 (SD = 3.0)		CAPS, IES, PCL	Significant improvement in the EMDR condition, both within the group and between groups.
Knaevelsrud & Maercker, 2007 [33]	I-CBT (49) vs. WL (47)	96 (86 F + 10 M)	Mixed	10	8 (16.33%) vs. 1 (2.13%)	IES-R, BSI	Significant improvement in the I-CBT condition, both within the group and between groups.
Litz et al., 2007 [34]	SM-CBT (24) vs. SC (21)	45 (10 F + 35 M))	Terrorism and Military-related	Daily for 8 weeks	9 (37.5%) vs. 3 (14.29%)	PCL, PSS-I	Significant improvement in the SM-CBT condition, both within the group and between groups.

Maercker et al., 2006 [35]	CBT (21) vs. WL (21)	42 (32 F + 10 M)	Accident	8 to 12	2 (8.7%) vs. 4 (16%)	CAPS	Significant improvement in the CBT condition, both within the group and between groups.
Monson et al., 2006 [36]	CPT (30) vs. WL (30)	60 (6 F + 54 M)	Military-related	12	6 (20%) vs. 3 (10%)	SCID-P, CAPS, PCL, STAI, TRGI	Significant improvement in the CPT condition, both within the group and between groups.
Nacasch et al., 2011 [37]	PE (15) vs. TAU (15)	30 (2 F + 28 M)	Military or Terror-related	9 to 15	2 (13.33%) vs. 2 (13.33%)	MINI, PSS-I, STAI, PTCI	Significant improvement in the PE condition, both within the group and between groups.
Neuner et al., 2008 [38]	NE (111) vs. TC (111) vs. WL (55)	277 (142 F + 135 M)	Military-related	6	25 (22.52%) vs. 26 (23.42%) vs. not informed	PDS, CIDI	Significant improvement in the NE and TC conditions, both within the groups and in comparison with WL. No relevant difference between NE and TC.
Nijdam et al., 2012 [39]	CBT (70) vs. EMDR (70)	140 (79 F + 61 M)	Mixed	6 to 16	25 (35.7%) vs. 20 (28.6%)	IES-R, SIP, SCID	Significant improvement in both conditions. EMDR more time-efficient method.
Pacella et al., 2012 [40]	PE (40) vs. MCC (25)	65 (24 F + 41 M)	Mixed	10	18 (45%) vs. 1 (4%)	PDS, SCID, PSS-SR, PTCI	Significant improvement in the PE condition, both within the group and between groups.
Ready et al. 2010 [41]	VRE (6) vs. PCT (5)	11 (M)	Military-related	10	1 (16.67%) vs. 1 (20%)	SCID, CAPS	No relevant improvement or differences were found between groups.

Table 1. (Cont'd.)

Reference	Group (n)	Sample, n (female + male)	Trauma	Sessions, n	Dropouts, n (%) ^a	Outcome measures	Findings
Resick et al., 2008 [42]	CPT (56) vs. CT (51) vs. WA (55)	162 (F)	Sexual/ physical assault	12	29 (51.79%) vs. 22 (43.14%) vs. 25 (45.45%)	CAPS, SCID, STI, PBRs, PDS, STAXI, STAI, TRGI	Significant improvement within each group, but no relevant difference between treatments.
Schnurr et al., 2007 [43]	PE (141) vs. PCT (143)	284 (F)	Military- related stressor	10	53 (38%) vs. 30 (21%)	CAPS, PCL, SCID	Significant improvement in the PE condition, both within the group and between groups.
Shalev et al., 2012 [16]	PE (63) vs. CT (40) vs. medication/placebo (46) vs. WL (93)	242 (126 F + 107 M + 9 not informed)	Mixed	12	28 (44.4%) vs. 16 (40%) vs. 19 19 (41.3%) vs. 14 (15.1%)	CAPS, SCID, PSS-SR	Significant improvement in the PE and CT conditions, both within the groups and in comparison with the other groups. No significant differences between PE and CT.
Sijbrandij et al., 2007 [44]	B-CBT (79) vs. WL (64)	143 (86 F + 57 M)	Mixed	4 (120 min.) in 1 week	17 (21.52%) vs. 10 (15.62%)	SIP, SCID	Significant improvement in the B-CBT condition, both within the group and between groups (not maintained at follow-up).

