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A Two-week Inpatient High Intensive Narrative Exposure Therapy Treatment Program for
Posttraumatic Stress Disorder: Preliminary Findings

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1. Abstract

Narrative Exposure Therapy and highly intensive forms of therapy have been shown effective for the treatment of posttraumatic stress disorder (PTSD). The current paper investigated the preliminary effectiveness of an intensive two-week inpatient NET treatment on symptom severity and symptom clusters of PTSD. A non-controlled pilot study with 13 patients was conducted. At baseline (T1), a week after treatment (T2), and at three-months follow-up (T3), the PTSD diagnosis was assessed with the Clinician-Administered PTSD Scale (CAPS). Findings were calculated using a repeated measures ANOVA, reliable change indexes (RCI) and clinically significant changes. From T1 to T3, PTSD symptoms significantly decreased with a large effect size (Cohen's $d = 1.13$). Six of the participants showed improvement with regard to reliable changes and two participants no longer met criteria for a PTSD diagnosis at T3. Intrusive symptoms significantly decreased from T1 – T2 and T2 – T3. Symptoms of cognition and mood, and arousal and reactivity significantly decreased from T1 – T3. HI-NET appears a promising treatment for patients with complex PTSD, and future research is needed to further determine its efficacy.

2. Introduction

2.1 Posttraumatic Stress Disorder

The lifetime risk of developing posttraumatic stress disorder (PTSD) following exposure to potentially traumatic events has been estimated 0.5% to 1.0% around the world (American Psychiatric Association, 2013). Yet, rates have been shown to vary substantially from less than 1.0% in Switzerland (Hepp et al., 2006), to 6.8% in the United States (Kessler et al., 2005), and up till 37.4% in post-conflict countries (De Jong et al., 2001). In the Netherlands, one study reported 80% of individuals were exposed to a potential trauma, and the lifelong prevalence of PTSD was estimated 7.4% which is remarkably high considering other studies (De Vries & Olf, 2009). A more recent study reported lifetime exposure was 71.1%, and one week after exposure the PTSD prevalence was approximately 2.0% (Knipscheer et al., 2020). Individuals diagnosed with PTSD suffer from intrusive symptoms such as flashbacks and nightmares, avoid stimuli related to the traumatic memories, experience negative thoughts and moods associated with the trauma, develop negative beliefs towards oneself, others, or the world, and have marked changes in arousal and reactivity levels (American Psychiatric Association, 2013). Furthermore, it is associated with severe impairments in psychosocial functioning (Zatzick et al., 2002), substance abuse and dependence (Jakupcak et al., 2009), and a significantly increased risk of suicidal ideation and suicide (Schnurr et al., 2005). The

high prevalence rate of PTSD and its debilitating consequences highlight the importance of effective treatments.

One risk factor for developing PTSD is the ‘building block’ effect in which cumulative exposure to trauma leads to a higher risk of development over time (Robjant & Fazel, 2010; Schauer et al., 2011). Individuals exposed to multiple traumas have consistently reported higher levels of symptoms compared to those exposed to a single trauma (Green et al., 2000; Lancaster et al., 2009; Resnick et al., 1993). Furthermore, they suffer from additional problems in relational areas, dissociation and somatisation, as well as having difficulties in regulating emotions (Cloitre et al., 2011). One study assessing PTSD symptoms in 110 patients using the Clinician-Administered PTSD Scale (CAPS) found that multiple trauma patients showed higher levels of dissociation, shame, guilt, and interpersonal sensitivity than single trauma patients (Hagenaars et al., 2011). These higher levels of symptoms found with cumulative exposure may also affect treatment as a number of studies have indicated that higher symptom severity pre-treatment is negatively associated with symptom reduction post-treatment (Schottenbauer et al., 2008; Van Minnen et al., 2002). Hence, it might be beneficial to design treatments specifically targeting the needs of individuals exposed to multiple traumas.

2.1 High Intensive Trauma-Focused Treatment

Currently, most treatment guidelines recommend trauma-focused cognitive behaviour therapy (TF-CBT) as the treatment-of-choice for PTSD. Variants include cognitive therapy, eye movement desensitisation and reprocessing, and prolonged exposure (Bryant, 2019). Although TF-CBT has been shown to be effective, only two-third of patients respond adequately to treatment (Bradley et al., 2005). Another concern is the high drop-out rates reported. One review indicated that the rates vary widely, and range from 0% to 54% (Schottenbauer et al., 2008). A more recent meta-analysis reported an average drop-out rate of 18%, but again highlighted the high variability (Imel et al., 2014). Several studies have argued that a higher number of trauma-focused therapy sessions and number of attended sessions are crucial for treatment outcome (Haagen et al., 2015; Schauer et al., 2011; Tarrier et al., 2000). Furthermore, the frequency of sessions may play a role as indicated by a study investigating the impact of sessions timing on treatment outcome in 136 PTSD patients. Session frequency was measured using the average days between sessions and consistency using the standard deviation of the number of days in-between. Results indicated that more

frequent sessions and higher consistency resulted in greater symptom reduction (Gutner et al., 2016).

