International Journal of Cognitive Therapy
https://doi.org/10.1007/s41811-024-00217-0

Metacognitive Therapy Versus Exposure-Based Treatments of Posttraumatic Stress Disorder: A Preliminary Comparative Trial in an Ordinary Clinical Practice

Johanne Nordahl[1] · Odin Hjemdal[1] · Sverre U. Johnson[2] · Hans M. Nordahl[3]

Accepted: 29 May 2024

Abstract

Cognitive behavioral therapy, prolonged exposure, and eye movement desensitization and reprocessing are effective treatments for posttraumatic stress disorder (PTSD). They emphasize the processing of trauma-related memories and exposure as central components in treatment. In contrast, the metacognitive model emphasizes that PTSD is caused by a persistent negative thinking style, and the goal is to find alternative coping strategies and modify metacognitive beliefs without the use of exposure. In a quasi-experimental A-B design, patients diagnosed with PTSD received either MCT ($n=32$) or TAU "treatment as usual" ($n=28$) consisting of exposure-based treatments and were tested on different measures of symptoms. The results indicated that both treatments were effective and performed well on both trauma and anxiety symptoms. Recovery rates and clinical improvement were higher in the MCT condition at post-treatment. The study indicates that MCT could potentially be a viable alternative to trauma-focused treatment of PTSD.

Clinical trial registration: The study is a clinical and quality audit of an ordinary routinely delivered clinical service in a specialized trauma clinic involving treatments for patients with PTSD. The trial was a preliminary stage in a larger trial of chronic PTSD.

Keywords PTSD · Cognitive behavioral therapy · Prolonged exposure · Eye movement desensitization and reprocessing · Metacognitive therapy

✉ Johanne Nordahl
johanne.nordahl@ntnu.no

[1] Division of Psychiatry, Department of Psychology, NTNU and St. Olavs Hospital, Trondheim, Norway

[2] Department of Psychology, Modum Bad Psychiatric Center, UIO, Oslo and Research Institute, Oslo, Norway

[3] Division of Psychiatry, Department of Mental Health, NTNU and St. Olavs Hospital, Trondheim, Norway

Published online: 12 June 2024

Introduction

Trauma-focused exposure-based treatments are the recommended treatments for patients with posttraumatic stress disorder (PTSD) (American Psychological Association (APA), 2017; National Institute for Health and Care Excellence (NICE), 2018; The Australian Guidelines for the Prevention and Treatment of Acute Stress Disorder, Posttraumatic Stress Disorder and Complex PTSD, 2021), and these are cognitive behavioral therapy (CBT), prolonged exposure (PE), and eye movement desensitization and reprocessing (EMDR) (NICE, 2018; Bradley et al., 2005; Powers et al., 2010; Seidler & Wagner, 2006; McLean & Foa, 2011). They are all well-established treatments with no apparent difference in effect and the use of exposure has for several years been central in these treatment approaches for PTSD.

Although many patients experience a significant improvement after completing exposure-based treatments (Watts et al., 2013), an average dropout of 18% was found in a meta-analysis by Imel et al. (2013), and a rate of 14–18% was reported in a review by Lewis et al. (2020). For approximately 50% of patients, symptoms remained after end of treatment or there was no improvement (Schottenbauer et al., 2008). Exposure can be exhausting for both patient and therapist, and implementing it in treatment could be challenging for therapists due to lack of training, availability of supervision, or personal beliefs about the context and condition for its use. Other challenges could include psychiatric comorbidity, task problems, patient refusal, or medical contraindications (Becker et al., 2004). Exposure could lead to avoidance reactions and secondary traumatization among therapists who are indirectly exposed to traumatic material (Stamm, 1999; Bride, 2007; Beck, 2011; Cieslak et al., 2014).

Trauma-focused exposure-based treatments are effective for many patients, but results from different studies challenge the established assumptions that only exposure-based treatments should be recommended in treatment of PTSD. A randomized controlled trial by Markowitz et al. (2015) showed that interpersonal psychotherapy without exposure to traumatic memories showed equal response rates compared to PE. In CBT, cognitive restructuring with or without the use of exposure-based techniques had the same treatment outcome (Foa et al., 2005; Tarrier et al., 1999; Marks et al., 1998). Results from studies on metacognitive therapy (MCT) for PTSD show large and statistically significant improvements on measures of PTSD, anxiety, and depression with within-group effect size ranging from $d = 1.6$ to $d = 5.0$ and between-group effect size ranging from $d = 0.74$ to $d = 3.61$. This was also maintained at follow-up 3 to 6 months and 18 to 41 months after treatment (Wells & Sembi, 2004b; Wells et al., 2008; Wells & Colbear, 2012; Simons & Kursawe, 2019). Wells et al. (2014) compared MCT with PE in a parallel randomized controlled trial and found MCT to have better outcome at post-treatment, with high effect sizes on trauma symptoms (within-group effect size Hedges's $g = 4.52$ for MCT and 1.53 for PE). Similarly, both MCT and PE differed from the wait-list group on trauma symptoms (effect size $\eta_p^2 = 0.69$ for IES and $\eta_p^2 = 0.67$ for PDS).

According to the metacognitive model, people have an innate adaption after exposure to a traumatic event that prevents them to develop persistent problems

which is called the reflexive adaptive process (RAP; Wells & Sembi, 2004a). In treatment, it is emphasized that trauma symptoms are normal reactions, and a goal is to help the patient to use more adaptive coping strategies. In contradiction to this natural adaption process, some individuals will utilize a persistent negative thinking style called the Cognitive Attention Syndrome (CAS), which consists of worry, rumination, and threat monitoring. Other central maladaptive coping strategies are thought suppression, which include avoidance of reminders by suppressing intrusive thoughts or memories about the trauma and gap filling which refers to going over events in memory and trying to fill in specific gaps. Whether these strategies persevere over time in response to trauma reactions is considered decisive for whether an individual develops PTSD (Wells & Colbear, 2012; Wells, 2009). MCT does not apply exposure in treatment, and results from previous studies on MCT for PTSD suggest that treatment may not require exposure to trauma for patients to improve from trauma symptoms.