Note: **ACP** = Academic Catch-up Program; **ADIS-R** = Anxiety Disorders Interview Schedule-Revised; **B-CBT** = Brief Cognitive-Behavioral Therapy; **BSI** = Brief Symptom Inventory; **CAPS** = Clinician Administered PTSD Scale for DSM-IV; **CBT** = Cognitive-Behavioral Therapy; **CIDI** = Composite International Diagnostic Interview; **CPT** = Cognitive Processing Therapy; **CR** = Cognitive Restructuring; **CT** = Cognitive Therapy; **DIS-IV** = Diagnostic Interview Schedule-IV; **E + CR** = Imaginal Exposure and Cognitive Restructuring; **EMDR** = Eye Movement Desensitization; **FAQ** = Fear and Avoidance Questionnaire; **GCBT** = Group Cognitive Behavioral Treatment; **GIS-A** = Global Improvement Scale-Assessor; **GIS-S** = Global Improvement Scale-Self; **HAM-A** = Hamilton Anxiety Rating Scale; **HTQ** = Harvard Trauma Questionnaire; **IBR** = Imagery-Based Relaxation; **I-CBT** = Internet Cognitive-Behavioral Therapy; **IES-R** = Impact of Events Scale-Revised; **LES** = Life Events Scale; **MCC** = Minimum Contact Comparison; **M-CET** = Multiple Channel Exposure Therapy; **MINI** = Mini International Neuropsychiatric Interview; **MPSS-SR** = Modified PTSD Symptom Scale-Self Report; **NE** = Narrative Exposure; **NWSPM** = National Women's Study Event History PTSD Module; **PBRs** = Personal Beliefs and Reactions Scale; **PCL** = Posttraumatic Checklist Scale; **PCL-C** = Posttraumatic Checklist-Civilian Version; **PCT** = Present-Centered Therapy; **PDS** = Posttraumatic Diagnostic Scale; **PE** = Prolonged Exposure; **PEI** = Physical Reactions Scale; **PSS-I** = PTSD Symptom Scale-Interview; **PSS-SR** = PTSD Symptom Scale-Self Report; **PTSD** = Posttraumatic Stress Disorder; **PTCI** = Posttraumatic Cognitions Inventory; **QLS** = Marks' Quality of Life Scale; **RA** = Repeated Assessments; **SC** = Supportive Counseling; **SCID** = Structured Clinical Interview for DSM-IV; **SCID-P** = Structured Clinical Interview for DSM-IV Patient Version; **SCS** = Sense of Control Scale; **SCL-90-R** = Symptom Checklist-Revised; **SIP** = Structured Interview for PTSD; **SSBT** = Single Session Behavioral Treatment; **STAIR** = Skills Training in Affect and Interpersonal Regulation; **STAI** = Spielberger State-Trait Anxiety Inventory; **SM-CBT** = Self-management Cognitive Behavioral Therapy; **SS-CBT** = Seeking Safety Cognitive-behavioral Treatment; **STAI-S** = State-Trait Anxiety Inventory-S; **STAXI** = State-Trait Anger Expression Inventory; **STI** = Standardized Trauma Interview; **TC** = Trauma Counseling; **TAU** = Treatment as Usual; **T-CBT** = Telephone Cognitive-Behavioral Therapy; **TRGI** = Trauma-Related Guilt Inventory; **VRE** = Virtual Reality Exposure Therapy; **VVAES** = Violence, War and Abduction Exposure Scale; **WA** = Written Accounts; **WHE** = Women's Health Education; **WL** = Waiting List.

^aDropouts were registered from randomization to the first posttreatment assessment.

studies, the results of this review are demonstrated comparatively in categories, as follows:

1. cognitive-behavioral therapies: CBT, brief CBT, telephone administered CBT, imaginal exposure with cognitive restructuring, and cognitive processing therapy;
2. cognitive therapies: CT and cognitive restructuring;
3. exposure therapies: single session of behavioral treatment, prolonged exposure therapy, multiple-channel exposure therapy, narrative exposure therapy, virtual reality exposure therapy, structured writing therapy, and written accounts;
4. other treatments: eye movement desensitization and reprocessing (EMDR), imagery-based relaxation, skills training in affect and interpersonal regulation, present-centered therapy, psychoeducation, supportive counseling, academic catch-up program, women's health education, and treatment as usual; and
5. assessment conditions: repeated assessments, minimum contact comparison, and wait list.

