The effectiveness of an intensive EMDR treatment program for PTSD and its effect on comorbid disorders: a pilot study

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Abstract

Research has shown that intensive, brief formats of exposure therapy and cognitive (behavioural) therapy for PTSD are well tolerated and effective. This pilot study examined the effectiveness of an intensive EMDR treatment program for PTSD, comorbid disorders and its effect on the level of psychological distress. Patients (n = 7) were hospitalised for five days, during which they received EMDR sessions twice a day, except for the first day on which they had one EMDR session. One week after the hospitalisation they received a follow-up EMDR session. PTSD symptoms were assessed with the CAPS-5 and the PCL-5. The MINI was used to assess comorbid disorders and psychological distress was assessed with the BSI. The CAPS-5, the PCL-5, the MINI and the BSI were administered before the treatment and two weeks after the hospitalisation. The PCL-5 was also administered at hospitalisation day one, hospitalisation day 5 and after the follow-up EMDR session, to monitor treatment progress. The results of this study show that the treatment program reduces all PTSD symptoms. On the PCL-5, patients report significantly less avoidance and arousal symptoms. The treatment also has an effect on comorbid depressive, anxiety and substance use disorders and it significantly reduces overall psychological distress, anxiety, hostility and psychoticism. This pilot study shows that an intensive EMDR treatment program can be an effective treatment for PTSD and comorbid disorders, but more research is needed.

1 Introduction

This pilot study examines the effectiveness of an intensive Eye Movement Desensitisation Reprocessing (EMDR) treatment for Post Traumatic Stress Disorder (PTSD) and comorbid disorders. This chapter starts with a description of what a PTSD is, based on the DSM 5 (paragraph 1.1). Thereafter, a recommended treatment for PTSD, EMDR, is described (paragraph 1.2). The third paragraph of this chapter is about trauma-Sensitive Yoga (TSY), which was also incorporated in the treatment program. Research on intensive treatment formats for PTSD is summarized in paragraph 1.4. The chapter concludes with an outline of the pilot study of intensive EMDR treatment for PTSD (paragraph 1.5).

1.1 Post traumatic stress disorder

In the mid-nineteenth century, psychiatrists and other physicians began to describe syndromes among combat veterans and civilians that cover many current PTSD symptoms and different theories about mechanisms through which traumatic stress might lead to PTSD were proposed (Van Der Kolk, Herron, & Hostetler, 2007). The DSM-I already had a diagnosis concerning traumatic stress and the initial appearance of the diagnosis PTSD was in the DSM-III. Since then, multiple revisions have been made, but the most extensive changes to the diagnosis are made in the last revision of the DSM, which led to the DSM 5.

The biggest change to the PTSD diagnosis in the DSM 5 is the move out of the anxiety disorders chapter, into the new trauma- and stressor-related disorders chapter in the DSM 5. Disorders in this chapter are defined as the onset or worsening of symptoms following a traumatic event. The diagnosis PTSD requires exposure to an event that involved or held the threat of death, violence or serious injury, in one of the following ways: directly experiencing the event, witnessing the event, learning about details of an event that happened to a close family member or close friend or experiencing repeated or extreme exposure to aversive details of a traumatic event (criterion A). Exposure through media does not meet criterion A, unless it is work related. Patients have to experience symptoms of the following symptom clusters, for more than a month (criterion F): intrusion symptoms (criterion B), persistent avoidance of stimuli associated with the traumatic event (criterion C), negative alterations in cognitions and mood (criterion D) and alterations in arousal and reactivity (criterion E). The diagnosis requires the presence of a minimum of one criterion B, one criterion C, two criterion D and two criterion E symptoms. Criterion G states that there should be significant symptom related distress or functional impairment and criterion H excludes the presence of

PTSD when the disturbances are due to medication, substance use or other illness (Miller, Mark, Wolf, Erika, Keane, & Terence, 2014).

Two PTSD subtypes were added to the DSM 5 (Friedman, 2013). Individuals who meet the PTSD criteria and also experience depersonalization and/or derealisation symptoms are diagnosed with the dissociative subtype. The addition of this subtype was based on multiple lines of research. Firstly, individuals with PTSD and dissociative symptoms show a different functional magnetic resonance imaging (fMRI) pattern; these patients have excessive prefrontal cortical activity associated with reduced activity in the amygdale, which is a reversal of the fMRI pattern that is usually seen with PTSD patients (lanius, Brand, Vermetten, Frewen, & Spiegel, 2012). Furthermore, recent research showed that symptom severity, chronicity, functional impairment and suicidality were worse among patients who also experience dissociative symptoms (Stein et al., 2013). Finally, research indicates that the optimal treatment differed for individuals with dissociative symptoms (Lanius et al., 2012). The second subtype that was added to the DSM 5 is the preschool subtype, which has separate diagnostic criteria. Research indicated that the diagnostic criteria for preschool children should be more behaviourally anchored and developmental sensitive to detect PTSD in this age group (Sheeringa, Seanah, & Cohen, 2011). This led to the inclusion of the preschool subtype, for children ages six years and younger (Friedman, 2013).

Another specification of PTSD in de DSM IV was 'PTSD with delayed onset'. This specification has been slightly altered to 'PTSD with delayed expression', because most individuals with this trajectory do experience immediate symptoms but do not meet the diagnosis of full PTSD until some later time. Patients are diagnosed with PTSD with delayed expression when the diagnostic threshold is not reached until six months after the traumatic event (Friedman, Resick, Bryant, & Brwin, 2011). The distinction between acute and chronic PTSD has been eliminated in the DSM 5 (Friedman, 2013).

1.2 Eye Movement Desensitisation Reprocessing

Clinical psychologist Francine Shapiro developed EMDR in the 1980s (Logie, 2014). In this therapy, unprocessed traumatic experiences that cause ongoing psychological disturbance are identified and patients are asked to focus on a disturbing image of the traumatic event, while simultaneously carrying out an external task, such as bilateral eye movements. EMDR is an evidence-based treatment for PTSD. According to the NICE guidelines (2005), all patients with PTSD should be offered trauma focused cognitive behaviour therapy or EMDR treatment.

The current theory about the working mechanism of EMDR concerns the use of a dual attention task. The recall of the traumatic event and the eye movements both use working memory capacity. Working memory capacity is limited and recalling a traumatic memory taxes the working memory resources because the memory is intense, vivid and emotionally charged. When a patient is simultaneously executing another task, there will be less resources available for the memory. As a consequence, there will be less memory resources for the vividness and emotionality of the memory and the memory will become less disturbing, vivid and emotionally charged (De Jongh, Ernst, Marques, & Hornsveld, 2013).

Recently, a meta-analysis was performed on the results of 26 Randomized Controlled Trials (RCT's) of EMDR treatment for PTSD, that were published between 1991 and 2013 (Chen et al., 2014). The outcome of this meta-analysis confirmed that EMDR treatment significantly reduces PTSD symptoms and, furthermore, it also significantly reduces symptoms of depression and anxiety and subjective distress. Since EMDR also impacts other psychological symptoms and disorders, different protocols have been developed for a wide variety of disorders (Logie, 2014). A RCT investigated the effectiveness of EMDR for boys with conduct problems. This study found that the EMDR treatment led to large and significant reductions of memory-related distress and problem behaviours. Non-randomized studies found that EMDR can be an effective therapy for patients with a borderline personality disorder, generalized anxiety disorder, bulimia nervosa, phobia and pain management. Case studies revealed positive effects of EMDR on depression as primary diagnosis, but this has not yet been investigated with a RCT. EMDR treatment does significantly reduce depression symptoms when it occurs comorbidly with PTSD. EMDR can also be used to treat obsessive compulsive disorder (OCD). In four case studies OCD was successfully treated with EMDR and a RCT showed that EMDR is more effective than medication. Finally, a pilot study demonstrated that EMDR is an effective and safe therapy for the treatment of PTSD in patients with a psychotic disorder. The treatment also had a positive effect on auditory verbal hallucinations, delusions, anxiety symptoms, depression symptoms and self-esteem (Logie, 2014). So the effectiveness of EMDR for PTSD is well established and there is also evidence that EMDR can have an effect on other psychological disorders.

1.3 Trauma-Sensitive Yoga

This pilot study of intensive EMDR treatment for PTSD is the first study in which patients receive EMDR sessions twice a day, which is a very intensive treatment format. Since there were concerns about the tolerability of such an intensive program, it was decided to

incorporate yoga in the treatment program. The last decade, there has been an increasing interest in the potential of yoga as a treatment for PTSD. Since yoga incorporates social interaction, physical activity and meditation, all of which are elements that are known to improve the course of PTSD, it makes sense that researchers have started investigating its potential for treating PTSD (Wynn, 2015). Also, research has demonstrated that yoga practices can improve the ability of PTSD patients to tolerate unpleasant feelings (Jindani et al., 2015). Therefore, it has a great potential as an adjunctive treatment, especially with intensive treatment programs like the one that is evaluated in this pilot study.