It seems necessary to investigate whether MCT can be an alternative treatment to help traumatized patients and be an alternative for those who refuse to work with exposure-based techniques, cannot tolerate exposure, or do not benefit from it. The aim of the present study was therefore to examine the relative efficacy of MCT compared to recommended exposure-based "treatment as usual" (TAU) consisting of CBT, PE, and EMDR in an ordinary outpatient setting. We hypothesized that there would be a significant difference in the outcome regarding change in symptoms and recovery rates between MCT and TAU condition, indicating that exposure is not a necessary requirement for treatment effects.

Methods

Procedure and Participants

Participants were consecutively referred by general practitioners and other regional psychiatric centers to an outpatient clinical service for PTSD and trauma. Following referral to the clinical service, all participants were contacted offering them an appointment to attend an initial psychological assessment interview with a view to participate in the study. They were provided information about the clinic and signed consent. They were informed that they could withdraw from the study at any time without giving a reason. Checkware was used as a digital solution to provide information from the measures. The study is a clinical and quality audit of an ordinary routinely delivered clinical service in a specialized trauma clinic and was a preliminary stage in a larger trial of chronic PTSD. Data was collected between winter 2010 and spring 2013. The hospital approved the study as a qualitative control of the interventions offered, and the project was financed and approved by Central Norway Regional Health Authority with project number HMN109/2009.

A quasi-experimental pre- to post A–B design was used to compare the effects of MCT and TAU. The participants were screened for PTSD according to the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV; American Psychiatric Association, 1994) by clinical psychologists using the

structured interview of the Anxiety Disorders Interview Schedule (ADIS-IV; Brown et al., 1994). In order to be included, the participants had to meet the criteria for PTSD and had to be 18 years or older. Participants were excluded if they were experiencing psychosis, severe depression, drug/alcohol addiction, current suicidal intent, or borderline personality disorder.

A total of 94 participants were assessed, and 60 were included in the trial (see Fig. 1). A total of 34 participants were excluded because they did not meet inclusion criteria, declined to participate, or for other reasons. Eleven men and 49 women between 18 and 55 years participated. The sample was divided into two groups and matched in terms of age and gender. There were 32 in the MCT group and 28 in the TAU group. Of the 28 participants receiving TAU, 60% participants received EMDR (17/28), 18% participants received prolonged exposure (5/28), and 22% participants received CBT (6/28). The average age of the participants in the MCT group was 28.1 years ($SD = 10.0$) and 27.7 years ($SD = 9.9$) in the TAU group. The descriptive statistics are shown in Table 1.

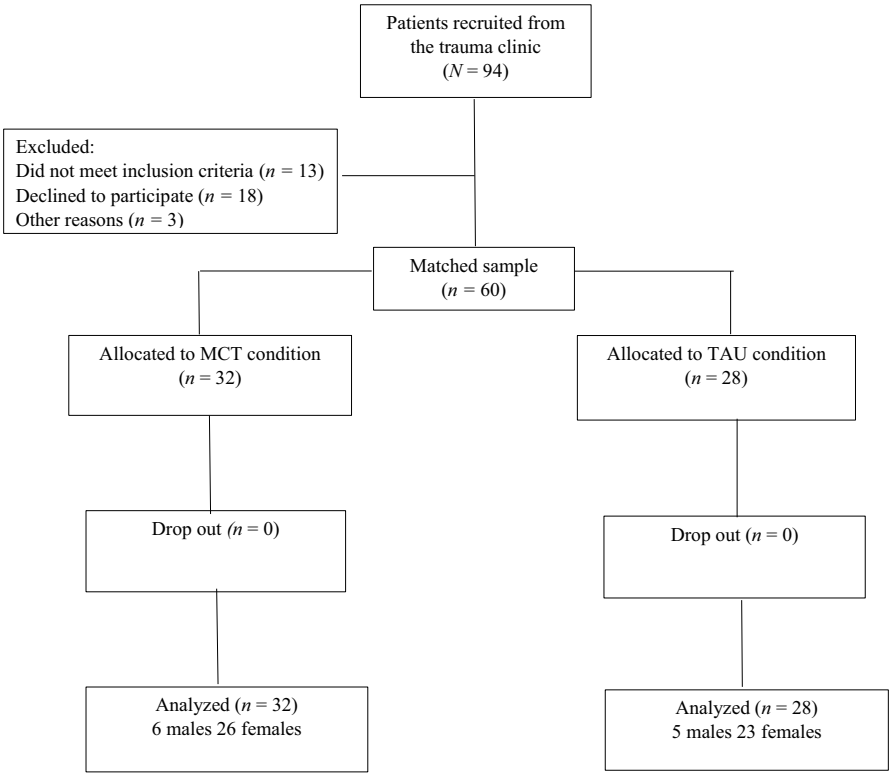

Fig. 1 Consort diagram. MCT, metacognitive therapy; TAU, treatment as usual

Table 1 Descriptive statistics for MCT and TAU group ($N=60$)

	MCT		TAU		Total	
	N	%	*N*	%	*N*	%
Female	26	81.2	23	82.1	49	81.7
Male	6	18.8	5	17.9	11	18.3
	M	*SD*	*M*	*SD*		
Age (in years)	28.0	10.2	27.6	10.0		
Number of sessions	11.6	4.5	9.0	4.5		

MCT metacognitive therapy, *TAU* treatment as usual, *N* number of participants, *SD* standard deviation. Two missing values in "number of sessions"

Measures

The primary self-report outcome for this study was the Impact of Event Scale-Revised (IES-R; Weiss & Marmar, 1997). The IES-R is related to the DSM-IV criteria for PTSD and the total score range from 0 to 88. It is considered to have a high internal consistency ($\alpha=0.96$) and test-retest reliability ranging from 0.89 to 0.94 (Weiss & Marmar, 1997). The secondary outcome measure was Posttraumatic Diagnostic Scale (PDS; Foa et al., 1997) which measures the extent and severity of trauma symptoms based on the DSM-IV criteria with a total score ranging from 0 to 51. PDS has a high internal consistency ($\alpha=0.92$) and test-retest reliability of 0.74 (Foa et al., 1997).