CBT versus Exposure Therapies

Only one study comparing CBT with ET was included. The randomized clinical trial by Resick et al. [42] compared cognitive processing therapy ($n = 56$) to its individual components: CT ($n = 51$) and written accounts ($n = 55$), a protocol that consisted of asking the patients to write about their worst trauma and to read this account aloud, as well as eliciting patients' emotional responses. No relevant differences were expressed between this exposure-based treatment and the full protocol, yet they were both effective individually. There were also no significant between-group differences in dropout rates.

CBT versus Cognitive Therapies

The trial mentioned above [42] was also the only study that evaluated comparatively the outcomes of CT and cognitive processing therapy, finding no between-group significant differences. Completers' CAPS average scores decreased 37.7 points from baseline in cognitive processing therapy ($p < .001$), 36.5 points in WA ($p < .001$), and 40.8 points in CT ($p < .001$).

CBT versus Other Treatments

We included seven studies comparing CBT to other therapeutic strategies, such as EMDR, supportive counseling and treatment as usual [23, 24, 29, 30, 32, 34, 38]. There was a total of 736 participants, 367 in the CBT groups. A significant group effect in favor of CBT was reported against treatment as usual [24, 29] and supportive counseling [34].

There were no significant differences between treatments in studies 23 and 29. Patients of the trial by Cottraux et al. [23] treated with CBT or supportive counseling presented no significant improvement in a study with important limitations: at least 76% of patients were said to be resistant to treatment, and counseling was delivered by CBT experts who claimed not to believe in the treatment. Hien et al. [30] identified improvement both in Seeking Safety CBT and in Women's Health Education, a protocol focused on psychoeducation and therapeutic attention, in a sample of women with PTSD and substance use disorders. Again, there were no differences between treatments.

Karatzias et al. [32] compared EMDR with a treatment comprised of cognitive restructuring and exposure, not far from CBT's full protocol. The authors registered significant difference in favor of EMDR on IES scores ($t = 2.7$, $p = 0.009$), as well as on secondary outcomes. The significant difference on IES scores was not maintained at follow-up. The other study that compared a CBT protocol with EMDR [39] found no significant group differences at posttreatment, although EMDR generated symptomatic and diagnostic improvement faster. Data analysis revealed a significant interaction between time and treatment on IES ($F = 4.00$, $df = 1065$, $p < 0.001$). Halfway through the CBT protocol, 21 CBT patients (47.7%) still had PTSD compared to 4 EMDR patients (7.8%).

CBT versus Assessment Conditions

We included seven studies in this review comparing CBT to wait-list, repeated assessments, or minimum contact comparison [19, 26, 31, 33, 35, 36, 44]. There was a total of 490 participants, 264 in the CBT groups and 226 assessment-only controls. CBT generated greater symptom reduction at posttreatment across all studies, although dropout rates were higher in some of the experimental groups [19, 33, 44]. The difference detected by Sijbrandij et al. [44] in favor of a brief CBT protocol was not maintained at follow-up.

Exposure Therapies versus Cognitive Therapies

The two core components of CBT for PTSD were compared by Resick et al. [42] and Shalev et al. [16]. Either protocol was efficacious in both studies, although CT generated greater PDS scores reduction than written accounts in the trial by Resick et al. [42]. The authors concluded that isolated CT is a valuable choice for patients unwilling to undergo exposure-based treatments or with limited time to attend a complete CBT protocol. Nevertheless, they did not recommend removing exposure from treatments for PTSD, since many patients benefit from activating the fear structure and emotionally processing the traumatic memories. Shalev et al. [16] did not find any significant difference between prolonged exposure therapy, delayed prolonged exposure, and CT.

Exposure Therapies versus Other Treatments

We obtained nine studies [17, 20-22, 27, 37, 38, 41, 43] comparing ET to other types of treatment. There was a total of 748 participants, 372 in the exposure groups and 376 undergoing other treatments. Overall, patients included on exposure conditions presented greater improvement when compared to control groups. Bichescu, Neuner, Schauer, and Elbert [20], for example, evaluated the effectiveness of narrative exposure versus psychoeducation on victims of political detention and torture, obtaining statistical significant clinical improvement in favor of narrative exposure with only 9 individuals in each group.