Based on the above, trauma-focused treatments might be more effective if provided in a condensed and intensive form. It may lead to faster symptom reduction which in turn increases attendance and reduces dropout through higher motivation (Bradley et al., 2005). Moreover, it might be more in line with patients' needs and expectations including travelling time and costs, and faster results. Intensive treatment might be more suitable for patient populations who benefit less from treatments such as veterans and refugees (Steenkamp et al., 2015; Zepeda Méndez et al., 2018). In a preliminary study by Zepeda Méndez and colleagues (2018) 12 PTSD patients including six veterans completed a five day-inpatient EMDR treatment programme. The majority of patients experienced a reduction in symptoms and two no longer met criteria for PTSD at the 21-day follow-up. Other studies have likewise found promising results for the tolerability, feasibility, and effectiveness of intensive forms of trauma-focused treatments (Blount et al., 2014; Bongaerts et al., 2017; Ehlers et al., 2014; Hendriks et al., 2010; Murray et al., 2017). Taken together, highly condensed and intensive treatment may be offered to individuals with PTSD resulting from multiple traumatic events who do not benefit sufficiently from other evidence-based treatments that are currently available.

2.2 Narrative Exposure Therapy

Narrative Exposure Therapy (NET) is an evidence-based therapy developed for the treatment of PTSD following exposure to multiple or continuous traumas (Schauer et al., 2011). NET is based on the theory that views PTSD as a disorder of memory in which the sensory-perceptual-emotional representations, the so-called hot memory, of the traumatic event are vividly remembered (Brewin, & Holmes, 2003; Ehlers, & Clark, 2000; Elbert, Schauer, & Neuner, 2015). These hot memories are part of the implicit memories which include habits, skills like riding a bike, conditioned responses, and emotional associations. In everyday life, implicit memories are not deliberately retrieved and require no conscious recollection. Explicit memories or cold memories, contrarily, cover memories of personal events, and of knowledge and facts of the world. These memories can be deliberately retrieved (Squire, 1994). However, an individual with PTSD has difficulty retrieving this autobiographical contextual information of the traumatic event, or the so-called explicit cold memory (Brewin & Holmes, 2003; Ehlers & Clark, 2000; Elbert et al., 2015).

A TWO-WEEK INPATIENT HIGH INTENSIVE NARRATIVE

At the start of the NET the patient's life line is laid out with rope, stones (representing traumatic events) and flowers (representing positive events). By talking about each traumatic memory on the life line in detail, the patient is repeatedly exposed to the implicit memory while also re-experiencing the cognitive, emotional, behavioural, physiological, and sensory elements of the explicit memory associated with the memory. Throughout this process, hot implicit memories are weaved together with cold explicit memories, and this results in an integration of the intrusive fragments into their original context. Along with the traumatic events, positive experiences on the life line are described, and so a consistent autobiographical narration of the patient's life is created. It is then believed that the self-regulation of memory leads to a reorganization of the individual. This process continues after treatment has finished and is thought to ultimately result in healing (Elbert et al., 2015; Schauer et al., 2011).

2.3 The Effectiveness of Narrative Exposure Therapy

NET has repeatedly been shown to be effective in reducing patients' trauma-related symptomatology (Crumlish & O'Rourke, 2010; Hecker et al., 2015; Jongedijk, 2014; McPherson, 2012; Mørkved et al., 2014; Robjant & Fazel, 2010), and in improving psychosocial functioning and physical health (Hecker et al., 2015; Schnyder et al., 2015). A meta-analysis of 16 RCTs found large effect sizes at post-treatment ($g = 1.18$, 95% confidence interval [0.87; 1.50]) and follow-up ($g = 1.37$ [0.96; 1.77]) for PTSD symptoms (Lely et al., 2019). Additionally, NET has been argued to be universally acceptable as it includes the worldwide oral tradition (Schauer et al., 2011). Indeed its effectiveness has been shown for various target groups such as refugees and veterans (Crumlish & O'Rourke, 2010; Gwozdziwycz & Mehl-Madrona, 2013; Lely et al., 2019; Robjant & Fazel, 2010; Schnyder et al., 2015).

Another striking outcome found in NET literature is the low drop-out rate. The previously mentioned meta-analysis reported a drop-out range from 0,00% to 25,49% (Lely et al., 2019). In studies the number of sessions given varies widely, ranging from 3% to 17% sessions as well as differences within studies (Lely et al., 2019; McPherson, 2012). Yet, reasons were not well documented. In contrast to research indicating that a higher number of sessions led to better outcomes, the meta-analysis by Lely and colleagues (2019) found that treatment dose was not significantly associated with treatment outcome for NET. The authors do not elaborate on possible explanations, and no research has yet directly compared number of (attended) treatment sessions for NET.