The other three measures were the Beck Anxiety Inventory (BAI; Beck et al., 1988a, b), the Beck Depression Inventory-Second Edition (BDI-II; Beck et al., 1996), and the Inventory of Interpersonal Problems (IIP-64-C; Alden et al., 1990). The BAI has been shown to have high internal consistency ($\alpha=0.92$) (Beck et al., 1988a, b) and test-retest reliability of 0.75 (Fydrich et al., 1992). The BDI-II has been found to be a reliable and valid measure of depressive symptomatology ($\alpha=0.86$) and show a test-retest reliability of 0.48 to 0.86 (Edwards et al., 1984; Beck et al., 1988a, b). The IIP-64-C has shown good test-retest reliability ranging from 0.80 to 0.90 and a high internal consistency ($\alpha=0.82$–0.94) (Horowitz et al., 1988).

Treatments

Both groups received a maximum of 12 sessions of treatment, each lasting up to 60 min. The treatment manual by Wells (2009) was used for the MCT group, while the TAU group followed the CBT (Ehlers et al., 2005), PE (McLean & Foa, 2011), and EMDR (Shapiro, 2017) treatment manuals. The eight therapists were all clinical psychologists with varying experience. Four had a therapeutic allegiance to MCT, and four to exposure-based treatments. The therapists were trained and regularly supervised in groups of four on a weekly or biweekly basis by a master clinician MCT therapist as an integral part of their clinical practice.

Metacognitive Therapy

MCT involves constructing a case formulation to help the patient understand how their problems are maintained by maladaptive coping strategies. The goal is to reduce maladaptive strategies like worry and rumination by new and alternative responses named "detached mindfulness" and "postponement of worry and rumination." Advantages/disadvantages analyses and behavioral experiments are used to weaken metacognitive beliefs. The therapist helps the patient deal with the occurrence of threat monitoring and practice attending to neutral and nonthreatened stimuli in the external environment as a part of the session and homework. At the end, the therapist and patient make a summary sheet which details an "old plan" and "new plan" for responses to triggers. In addition, summarizing what they have learned about their thoughts (Wells, 2009).

Cognitive Behavioral Therapy

CBT typically focuses on identifying the patients' dysfunctional thoughts, memory triggers, and cognitive and behavioral strategies that maintain PTSD. Repeated exposure to trauma memories is central, which includes imaginal exposure, writing the traumatic narrative, reading about traumatic events, and in vivo exposure. Cognitive restructuring is used, often in combination, to identify dysfunctional thoughts regarding themselves, others, and the world. It is also used to elicit alternative thoughts and new beliefs about the meaning of the trauma (Marks et al., 1998; Ehlers et al., 2005).

Prolonged Exposure

The first phase of PE treatment involves psychoeducation about trauma reactions and presenting a clear rationale for the use of exposure. It is emphasized that PTSD is maintained by avoidance and negative beliefs connected to the self, others, and the world. The patient and therapist determine which trauma to focus on, and imaginary exposure is applied to the memory of the traumatic event and cognitive restructuring before and after exposure. Exercise with controlled breathing and muscle relaxation are used during sessions and as homework. The last phase of treatment concerns performing in vivo exposure to external stimuli and creates a hierarchy of what causes the most distress. Then, a plan for exposure for the sessions is made which forms the basis for homework (McLean & Foa, 2011).

Eye Movement Desensitization and Reprocessing

The beginning of treatment involves writing down the patient's history, creating a treatment plan, and identifying possible "targets" that cause emotional distress. The patient learns different techniques to reduce emotional distress, for example finding a "safe place" which is a visualization of a calm memory or thought. Further, "targets" are processed, and the patient must identify the visual image of the memory, negative assumptions about the self, related emotions, and bodily reactions.

The patient must also identify a positive assumption, for example "I'm safe now." The desensitization and reprocessing represent the core component of the treatment where the patient focuses on a stimulus, e.g., eye movements, while holding in mind the associated memory, negative assumption, and bodily reactions. Tactile taps or auditory tones are used if it is difficult for the patient to use visual tracking. Following the bilateral stimulation, the patient must identify the associative information that was elicited. When the distress has decreased, the positive assumption is repeated and reinforced with bilateral stimulation. The patient is guided through relaxation techniques to enhance emotional stability and writes down residual negative thoughts and how to deal with emotional distress. At the end of treatment, there is an evaluation and discussion on how the patient can cope with future challenging situations (Shapiro, 2017; Landin-Romero et al., 2018).

Data Analysis

The analyses were estimated using IBM SPSS version 29. To manage missing data, multiple imputation was used running 20 imputations aiming to reduce biases (Graham et al., 2007). Analysis of covariance (ANCOVA) tested for differences between MCT and TAU on symptoms at post-treatment while controlling for pre-treatment scores. In addition to between-group effect sizes (η_p^2), the controlled effect sizes were computed with Cohen's formula *d* by subtracting the post-treatment means for both groups and dividing this by the pooled standard deviation (Cohen, 1988).

