Psychiatry Research 266 (2018) 116–123

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Stress management versus cognitive restructuring in trauma-affected refugees—A pragmatic randomised study

Jessica Carlsson[a,b,*], Charlotte Sonne[a], Erik Vindbjerg[a], Erik Lykke Mortensen[c]

[a] Competence Centre for Transcultural Psychiatry, Mental Health Centre Ballerup, Mental Health Services of the Capital Region, Ballerup, Denmark
[b] Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark
[c] Department of Public Health and Center for Healthy Aging, University of Copenhagen, Copenhagen, Denmark

ABSTRACT

The aim of this randomised trial was to compare the effectiveness of stress management (SM) versus cognitive restructuring (CR) in trauma-affected refugees. The intention-to-treat sample comprised 126 refugees with PTSD (SM = 62, CR = 64). The treatment consisted of 16 sessions of psychotherapy with manualised SM or CR in addition to 10 sessions with a medical doctor (psychoeducation and pharmacological treatment). The primary outcome was PTSD symptom severity (Harvard Trauma Questionnaire). Secondary outcomes were symptoms of depression and anxiety (Hopkins Symptom Checklist-25, Hamilton Depression and Anxiety Ratings), quality of life (WHO-5), functioning (Global Assessment of Functioning, Sheehan Disability Scale), pain (Visual Analogue Scale) and somatisation (Symptom Checklist). There was no difference in the primary outcome between groups. A significant group difference was found on the Hamilton Anxiety Rating with the SM group improving more than the CR group (effect size 0.46) indicating that methods in SM could potentially be helpful in this population.

1. Introduction

In mid-2015 the number of refugees worldwide was the highest in 20 years (UNHCR, 2016). A systematic review by Steel et al. found that the proportion of refugees suffering from trauma-related mental health problems, such as post-traumatic stress disorder, is as high as 30% (Steel et al., 2009). Thus, the demand for effective treatment for this group is expected to increase rapidly over the coming years. We also know that trauma-affected refugees often show a complex symptom pattern probably reflecting the long time period with traumatic events, the high number of traumatic events experienced as well as the characteristics of the trauma (Palic et al., 2016; Teodorescu et al., 2012). Furthermore, research shows that post-migratory stressors are related to mental health in trauma-affected refugees and probably challenges treatment outcome (Carswell et al., 2011; Sonne et al., 2016a).

The most recent Cochrane reviews on PTSD treatment highlight pharmacological treatment with selective serotonin reuptake inhibitors (Stein et al., 2009) and promising psychotherapeutic approaches, including trauma-focused cognitive behavioural therapy (TFCBT) and stress management (non-TFCBT) as well as eye movement desensitisation and reprocessing (EMDR) (Bisson and Andrew, 2007). The evidence for combining pharmacological treatment and psychotherapy is still scarce (Hetrick et al., 2010).

The increase in number of treatment-seeking trauma-affected refugees and the complex symptomatology call for a need for evidence-based effective treatment options for this population. So far, rather few treatment outcome studies have been carried out on trauma-affected refugees, and to a large extent services for trauma-affected refugees rely on treatment outcome studies carried out in other trauma-affected populations (Carlsson et al., 2014). The critique of some of the treatment outcome studies on trauma-affected refugees includes rather small samples, limited data on comorbidities, and selected samples in specialised settings (Crumlish and O'Rourke, 2010; Nosè et al., 2017). However, in recent years high-quality treatment outcome studies on trauma-affected refugees are emerging (Buhmann et al., 2016; Sonne et al., 2016b; Stenmark et al., 2013). So far, the studies on psychotherapy carried out specifically on trauma-affected refugees have shown promising results for narrative exposure therapy (NET) in various settings as well as for culturally adapted CBT (Hinton et al., 2004; Nosè et al., 2017). In a randomised clinical trial carried out at the Competence Centre for Transcultural Psychiatry (CPT), the setting of the present trial, a small advantage to psychopharmacological treatment (sertraline) versus CBT was observed. It is possible that the superiority of psychopharmacological treatment compared to CBT reflects

* Corresponding author at: Competence Centre for Transcultural Psychiatry, Mental Health Centre Ballerup, Maglevænget 2, Ballerup 2750, Denmark.
E-mail address: jessica.carlsson@regionh.dk (J. Carlsson).