NET has been developed for individuals exposed to multiple traumas. As previously described, these individuals have additional problems that might influence the clinical presentation (Cloitre et al., 2011; Hagenaars et al., 2011). Therefore, it is important to gain information on the efficacy of NET on different symptom clusters. One study of 10 NET for 16 torture survivors examined its effects on PTSD symptom clusters using the CAPS. A significant decrease in the total severity score, the symptom severity of re-experiencing, and the symptom severity of avoidance were found from pre-treatment to post-treatment, and from pre-treatment to follow-up. Numbing was distinguished from avoidance, but the decrease was non-significant. The severity of hyperarousal and depressive symptoms were both found to significantly decrease only between pre-treatment and follow-up (Halvorsen & Stenmark, 2010). Yet, it is clear that more research is needed to establish a clear picture of NET's efficacy on PTSD symptom clusters.

2.4 The Current Study

In 2019, ARQ Centrum '45 in Oegstgeest, the Netherlands, successfully finished a pilot for a high intensive form of NET (HI-NET). In order to research the effectiveness of the HI-NET, this paper will focus on the following question: what is the relationship between receiving High Intensive Narrative Exposure Therapy (HI-NET) and the reported symptoms of posttraumatic stress disorder (PTSD)? This will be done by examining various sub-questions:

1. Firstly, what is the relationship between receiving HI-NET and the overall symptom severity based on the Clinical-Administered PTSD Scale for DSM-5 (CAPS-5)?
Following previously described literature, it is hypothesised that completion of HI-NET will be associated with a clinically significant reduction of PTSD symptoms.
2. Secondly, what is the relationship between receiving HI-NET and different symptom clusters (intrusive symptoms, avoidance symptoms, cognitions and mood symptoms, and arousal and reactivity symptoms) measured with the CAPS-5? The results are expected to follow those found in the study by Halvorsen and Stenmark (2010). Symptom severity of re-experiencing and avoidance are expected to be associated with a significant decrease from pre-treatment to post-treatment, and from pre-treatment to follow-up. The severity of hyperarousal and depressive symptoms are hypothesised to show a significant decrease only between pre-treatment and follow-up (Halvorsen & Stenmark, 2010).

3. Methods

3.1 Design and Procedure

During the intake procedure (see below), oral and written information on the HI-NET treatment program was given to participants. For two weeks participants stayed at the clinic of ARQ Centrum '45 in Oegstgeest, the Netherlands. On weekdays, they received two treatment sessions per day consisting of either a NET session given by two alternating NET-trained therapists or two times a week an art therapy session. Participants stayed at the centre during the weekend in which they could plan their own activities. Furthermore, an hour of trauma-sensitive yoga was given on weekday evenings. During the first session the lifeline was laid out, and subsequent sessions lasted around 90 minutes in which one life event (a stone or a flower) was treated. Frequently a writer was present for the writing down of the narrative. During the last session the life narrative was shared and given to participants, and, if possible, with a loved one present (see Appendix I for an example of a HI-NET schedule).

Participants were assessed on PTSD symptoms on three different occasions, namely at baseline in the week prior to treatment (T1), at posttreatment in the week after treatment (T2), and at follow-up approximately three months after treatment completion (T3).

3.2 Participants

Participants were referred to ARQ Centrum '45 by their clinician for treatment, and were included if (1) PTSD was indicated by the CAPS-5 (Weathers et al., 2019; Dutch translation: Boeschoten et al., 2018), (2) they were motivated for intensive treatment in the inpatient clinic, (3) they could express themselves in Dutch, English, or their native language (with an interpreter present), (4) a crisis plan was present, and (5) they were willing to participate in the research. Exclusion criteria were (1) acute suicidality, (2) severe or acute psychotic state, (3) alcohol- or substance dependence, or (4) severe somatic complaints.

A total of 28 patients started the HI-NET of which 5 participants dropped out due to exposure being insufficiently possible for one patient, one patient having difficulty in the clinical setting and with fellow patients, one patient showing unacceptable behaviour towards others, or other personal circumstances. Data from 10 participants were eliminated because of absence of a PTSD diagnosis ($n = 2$), or absence of a CAPS score from the follow-up as a result of emotional inability ($n = 2$), terminal illness ($n = 1$), or follow-up had not taken place yet ($n = 5$). The remaining participants ($n = 13$) were on average 39 years old, and eight were male (62%). Table 1 below shows an overview of demographic and clinical characteristics.