The practice of yoga consists of coordinated breathing, movement and meditation (Jeter, Slutsky, Sing, & Khalsa, 2015). Yoga is a varied practice and at this time, it is unclear which style of yoga is the best for patients with PTSD. The Trauma Centre at the Justice Resource Institute in Brookline, Massachusetts, developed trauma-sensitive yoga (TSY). This is a form of yoga that is customized to make it suitable for PTSD patients. The following aspects require special consideration in TSY: the environment, exercises, teacher qualities, assists and language. Firstly, patients should feel safe in the environment in which the yoga is practiced. Also, the exercises in the yoga sessions should be offered in a trauma-sensitive way, which means that patients should be offered multiple options for relaxation and postures. Important teacher qualities are: being present, positive, engaged, welcoming, approachable, competent with the yoga material, open for feedback and willing to make changes when things are not working. Physical assists are dissuaded, especially during the first months of TSY, but verbal assists can be valuable. Verbal assists can show that a teacher attends to the patient in a nurturing way, while at the same time respecting the physical space of the patient. Language is the final aspect that needs consideration. In TSY it is not about getting patients to do something. Instead, it is about inviting patients to try something. This is done with invitatory language, in which patients are invited to do something but are not required or pushed to do it (Emerson, Sharma, Chaudhry, & Turner, 2009).

Three studies investigated the effectiveness of TSY for PTSD. In the first pilot study, 16 women were randomly assigned to either an eight weeks TSY intervention or to a dialectical behaviour therapy group intervention. Self-report inventories measuring the severity of the PTSD symptoms, positive and negative affect and body awareness were used to compare the effects of the interventions. The participants in the yoga intervention group showed improvements on al measurements and the reduction in frequency of the PTSD symptoms and the severity of hyperarousal symptoms was greater than with the participants in the dialectical behaviour therapy group. Due to the small sample size, the results were not

significant, but yoga does appear to have positive effects for PTSD patients (Emerson, Sharma, Chaudhry, & Turner, 2009). Another pilot study investigated the feasibility of thirty minutes yoga after each 12 weekly group therapy session (Clark et al., 2014). A control group received typical psychotherapy. The efficacy of the yoga intervention could not be established, but the study did show that the yoga intervention can be administered without any adverse effects. Finally, a RCT investigated the effectiveness of TSY. In this study, 64 woman with chronic treatment resistant PTSD were randomly assigned to either 10 weeks of yoga or supportive health education. The yoga intervention significantly reduced the PTSD symptoms, with effect sizes comparable to evidence-based psychotherapeutic treatments and well-studied psychopharmacologic treatment (Van der Kolk et al., 2014). The results of these studies are promising, but cannot be generalized, since there has been only one RCT in which the effectiveness of TSY was investigated.

Given the fact that TSY was specifically developed for PTSD patients and the positive results concerning the feasibility and effectiveness of the intervention, this specific form of yoga was incorporated in the intensive EMDR treatment program.

1.4 Research on intensive treatment formats for PTSD

Psychological treatments for PTSD, such as EMDR, are usually delivered in weekly of biweekly sessions and it can take several months to treat the disorder. However, if this is the best format for treating PTSD can be questioned. Firstly, it can be a problem for patients who live far away from the treatment services and have to travel long distances (Stecker, Fortney, Hamilton, Sherbourne, & Ajzen, 2010). Secondly, PTSD has a large impact on the social and occupational functioning of patients (Bisson et al., 2007). Therefore it is desirable to make more rapid progress. Furthermore, it can be difficult for patients to commit to prolonged psychological treatment, which can lead to drop-out and non-compliance (Bisson et al., 2007).

Researchers have started to investigate the feasibility, acceptability and effectiveness of intensive brief psychological therapies for PTSD. A case study examined the effectiveness of intensive outpatient prolonged exposure for combat-related PTSD. After a period of two weeks, in which the patient received 10 full day outpatient sessions, she no longer met the diagnostic threshold for PTSD. This treatment result was maintained at the six months follow up (Blount, Cigrang, Foa, Ford, & Peterson, 2014). Hendriks, De Kleine, Van Rees, Bult en Van Minnen (2010) studied the feasibility of an brief intensive exposure programme for four PTSD patients with a history of childhood sexual abuse. Patients in this study experienced multiple (sexual) traumas during their childhood, had high comorbidity levels and high levels

of psychosocial stressors. The treatment programme consisted of individual sessions for five working days, with a mean of six hours of treatment a day and 24 of the 30 hours in total where dedicated to trauma processing. Patients stayed in a hotel during the night to limit interference of psychosocial stressors. The results of the treatment indicate substantially decrease of PTSD symptoms and the effect sizes were large. Moreover, patients showed no symptom worsening and none of the patients dropped out. Teng et al. (2015) examined the feasibility and effectiveness of an intensive weekend group treatment for veterans with a panic disorder and co-occurring PTSD. Patients received psycho education, cognitive restructuring and introspective exposure for six hours each day. All 10 patients completed the treatment program and the panic symptoms were significantly reduced at the end of the treatment, which was maintained at a seven month follow up. Also, a large effect size was observed for the reduction of PTSD symptoms. Ehlers et al. (2014) did a RCT of seven day intensive and standard weekly cognitive therapy and emotion-focused supportive therapy for chronic PTSD. Participants (n = 121) received seven days intensive cognitive therapy for PTSD, three months standard weekly cognitive therapy or three months weekly emotion-focused supportive therapy or were placed on a fourteen week waiting list. Changes in PTSD symptoms and diagnosis were measured with the Clinician Administered PTSD Scale (CAPS) and a self-report questionnaire. Secondary outcome measures were disability, anxiety, depression and quality of life. Intensive cognitive therapy for PTSD led to a faster decrease of PTSD symptoms and comparable overall outcomes as standard cognitive therapy. For both intensive as standard cognitive therapy, effect sizes for improvement of PTSD symptoms and disability were very large and effect sizes for anxiety, depression and quality of life were large. Symptom deterioration ratings were low in both the intensive and standard cognitive therapy condition. Drop-out rates were the same in the intensive and standard format of cognitive therapy, as well as low. The results of this study suggest that intensive cognitive therapy is as effective as standard cognitive therapy, can achieve faster symptom reduction and is well tolerated.

The outcomes of the described studies of intensive therapies for PTSD are positive. The treatment programs were well tolerated and resulted in a (significant) reduction of PTSD symptoms. Intensive, brief treatment can even be as effective as standard therapy, with a faster symptom reduction. Since research has shown that intensive formats of other therapies for PTSD are well tolerated and effective, it makes sense to also examine the effectiveness of intensive EMDR treatment.

1.5 A pilot study of intensive EMDR

A non-randomized, uncontrolled, evaluative pilot study will investigate the effectiveness of an intensive EMDR inpatient treatment program. The research will take place in the national treatment and expertise centre for psychological trauma in the Netherlands: 'Stichting Centrum 45'. This paper will focus on the effectiveness of the intensive EMDR inpatient treatment program for reducing the PTSD symptoms and the effects of the treatment on psychological distress and comorbid disorders. The following research questions will be answered:

Is an intensive, inpatient EMDR treatment program effective for PTSD? To answer this research question, the following hypotheses will be tested:

1) Patients total score on the Clinician Administered PSTD Scale (CAPS-5) two weeks after the intensive EMDR treatment program is significantly lower than their total score on the CAPS-5 before the intensive EMDR treatment program.
    a) Patients score on the subscale re-experiencing of the CAPS-5 two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale re-experiencing of the CAPS-5 before the intensive EMDR treatment program.
    b) Patients score on the subscale avoidance of the CAPS-5 two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale avoidance of the CAPS-5 before the intensive EMDR treatment program.
    c) Patients score on the subscale negative cognitions and mood of the CAPS-5 two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale negative cognitions and mood of the CAPS-5 before the intensive EMDR treatment program.
    d) Patients score on the subscale arousal of the CAPS-5 two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale arousal of the CAPS-5 before the intensive EMDR treatment program.
2) Patients total score on the PTSD Checklist for DSM-5 (PCL-5) after the last EMDR session is significantly lower than their total score on the PCL-5 before the intensive EMDR treatment program.
    a) Patients score on the subscale re-experiencing of the PCL-5 after the last EMDR session is significantly lower than their score on the subscale re-experiencing of the PCL-5 before the intensive EMDR treatment program.

b) Patients score on the subscale avoidance of the PCL-5 after the last EMDR session is significantly lower than their score on the subscale avoidance of the PCL-5 before the intensive EMDR treatment program.
c) Patients score on the subscale negative cognitions and mood of the PCL-5 after the last EMDR session is significantly lower than their score on the subscale negative cognitions and mood of the PCL-5 before the intensive EMDR treatment program.
d) Patients score on the subscale arousal of the PCL-5 after the last EMDR session is significantly lower than their score on the subscale arousal of the PCL-5 before the intensive EMDR treatment program.