https://doi.org/10.1016/j.psychres.2018.05.015
Received 4 March 2018; Received in revised form 30 April 2018; Accepted 5 May 2018
Available online 24 May 2018

that some parts of the CBT offered in this study were unsuitable for the population (Buhmann et al., 2016). The clinicians using the psychotherapy manual during this trial experienced several challenges such as a need to focus on ongoing stressors and not only past trauma as well as difficulties in disclosing and separating thoughts, feelings, bodily sensations and behaviours (Buhmann et al., 2016; Vindbjerg et al., 2014). The design and content of the present trial was influenced by these results as well as studies pointing to stress management (SM) as a promising intervention for PTSD (Bisson and Andrew, 2007). A hypothesis that SM would be superior to classical CBT in trauma-affected refugees was based on the assumption that SM would meet the challenges in psychotherapy mentioned above. Firstly, the rationale for the therapy would be easy to explain to the patients and secondly, the sessions would allow for a focus on current problems rather than past trauma. The choice of SM for the present trial and the development of the manual has been described previously in detail (Vindbjerg et al., 2014). The aim of this study was therefore to compare the effectiveness of CBT with a focus on stress management (SM) or cognitive restructuring (CR) in a clinical sample of trauma-affected refugees.

2. Methods

2.1. Setting

The Competence Centre for Transcultural Psychiatry (CTP) is a public outpatient clinic for trauma-affected refugees serving the Mental Health Services in the Capital Region of Denmark (Carlsson et al., 2014).

2.2. Participants

In order to be offered treatment at the clinic, the following requirements must be fulfilled: being at least 18 years old, being a refugee or family reunified with a refugee, having obtained asylum in Denmark, having trauma-related mental health problems, having been referred by a general practitioner, psychiatric practitioner or medical doctor at a hospital and being motivated for treatment. Furthermore, patients with current substance abuse (ICD-10 F1x) were not offered treatment.

2.2.1. Eligibility criteria

All patients admitted to the clinic from 15th June 2011–31st March 2012 and fulfilling the eligibility criteria were invited to participate in the study (Fig. 1). The eligibility criteria for this study were: belonging to the clinic's target group, having a history of at least one severe psychological trauma (typically imprisonment with torture, organised violence, persecution or war experiences), fulfilling the diagnosis of PTSD according to ICD-10 research criteria (WHO Collaborating Centre for Research and Training in Mental Health, 1996) and giving informed consent. The exclusion criteria were having a psychotic disorder (ICD-10 F2x and F30.1-30.9) or a need for admission to a psychiatric ward at the pre-treatment assessment.

2.3. Procedure

All patients referred to CTP were invited to a one- to two-hour pre-treatment assessment with a medical doctor / psychiatrist (henceforth referred to as the medical doctor) at CTP. During the pre-treatment assessment the medical doctors obtained trauma and medical, including psychiatric, history as well as sociodemographic data. Diagnosis of PTSD, depression and enduring personality change after catastrophic experience was determined through a clinical interview followed by entering ICD-10 criteria for each of the diagnoses into a diagnostic algorithm. Psychotic and bipolar disorders were excluded using the Schedules for Clinical Assessment in Neuropsychiatry (SCAN) (WHO, 1999). If the patients fulfilled the eligibility criteria and accepted to participate in the trial, they signed an informed consent and were then randomised to one of the two treatment groups. Patients who fulfilled the inclusion criteria, but who did not wish to participate in the study were offered treatment as usual (TAU), which was similar to the treatment provided to the group offered CR. All patients in need of an interpreter received this assistance and if possible the same interpreter was used throughout the treatment. All interpreters involved in the trial were introduced to the study including the ratings used. See Fig. 1 for a flow chart of the study participants.

2.4. Interventions

For both the SM and the CR group, the treatment programme was planned to last 6–7 months. Participants in both groups were offered a total of 10 sessions with a medical doctor and 16 sessions of psychotherapy with a psychologist. Furthermore, at the start of the treatment, all participants were offered a session with a social worker to assess the social situation and assist in contacting relevant Danish authorities when needed. The sessions with the medical doctor followed a manual and included psychoeducation on predefined topics such as PTSD, sleep, social relations as well as psychopharmacological treatment when needed, following a predefined algorithm. The first choice of psychopharmacological treatment was sertraline gradually increased by 25–50 mg to a maximum dose of 200 mg. Participants who reported sleep problems were offered mianserin in doses of 10–30 mg at night, with doses titrated weekly by 10 mg. Participants who did not wish to receive psychopharmacological treatment or received appropriate psychopharmacological treatment at the time of referral to CTP were included in the study but with no alterations in the pharmacological treatment.