We applied a reliable change index (RCI) and cut-off score to the primary outcome measures (IES-R and PDS) to determine whether any clinically significant change had taken place. Using criteria C by Jacobson and Truax (1991), the RCI was calculated using the mean from the pre-scores (M_1) and the mean from the post-scores (M_2), divided by the standard deviation S_1 for the pre-test group and r_{xx} which is the test-retest reliability. The test-retest reliability is ranging from 0.89 to 0.94 for PDS (Weiss & Marmar, 1997), and the value used in this study was 0.92 (Joseph, 2000). The test-retest reliability used for PDS was 0.83 (Foa et al., 1997). Reliable change was determined by a cut-off score of 24 and RCI of 6 for the IES-R, and a cut-off score of 12 and RCI of 10 for PDS. Recovered patients had an RCI more than 6 for the IES-R and 10 for PDS, without crossing the cut-off point. Reliably improved patients had an RCI more than 6 for the IES-R or 10 for the PDS and crossed the cut-off point. Patients making no change, had reliable change less than 6 for the IES-R or 10 for the PDS, irrespective of the cut-off point. Patients reporting reliable deterioration showed no reliable change and had scores over the cut-off point.

Results

Pre- and post-treatment descriptive statistics are shown in Table 2. There was no significant difference between MCT and TAU on symptom measures at baseline. Within-group analyses were calculated using paired sample *t*-test and revealed

Table 2 ANCOVA results for within and between comparisons for MCT and TAU ($N=60$)

Pre				Post		Between MCT-TAU			Within-group	
	n	*M*	*SD*	*M*	*SD*	*F*	η_p^2	*d*	*t*	*d*
IES-R										
MCT	32	57.53	13.00	21.63	18.30	7.813**	0.12	0.70	9.58**	2.26
TAU	28	53.79	11.37	35.79	22.14				3.99**	1.02
PDS										
MCT	32	30.25	7.74	10.06	9.35	8.077**	0.12	0.60	10.94**	2.35
TAU	28	29.34	6.95	17.04	13.66				6.17**	1.13
BDI-II										
MCT	32	25.63	8.89	14.26	13.70	0.533	0.01	0.26	5.41**	0.98
TAU	28	27.39	8.66	17.68	12.06				4.45**	0.92
BAI										
MCT	32	20.56	11.67	9.00	10.54	5.536*	0.09	0.65	5.25**	1.04
TAU	28	23.18	10.21	16.73	13.05				3.23**	0.55
IIP-64										
MCT	32	1.36	0.55	0.86	0.67	1.106	0.02	0.30	5.70**	0.82
TAU	28	1.48	0.48	1.11	0.72				2.59*	0.67

IES-R impact of Event Scale-Revised, *PDS* Posttraumatic Diagnostic Scale, *BDI-II* Beck Depression Inventory; *BAI* Beck Anxiety Inventory; *IIP-64* Inventory of Interpersonal Problems. *d* Cohen's *d* (effect size)

*$p<.05$

**$p<.01$

statically significant differences in the measures from pre- to post within the MCT and TAU groups. Within the MCT group, there was a significant difference on IES-R scores from pre- ($M=57.53$, $SD=13$) to post ($M=21.63$, $SD=18.30$); $t(31)=9.580$, $p<.01$ and on PDS scores from pre- ($M=30.25$, $SD=7.74$) to post ($M=10.06$, $SD=9.35$); $t(31)=10.94$, $p<.01$. There was also a significant difference on BDI-II scores from pre- ($M=25.63$, $SD=8.89$) to post ($M=14.26$, $SD=13.70$); $t(31)=5.41$, $p<.01$, on BAI from pre- ($M=20.56$, $SD=11.67$) to post ($M=9$, $SD=10.54$); $t(31)=5.25$, $p<.01$, and on IIP-64 from pre- ($M=1.36$, $SD=0.55$) to post ($M=0.86$, $SD=0.67$); $t(31)=5.70$, $p<.01$.

Within the TAU group, there was a significant difference on IES-R from pre- ($M=53.79$, $SD=11.37$) to post ($M=35.79$, $SD=22.14$); $t(27)=3.99$, $p<.01$, and on PDS from pre- ($M=29.34$, SD = 6.95) to post ($M=17.04$, $SD=13.66$); $t(27)=6.17$, $p<.01$. There was a significant difference on BDI-II from pre- ($M=27.39$, $SD=8.66$) to post ($M=17.68$, $SD=12.06$); $t(27)=4.45$, $p<.01$, on BAI from pre- ($M=23.18$, $SD=10.21$) to post ($M=16.73$, $SD=13.05$); $t(27)=3.23$, $p<.01$, and IIP-64 from pre- ($M=1.48$, $SD=0.48$) to post ($M=1.11$, $SD=0.72$); $t(27)=2.59$, $p<.05$.

The within-group effect sizes (Cohen's *d*) at post-treatment indicate large effects for trauma symptoms in MCT group (IES-*R* = 2.26, PDS = 2.35), TAU group (IES-R = 1.02, PDS = 1.13), and depression symptoms in both MCT group (BDI-II = 0.98) and TAU group (BDI-II = 0.92). Large effects were found for anxiety

symptoms within the MCT group (BAI = 1.04) and medium effect in the TAU group (BAI = 0.55). Large effects were found for interpersonal difficulties in the MCT group (IIP-64 = 0.82) and medium effect for TAU group (IIP-64 = 0.67).

ANCOVA was run to test for differences between MCT group and TAU group at post-treatment, while controlling for pre-treatment scores. The MCT group had improved more than TAU group in trauma symptoms measured with IES-R [F (1, 58) = 7.813, $p < .01$, $\eta_p^2 = 0.12$] and PDS [F (1, 58) = 8.077, $p < .01$, $\eta_p^2 = 0.12$] and showed large effect size. The MCT group had also improved more on anxiety symptoms measured with BAI [F (1, 58) = 5.536, $p < .05$, $\eta_p^2 = 0.09$] with medium effect size. No significant difference and low effect sizes were found between the MCT group and TAU group on depressive symptoms measured with BDI-II [F (1, 58) = 0.533, $p > .01$ $\eta_p^2 = 0.01$] and interpersonal difficulties measured with IIP-64 [F (1, 58) = 1.106, $p > .01$, $\eta_p^2 = 0.02$].