3) Patients total score on the PCL-5 two weeks after the intensive EMDR treatment program is significantly lower than their total score on the PCL-5 before the intensive EMDR treatment program.
   a) Patients score on the subscale re-experiencing of the PCL-5 two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale re-experiencing of the PCL-5 before the intensive EMDR treatment program.
   b) Patients score on the subscale avoidance of the PCL-5 two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale avoidance of the PCL-5 before the intensive EMDR treatment program.
   c) Patients score on the subscale negative cognitions and mood of the PCL-5 two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale negative cognitions and mood of the PCL-5 before the intensive EMDR treatment program.
   d) Patients score on the subscale arousal of the PCL-5 two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale arousal of the PCL-5 before the intensive EMDR treatment program.

Is an intensive, inpatient EMDR treatment program effective for comorbid disorders? To answer this research question, the following hypothesis will be tested:

4) Patients who were diagnosed with a comorbid disorder will no longer meet the diagnostic criteria for a comorbid disorder after the intensive EMDR treatment program, according to the Mini International Neuropsychiatric Interview (MINI).

Does an intensive, inpatient EMDR treatment program result in a decrease of psychological distress? To answer this research question, the following hypotheses will be tested:

5) Patients score on the Global Severity Index (GSI) of the Brief Symptom Inventory (BSI) two weeks after the intensive EMDR treatment program is significantly lower than their score on the GSI of the BSI before the intensive EMDR treatment program.
    a) Patients score on the subscale somatisation of the BSI two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale somatisation before the intensive EMDR treatment program.
    b) Patients score on the subscale obsessive-compulsive of the BSI two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale obsessive-compulsive before the intensive EMDR treatment program.
    c) Patients score on the subscale interpersonal sensitivity of the BSI two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale interpersonal sensitivity before the intensive EMDR treatment program.
    d) Patients score on the subscale depression of the BSI two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale depression before the intensive EMDR treatment program.
    e) Patients score on the subscale anxiety of the BSI two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale anxiety before the intensive EMDR treatment program.
    f) Patients score on the subscale hostility of the BSI two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale hostility before the intensive EMDR treatment program.
    g) Patients score on the subscale phobic anxiety of the BSI two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale phobic anxiety before the intensive EMDR treatment program.
    h) Patients score on the subscale paranoid ideation of the BSI two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale paranoid ideation before the intensive EMDR treatment program.
    i) Patients score on the subscale psychoticism of the BSI two weeks after the intensive EMDR treatment program is significantly lower than their score on the subscale psychoticism before the intensive EMDR treatment program.

2 Method

This chapter describes the method of the pilot study. Characteristics of the participants (paragraph 2.1), the research design (paragraph 2.2), the procedure of the study (paragraph 2.3), the interviews and questionnaires that are used to test the hypotheses of this paper (paragraph 2.4) and the statistical analysis (paragraph 2.5) are described.

2.1 Participants

A sample of seven patients participated in this study. Patients of whom the intaker of Centrum 45 judged as suitable for the intensive EMDR treatment, were referred to this pilot study. Participants were screened for PTSD with the Life Events Checklist for DSM-5 (LEC-5), CAPS-5 and the PCL-5. Also, the BSI was used to assess psychological distress. Furthermore, patients were assessed on the Mini International Neuropsychiatric (MINI) to investigate whether intensive EMDR treatment is also suitable for patients with comorbid disorders. Inclusion criteria were: patients are diagnosed with PTSD according to the CAPS-5, patients are motivated for brief inpatient treatment, patients have a relapse prevention plan and patients have a therapist for the follow-up treatment. Exclusion criteria were: non-Dutch speaking, acute suicidality, severe psychotic symptoms and severe substance dependency.

2.2 Research design

This study has a case series design. There was a baseline measurement before admission to the clinic. Participants were assessed on the Life Event Checklist for DSM-5 (LEC-5), CAPS-5, Mini International Neuropsychiatric (MINI), BSI, and PCL-5.

During the hospitalization, patients had to fill in a visual analogue scale (VAS) after every EMDR session, to monitor tolerability, suicidality and dissociation. On the first day and the last day of the hospitalization, patients were tested on the PCL-5. After the follow up session a week after the hospitalization, patients were assessed on the VAS and PCL-5. Finally, patients were tested one week after the follow up session on the CAPS-5, MINI, BSI, and PCL-5. In figure 1, the procedure of the pilot study, including the assessment time points, is graphically displayed.

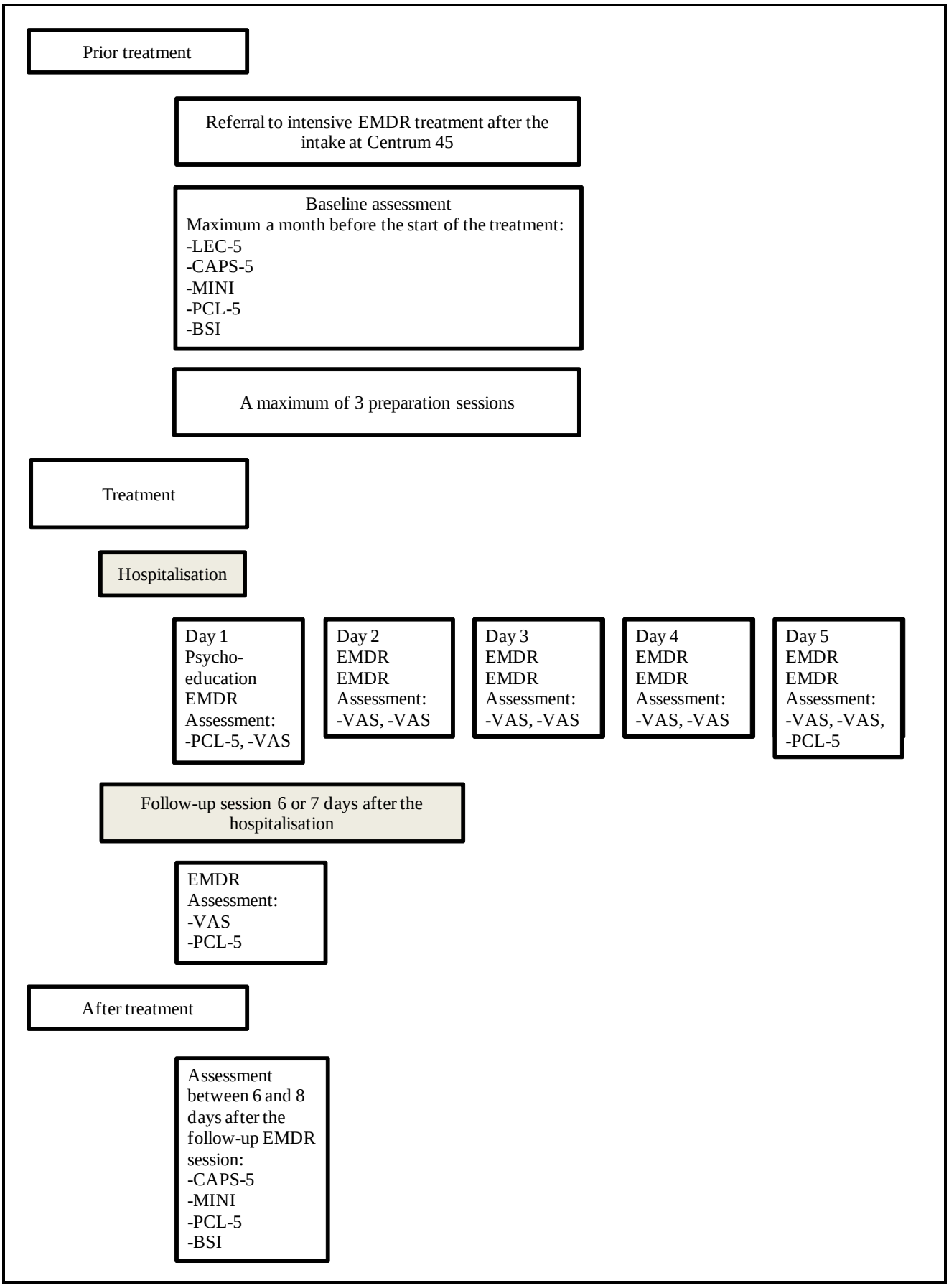

Figure 1. Graphic display of the procedure of the pilot study.