All psychotherapists were trained psychologists and carried out both SM and CR in order to avoid a therapist effect. When possible, the participants had the same psychotherapist throughout the trial. The duration of the psychotherapy sessions was 45–60 min. Separate manuals were developed for the psychotherapy offered for SM and CR respectively. The content of these manuals is described below and has been described in detail by Vindbjerg et al. (2014). In order to ensure compliance with the content of the manual, all psychotherapists participated in monthly manual supervision throughout the study.

Psychoeducation topics covered, psychotherapeutic methods used and compliance with medical treatment were recorded at each session to determine compliance with the treatment programme.

2.4.1. Stress management (SM)

The most common SM programme for PTSD is Stress Inoculation Training (Meichenbaum, 2007). According to this programme, and following the view of Lazarus and Folkman, pathological stress is caused by an insufficient ability to cope with stress and anxiety (Lazarus and Folkman, 1984). The primary goal of the therapy is to help patients acquire and consolidate a number of coping skills. Thus, the sessions focus on learning and applying new coping skills. The SM manual used in this study included the following techniques: (1) relaxation, (2) attention diversion and (3) behavioural activation. Relaxation consisted of a combination of breathing exercises, body relaxation and visualisation exercises. Attention diversion involved shifting focus away from unwanted or uncomfortable thoughts, feelings or impulses. The aim of behavioural activation was to offer techniques to break a vicious circle of inactivity. Among the techniques used were visualisation and activity planning.

2.4.2. Cognitive restructuring (CR)

The CR manual consisted mainly of psychoeducation and cognitive restructuring of negative thoughts resulting from traumatic experiences and exposure. The structure of the CR manual was based on a number of themes for the therapist to select from, based on clinical evaluation and the capabilities and needs of the patient. Each theme consisted of psychoeducation, suggestions for interventions as well as suggestions