The between-group effect sizes (Cohen's d) at post-treatment were also computed using the pooled standard deviation and indicated large effects on trauma symptoms and medium effect on anxiety symptoms for the MCT group: IES-R: 0.70, PDS: 0.60, BDI-II: 0.26, BAI: 0.65 and IIP-64: 0.30.

In summary, the results showed that both groups had improved in trauma and anxiety symptoms, but the MCT group had improved more than the TAU group with respect to trauma and anxiety symptoms, but not for depression symptoms and interpersonal difficulties.

Clinically Significant Change

At post-treatment, IES-R-scores (Table 3) demonstrated that 53.13% of the patients in the MCT group met criteria for recovery compared to 28.57% in the TAU group. In the MCT group, 34.38% patients and 32.14% patients of TAU group were reliably improved at post-treatment. No change was observed in 12.50% of the patients in the MCT group and 28.57% patients in the TAU group. In the TAU group, 10.71% of the patients showed a reliable deterioration at post-treatment. A chi-square test

Table 3 Clinically significant change in IES-R for the MCT and TAU group ($N = 60$)

Pre-post					
IES-R	*N*	Recovered	Improved	No change	Deteriorated
MCT (MI)	32	17 (53.13%)	11 (34.38%)	4 (12.50%)	-
MCT (completers)	29	17 (58.62%)	8 (27.59%)	4 (13.79%)	-
TAU (MI)	28	8 (28.57%)	9 (32.14%)	8 (28.57%)	3 (10.71%)
TAU (completers)	25	8 (32.00%)	6 (24.00%)	8 (32.00%)	3 (12.00%)
All (MI)	60	25 (41.67%)	20 (33.33%)	12 (20.00%)	3 (5.00%)

Cut-off point 24, reliable change index 6 on the IES-R. *MCT (MI)* MCT group with multiple imputation, *TAU (MI)* treatment as usual with multiple imputation, *all* the total sample, *IES-R* impact of Event Scale-Revised

revealed a nonsignificant difference between treatment conditions and reliable change X^2 (3, $N = 60$) = 7.54, $p = .06$.

PDS scores (Table 4) demonstrated that 59.40% of the patients in the MCT group met criteria for recovery, compared with 35.70% of the patients in the TAU group. In MCT group, 18.80% had reliably improved and 21.40% in the TAU group at post-treatment. No change was observed for 21.90% of the patients in the MCT group and 39.30% in the TAU group. 3.60% of the patients in the TAU group showed deterioration post-treatment. A chi-square test revealed a nonsignificant difference between treatment conditions and reliable change X^2 (3, $N = 60$) = 4.435, $p = .218$.

Discussion

The present study aimed to examine the effect of MCT compared to exposure-based treatment approaches for PTSD in an ordinary outpatient setting. Patients receiving MCT and TAU improved, but those receiving MCT had fewer trauma and anxiety symptoms after treatment, but this was not the case for depressive symptoms and interpersonal difficulties. The results are consistent with earlier studies which report that exposure-based treatments and MCT contribute to reductions in trauma symptoms (Bradley et al., 2005; Seidler & Wagner, 2006; Powers et al., 2010; McLean & Foa, 2011; Cusack et al., 2016; Lewis et al., 2020; Wells & Sembi, 2004b; Wells et al., 2008, 2014; Wells & Colbear, 2012; Simons & Kursawe, 2019).

There was a larger proportion of recovery rates after treatment in the MCT group compared with the TAU group based on the level of trauma symptoms. Three of the patients in the TAU group reported deterioration measured by the IES-R, and one in the TAU group reported deterioration measured by PDS. No deterioration was reported in the MCT group. The use of exposure is a central component in the three treatments in TAU group, but similar with other psychological interventions; it can lead to dropout and failure to improve (Bradley et al., 2005; Schottenbauer et al., 2008; Imel et al., 2013; Lewis et al., 2020). Re-traumatization can occur because of inappropriate use of exposure, where strong emotional reactions and destructive coping attempts are activated, without

Table 4 Clinically significant change in PDS for the MCT and TAU group ($N = 60$)

Pre-post					
PDS	*N*	Recovered	Improved	No change	Deteriorated
MCT (MI)	32	19 (59.40%)	6 (18.80%)	7 (21.90%)	-
MCT (completers)	28	18 (64.30 %)	5 (17.90%)	5 (17.90%)	-
TAU (MI)	28	10 (35.70%)	6 (21.40%)	11 (39.30%)	1 (3.60%)
TAU (completers)	26	9 (34.60%)	5 (19.20%)	11 (42.30%)	1 (3.80%)
All (MI)	60	29 (48.30%)	12 (20.00%)	18 (30.00%)	1 (1.70%)

Cut-off point 12, reliable change index 10 on the PDS. *MCT (MI)* MCT group with multiple imputation, *TAU (MI)* treatment as usual with multiple imputation, *all* the total sample, *PDS* Posttraumatic Diagnostic Scale

the patient having methods to regulate these (Courtois, 1997). Although exposure-based treatments have the largest and strongest research evidence (Cusack et al., 2016), the results indicate that an effective treatment for PTSD may not require trauma-focused exposure-techniques, e.g., imaginal reliving or challenging thoughts and beliefs about trauma. The current study indicates that there may be a non-exposure-based alternative, founded on a well-supported theory of what maintain mental disorders, including PTSD (Wells & Matthews, 1994; Wells, 2009). Alternative interventions based on MCT theory could be learning how to respond to negative thoughts by challenging negative metacognitive beliefs, practice detached mindfulness, postponement of worry and rumination, and alter threat monitoring.