Table 1. Baseline Demographic and Clinical Characteristics of Sample (N=13)

| | | N (%) |
|--|---|-----------------|
| Male | | 8 (62%) |
| Civil status | Single | 7 (54%) |
| | Married/ partnership | 3 (23%) |
| | Married/ partnership with children | 3 (23%) |
| Educational level* | Low | 1 (8%) |
| | Middle | 6 (46%) |
| | High | 2 (15%) |
| | Unknown | 4 (31%) |
| Trauma type | Occupational-related traumatisation | 2 (15%) |
| | Post-war generation | 1 (8%) |
| | Veterans | 2 (15%) |
| | Refugees and asylum seekers | 6 (46%) |
| | Early childhood trauma | 1 (8%) |
| | Other traumatisation / violence | 1 (8%) |
| Nationality | Dutch | 6 (46%) |
| | Other (Afghanistan, Argentina, Brazil, Syria, Iran, Turkey) | 7 (54%) |
| | | |
| Previous trauma-related treatment | Yes | 10 (77%) |
| | | M (SD) |
| Age | | 39.00 (9.53) |
| Duration of PTSD symptoms at the start of treatment (in months) | | 134.46 (165.16) |
| Baseline CAPS total score** | | 47.54 (10.34) |

* Low: completed elementary school or lower vocational education; Middle: completed high school or middle level vocational education; High: completed high level vocational education, pre-university, college, or university degree.

** Six patients fulfilled the criteria of the dissociative subtype of PTSD

3.3 Instruments

3.3.1. *The Life Events Checklist-5*

To examine the presence of a PTSD diagnosis at baseline, the Life Events Checklist-5 (LEC-5) and CAPS-5 were administered (Boeschoten et al., 2014; Weathers et al., 2019). The LEC-5 is a 17-item measure for screening potentially traumatic events in a participant's lifetime as a companion measure for the A-criterion of the CAPS-5. For each event, the respondent indicates *happened to me, witnessed it, learned about it, part of my job, not sure* and *doesn't apply*. The LEC has demonstrated adequate psychometric properties as stand-alone assessment, and was shown to have convergent validity with other measures for assessment of exposure to potentially traumatic events (Gray et al., 2004).

3.3.2. *The Clinical-Administered PTSD Scale for DSM-5*

At all three assessments the CAPS-5 was administered. It is a structured diagnostic interview for the assessment of the PTSD diagnostic status and the symptom severity. A score is obtained through 30 items of which frequency and intensity information is rated on a single 5-point (0-4) symptom severity scale. The maximum score is 80, yet no cut-off score is established for a diagnosis (Weathers et al., 2019). Instead, a diagnosis is given when all PTSD symptoms are present, including exposure to a traumatic event; a minimum of one intrusion symptom, two avoidance symptoms, two cognition and mood symptoms, two arousal and reactivity symptoms; a symptom duration of minimally a month; and significant impairment in daily functioning (American Psychiatric Association, 2013; Weathers et al., 2019). The CAPS-5 is considered the 'golden standard' for PTSD diagnosing (Bovin et al., 2016), and psychometric evaluation has shown strong interrater and test-retest reliability, high internal consistency, and strong correspondence with a DSM-IV diagnosis (Weathers et al., 2019). The Dutch version has also shown high internal consistency ($\alpha = .90$), interrater reliability for total severity scores, and modest interrater reliability for diagnosis (Boeschoten et al., 2018). Moreover, based on the results of a systematic review on assessment measurements, the authors advocate the use of the CAPS for Kurdish, Syrian, and Iraqi refugees (Nakeyar & Frewen, 2016). Literature on the CAPS' utility for other non-western cultures was not found.

3.4 Statistical Analysis

To calculate the overall mean changes in the total and cluster scores of the CAPS-5 from T1

to T2 and T3, a repeated measures ANOVA was performed using IBM SPSS Statistics version 23.0.

In order to interpret the association between the HI-NET and participants' PTSD symptoms, outcome was categorised into recovered, improved, and unchanged from T1 to T2 and from T1 to T3. This was based on criteria of clinically significant change and the Reliable Change Index (RCI; Jacobson & Truax, 1991) following the example of Zepeda Méndez and colleagues (2018). This method was preferred due to the issue of a small sample size leading to potential problems such as a lack of statistical power and outliers biasing results. Clinically significant change was defined as shifting from clinical to subclinical level of symptoms for which the CAPS-5 the diagnostic criteria were used. The RCI was used to establish whether test scores differences between measurements reflected statistically reliable change. RCI values larger than 1.96 or smaller than -1.96 indicate a statistically reliable difference with a 95% certainty of it being due to actual change instead of measurement error. Recovery was defined by a clinically significant change and a statistically reliable improvement (based on RCI). In case participants still had a PTSD diagnosis, they were either defined as improved (a clinically significant change in scores) or unchanged (no clinically significant change in scores). Preliminary effect sizes (Cohen's *d*) were calculated using means and standard deviations of total scores of the CAPS-5 at T1-T2 and T1-T3.

4. Results

4.1. Total Scores of the CAPS-5

An overview of outcomes on CAPS-5 total scores and cluster scores can be found in Appendix II.