2.3 Procedure

Prior to the inpatient treatment, patients had a maximum of three preparation sessions in which a treatment plan was jointly drawn up by therapist and patient, a relapse prevention plan was made and patients received psycho-education about PTSD, EMDR, stabilization techniques and the rationale behind the treatment program. Together with the therapist, patients selected three to five traumatic memories to be processed during the EMDR sessions and lastly, patients were shown the clinic of Centrum 45. On the first day of the hospitalization, patients received psycho-education about PTSD and EMDR and, together with their therapist, they discussed the treatment plan and the order of the traumatic memories to be processed. At midday, patients had their first EMDR session. The other four days of the hospitalization, patients had EMDR sessions twice a day. The duration of EMDR sessions was 90 minutes. Patients also received TSY for one hour every day and were encouraged to fill in their free time with going on walks and exercising. One week after the inpatient treatment, patients received a final follow-up EMDR session.

2.4 Tests

In order to answer the research questions of this study, a number of interviews and self-report questionnaires were used. The Life Event Checklist for DSM-5 (LEC-5) was used to assess exposure to traumatic events (paragraph 2.4.1). The CAPS-5 and the PCL-5 were used to answer the first research question: is an intensive, inpatient EMDR treatment program effective for PTSD? (paragraph 2.4.2 en paragraph 2.4.3). The MINI was used to answer the second research question: is an intensive, inpatient EMDR treatment program effective for comorbid disorders? (paragraph 2.4.4). The BSI was used to answer the third research question: Does an intensive, inpatient EMDR treatment program result in a decrease of psychological distress (paragraph 2.4.5).

2.4.1 The LEC-5

The LEC-5 assesses exposure to traumatic events. There are three formats in which the LEC-5 can be administered: as a standard self-report to determine if a traumatic event occurred, as an extended self-report to identify the worst event and as an interview to determine if criterion A is met. It is recommended to administer the LEC-5 before the CAPS-5, to establish if criterion A is met. In this pilot study, the LEC-5 was administered at the baseline assessment as an interview before the CAPS-5. The LEC-5 consists of 17 items. The first 16 items represent 16 events that can result in PTSD and the last item assesses any other stressful event that was not

yet assessed in the prior items. Possible responses to an item, for example a natural disaster, are: happened to me, witnessed it, learned about it, part of my job, not sure or no exposure to the event.

The previous LEC for DSM-IV demonstrated good psychometric properties. Gray, Litz , Hsu and Lombardo (2004) describe two studies in which the psychometric properties of the LEC are investigated. The first study compared the LEC to the Traumatic Life Events Questionnaire (TLEQ), a questionnaire of which the psychometric quality is well established, in a college undergraduates sample (n = 108). With regard to the reliability of the LEC when it is used as a measure of direct trauma exposure, all item kappas were above .50 and only one item had a kappa lower than .40. The mean kappa was .61 and the retest correlation was r = .82. The low reliability that was found for some of the items is attributable to low base rates of those events. The reliability of the items is lower when all indirect exposure response options were included, but even then 12 of the 17 items achieved a kappa of .40 or higher. The total score correlation between the LEC and the TLEQ was r = .55. The correlation with related symptom measures (the modified PTSD symptom scale and the PTSD checklist) was similar for the LEC and the TLEQ, both having Pearson r coefficients ranging from .34 and .48. In the second study that is described, the correlations between the LEC and measures of psychopathology that is associated with exposure to trauma were investigated in a clinical sample of combat veterans (n =131). This study found that the LEC was significantly related, in the predicted direction, to the PCL-M (r = -.43), the CAPS (r = -.39) and the Mississippi Scale (r = -.33). When the LEC was revised, two changes were made in the questionnaire: item 15 is now named "sudden accidental deaths" instead of "sudden, unexpected death of someone close to you" and "part of my job" was added as possible response category. Since the difference between the LEC and the LEC-5 are minimal, the psychometric properties are expected to be the same ("Life Events Checklist for DSM-5 (LEC-5)", n.d.).

2.4.2 The CAPS-5

The CAPS is the standard criterion measure for diagnosing and measuring the severity of PTSD (Pupo et al., 2011). In response to changes in diagnostic criteria of PTSD, the CAPS has been revised several times. In this study the CAPS-5 was used, which was developed in response to the publication of the DSM-5. The CAPS-5 contains 30 items that are rated on a 5-point likert-type scale, ranging from zero (absent) to four (extremely). It assesses the twenty DSM-5 PTSD symptoms and in addition to that, there are also questions about the onset and duration of symptoms, subjective distress, the effect of PTSD symptoms on social and

occupational functioning, response validity, overall PTSD severity, improvement of symptoms since a previous administration and dissociative symptoms. There are three versions of the CAPS-5: the past week version to assess PTSD symptoms over the past week, the past month version to make a current diagnosis of PTSD and the worst month version to make a lifetime PTSD diagnosis. In this pilot study, the past month version was used to assess the PTSD symptoms before the intensive treatment program and to make a current PTSD diagnosis and the past week version was used to assess the PTSD symptoms the week after the intensive treatment program ("Clinically-Administered PTSD Scale for DSM-5", n.d.).

Weathers, Keane and Davidson (2001) reviewed the first ten years of research that has been done on the psychometric properties of the CAPS. Researchers have investigated the psychometric properties of the CAPS across a wide variety of trauma populations: combat veterans, resistance veterans, concentration camp survivors, older combat veterans, Vietnam veterans, military personnel with mixed military and civilian trauma exposure and motor vehicle accident victims. Weathers et al. (2001) found that the CAPS has excellent reliability, with interrater reliability scores of .90 or higher and test-retest reliability scores between .86 and 1.00. Internal consistency is high, with alphas between .80 and .90. The found convergent validity of the CAPS is also good in these studies, with correlations at the .70 level and above. Research on discriminant validity is difficult, because depression and anxiety conceptually overlap with PTSD. Weathers et al. (1999) found correlations between CAPS total severity and measures of depression and anxiety in the range of .61 and .76, but when controlling for the effects of nonspecific distress, the correlations are in the range of .37 and .55. When measures of antisocial personality disorder were used, which is a construct that is conceptually unrelated to PTSD, weaker correlations with the CAPS total severity are found (between .14 and .33) and after controlling for the effects of nonspecific distress, the correlations are almost zero (between -.05 and .02). So there is some evidence for discriminant validity, but more research is needed. The diagnostic utility of the CAPS is high, with sensitivities and specificities above .80 and kappas above .70. The results of these studies indicate that the psychometric properties of the CAPS are adequate.

2.4.3 The PCL-5

The PCL is the most commonly used self-report questionnaire for PTSD. More than twenty validation studies in a wide range of populations found that the reliability and validity of the self-report questionnaire is generally good (McDonald & Calhoun, 2010). When it is used in combination with a diagnostic interview, the PCL is an effective method to identify PTSD

(Schlenger, Jordan, Caddell, Ebert, & Fairbank, 20014). The PCL has been revised several times in response to changes in diagnostic criteria of PTSD. In this pilot study the PCL-5 was used, which was developed in response to the publication of the DSM-5. The PCL-5 contains twenty items that correspond with the twenty DSM-5 PTSD symptoms. Respondents have to rate the degree in which they experienced PTSD symptoms in the past month on a 5-point likert scale, ranging from one (not at all) to five (extremely). There are multiple ways to interpret PCL-5 scores of patients. Firstly, a total symptom severity score can be obtained and a cut off point of 33 can be used. Also, PTSD can be diagnosed. Each item that is rated as 2 or higher is treated as a symptom endorsed and a PTSD diagnosis can be made when the diagnostic rule of the DSM-5 is met. Finally, the PCL-5 can be used to monitor patient progress: for the PCL for the DSM-IV a change of five points was the minimum threshold to determine that a patient has responded to treatment and a change of ten points was the minimum threshold to determine that the improvement is clinically significant. It is expected that the change scores for the PCL-5 will be in the similar range ("PTSD checklist for DSM-5 (PCL-5)", n.d.).

Since the PCL-5 is recently developed, there has not been much research done on the psychometric properties of the diagnostic instrument. Two studies investigated the psychometric properties of the PCL-5 in a trauma-exposed college student population (Blevins, Weathers, Davis, Witte, & Domino, 2015). Study one (N = 278) found strong internal consistency (α = .94), test-retest reliability (r = .82), convergent validity (rs = .74 to .85) and discriminant validity (rs = .31 to .60). Study two (N = 558) also found high internal consistency (α = .95) and demonstrated similarly strong reliability and validity as the researchers found in study one. The results of these studies indicate that the psychometric properties of the PCL-5 are adequate (Blevins et al., 2015).