The MCT group showed a significant reduction on trauma and anxiety symptoms, compared to the TAU group. The results indicate that MCT not only reduce symptoms related to the primary diagnosis but also comorbid disorders. MCT build on a transdiagnostic treatment approach (Wells, 2009) which means that there is a common underlying persistence thinking style that maintain psychological disturbance across disorders. A meta-analysis by Normann et al. (2014) found that MCT was more effective than CBT in treatment of anxiety and depression and resulted in larger change in negative metacognitive beliefs. A study by Johnson et al. (2017) found transdiagnostic MCT to be more effective than disorder-specific CBT from pre- to post-treatment in a sample of patients with comorbid anxiety disorders. Further, Hjemdal et al. (2017) found that patients who were treated with MCT for major depressive disorder also showed effect on anxiety symptoms and interpersonal difficulties. These results seem promising since there is a high comorbidity of other disorders in PTSD (Kessler et al., 1995; Sareen et al., 2007), especially depressive disorder (Shalev et al., 1998; Stander et al., 2014), and MCT could contribute to reduction of comorbid disorders.

There are some potential limitations regarding the design of the study that need to be addressed. No formal measures of adherence or treatment fidelity were implemented as this was a preliminary comparative study in an ordinary treatment setting. All the participants had received some form of earlier treatment or medication for their condition, but the specific type and length of treatment were unfortunately not controlled for. There is a high comorbidity of other disorders in PTSD and many of the patients also have a comorbid depressive disorder. The treatments used in the study were primarily adapted to patients with PTSD and did not necessarily address underlying factors of depressive symptoms and interpersonal difficulties. There were only two points of measurement (pre- to post-treatment) with no follow-up. It is necessary with further evaluation to conduct larger randomized controlled trials with a follow-up that could give indications of whether improvement was maintained across time. One group consisted of one treatment while the other group consisted of three treatments. This may have affected that one group could be more exposed to confounding variables since it includes three different treatments. An alternative could be to compare MCT to one treatment, for example EMDR or CBT. Nevertheless, the study provides indications of the outcome of MCT for PTSD in an ordinary clinical setting, which has generated results that indicate a need for further exploration and testing.

Conclusion

In the current comparison from pre- to post-treatment, MCT showed a better outcome on self-reported measures of trauma and anxiety symptoms. It was also associated with higher recovery rates after treatment and appeared to be well tolerated, indicated by patient reports and no deterioration after treatment. MCT may be an alternative option for treatment for trauma patients and may be particularly relevant for groups who refuse to work with exposure-based techniques, or those that cannot tolerate exposure or do not benefit from it. Further investigation is needed to enhance understanding of the comparative effects and mechanisms in PTSD and especially investigation the role of CAS and metacognitive beliefs in the treatment of PTSD.

Acknowledgements We wish to thank the individuals who participated and the specialist outpatient clinic for contributing to this study.

Author Contribution JN, OH and HMN contributed to the study design and data collection. JN and OH conducted the statistical analysis. JN, OH, SUJ and HMN interpreted the data and drafted the manuscript. All authors read and approved the final manuscript.

Funding Open access funding provided by NTNU Norwegian University of Science and Technology (incl St. Olavs Hospital - Trondheim University Hospital)

Data Availability The datasets used and analyzed during this study are available from the corresponding author on reasonable request.

Declarations

Consent to Participate Following referral to the clinical service for PTSD, all patients were contacted offering them an appointment to attend an initial psychological assessment interview with a view to participating in the treatment of PTSD. They were also provided information about the service and offered consent forms to participate.

Conflict of Interest The authors declare no competing interests.

References

Alden, L. E., Wiggins, J. S., & Pincus, A. L. (1990). Construction of circumplex scales the inventory of interpersonal problems. *Journal of Personality Assessment, 55*, 521–536. https://doi.org/10.1080/00223891.1990.9674088

American Psychological Association (2017). *Clinical practice guideline for the treatment of posttraumatic stress disorder* http://www.apa.org/about/offices/directorates/guidelines/clinical-practice.aspx

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders*. DSM-IV). American Psychiatric Association.

Beck, C. T. (2011). Secondary traumatic stress in nurses: A systematic review. *Archives of Psychiatric Nursing, 25*, 1–10. https://doi.org/10.1016/j.apnu.2010.05.005

Beck, A. T., Steer, R. A., & Carbin, M. G. (1988a). Psychometric properties of the Beck depression inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8*(1), 77–100. https://doi.org/10.1016/0272-7358(88)90050-5

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988b). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology, 56*(6), 893–897. https://doi.org/10.1037/0022-006X.56.6.893

Beck, A. T., Steer, R., A., & Brown, G. K. (1996). *Manual for the Beck Depression Inventory-II* (2nd ed.). Psychological Corporation.

Becker, C. B., Zayfert, C., & Anderson, E. (2004). A survey of psychologists' attitudes towards and utilization of exposure therapy for PTSD. *Behaviour Research and Therapy, 42*(3), 277–292. https://doi.org/10.1016/S0005-7967(03)00138-4

Bradley, R., Greene, J., Russ, E., Dutra, L., & Westen, D. (2005). A multidimensional meta-analysis of psychotherapy for PTSD. *The American Journal of Psychiatry, 162*(2), 214–227. https://doi.org/10.1176/appi.ajp.162.2.214

Bride, B. E. (2007). Prevalence of secondary traumatic stress among social workers. *National Association of Social Workers, 52*(1), 63–70. https://doi.org/10.1093/sw/52.1.63

Brown, A. B., DiNardo, P. A., & Barlow, D. H. (1994). *Anxiety disorders interview schedule for DSM-IV*. Oxford University Press.

Cieslak, R., Shoji, K., Douglas, A., Melville, E., Luszczynska, A., & Benight, C. C. (2014). A meta-analysis of the relationship between job burnout and secondary traumatic stress among workers with indirect exposure to trauma. *Psychological Services, 11*(1), 75–86. https://doi.org/10.1037/a0033798

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed). Erlbaum.