4.1.1. Repeated Measures ANOVA

A Schapiro-Wilk test of Normality indicated that all three time variables were normally distributed (T1: $D(13) = 0.97$, $p = 0.88$; T2: $(D(13) = 0.99$, $p = 0.99$; T3: $D(13) = 0.98$, $p = 0.98$). The assumption of sphericity had not been violated as shown by Mauchly's Test of Sphericity ($\chi^2(2) = .56$, $p = .75$). Completion of HI-NET was expected to be associated with a significant reduction of PTSD symptoms, and this was indeed found as the outcome on the CAPS-5 differed significantly over time, $F(2, 24) = 9.78$, $p = 0.001$. Post hoc tests using the Bonferroni correction indicated a non-significant decrease from T1 to T2 ($p = 0.17$) and from T2 to T3 ($p = 0.18$), but scores did significantly decrease from T1 to T3 ($p = 0.001$). Thus,

participants had a decrease in CAPS-5 scores following HI-NET, but this was only significant at the three-months follow-up.

4.1.2. Reliable Change Index

Figure 1 displays the mean total CAPS-5 scores at each measurement point for the three outcome categories. In addition, mean CAPS-5 scores per category can be found in Table 2.

From T1 to T2, the effect was medium-sized (Cohen’s $d = 0.55$). Table 3 shows that six (46.2%) of the 13 participants who completed treatment reported improvement or recovery between T1 and T3 as indicated by reliable changes. The remaining seven (53.8%) showed no change. From T1 to T3, the effect was large-sized (Cohen’s $d = 1.13$). Out of the six patients who showed a reliable change after HI-NET, two patients lost their PTSD diagnosis, and accordingly fulfilled the criteria for clinically significant change.

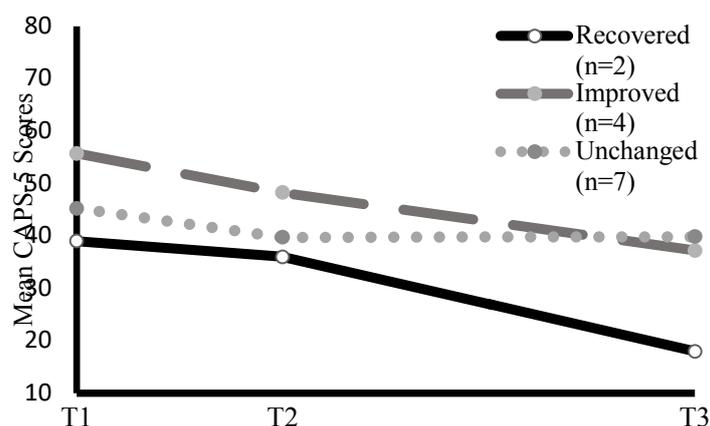


Figure 1. Mean total CAPS-5 scores on T1, T2, and T3 in groups of recovered (patient number: 1,10), improved (patient number: 2,7,8,13), and unchanged (patient number: 3,4,5,6,9,11,12) patients.

Table 2. CAPS-5 scores of total group (N = 13) in categories of recovered, improved and unchanged

| | T1 mean (SD) | T2 mean (SD) | T3 mean (SD) |
|-------------------|---------------|---------------|---------------|
| CAPS-5 total | 47.54 (10.34) | 41.77 (10.82) | 35.69 (10.70) |
| Recovered (N = 2) | 39.00 (7.07) | 36.00 (18.39) | 18.00 (5.66) |
| Improved (N = 4) | 55.75 (8.46) | 48.25 (5.62) | 37.25 (7.97) |
| Unchanged (N = 7) | 45.29 (9.73) | 39.71 (10.86) | 39.86 (8.09) |

T1 = a week before treatment; T2 = a week after treatment; T3 = three months after treatment; CAPS-5 total score: recovered = no diagnosis of PTSD and $RCI \leq 1.96$; improved = diagnosis of PTSD and $RCI < -1.96$; unchanged = PTSD diagnosis and $RC < 1.96$ or > -1.96 .

4.2. Cluster Scores of the CAPS-5

Shapiro-Wilk tests of Normality showed that assessment scores for cluster B, D, and E were normally distributed, except for T1 for the cluster C scores ($D(13) = 0.93$, $p = 0.01$). The

Table 3. Treatment outcome and reliable change indexes on CAPS-5 scores per patient from T1 to T2 and from T1 to T3.