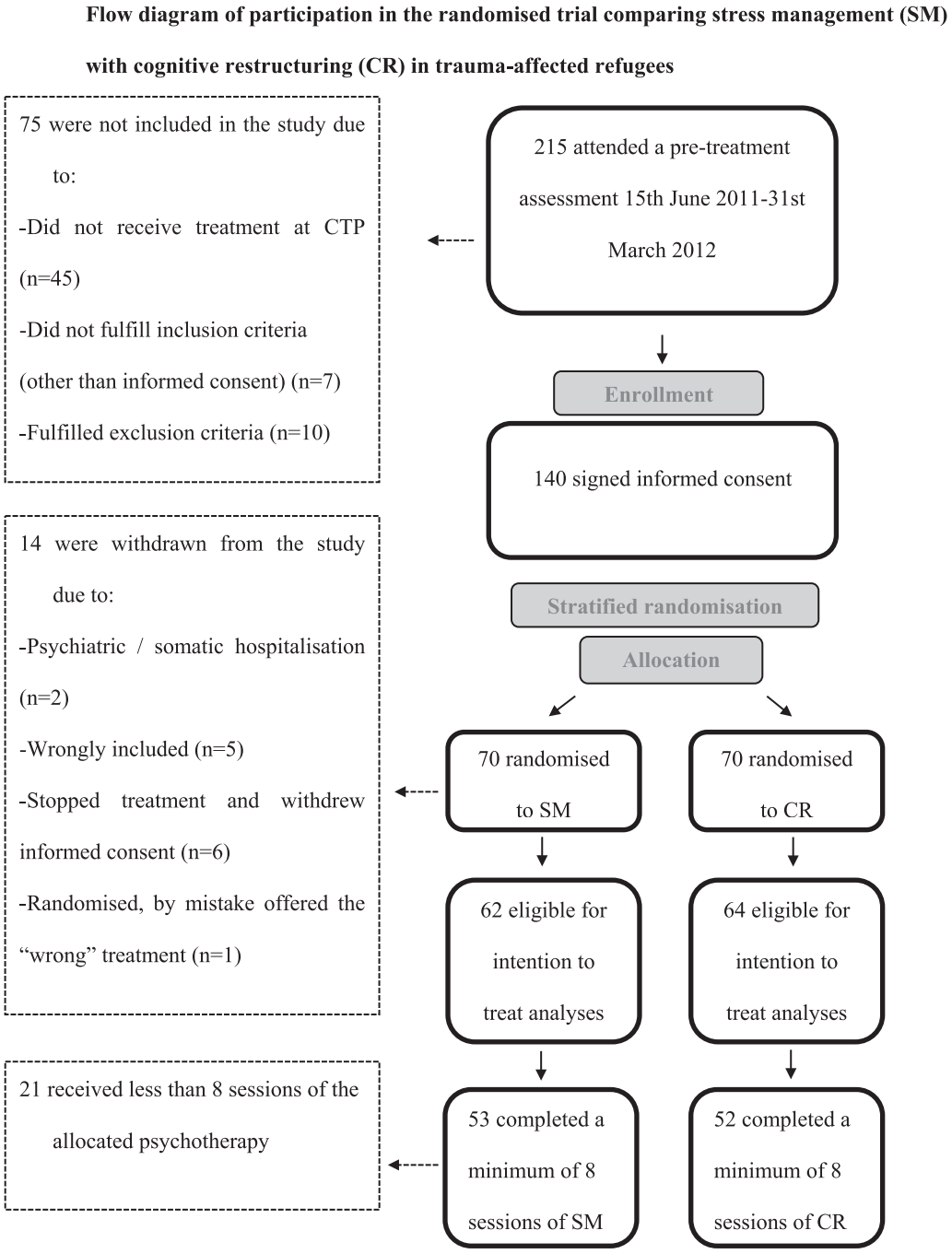

Fig. 1. Flow diagram of participation in the randomised trial comparing stress management (SM) with cognitive restructuring (CR) in trauma-affected refugees.

for homework assignments.

2.5. Outcome measures

The primary outcome measure was PTSD symptom severity measured by the Harvard Trauma Questionnaire (HTQ), part IV. The HTQ has been developed specifically for trauma-affected refugees, and it has been validated and is widely used in refugee studies (Kleijn et al., 2001; Mollica and Caspi-Yavin, 1991). The secondary outcome measures were symptoms of depression and anxiety assessed by both the Hopkins Symptom Checklist-25 (HSCL-25) (Kleijn et al., 2001; Mollica et al., 1987) and Hamilton Depression and Anxiety Ratings Scales (HAM-D and HAM-A) (Bech et al., 1986). Furthermore, the secondary outcomes also included somatisation (somatisation items from Symptom Checklist (SCL)), pain on a visual analogue scale (VAS), well-being on the WHO-5 (Topp et al., 2015), level of functioning using Sheehan Disability Scales (SDS) (Sheehan and Sheehan, 2008) and the Global Assessment of Functioning, Symptom and Function section (GAF-S and GAF-F) (Schwartz, 2007). The measures were all self-report except GAF-S and-F, which were completed by the medical doctor in charge of the treatment and the HAM-D and HAM-A, which were completed by raters blinded to the time of the interview (pre-treatment or post-treatment) and to the intervention group. As the majority of the study participants were expected to be unemployed, we used a previously modified version of the SDS where the wording of the first item was 'work/daily tasks' (Buhmann et al., 2016). All self-administered questionnaires were available in 5 languages: Arabic, Bosnian, Danish, English and Farsi. All outcome measures had been used in a previous

Table 1
Pre-treatment and treatment characteristics for the study population.