The study by Ready, Gerardi, Bakscheider, Mascaro, and Rothbaum [41], however, registered no difference between virtual reality exposure and present centered therapy, possibly because of the small sample—only 11 participants. Another exception was the trial by Neuner et al. [38], in which narrative exposure and trauma counseling were equally effective in reducing posttraumatic symptoms. Therapists in this trial had no prior experience in narrative exposure, receiving a six-week training in order to carry out the treatment in an Ugandan refugee settlement. Patients in Schnurr et al. [43] dropped out more from prolonged exposure than from present centered therapy, but exposure still generated significantly greater diagnostic and symptomatic improvement.

Exposure Therapies versus Assessment Conditions

We included six studies [16, 18, 27, 28, 38, 40] in this category. The total number of participants was 528: 281 in the exposure groups and 247 in assessment conditions. Across all trials, exposure treatments were more effective than no active treatment. Dropout rates were higher in the experimental groups in the studies by Pacella et al. [40] and Shalev et al. [16]. Basoglu, Salcioglu, and Livanou [18] managed to improve earthquake-related PTSD patients' primary outcome measures with a single session of exposure treatment.

CT versus Assessment Conditions

CT was compared with wait list in two studies [16, 25]. Both trials documented significant improvement in favor of the experimental groups. Duffy, Gillespie, and Clark [25] found that dropout rates differed between patients in the immediate CT condition ($n = 9$; 31%) and those who received treatment after wait list ($n = 3$; 10.71%). Shalev et al. [16] found no significant differences in dropout rates between CT and wait list at the posttreatment assessment; however, many treatment non-completers were taken into account. No studies comparing CT with other forms of treatment were included.

DISCUSSION

The studies included in this review support that CBT and the protocols derived from its individual components are all effective treatments for PTSD, at least when compared to assessment-only conditions. As in the previous review [14], there were no significant differences between any of those treatments, except for the greater PDS reduction in the CT condition versus written accounts identified by Resick et al. [42]. That is not enough to say that CT is a more efficacious treatment than ET. In fact, primary outcomes from exposure strategies were more consistent across the trials with other active treatments when compared to CBT and CT.

The fact that relatively more studies with exposure strategies were found may have unbalanced our results in favor of ET. Also, no studies were included comparing CT with other treatments. A current tendency of researchers to focus on exposure strategies for PTSD could explain this unbalance. Similarly to the present review, a recent meta-analysis [45] found more articles utilizing primarily exposure strategies for PTSD than all other CBT strategies put together. Even so, in that study, cognitive restructuring-based approaches generated better results for PTSD when compared to primarily exposure-based psychotherapy or full trauma-focused CBT protocols.

As Resick et al. [42], we believe that the comparison between CT, ET, and CBT does not indicate a sole treatment of choice for PTSD. Also, patients may benefit differently from each type of therapeutic strategy. While understanding and challenging dysfunctional posttraumatic cognitions may be a more efficacious treatment focus for some, as well as a less emotionally demanding method, other individuals markedly improve through processing the emotional load associated with the activation of their fear structure. The fact that CBT focuses on those strategies in different parts of its protocol may be a reason for therapists to choose CBT over CT or ET individually. Clinicians are nevertheless required to be efficient and to adjust to patients' needs, what suggests that CT and ET are valuable choices when patients are expected to benefit from a more direct approach or when there are individual limitations regarding an extended protocol.

Results from the studies that compared CBT to other active treatments were inconsistent, with only three registering a significant difference in treatment outcomes in favor of CBT—against counseling [34] and treatment as usual [24, 29]. Results of both studies [32, 39] comparing CBT with EMDR favored the latter, which indicates a need to investigate further the comparative benefits of this treatment for PTSD. The EMDR protocol requires fewer sessions to generate clinical improvement, since it is based on a more direct approach on memory processing, while the exposure component of CBT requires emotionally experiencing the traumatic memory and processing it gradually

along the treatment. Past reviews found no differences between EMDR and trauma-focused CBT [14, 46]. On the other hand, the meta-analysis by Watts et al. [45] found stronger effect sizes in favor of CBT and its individual components. We suggest that more follow-up trials with those treatments be conducted and reviewed in order to evaluate how outcomes compare between both strategies.