| Patient number | CAPS-5 total T1-T2 | RCI T1-T2 | CAPS-5 total T1-T3 | RCI T1-T3 |
|----------------|-----------------------|-----------|-----------------------|-----------|
| 1 | 3 | -1.15 | 1 | -2.37 |
| 2 | 3 | -0.21 | 2 | -2.01 |
| 3 | 3 | 0 | 3 | 0.47 |
| 4 | 3 | 0 | 3 | -0.47 |
| 5 | 3 | -1.04 | 3 | -0.44 |
| 6 | 3 | -1.36 | 3 | -1.54 |
| 7 | 3 | -1.36 | 2 | -2.37 |
| 8 | 3 | -0.94 | 2 | -2.37 |
| 9 | 1 | -2.40 | 3 | -0.95 |
| 10 | 3 | 0.52 | 1 | -2.60 |
| 11 | 3 | -1.67 | 3 | -1.54 |
| 12 | 3 | 1.46 | 3 | 0 |
| 13 | 3 | -0.63 | 2 | -2.01 |

T1-T2 = difference between a week after treatment and a week before treatment; T1-T3 = difference between three months after treatment and a week after treatment; CAPS-5 score: 1 = recovered (no diagnosis of PTSD and $RCI \leq 1.96$); 2 = improved (diagnosis of PTSD and $RCI < -1.96$); 3 = unchanged (PTSD diagnosis and $RC < 1.96$ or > -1.96).

assumption of sphericity was not violated for cluster B, D and E scores (see Appendix III). A Friedman's Test was used for analysing the cluster C scores.

4.2.1. Scores of Intrusive Symptoms (B-criterion)

The intrusive symptom scores differed significantly over time, $F(2, 24) = 14.21$, $p < 0.001$. Post hoc tests using the Bonferroni correction indicated the intrusive scores did not significantly decrease from T1 to T2 ($p = 0.46$), but did significantly decrease from T2 to T3 ($p = 0.03$) and from T1 to T3 ($p < 0.001$). Therefore, participants showed a significant decrease in intrusive symptoms scores following HI-NET from the week before treatment and a week after treatment to three months follow-up.

4.2.2. Scores of Avoidance Symptoms (C-criterion)

The scores on the avoidance symptoms did not significantly change following HI-NET ($\chi^2(2) = 0.05, p = 0.98$).

4.2.3. Scores of Cognition and Mood Symptoms (D-criterion)

The cognition and mood symptoms scores differed significantly over time, $F(2, 24) = 5.61, p = 0.01$. Post hoc tests using the Bonferroni correction indicated that difference was non-significant between T1 to T2 ($p = 0.28$) or T2 to T3 ($p = 0.35$), but was significant from T1 to T3 ($p = 0.03$). Thus, participants reported a decrease in cognition and mood symptoms following HI-NET, but this was only significant three months after treatment.

4.2.4. Scores of Arousal and Reactivity Symptoms (E-criterion)

Scores of arousal and reactivity symptoms differed significantly over time, $F(2, 24) = 5.24, p = 0.01$. Post hoc tests using the Bonferroni correction indicated that the CAPS scores did not significantly decrease from T1 to T2 ($p = 0.23$) or T2 to T3 ($p = 0.69$), but did significantly decrease from T1 to T3 ($p = 0.02$). So, participants showed a decrease in arousal and reactivity symptoms after HI-NET, but this was only significant at the three month follow up.

5. Discussion

In order to investigate the effectiveness of the HI-NET, this paper studied the relationship between completing a two-week HI-NET program and participants' symptoms of PTSD.

5.1 Overall Symptom Severity

Symptom severity was found to differ significantly over time, yet it was only significant from baseline to the follow-up. At post-treatment, the effects were indicative of a medium effect in terms of effect size. At the three-month follow-up, treatment effects were large, and six participants reported improvement with regard to PTSD symptoms corresponding with reliable changes. Two of the six patients no longer fulfilled the criteria for a PTSD diagnosis. The other four patients reported a significant improvement in PTSD symptoms but still met the criteria for a diagnosis. The remaining seven participants reported no reliable change in PTSD symptoms.

The large effect size ($d = 1.13$) found in the current study is comparable to the large effect size ($g = 1.18$) found in a meta-analysis of NET (Lely et al., 2019). HI-NET as an high

intensive form of treatment may thus be as effective in reducing PTSD symptoms as NET offered with less frequent sessions.

5.2 Symptom Clusters

The current paper also examined the relationship between different symptom clusters and receiving HI-NET. Similar to the results found in the study by Halvorsen and Stenmark (2010), intrusive symptoms decreased significantly from pre-treatment to post-treatment and from post-treatment to follow-up. Moreover, as expected, symptoms of cognition and mood, and arousal and reactivity were found to only significantly decrease from pre-treatment to follow-up. Yet, unlike the findings of Halvorsen and Stenmark, avoidance symptoms did not significantly decrease following treatment. In the CAPS-5 avoidance is measured using only two question items with a score from 0-5, and changes in total score may thus appear to be minor. Diversely, an intensive form of NET may not target avoidance enough to result in a decrease of symptoms. In the study by Halvorsen and Stenmark (2010), avoidance and numbing in the CAPS Criterion C were separated as previous studies suggest they could be distinct symptom clusters and may respond differently to treatment (Asmundson et al., 2004). Their study found a significant decrease in avoidance symptoms, whereas this was not found with numbing severity. NET may thus be more effective in targeting avoidance symptoms instead of numbing, and as this distinction was not made in the current paper it may have led to a non-significant decrease in the C Criterion of the CAPS.