Sociodemographic	All (n = 126)*	SM (n = 62)*	CR (n = 64)*
Mean(SD)			
Age	43.3(9.5)	43.1(9.3)	43.5(9.9)
Years since arrival in Denmark (n = 124)	14.8(7.2)	15.3(7.1)	14.3(7.2)
N(%)			
Male	71(56.4)	35(56.4)	36(56.2)
Country of origin:			
Afghanistan	16(12.7)	5(8.1)	11(17.2)
Ex-Yugoslavia	12(9.5)	6(9.7)	6(9.4)
Iran	18(14.3)	8(12.9)	10(15.6)
Iraq	43(34.1)	19(30.6)	24(37.5)
Lebanon	17(13.5)	10(16.1)	7(10.9)
Other*	20(15.9)	14(22.6)	6(9.4)
Education >10 years home country (n = 120)	58(48.3)	26(44.1)	32(52.5)
Muslim (n = 119)*	90(71.4)	38(65.2)	52(85.2)
Married (n = 124)	61(49.2)	32(51.6)	29(46.8)
Children <18 years (n = 123)	82(66.7)	44(71.0)	38(62.3)
Income salary/state education grant (n = 123)	7(5.7)	4(6.6)	3(4.8)
Living alone all the time (n = 124)	33(26.6)	15(24.2)	18(29.0)
Trauma history			
Imprisonment	59(46.8)	28 (45.2)	31(48.4)
Torture (n = 125)	61(48.8)	31(50.8)	30(46.9)
Psychopathology pre-treatment			
Depression	124(98.4)	62(100.0)	62(96.9)
Enduring personality change after catastrophic experience (F.62.0) (n = 122)	61(50.8)	28(45.9)	33(55.9)
Other psychiatric disorders	10(7.9)	6(9.7)	4(6.2)
Psychiatric symptoms > = 10 years(n = 125)	89(71.2)	42(67.7)	47(74.6)
Treatment characteristics			
Mean(SD)			
Number of psychotherapy sessions	11.3(4.23)	11.3(4.14)	11.2(4.36)
Number of session with medical doctor*	8.1(2.06)	8.4(2.07)	7.7(2.00)
Months in multidisciplinary treatment	6.8(1.72)	6.8(1.60)	6.8(1.84)
N(%)			
Antidepressants at end of treatment	97(77.0)	47(75.8)	50(78.1)
Interpreter used in psychotherapy*	79(62.7)	33(53.2)	46(71.9)

SM = stress management, CR = cognitive restructuring.
* Group difference significant: country of origin, other p = 0.04, Muslim p = 0.01, number of session with MD p = 0.03, interpreter used in psychotherapy p = 0.03.

randomised clinical trial at the clinic and had been translated and back-translated. If the participants did not understand any of the above mentioned languages, the questionnaires were translated by an interpreter during the session. If the participants were illiterate, an interpreter assisted with reading the questionnaires. All participants completed self-report ratings three times during the study: during the pre-treatment assessment (pre-treatment), prior to starting psychotherapy, and when completing the treatment programme (post-treatment) (Vindbjerg et al., 2014). The blinded Hamilton observer ratings were carried out twice: pre-treatment and post-treatment. All participants, regardless of the time of terminating the treatment course, were encouraged to complete the post-treatment ratings. In this paper, only measurements from pre- and post-treatment were analysed. Cronbach's alpha at pre-treatment for the HTQ was 0.79 and for the secondary outcomes ranged from 0.71–0.89.

2.6. Randomisation

A computer-generated randomisation sequence was obtained from the Department of Biostatistics at the University of Copenhagen. Allocation was concealed by using sequentially numbered sealed envelopes. The randomisation was stratified by gender and level of severity of PTSD symptoms measured on the HTQ. A stratification level of 3.2 was chosen because 3.2 had previously been shown to reflect a mean HTQ score at CTP. When the clinicians had obtained informed consent from a participant, they received the allocation by calling a secretary at Mental Health Centre Ballerup with no other contact to CTP, administering the randomisation envelopes. Neither clinicians nor patients were blinded in this study.

2.7. Data analyses

Pre-treatment descriptive data and data on the treatment provided were analysed for group differences with chi-square and t tests. Differences between pre- and post-treatment ratings were analysed using a mixed model. For each rating the mixed model included intervention group, rating time (pre- treatment or post-treatment) as well as interaction between intervention group and time (pre- or post-treatment assessment) as predictors. By using Stata's ``margins' and ``contrast'' commands, it is possible to obtain estimates for pre- and post-treatment group means, to test group differences on pre- and post-treatment ratings separately, to test differences between pre- and post-treatment ratings in each group and group differences in differences between pre- and post-treatment ratings (corresponding to the interaction between intervention group and time of assessment). This analysis was conducted on all participants with pre-treatment data, i.e. the intention-to-treat sample. Pre-post-treatment differences are often correlated with pre-treatment scores. Therefore, differences between the SM and CR groups were also analysed with regression models that included pre-treatment scores on each rating scale and intervention group as predictors and the post-treatment score on the rating scale as outcome. To conduct intention-to-treat analyses the regression analyses were conducted using Full Information Maximum Likelihood (FIML) which incorporates all available information including pre-treatment scores for participants without post-treatment scores. The structural equation modelling procedure of Stata 14 (“sem”) was used to conduct these analyses. Both the mixed model and the regression models were conducted with robust standard errors. The analyses conducted on the intention-to-treat sample were repeated for a reduced sample of psychotherapy completers (defined as having participated in eight or more psychotherapy sessions). All analyses were carried out using Stata 14.