2.4.4 The MINI

The MINI is a short diagnostic structured interview that is used to diagnose the DSM mental disorders. The reliability and validity of the MINI are well established (Lecrubier et al., 1997; Sheehan et al., 1997). Good validity and reliability was demonstrated in a study that investigated the validity and reliability of the MINI according to the Composite International Diagnostic Interview (CIDI) (Lecrubier et al., 1997). The specificity of the MINI was adequate, ranging from .72 to .97. The lowest sensitivity was found for simple phobia and agoraphobia (.46 and .59) and the highest sensitivity was found for depressive episode (.94). Inter-rater reliability was good (ranging from .88 and 1.00) and test-retest reliability was also

high (kappa coefficients between .76 and .93). A study that investigated the validity and reliability of the MINI according to the Structured Clinical Interview for DSM-III-R (SCID) (Sheehan et al., 1997) also found high specificity (between .86 and 1.00). The lowest sensitivity was found for current drug dependence and obsessive compulsive disorder (.45 and .62) and the highest sensitivity was found for major depressive disorder (.96). Excellent inter-rater reliability was found, with kappa values ranging from .81 to 1.00. Test-retest reliability was also good for most diagnoses: sixteen out of 23 diagnoses had a test-retest reliability above .70 and only two diagnoses (current mania and lifetime simple phobia) had a test-retest reliability lower than .60. Since the MINI for the DSM-5 is not yet available, the MINI Dutch Version 5.0.0 for the DSM IV was used in this pilot study.

2.4.5 The BSI

The BSI is a shortened version of the Symptom Checklist 90-R. It is a self-report measurement of the subjective burden of having a mental illness. Respondents have to rate the intensity of distress that they have experienced during the past seven days on a 5-point Likert scale, ranging from zero (not at all) to four (extremely). The BSI measures nine primary symptom constructs: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. The BSI also has three global indices of distress: the GSI score embodies the information about the number and the intensity of the symptoms, the Positive Symptom Distress Index (PSDI) is a measurement of the intensity of the symptoms and the Positive Symptom Total (PST) is a measurement of the number of symptoms (Derogatis & Melisaratos, 1983). In this pilot study, patients score on the GSI and the subscales after the treatment were compared to their score on the GSI and the subscales prior the treatment.

Studies investigating the psychometric properties of the BSI have found that it has good reliability and validity (Derogatis, 1975; Boulet & Boss, 1991). The internal consistency is high. The lowest found alpha is for the subscale psychoticism ($\alpha = .71$) and the highest found alpha is for the GSI score($\alpha = .96$). Test-retest reliability is also good, ranging from .71 (for the somatisation subscale) to .90 (for the GSI score). Convergent validity for the BSI is high (*rs* = .72 to .82). The value of the depression subscale to detect a depressive disorder is acceptable (sensitivity = .80 and specificity = .72). The value of the phobic anxiety subscale, somatisation subscale and anxiety subscale to detect any anxiety disorder is somewhat lower, with a sensitivity of .67 and a specificity of .72 for the phobic anxiety subscale, a sensitivity of .67 and a specificity of .65 for the somatisation subscale and a sensitivity of .66 and a

specificity of .64 for the anxiety subscale. The sensitivity of the phobic anxiety subscale to detect a panic disorder with agoraphobia is .73 and its specificity is .64. Finally, the sensitivity of the interpersonal sensitivity subscale to detect social phobia is .67 and its specificity is .61. The Dutch version of the BSI also has sufficient reliability and validity and De Beurs & Zitman (2006) concluded that it is an excellent instrument to screen for psychopathology.

2.5 Statistical analysis

SPSS version 21 was used to analyze the data. Descriptive statistics were used to describe the demographic characteristics of the sample. Paired within sample t-tests for means were performed to test the hypotheses that patients total score on the CAPS-5 and their score on the subscales two weeks after the intensive EMDR treatment program is significantly lower than their total score on the CAPS-5 and their score on the subscales before the intensive EMDR treatment program. Paired within sample t-tests for means were also performed to test the hypotheses that patients score on the GSI of the BSI and the subscales of the BSI two weeks after the intensive EMDR treatment program is significantly lower than their score on the GSI of the BSI and the subscales of the BSI before the intensive EMDR treatment program. The assumptions for a paired within sample t-test are: the data that is measured is at least at the interval level and the data is normally distributed. The assumption that the data is measured at least at interval level is met. The assumption of normality was tested with a Shapiro Wilk test, which is a good test for normality with small sample sizes. Effect sizes were determined with Cohens d.

Repeated measures ANOVA were performed to test the hypotheses that patients total score on the PCL-5 and their score on the subscales of the PCL-5 after the last EMDR session will be significantly lower than their total score on the PCL-5 and their score on the subscales of the PCL-5 before the intensive EMDR treatment program. Repeated measures ANOVA were also performed to test the hypotheses that patients total score on the PCL-5 and their score on the subscales of the PCL-5 two weeks after the intensive EMDR treatment program will be significantly lower than their total score on the PCL-5 and their score on the subscales of the PCL-5 before the intensive EMDR treatment program. Simple contrasts were used to compare patients score on the PCL-5 after the last EMDR session and two weeks after the treatment program with their score on the PCL-5 pre-treatment. The assumptions for a repeated measures ANOVA are: the data is at least at interval level, the data is normally distributed and the variances of the differences between all combinations of related groups (levels) are equel (the assumption of spericity). The assumption that the data is measured at least at interval

level is met. The assumption of normality was tested with a Shapiro Wilk test. The assumption of sphericity was tested with the Mauchly's test. Effect sizes were determined with partial eta squared.

3 Results

This chapter describes the results of this pilot study. Firstly, the characteristics of the participants will be presented in paragraph 3.1. Paragraph 3.2 presents the outcomes of the testing of hypotheses one, two and three, in order to answer the first research question: is an intensive, inpatient EMDR treatment program effective for PTSD? After that, the outcomes of the testing of hypothesis four are described in paragraph 3.3 to answer the second research question: is an intensive, inpatient EMDR treatment program effective for comorbid disorders. Finally, the results of the testing of hypothesis five are presented in paragraph 3.4 to answer the last research question: does an intensive, inpatient EMDR treatment program result in a decrease of psychological distress?

3.1 Sample characteristics

Participants in this study were patients with PTSD and one or more comorbid disorders. Characteristics of the patients of the sample and the experienced traumatic event(s) are presented in table 1.

Table 1

Sample and trauma characteristics

Characteristics	*n* = 7				
	Min	*Max*	*M*	*Mdn*	*SD*
Age	32	59	46,86	50	10,75
Number of years after the most significant traumatic event	1	39	18,71	20	14,60
	N	%			
Sex					
Male	5	71,4			
Female	2	28,6			
History of other trauma					
Yes	4	57			
No	3	43			
Time since most significant traumatic event					
< 5 years	1	14,3			
5-15 years	2	28,6			
15-25 years	2	28,6			
> 25 years	2	28,6			
PTSD with delayed expression					
Yes	5	71,4			
No	2	28,6			
Dissociative subtype					
Yes	1	14,3			
No	6	85,7			
Comorbidity					
Depressive disorder	7	100			
Anxiety disorder	2	29			
History of substance dependence	1	14			

Table 1 shows that the mean age of the patients was 46,86 with a standard deviation of 10,75. The mean number of years after the most significant traumatic event was 18,71 with a standard deviation of 14,60. The sample was comprised of five men and two women. Of the seven patients, four patients had a history of other trauma. The passed time since the most

significant traumatic event was variable, with a range from one year to 39 years. Five patients were diagnosed with PTSD with delayed expression and one patient was diagnosed with the dissociative subtype. All patients had a comorbid depressive disorder and two patients also had a panic disorder with agoraphobia. One patient was diagnosed with alcohol dependence in early remission.

Six patients completed the treatment program, while one patient dropped out after the first day of the hospitalisation. Furthermore, one patient did not attend to the fifth EMDR treatment session, but this patient did completed the rest of the treatment program. The patient that dropped out had decided to postpone the treatment of his PTSD because he found it more important to work on family related problems first. This patient was diagnosed with PTSD with delayed expression and a recurrent depression. Due to practical problems, the patient was not assessed on the CAPS-5 and the MINI post-treatment and was not tested on the PCL-5 at day five of the hospitalisation and after the follow up EMDR session.

3.2 Is an intensive, inpatient EMDR treatment program effective for PTSD?

In order to answer the first research question 'is an intensive, inpatient EMDR treatment program effective for PTSD', hypotheses one, two and three were tested. In paragraph 3.2.1, the results of the testing of hypothesis one, patients total score on the CAPS-5 two weeks after the intensive EMDR treatment program is significantly lower than their total score on the CAPS-5 before the intensive EMDR treatment program, are outlined. In paragraph 3.2.2, the results of the testing of hypotheses two and three, patients total score on the PCL-5 after the last EMDR session and patients total score on the PCL-5 two weeks after the intensive treatment are significantly lower than their total score on the PCL-5 before the intensive EMDR treatment program, are described.