The non-significant effect at post-treatment of total, cognition and mood, and arousal and reactivity symptom reduction may not be surprising as the developers of NET theorise that the healing process requires months to a year to completely unfold. They recommend evaluating the symptoms at 6 months and 1 year posttreatment (Schauer et al., 2011). In the future, it might therefore be more beneficial to postpone the post-treatment and follow-up measurement of PTSD symptoms after completion of HI-NET.

5.3 Strengths, Limitations, and Recommendations for Future Studies

This study is one of the few studies that examined therapy in an intensive and condensed form and showed that HI-NET seems appropriate for participants with various cultural backgrounds. Nevertheless, the lack of control group and small sample size warrant caution in generalisation of the findings and causality. Moreover, although the Dutch CAPS-5 has been well validated for Dutch participants, it is not yet clearly established whether it can be used for non-Dutch participants. Furthermore, the HI-NET sessions were executed according

to the manual by well-trained therapists. Nevertheless it is recommended that each session is monitored for treatment integrity and tolerability. Importantly, five participants dropped out of the treatment program which is unlike the low drop-out rates found in the NET literature. It is unclear what role the HI-NET itself played in the drop-out, and therefore further investigation is needed. Lastly, the HI-NET program consisted of NET-sessions as well as art therapy and trauma-sensitive yoga. These added interventions could have contributed to the treatment effect found. Trauma-sensitive yoga as a stand-alone intervention has shown promising results (West et al., 2017). Furthermore, the few and low-quality studies on art therapy for PTSD show moderate evidence for art therapy significantly reducing anxiety and depression symptoms (McMillan et al., 2018; Nicholson, 2019; Schouten et al., 2019). As the effects of the yoga and art interventions cannot be separated from the NET intervention, no conclusions can be drawn about separate contributions of the components.

Future studies of HI-NET could include additional questionnaires on symptom clusters besides the CAPS-5. For example, in the current study avoidance symptoms were measured using only two question items on the CAPS-5 and additional questionnaires could help gain information on HI-NET's effect on avoidance symptoms. Lastly, studies have shown that symptom severity differs between trauma types with for instance survivors of sexual trauma showing the highest level of severity in comparison to any other type of trauma. The HI-NET was given to participants with diverse trauma types such as early childhood trauma and occupational-related trauma. It would therefore be interesting to examine whether HI-NET shows a difference in effectiveness for these trauma types (Smith et al., 2016).

5.4 Clinical Implications

NET has been developed for treating PTSD as a result of multiple traumas (Elbert et al., 2015). Cumulative exposure has also been shown to be associated with higher levels of PTSD symptoms, and may thus be especially effective for people suffering from more complex PTSD (Green et al., 2000; Lancaster et al., 2009; Resnick et al., 1993). The current paper also found indications that patients with more complex types of trauma benefited from the HI-NET. Specifically when comparing the CAPS scores of recovered, improved and unchanged patients, it appears that participants with a high baseline CAPS score improved significantly from the HI-NET. Remarkably, recovered participants show a comparatively low baseline score. However, it must be kept in mind that the difference may also be due to high scores being able to drop more than low scores. Comorbidity may also influence the baseline score

as comorbid symptoms can increase symptom severity (Spinhoven et al., 2014). As this was not measured in this study more research into baseline severity of symptoms and HI-NET is clearly needed.

The treatment was given in a high intensive form and appears to be as effective in reducing PTSD symptoms as non-intensive forms. As mentioned previously, one of the benefits of high intensive treatment is that it is more suitable for patient populations that benefit less from treatments such as refugees and veterans (Bradley et al., 2005; Steenkamp et al., 2015; Zepeda Méndez et al., 2018). Additionally, NET has been argued to be universally acceptable (Schauer et al., 2011). Besides two veterans, almost half of the participants ($n = 6$) in the current study consisted of refugees, and hence HI-NET appears appropriate for these patients.

6. Conclusion

The preliminary findings of the HI-NET seem promising as symptom severity significantly decreased after three months and six out of thirteen participants showed improvement with regard to PTSD symptoms corresponding with reliable changes. Moreover, HI-NET led to a decrease in intrusive, cognitions and mood, and arousal and reactivity symptoms. HI-NET as an intensive form of NET is a step towards tailoring treatment to the individual patient and improving the treatment of complex PTSD.