Courtois, C. A. (1997). Healing the incest wound: A treatment update with attention to recovered-memory issues. *American Journal of Psychotherapy, 51*(4), 464–494. https://doi.org/10.1176/appi.psychotherapy.1997.51.4.464

Cusack, K., Daniel, E. J., Forneris, C. A., Wines, C., Sonis, J., Middleton, J. C., Feltner, C., Brownley, K. A., Olmsted, K. R., Greenblatt, A., Weil, A., & Gaynes, B. N. (2016). Psychological treatment for adults with posttraumatic stress disorder: A systematic review and meta-analysis. *Clinical Psychology Review, 43*, 128–141. https://doi.org/10.1016/j.cpr.2015.10.003

Edwards, B. C., Lambert, M. J., Moran, P. W., McCully, T., Smith, K. C., & Ellingson, A. G. (1984). A meta-analytic comparison of the Beck Depression Inventory and the Hamilton rating scale for depression as measures of treatment outcome. *The British Journal of Clinical Psychology, 23*, 93–99. https://doi.org/10.1111/j.2044-8260.1984.tb00632.x

Ehlers, A., Clark, D. M., Hackmann, A., McManus, F., & Fennell, M. (2005). Cognitive therapy for posttraumatic stress disorder: Development and evaluation. *Behaviour Research and Therapy, 43*(4), 413–431. https://doi.org/10.1016/j.brat.2004.03.006

Foa, E. B., Cashman, L., Jaycox, L., & Perry, K. (1997). The validation of a self-report measure of posttraumatic stress disorder: The posttraumatic diagnostic scale (PDS). *Psychological Assessment, 9*(4), 445–451. https://doi.org/10.1037/1040-3590.9.4.445

Foa, E. B., Hembree, E. A., Cahill, S. P., Rauch, S. A. M., Riggs, D. S., & Freeny, N. C. (2005). Randomized trial of prolonged exposure for posttraumatic stress disorder with and without cognitive restructuring: Outcome at academic and community clinics. *Journal of Consulting and Clinical Psychology, 73*(5), 953–964. https://doi.org/10.1037/0022-006X.73.5.953

Fydrich, T., Dowdall, D., & Chambless, D. L. (1992). Reliability and validity of the Beck Anxiety Inventory. *Journal of Anxiety Disorders, 6*(1), 55–61. https://doi.org/10.1016/0887-6185(92)90026-4

Graham, J. W., Olchowski, A. E., & Gilreath, T. D. (2007). How many imputations are really needed? Some practical clarifications of multiple imputation theory. *Prevention Science, 8*, 206–213. https://doi.org/10.1007/s11121-007-0070-9

Hjemdal, O., Hagen, R., Solem, S., Nordahl, H., Kennair, L. E. O., Ryum, T., Nordahl, H. M., & Wells, A. (2017). Metacognitive therapy in major depression: An open trial of comorbid cases. *Cognitive and Behavioral Practice, 24*(3), 312–318. https://doi.org/10.1016/j.cbpra.2016.06.006

Horowitz, L. M., Rosenberg, S. E., Baer, B. A., Ureño, G., & Villaseñor, V. S. (1988). Inventory of interpersonal problems: Psychometric properties and clinical applications. *Journal of Consulting and Clinical Psychology, 56*(6), 885–892. https://doi.org/10.1037/0022-006X.56.6.885

Imel, Z. E., Laska, K., Jakupcak, M., & Simpson, T. L. (2013). Meta-analysis of dropout in treatments for posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 81*(3), 394–404. https://doi.org/10.1037/a0031474

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology, 59*(1), 12–19. https://doi.org/10.1037/0022-006X.59.1.12

Johnson, S. U., Hoffart, A., Nordahl, H. M., & Wampold, B. E. (2017). Metacognitive therapy versus disorder-specific CBT for comorbid anxiety disorders: A randomized controlled trial. *Journal of Anxiety Disorders, 50*, 103–112. https://doi.org/10.1016/j.janxdis.2017.06.004

Joseph, S. (2000). Psychometric evaluation of Horowitz´s impact of event scale: A review. *Journal of Traumatic Stress, 13*(1), 101–103. https://doi.org/10.1023/A:1007777032063

Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the national comorbidity survey. *Archives of General Psychiatry, 52*(12), 1048–1060. https://doi.org/10.1001/archpsyc.1995.03950240066012

Landin-Romero, R., Moreno-Alcazar, A., Pagani, M., & Amann, B. L. (2018). How does eye movement desensitization and reprocessing therapy work? A systematic review on suggested mechanisms of action. *Frontiers in Psychology*, *9*(1395). https://doi.org/10.3389/fpsyg.2018.01395

Lewis, C., Roberts, N. P., Gibson, S., & Bisson, J. I. (2020). Dropout from psychological therapies for post-traumatic stress disorder (PTSD) in adults: Systematic review and meta-analysis. *European Journal of Psychotraumatology*, *11*(1). https://doi.org/10.1080/20008198.2019.1709709

Markowitz, J. C., Petkova, E., Neria, Y., Van Meter, P. E., Zaho, Y., Hembree, E., & Marshall, R. D. (2015). Is exposure necessary? A randomized clinical trial of interpersonal psychotherapy for PTSD. *The American Journal of Psychiatry, 172*(5), 430–440. https://doi.org/10.1176/appi.ajp.2014.14070908

Marks, I., Lovell, K., Noshirvani, H., Livanou, M., & Thrasher, S. (1998). Treatment of post-traumatic stress disorder by exposure and/or cognition restructuring – a-controlled study. *Archives of General Psychiatry, 55*(4), 317–325. https://doi.org/10.1001/archpsyc.55.4.317