3.2.1 Is an intensive, inpatient EMDR treatment program effective for PTSD, according to the CAPS-5?

The first hypothesis stated that patients total score on the CAPS-5 two weeks after the intensive EMDR treatment program will be significantly lower than their total score on the CAPS-5 before the intensive EMDR treatment program. This hypothesis also contained four sub-hypotheses that state that patients score on the subscales of the CAPS-5 will be significantly lower than their scores on the subscales of the CAPS-5 before the intensive EMDR treatment program. The hypotheses were tested with a paired within samples t-test. The assumption that the data is at least at interval level was met. The assumption of normality

was tested with a Shapiro Wilk test. A Shapiro Wilk test showed that the data was normally distributed for the total score on the CAPS-5 ($w(6) = .894$, $p = .341$), the subscale re-experiencing ($w(6) = .935$, $p = .620$), the subscale avoidance ($w(6) = .916$, $p = .480$), the subscale negative cognitions and mood ($w(6) = .925$, $p = .541$) and the subscale arousal ($w(6) = .930$, $p = .582$).

In table 2 the mean scores of the patients on the CAPS-5 pre- and post-treatment are presented.

Table 2

Comparison of the mean scores of the patients on the CAPS pre- and post-treatment

	Pre-treatment (n = 6)		Post-treatment (n = 6)			
CAPS	*M*	*SD*	*M*	*SD*	*t* -waarde	*df*
Total score	39,67	6,28	18,00	10,50	4,030**	5
Re-experiencing	11,17	2,14	3,00	3,29	5,171**	5
Avoidance	4,00	1,26	1,33	1,75	4,000**	5
Negative cognitions and mood	13,00	4,20	6,83	3,92	2,060*	5
Arousal	11,50	2,81	6,83	3,06	3,715**	5

Note. * $p < .05$, ** $p < .01$, *** $p < .001$, one-tailed. CAPS = Clinician Administered PTSD Scale.

Table 2 shows that a paired within sample t-test indicated that patients total score on the CAPS-5 post-treatment ($M = 18$, $SD = 10,50$) was significantly lower than their total score on the CAPS-5 pre-treatment ($M = 39,67$, $SD = 6,28$), $t(5) = 4,030$, $p = .005$, $d = 1.65$. On the subscale re-experiencing, patients score post-treatment ($M = 3$, $SD = 3,29$) was significantly lower than their score on the subscale pre-treatment ($M = 11,17$, $SD = 2,14$), $t(5) = 5,171$, $p = .002$, $d = 2.11$. The score of the patients post-treatment on the subscale avoidance ($M = 1,33$, $SD = 1,75$) was also significantly lower than their score on the subscale pre-treatment ($M = 4$, $SD = 1,26$), $t(5) = 4,000$, $p = .005$, $d = 1.63$. Patients score on the subscale negative cognitions and mood was post-treatment ($M = 6,83$, $SD = 3,92$) significantly lower than their score on the subscale pre-treatment ($M = 13$, $SD = 4,2$), $t(5) = 2,060$, $p = .047$, $d = 0.84$. Finally, patients score on the subscale arousal post-treatment ($M = 6,83$, $SD = 3,06$) was significantly lower than their score on the subscale pre-treatment ($M = 11,5$, $SD = 2,81$), $t(5) = 3,715$, $p = .007$, $d = 1.52$.

Of the six patients that completed the program, four patients did not meet the diagnostic criteria for PTSD anymore at the end of the treatment. This includes the patient that was diagnosed with the dissociative subtype. Five patients were diagnosed with PTSD with delayed expression and two patients were diagnosed with PTSD without delayed expression. Three of the patients that were diagnosed with PTSD with delayed expression and

one of the patients that was diagnosed with PTSD without delayed expression did not meet the diagnostic criteria for PTSD anymore.

3.2.2 Is an intensive, inpatient EMDR treatment program effective for PTSD, according to the PCL-5?

Hypothesis two stated that patients score on the PCL-5 after the last EMDR session will be significantly lower than their score on the PCL-5 before the intensive EMDR treatment program. This hypothesis also contained four sub-hypotheses that state that patients score on the subscales of the PCL-5 after the last EMDR session will be significantly lower than their score on the subscales of the PCL-5 before the intensive EMDR treatment program. The hypotheses were tested with a repeated measures ANOVA. The assumption that the data is at least at interval level was met. The assumption of normality was tested with a Shapiro Wilk test. A Shapiro Wilk test showed that the data was normally distributed for the total score on the PCL-5 ($w(7) = .835$, $p = .117$), the subscale re-experiencing ($w(7) = .868$, $p = .220$), the subscale avoidance ($w(7) = .866$, $p = .212$), the subscale negative cognitions and mood ($w(7) = .959$, $p = .815$), and the subscale arousal ($w(7) = .996$, $p = .999$). Hypothesis three stated that patients score on the PCL-5 two weeks after the intensive EMDR treatment program is significantly lower than their score on the PCL-5 before the intensive EMDR treatment program. This hypothesis also contained four sub-hypotheses that state that patients score on the subscales of the PCL-5 two weeks after the intensive EMDR treatment will be significantly lower than their scores on the subscales of the PCL-5 before the intensive EMDR treatment program. The hypotheses were tested with a repeated measures ANOVA. The assumption that the data is at least at interval level was met. The assumption of normality was tested with a Shapiro Wilk test. A Shapiro Wilk test showed that the data was normally distributed for the total score on the PCL-5 ($w(7) = .931$, $p = .556$), the subscale re-experiencing ($w(7) = .825$, $p = .071$), the subscale avoidance ($w(7) = .952$, $p = .744$), the subscale negative cognitions and mood ($w(7) = .965$, $p = .858$), and the subscale arousal ($w(7) = .961$, $p = .828$). The assumption of sphericity was tested with the Mauchly's test. The Mauchly's test indicated that the assumption of sphericity was not violated for the total score on the PCL-5 ($X2$ (9) = 4,760, $p > .05$), the subscale re-experiencing ($X2$ (9) = 10,589, $p > .05$), the subscale avoidance ($X2$ (9) = 3,705, $p > .05$), the subscale negative cognitions and mood ($X2$ (9) = 9,599, $p > .05$) and the subscale arousal ($X2$ (9) =17,681, $p > .05$).

In table 2 the mean scores of the patients on the PCL-5 pre-treatment (T1), at hospitalisation day one (T2), at hospitalisation day 5 (T3), after the follow-up EMDR session (T4) and two weeks after the intensive treatment program (T5) are presented.

Table 3

Comparison of the mean scores of the patients on the PCL-5

(n = 6)	T1	T2	T3	T4	T5		
PCL-5	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F* -value	*df*
Total score	45,83 (12,86)	50,67 (13,95)	42,67 (16,95)	36,50 (19,87)	30,83 (20,70)	3,943*	4
Re-experiencing	11,17 (3,06)	12,67 (3,61)	11,83 (3,60)	8,33 (5,79)	6,33 (5,57)	3,738*	4
Avoidance	5,17 (1,72)	4,83 (2,56)	3,33 (2,94)	3,50 (2,17)	2,83 (2,56)	3,489*	4
Negative cognitions and mood	14,50 (6,66)	17,17 (6,46)	15,83 (5,27)	13,50 (6,77)	11,67 (7,34)	1,992	4
Arousal	15,00 (4,24)	16 (4,43)	11,67 (6,22)	11,17 (5,91)	10,00 (5,87)	4,622**	4

Note. * p < .05, ** p < .01, *** p < .001. PCL-5 = PTSD Checklist for DSM-5. T1 = pre-treatment, T2 = hospitalisation day 1, T3 = hospitalisation day 5, T4 = follow -up EMDR session, T5 = two weeks after the intensive treatment program.

Table 3 shows that a repeated measures ANOVA indicated that patients total score on the PCL-5 differed significantly across time, $F(4, 20) = 3.943$, $p = .016$, $n = .818$. Simple contrasts revealed that patients total score after the follow-up EMDR session was not significantly different from their total score pre-treatment, $F(1, 5) = 1,741$, $p = .244$, and that patients total score two weeks after the treatment program was not significantly different from their total score pre-treatment, $F(1, 5) = 5,233$, $p = .071$. A significant difference would have been found when the study aimed to compare the score of the patients to their total score on treatment day one: the total score of the patients after the follow-up EMDR session was significantly lower than their total score on treatment day one, $F(1,5) = 8,127$, $p = .036$, and their total score two weeks after the treatment program was also significantly lower than their total score on treatment day one, $F(1, 5) = 17,912$, $p = .008$. On the subscale re-experiencing, patients score also differed significantly across time, $F(4, 20) = 3,738$, $p = .02$, $n = .839$. Simple contrasts revealed that patients score after the follow-up EMDR session was not significantly different from their score pre-treatment, $F(1, 5) = 1,052$, $p = .352$, and that patients score two weeks after the treatment program was not significantly different from their score pre-treatment, $F(1, 5) = 4,151$, $p = .097$. A significant difference would have been found when the study aimed to compare the score of the patients to their score on treatment

day one: the score of the patients two weeks after the treatment program was significantly lower than their score on treatment day one, F(1,5) = 8,280, p = .035. Patients score on the subscale avoidance also differed significantly across time, $F(4, 20)$ =3,498, p = .025, n = .844. Simple contrasts revealed that patients score after the follow-up EMDR session was significantly different from their score pre-treatment, $F(1, 5)$ = 7,353, p = .042, and that patients score two weeks after the treatment program was significantly different from their score pre-treatment, $F(1, 5)$ = 14,412, p = .013. On the subscale negative cognitions and mood, patients score did not differ significantly across time, $F(4, 20)$ = 1,992, p = .135. Finally, the score of the patients on the subscale arousal differed significantly across time, $F(4, 20)$ = 4.622, p = .008, n = .986. Simple contrasts revealed that patients score after the follow-up EMDR session was not significantly different from their score pre-treatment, $F(1, 5)$ = 4,205, p = .096, but that patients score two weeks after the treatment program was significantly different from their score pre-treatment, $F(1, 5)$ = 14,423, p = .013.