7. References

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A TWO-WEEK INPATIENT HIGH INTENSIVE NARRATIVE

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RUNNING HEAD: A TWO-WEEK INPATIENT HIGH INTENSIVE NARRATIVE

Appendix II – Outcomes of the CAPS-5 Total Scores and Cluster Scores

| Patient number | CAPS-5 Total Score | CAPS-5 Total Score | CAPS-5 Total Score | CAPS-5 B-score T1 | CAPS-5 B-score T2 | CAPS-5 B-score T3 | CAPS-5 C-score T1 | CAPS-5 C-score T2 | CAPS-5 C-score T3 | CAPS-5 D-score T1 | CAPS-5 D-score T2 | CAPS-5 D-score T3 | CAPS-5 E-score T1 | CAPS-5 E-score T2 | CAPS-5 E-score T3 |
|----------------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 1 | 34 | 23 | 14 | 8 | 9 | 5 | 3 | 6 | 4 | 9 | 3 | 2 | 14 | 5 | 3 |
| 2 | 47 | 45 | 30 | 11 | 10 | 9 | 6 | 8 | 5 | 17 | 19 | 9 | 13 | 8 | 7 |
| 3 | 30 | 30 | 34 | 11 | 9 | 8 | 3 | 3 | 4 | 9 | 11 | 10 | 7 | 7 | 12 |
| 4 | 43 | 43 | 39 | 13 | 13 | 11 | 6 | 6 | 6 | 12 | 12 | 11 | 12 | 12 | 11 |
| 5 | 40 | 39 | 36 | 15 | 10 | 11 | 6 | 7 | 7 | 8 | 9 | 8 | 11 | 13 | 10 |
| 6 | 45 | 32 | 32 | 13 | 11 | 11 | 6 | 3 | 5 | 13 | 5 | 8 | 13 | 13 | 8 |
| 7 | 66 | 53 | 46 | 17 | 16 | 10 | 7 | 6 | 5 | 26 | 19 | 19 | 16 | 12 | 12 |
| 8 | 51 | 42 | 31 | 14 | 14 | 9 | 6 | 5 | 4 | 17 | 13 | 9 | 14 | 10 | 9 |
| 9 | 62 | 39 | 54 | 19 | 11 | 12 | 7 | 6 | 8 | 21 | 17 | 23 | 15 | 5 | 11 |
| 10 | 44 | 49 | 22 | 11 | 13 | 7 | 2 | 5 | 3 | 18 | 16 | 5 | 13 | 15 | 7 |
| 11 | 49 | 33 | 36 | 12 | 8 | 9 | 8 | 2 | 7 | 16 | 11 | 7 | 13 | 12 | 13 |
| 12 | 48 | 62 | 48 | 10 | 14 | 6 | 6 | 8 | 6 | 15 | 21 | 18 | 17 | 19 | 16 |
| 13 | 59 | 53 | 42 | 15 | 14 | 10 | 7 | 5 | 5 | 20 | 18 | 17 | 17 | 16 | 10 |
| Total Mean | 47,54 | 41,77 | 35,69 | 13,00 | 11,69 | 9,08 | 5,62 | 5,38 | 5,46 | 15,46 | 13,38 | 11,23 | 13,46 | 11,31 | 9,92 |
| SD | 2,87 | 3,00 | 2,97 | 0,83 | 0,68 | 0,582 | 0,500 | 0,51 | 0,45 | 1,46 | 1,55 | 1,70 | 0,74 | 1,17 | 0,90 |

T1 = a week before treatment; T2 = a week after treatment; T3 = three months after treatment; B-score = intrusive symptoms score; C-score = avoidance symptoms score; D = cognitions and mood symptoms score; E = arousal and reactivity symptoms score

Appendix III – Outcomes of Assumption Checking Tests

Table ? Shapiro-Wilk Test of Normality Outcomes of Cluster Scores

| | Statistic | Difference | Significance |
|---------------------|-----------|------------|--------------|
| Cluster B scores T1 | 0,97 | 13 | 0,93 |
| Cluster B scores T2 | 0,94 | 13 | 0,47 |
| Cluster B scores T3 | 0,94 | 13 | 0,46 |
| Cluster C scores T1 | 0,83 | 13 | 0,01 |
| Cluster C scores T2 | 0,93 | 13 | 0,33 |
| Cluster C scores T3 | 0,92 | 13 | 0,24 |
| Cluster D scores T1 | 0,96 | 13 | 0,80 |
| Cluster D scores T2 | 0,95 | 13 | 0,53 |
| Cluster D scores T3 | 0,93 | 13 | 0,32 |
| Cluster E scores T1 | 0,91 | 13 | 0,20 |
| Cluster E scores T2 | 0,96 | 13 | 0,71 |
| Cluster E scores T3 | 0,98 | 13 | 0,95 |

Table ? Mauchly's Test of Sphericity Outcomes of Cluster Scores

| | Mauchly's W | Difference | Significance |
|------------------|-------------|------------|--------------|
| Cluster B scores | 0,64 | 2 | 0,09 |
| Cluster D scores | 0,96 | 2 | 0,79 |
| Cluster E scores | 1,00 | 2 | 1,00 |