Trials that focused on trauma related with military, terrorism, and sexual abuse had the highest dropout rates in this review, regardless of which therapeutic strategy was used [22, 24, 25, 36]. According to Mendes et al. [14], dropout rates in PTSD treatments remain around 25%. However, trials with these specific types of traumatic events found rates twice as large. Resick et al. [47] and Foa et al. [48] suggested that trauma characteristics can influence patient adherence to CBT protocols. Difede et al. [24] point out that higher dropout rates can be related with educational level, as well as with the use of alcohol. Duffy et al. [25] suggested that these numbers might be reduced if patients count with social support during treatment.

It should be highlighted that several types of traumatic events characterized the studies' samples. Although treatment with patients that experienced different types of trauma can generate different outcomes [47, 48], we did not take this diversity into account when analyzing symptomatic and diagnostic improvement across trials. Another limitation was the wide range of sessions across treatments (e.g., 1 to 15 sessions in ET protocols), making it difficult to perform a perfectly fair comparison. We also did not consider patients' medication intake in the analysis. The decision of comparing only outcomes from treatment completers was based on the fact that intention-to-treat analyses were not performed in many studies. Finally, it is known that therapeutic strategies are not the only influence on clinical improvement. In human research there are individual and relational factors that can influence the outcome immeasurably [49].

The purpose of this study was to replicate a previous review [14] and to evaluate comparatively the efficacy of CBT, CT, ET, and other treatments for PTSD in recent randomized clinical trials. We found, as in the replicated study, that CBT treatments present equally efficacious results. The variety of novel protocols utilizing the core strategies of CBT indicates that researchers are already confident enough to adapt CBT's protocol and utilize its components individually to better suit patients' and therapists' needs and possibilities. Future research should focus on comparative follow-up analysis of PTSD treatments currently available, in order to clarify how the outcomes of more efficient treatments such as EMDR and ET protocols comprised of fewer sessions are maintained when compared to more extensive protocols focused on cognitive restructuring strategies.

APPENDIX 1: Search Strategy

(Posttraumatic stress disorder OR Posttraumatic stress disorders OR Stress disorders OR Stress disorder OR Stress disorder posttraumatic OR Stress disorders posttraumatic OR Post traumatic stress disorder OR Post traumatic stress disorders OR Traumatic stress disorder OR Traumatic stress disorders OR Acute post traumatic stress disorder OR Stress disorder post traumatic OR Chronic post traumatic stress disorder OR Stress disorders post traumatic OR Stress disorder traumatic OR Stress disorders traumatic OR Stress disorder OR Delayed onset post traumatic stress disorder OR Stress disorders OR Acute stress disorder OR Stress disorders traumatic acute) AND (Treatment OR Treatments OR Psychotherapy OR Psychotherapies OR Ect psychotherapy OR Ects psychotherapy OR Group psychotherapy OR Brief psychotherapy OR Rational psychotherapy OR Psychotherapy group OR Psychotherapy brief OR Psychotherapy rational OR Cognitive psychotherapy OR Psychopharmacology OR Psychopharmaceuticals OR Cognitive behavioral therapy OR Cognitive behavioral therapies OR Therapy cognitive behavior OR Therapies cognitive behavior OR Behavior therapy cognitive OR Behavior therapies cognitive OR Cognitive therapy OR Cognitive therapies OR Behavior therapy OR Therapy behavior OR multimodal treatment OR combined therapy OR multimodal treatments OR exposure OR exposure therapy OR exposure therapies OR prolonged exposure OR prolonged exposure therapy OR virtual reality OR virtual reality exposure OR virtual reality exposure therapy OR imaginal exposure OR imaginal exposure therapy OR narrative exposure OR narrative exposure therapy) AND (Randomized controlled trials OR Randomized clinical trials OR Controlled trials randomized OR Randomized controlled trial OR Clinical trials randomized OR Controlled trial randomized OR Trials randomized clinical OR Trials randomized controlled OR Trial randomized controlled OR Controlled clinical trials randomized)

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