The PCL-5 can be used to monitor patient progress. As mentioned in the 'Method' section, a change of five points is the minimum threshold to determine that a patient has responded to treatment and a change of ten points is the minimum threshold to determine that the improvement is clinically significant ("PTSD checklist for DSM-5 (PCL-5)", n.d.). For three patients, the change on the PCL-5 was clinically significant at the assessment after the last EMDR session. A fourth patient had reached this threshold at the assessment two weeks after the treatment program.

3.3 Is an intensive, inpatient EMDR treatment program effective for comorbid disorders?

The second research question was: is an intensive, inpatient EMDR treatment program effective for comorbid disorders? To answer this research question, the following hypothesis was tested: patients who were diagnosed with a comorbid disorder will no longer meet the diagnostic criteria for a comorbid disorder after the intensive EMDR treatment program, according to the MINI. The outcomes of the assessment on the MINI pre- and post treatment are presented in table 4.

Table 4

Comparison of the outcomes on the MINI pre- and post-treatment

	Pre-treatment (n = 7)		Post-treatment (n = 6)	
MINI	N	%	N	%
Depressive disorder				
Mild depressive episode	2	28,6	1	14,3
Moderate depressive episode	1	14,3	0	0,0
Depressive episode in early remission	1	14,3	2	28,6
Recurrent depression	2	28,6	1	14,3
Chronic depression	1	14,3	1	14,3
Anxiety disorder				
Panic disorder with agoraphobia	2	28,6	1	14,3
History of substance dependence				
Subclinical alcohol dependence	1	14,3	0	0,0
Alcohol dependence in early remission	1	14,3	1	14,3

Note. MINI = Mini International Neuropsychiatric Interview.

Table 4 shows that all seven patients had a depressive disorder on the assessment on the MINI pre-treatment. Two patients had a mild depressive disorder at the start of the treatment. One of these patients remained mildly depressed and the other patient was classified as having a depressive episode in early remission at the end of the treatment. One patient was diagnosed with a moderate depressive episode pre-treatment. This patient did not meet the diagnostic criteria anymore for a depressive disorder at the end of the treatment. One patient was diagnosed with a depressive episode in early remission at the assessment pre-treatment as well as post-treatment. Two patients were diagnosed with a recurrent depression and were currently depressed pre-treatment. One of these patients still met the diagnosis recurrent depression and the other patient dropped out of the study. Finally, one patient was diagnosed with a chronic depression at the assessment pre-treatment as well as post-treatment. Two patients were also diagnosed with a panic disorder with agoraphobia at the start of the treatment. Post-treatment, one of these patients did not meet the diagnostic criteria for this anxiety disorder anymore. Two patients had a history of alcohol dependence. The patient that was diagnosed with alcohol dependence in early remission, still met the diagnostic criteria for this disorder post-treatment. The other patient had subclinical alcohol dependence pre-treatment, but did not meet the diagnostic criteria for an alcohol dependence disorder anymore at the end of the treatment.

3.4 Does an intensive, inpatient EMDR treatment program result in a decrease of psychological distress?

In order to answer the third research question 'does an intensive, inpatient EMDR treatment program result in a decrease of psychological distress?', hypothesis five was tested. This hypothesis stated that patients GSI score on the BSI two weeks after the intensive EMDR treatment after the intensive EMDR treatment program will be significantly lower than their GSI score on the BSI before the intensive EMDR treatment program. This hypothesis also contained nine sub-hypotheses that state that patients score on the subscales of the BSI two weeks after the intensive EMDR treatment after the intensive EMDR treatment program will be significantly lower than their score on the subscales of the BSI before the intensive EMDR treatment program. The hypotheses were tested with a paired within samples t-test. The assumption that the data is at least at interval level was met. The assumption of normality was tested with a Shapiro Wilk test. A Shapiro Wilk test showed that the data was normally distributed for the difference between the total score on the BSI ($w(7) = .900$, $p = .328$), the subscale somatisation ($w(7) = .918$, $p = .451$), the subscale obsessive-compulsive ($w(7) = .853$, $p = .131$), the subscale interpersonal sensitivity ($w(7) = .952$, $p = .744$), the subscale depression ($w(7) = .960$, $p = .815$), the subscale anxiety ($w(7) = .875$, $p = .207$), the subscale hostility ($w(7) = .846$, $p = .112$), the subscale phobic anxiety ($w(7) = .863$, $p = .160$), the subscale paranoid ideation ($w(7) = .886$, $p = .255$) and the subscale psychoticism ($w(7) = .914$, $p = .424$). In table 5, the mean scores of the patients on the BSI pre- and post-treatment are presented.

Table 5

Comparison of the mean scores of the patients on the BSI pre- and post-treatment

	Pre-treatment ($n = 7$)		Post-treatment ($n = 7$)			
BSI	*M*	*SD*	*M*	*SD*	*t* -waarde	*df*
GSI score	1,72	0,73	1,22	0,90	2,072*	6
Somatisation	1,35	0,64	0,90	0,67	1,526	6
Obsessive-compulsive	2,21	1,15	1,50	1,31	1,73	6
Interpersonal sensitivity	1,50	0,69	1,14	1,01	1,433	6
Depression	1,98	0,98	1,62	1,30	0,664	6
Anxiety	1,93	0,85	1,19	1,04	3,028*	6
Hostility	1,74	1,12	0,91	1,07	2,848*	6
Phobic anxiety	1,60	0,97	1,29	1,16	1,256	6
Paranoid ideation	1,37	1,07	1,14	1,02	1,22	6
Psychoticism	1,63	0,88	1,17	0,91	2,248*	6

Note. * $p < .05$, ** $p < .01$, *** $p < .001$, one-tailed. BSI = Brief Symptom Inventory, GSI = Global Severity Index.

Table 5 shows that a paired within sample t-test indicated that patients GSI score on the BSI post-treatment (*M* = 1,22, *SD* = 0,90) was significantly lower than their GSI score on the BSI pre-treatment (*M* = 1,72, *SD* = 0,73), *t*(6) = 2,072, *p* = .042. The mean score of the patients post-treatment was lower than the mean score of the patients pre-treatment on all the subscales of the BSI, but this difference was not significant on the subscales somatisation, obsessive-compulsive, interpersonal sensitivity, depression, phobic anxiety and paranoid ideation. However, patients score on the subscale anxiety post-treatment (*M* = 1,19, *SD* = 1,04) was significantly lower than their score on the subscale pre-treatment (*M* = 1,93, *SD* = 0,85), *t*(6) = 3,028, *p* = .012, *d* = 1.14. On the subscale hostility, patients score post-treatment (M = 0,91, *SD* = 1,07) was also significantly lower than their score on the subscale pre-treatment (*M* = 1,74, *SD* = 1,12), *t*(6) = 2,848, *p* = 0,15, *d* = 1.08. Finally, patients score on the subscale psychoticism post-treatment (*M* = 1,17, *SD* = 0,91) was significantly lower than their score on the subscale pre-treatment (*M* = 1,63, *SD* = 0,88), *t*(6) = 2,248, *p* = .033, *d* =0.85.

4 Discussion

This pilot study investigated the effectiveness of an intensive EMDR inpatient treatment program. Firstly, the outcomes of the study are interpreted in paragraph 4.1. After that, the results of this study are evaluated against the outcomes of earlier studies in paragraph 4.2. The limitations of this study are described in paragraph 4.3. The chapter concludes with a summary and recommendations for a next study (paragraph 4.4).