McLean, C. P., & Foa, E. B. (2011). Prolonged exposure therapy for post-traumatic stress disorder: A review of evidence and dissemination. *Expert Review of Neurotherapeutics, 11*(8), 1151–1163. https://doi.org/10.1586/ern.11.94

National Institute for Health and Care Excellence (NICE) (2018). *Psychological interventions for the treatment of PTSD in adults* https://www.nice.org.uk/guidance/ng116/resources/posttraumatic-stress-disorder-pdf-66141601777861

Normann, N., Emmerik, A. A., & Morina, N. (2014). The efficacy of metacognitive therapy for anxiety and depression: A meta-analytic review. *Depression and Anxiety, 31*(5), 402–411. https://doi.org/10.1002/da.22273

Phoenix Australia (2021). *The Australian Guidelines for the prevention and treatment of acute stress disorder, posttraumatic stress disorder (PTSD).* https://www.phoenixaustralia.org/wp-content/uploads/2022/11/PTSD-Guidelines-Chapter-6-Treatment-recommendations.pdf

Powers, M. B., Halpern, J. M., Ferenschak, M. P., Gillihan, S. J., & Foa, E. B. (2010). A meta-analytic review of prolonged exposure for posttraumatic stress disorder. *Clinical Psychology Review, 30*(6), 635–641. https://doi.org/10.1016/j.cpr.2010.04.007

Sareen, J., Cox, B. J., Stein, M. B., Afifi, T. O., Fleet, C., & Asmundson, G. J. G. (2007). Physical and mental comorbidity, disability, and suicidal behavior associated with posttraumatic stress disorder in a large community sample. *Psychosomatic Medicine, 69*(3), 242–248. https://doi.org/10.1097/PSY.0b013e31803146d8

Schottenbauer, M. A., Glass, C. R., Arnkoff, D. B., Tendick, V., & Gray, S. H. (2008). Nonresponse and dropout rates in outcome studies on PTSD: Review and methodological considerations. *Psychiatry-Interpersonal and Biological Processes, 71*(2), 134–168. https://doi.org/10.1521/psyc.2008.71.2.134

Seidler, G. H., & Wagner, F. E. (2006). Comparing the efficacy of emdr and trauma-focused cognitive-behavioral therapy in the treatment of PTSD: A meta-analytic study. *Psychological Medicine, 36*(11), 1515–1522. https://doi.org/10.1017/S0033291706007963

Shalev, A. Y., Freedman, S., Peri, T., Brandes, D., Sahar, T., Orr, S. P., & Pitman, R. K. (1998). Prospective study of posttraumatic stress disorder and depression following trauma. *The American Journal of Psychiatry, 155*(5), 630–637. https://doi.org/10.1176/ajp.155.5.630

Shapiro, F. (2017). *Eye movement desensitization and reprocessing: Basic principles, protocols, and procedures* (3nd ed.). Guilford Press.

Simons, M., & Kursawe, A. L. (2019). Metacognitive therapy for posttraumatic stress disorder in youth: A feasibility study. *Frontiers in Psychology, 264*(10). https://doi.org/10.3389/fpsyg.2019.00264

Stamm, B. H. (1999). *Secondary traumatic stress. Self-care issues for clinicians, researchers & educators* (2nd ed.). Sidran.

Stander, V. A., Thomsen, C. J., & Highfill-McRoy, R. M. (2014). Etiology of depression comorbidity in combat-related PTSD: A review of the literature. *Clinical Psychology Review, 34*(2), 87–98. https://doi.org/10.1016/j.cpr.2013.12.002

Tarrier, N., Sommerfield, C., Pilgrim, H., & Humphreys, L. (1999). Cognitive therapy or imaginal exposure in the treatment of post-traumatic stress disorder. Twelve-month follow-up. *British Journal of Psychiatry*, *175*(6). https://doi.org/10.1192/bjp.175.6.571

Watts, B. V., Schnurr, P. P., Mayo, L., Young-Xu, Y., Weeks, W. B., & Friedman, M. (2013). Meta-analysis of the efficacy of treatments for posttraumatic stress disorder. *The Journal of Clinical Psychiatry, 74*(6), 541–550. https://doi.org/10.4088/jcp.12r08225

Weiss, D. S., & Marmar, C. R. (1997). The impact of event scale. In J. P. Wilson, & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (pp. 399–411). Guilford Press.

Wells, A. (2009). *Metacognitive therapy for anxiety and depression*. Guilford Press.

Wells, A., & Colbear, J. S. (2012). Treating posttraumatic stress disorder with metacognitive therapy: A preliminary controlled trial. *Journal of Clinical Psychology, 68*(4), 373–381. https://doi.org/10.1002/jclp.20871

Wells, A., & Matthews, G. (1994). *Attention and emotion: A clinical perspective*. Erlbaum.

Wells, A., & Sembi, S. (2004a). Metacognitive therapy for PTSD: A core treatment manual. *Cognitive and Behavioral Practice, 11*(4), 365–377. https://doi.org/10.1016/S1077-7229(04)80053-1

Wells, A., & Sembi, S. (2004b). Metacognitive therapy for PTSD: A preliminary investigation of a new brief treatment. *Journal of Behavior Therapy and Experimental Psychiatry, 35*(4), 307–318. https://doi.org/10.1016/j.jbtep.2004.07.001

Wells, A., Welford, M., Fraser, J., King, P., Mendel, E., Wisley, J., & Rees, D. (2008). Chronic PTSD treated with metacognitive therapy: An open trial. *Cognitive and Behavioural Practice, 15*(1), 85–92. https://doi.org/10.1016/j.cbpra.2006.11.005

Wells, A., Walton, D., Lovell, K., & Proctor, D. (2014). Metacognitive therapy versus prolonged exposure in adults with chronic post-traumatic stress disorder: A parallel randomized controlled trial. *Cognitive Therapy and Research, 39*(1), 70–80. https://doi.org/10.1007/s10608-014-9636-6