4.1 Outcomes of the study

In order to answer the first research question 'is an intensive, inpatient EMDR treatment program effective for PTSD?', patients score on the CAPS-5 post-treatment was compared to their score on the CAPS-5 pre-treatment. The results of this study show that the patients in this study experience significantly less overall PTSD symptoms two weeks after the intensive EMDR treatment, with large effect sizes, and that this is also the case for the separate symptom categories; patients experience significantly less re-experiencing, avoidance, negative cognitions and mood and arousal symptoms. Also, of the six patients that completed the treatment program, four patients do not meet the diagnostic criteria for PTSD anymore, according to the assessment with the CAPS-5. This includes the patient that was diagnosed with the dissociative subtype and also met the diagnostic criteria for the delayed expression subtype, two other patients that were diagnosed with PTSD with delayed expression and one patient that was diagnosed with PTSD without delayed expression. This implies that an intensive EMDR treatment program can be suitable for different forms of PTSD.

Next to a clinical interview, PTSD symptoms were also assessed with a self-report questionnaire, the PCL-5, which was administered five times during the study. The results of the study show that, compared to the baseline measurement, the patients report significantly less avoidance and arousal symptoms two weeks after the treatment program, with large effect sizes. They also experience less overall PTSD symptoms, re-experiencing symptoms and negative cognitions and mood symptoms after the treatment program, but, compared to the baseline measurement, this difference is not significant. However, the patients do report significantly less overall PTSD symptoms and re-experiencing symptoms compared to treatment day one. If the PCL-5 is used to monitor patient progress, a change of ten points is the minimum threshold to determine that the improvement is clinically significant ("PTSD checklist for DSM-5 (PCL-5)", n.d.). For three of the six patients that completed the program, the change on the PCL-5 was clinically significant at the assessment after the last EMDR

session. A fourth patient had reached this threshold at the assessment two weeks after the treatment program. These results suggest that patients themselves experience significantly less avoidance and arousal symptoms after an intensive EMDR treatment program and that the treatment can lead to a clinically significant improvement.

In order to answer the second research question 'is an intensive, inpatient EMDR treatment program effective for comorbid disorders?', patients were assessed on the MINI pre-treatment and two weeks after the treatment program. All patients had a depressive disorder pre-treatment. Of the six patients that were assessed on the MINI post-treatment, four patients still met the criteria for the same depressive disorder, but with two patients the treatment program seems to have had an effect on their depressive symptoms as well. One patient was mildly depressed at the start of the treatment and at the end of the treatment she got the diagnosis 'depressive episode in early remission'. Another patient was moderately depressed at the start of the treatment and did not meet the criteria for any depressive disorder at the end of the treatment. Two patients were also diagnosed with a panic disorder with agoraphobia at the start of the treatment and one of them did not meet the diagnostic criteria for this anxiety disorder anymore. Finally, two patients were diagnosed with a substance use disorder at the start of the treatment and one of them also did not meet the criteria for the disorder anymore. These results suggest that an intensive EMDR treatment program can also have an positive effect on comorbid disorders.

In order to answer the third research question 'Does an intensive, inpatient EMDR treatment program result in a decrease of psychological distress?', patients had to fill in a self-report questionnaire, the BSI, pre-treatment and post-treatment. The results of the study show that patients report significantly lower psychological distress two weeks after the treatment program compared to the baseline measurement, with large effect sizes. Looking at the symptom constructs that constitute psychological distress, patients report significantly less anxiety, hostility and psychoticism, with large effect sizes. These results suggest that an intensive EMDR treatment program can also have a positive effect on psychological distress.

This intensive EMDR treatment program also seems to be tolerable. Only one patient dropped out of the study and one patient did not attend to the fifth EMDR session, but this patient did completed the rest of the treatment program.

4.2 A comparison with earlier studies

The results of this study are consistent with the literature, in which the effectiveness of EMDR for PTSD, comorbid symptoms of depression and anxiety and subjective distress is

well established (Chen et al., 2014). The results are also in accordance with the results of studies that show that intensive formats of other therapies for PTSD are well tolerated and effective. Intensive outpatient prolonged exposure for combat-related PTSD appeared to be effective in a case study (Blount et al., 2014), a brief intensive exposure program was effective for four patients with a history of childhood sexual abuse (Hendriks et al., 2010), an intensive weekend group treatment was effective for 10 veterans with a panic disorder and co-occurring PTSD (Teng et al., 2015) and a RCT showed that a seven day intensive cognitive treatment program is effective for chronic PTSD (Ehlers et al., 2014). Now this study shows that an intensive format of EMDR therapy also seems to be an effective and tolerable treatment for PTSD, but since this is the first study in which an intensive format of EMDR is investigated, more research is necessary.

4.3 Limitations

This pilot study shows that intensive EMDR treatment can be an effective and tolerable treatment for patients with PTSD and comorbid disorders, but the study also has some important limitations. First of all, patients did not only receive EMDR treatment, but they also received TSY. The decision to incorporate TSY in the treatment program was based on the fact that this is the first study in which patients get EMDR treatment in a very intensive treatment format, which raised concerns about the tolerability of the treatment program. TSY can improve the ability of PTSD patients to tolerate unpleasant feelings (Jindani et al., 2015), so the incorporation of TSY in the treatment program can increase the tolerability of the program. However, since there are studies that show that TSY can reduce PTSD symptoms (Emorson et al., 2009; Clark et al., 2014; Van Der Kolk et al., 2014), it makes it difficult to conclude that intensive EMDR treatment alone is an effective and tolerable treatment for PTSD. A major drawback of the incorporation of TSY in the treatment program is multiple treatment interference, which refers to drawing conclusions about a treatment when this treatment is evaluated in the context of other treatments (Kazdin, 2014). This is an external validity problem. From this study it can only be concluded that intensive EMDR treatment with TSY seems to be an effective and tolerable treatment for PTSD.

Another limitation of the study is the small sample size, which limits the generalizability of the findings. Only seven patients participated in this study and only six patients completed the treatment program. Since this is the first study that investigates the effectiveness of intensive EMDR treatment, a pilot study with a small sample size is justified,

but further investigation of the treatment program in a study with a bigger sample size is needed to improve the generalizability of the findings.

A critical limitation of this study is the absence of a control group. The inclusion of a control group rules out al lot of threats to internal validity. For example, the threat history, which refers to an event other than the independent variable that may account for the results (Kazdin, 2014), can be ruled out when a control group is included because both groups would share the effects of these influences. A RCT is needed to rule out the threats to internal validity and to ensure that it is the intervention that accounts for the results.

A final limitation concerns the use of the CAPS-5, the PCL-5 and the MINI. The post-treatment assessment with the CAPS -5 and the MINI was one week after the last EMDR session. The questions that the interviewers asked in these interviews referred to the week after the last EMDR session, because the aim of the post-treatment assessment was to establish if the patients experienced less PTSD symptoms and symptoms of comorbid disorders since the intensive EMDR treatment program and to compare this to the baseline assessment. Officially, the questions in these interviews should refer to the past month, but this would have included the weeks in which the patients were in treatment and the week before the hospitalisation. This is also the case with the PCL-5. The questions in this questionnaire should refer to the past month, but in this study the questions referred to the period since the last assessment with the PCL-5, because the goal was to establish if the patients experienced less PTSD symptoms during the week directly after the hospitalisation and during the week after the last EMDR session. In conclusion, the CAPS-5, the PCL-5 and the MINI are not used properly in this study, which makes the reliability and validity of the outcomes of these assessments questionable.

4.4 Summary and recommendations

In summary, this pilot study shows that an intensive EMDR program can be an effective treatment for different forms of PTSD. When the effectiveness is investigated with a clinical interview, an intensive EMDR treatment program reduces all PTSD symptoms and at a self-report questionnaire, patients report less avoidance and arousal symptoms. An intensive EMDR treatment program can also have an effect on comorbid depressive, anxiety and substance use disorders and reduces overall psychological distress, anxiety, hostility and psychoticism. So, intensive EMDR treatment can be an effective and tolerable treatment for patients with PTSD and comorbid disorders, but because of the treatment interference, small

sample size, the absence of a control group and the invalid use of some of the interviews and questionnaires, more research is needed.

A next study could investigate if intensive EMDR treatment without TSY as adjunctive treatment would also be effective, but the importance of eliminating this treatment interference effect can be questioned. Establishing that intensive EMDR with TSY as an adjunctive treatment is effective and tolerable would already be a great finding, so the benefits of establishing if intensive EMDR alone is effective and tolerable should be carefully weight against the risk of symptom deterioration, high drop-out and maybe even suicidality. It is therefore recommended that a next study also investigates the effectiveness and tolerability of intensive EMDR treatment with TSY as adjunctive treatment. Since the results of this small pilot study are already so positive, the effectiveness can now be investigated with a RCT. This RCT should have a bigger sample size to improve the generalizability of the findings. Finally, it is recommended to use the interviews and questionnaires properly in a next study, to ensure that the findings are valid.

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