2.8. Ethics

All participants signed a written informed consent and were informed that they could withdraw their consent at any time without this affecting the treatment offered. The project was planned in accordance with the Helsinki Declaration II, and had been approved by the Danish Data Protection Agency and the Danish Ethical Committee of Science (H-4-2011-020). Furthermore, the project is registered with ClinicalTrial.gov (NCT01362543) and is compliant with the Consolidated Standards of Reporting Trials (CONSORT) and Statement for trials assessing nonpharmacological treatments (Boutron et al., 2008). The study was monitored by the Good Clinical Practice (GCP) Unit at Copenhagen University Hospital.

3. Results

Fig. 1 illustrates the flow of the study population throughout the study.

3.1. Characteristics of the study population

Table 1 shows pre-treatment characteristics of the study population in the respective treatment groups. The population originated mainly from the Middle East and had stayed in Denmark for a mean of 14.8 years and 98.4% of the population had a comorbid depression at baseline. The participants in SM and CR did not differ significantly in age, gender, education, duration of stay in Denmark or comorbid psychiatric disorders. There were significantly more in the SM group from "other, country of origin" and there were significantly more Muslims in the CR group.

3.2. Treatment

Table 1 shows characteristics of the treatment offered. The SM group received slightly more sessions with the medical doctor. A mean of 77.0% received antidepressants at the end of treatment with no difference between the two groups. The most common psychotropics used in both groups were sertraline and mianserin following the algorithm in the medical doctors' manual. Three participants (two randomised to CR and one to SM) did not receive psychotherapy at all after randomisation. All three decided to drop out of treatment at CTP shortly after randomisation. With regard to the psychotherapy methods recorded, four participants in the SM group did not receive any of the core SM components as defined in the SM manual. In the CR group, none of the participants had failed to receive any of the core CR methods as defined in the CR manual. Approximately 62.7% used an interpreter during psychotherapy. Fewer participants in the SM group needed an interpreter (53.2%) compared to the CR group (71.9%) ($p = 0.03$), but we found no significant association between treatment outcome and using an interpreter. There were 105 (83%) participants completing eight or more sessions of psychotherapy. This group was defined as psychotherapy completers as eight sessions were considered a minimum in order to obtain a change in this population. No difference was found in proportion of completers between intervention groups compared to the intention-to-treat sample.

3.3. Outcome

3.3.1. Pre- and post-treatment ratings

There were 111 participants that had completed the primary outcome rating (HTQ) both pre- and post-treatment. For the secondary outcomes, between 99 and 111 completed both pre- and post-treatment ratings, with an exception for GAF-F and GAF-S, where 81 had completed both pre- and post-treatment ratings. The mixed model analyses showed no significant main effects corresponding to the overall mean differences between the two treatment groups. Similarly, there were no significant differences between the two treatment groups pre- and post-treatment. The main effect corresponding to the pre- to post-treatment difference for the full sample was significant for the primary outcome HTQ ($p = 0.04$), and this was also the case for the two GAF-scores (GAF-F $p = 0.009$, GAF-S $p = 0.000$). However, Table 2 shows that the interaction between treatment group and time of assessment was only significant for HAM-A ($p = 0.03$). This interaction reflected a significant decline in scores between pre- and post-treatment scores in the SM group, but a non-significant increase in HAM-A scores in the CR group with an effect size of 0.46. For the primary HTQ outcome, the small improvement in the two treatment groups was only statistically significant for the CR group, but the interaction was not significant ($p = 0.45$) meaning that there was no statistically significant group difference between the pre-post changes on the HTQ.

Table 2 shows a number of outcome variables showing significant change in only one of the treatment groups, and this may suggest different effects of the two treatments. In addition to the HAM-A score, only the SM group showed significant improvement on the HAM-D score. In contrast, only the CR group showed significant improvement on the HTQ score, but significant worsening on the VAS score. Since the interactions were not significant for these variables and the significant results do not consistently indicate stronger effects of one of the two treatments, these findings were not interpreted.

The completer analyses ($n = 105$) showed essentially the same results as the full sample. A significant interaction between treatment group and time of assessment was only observed for HAM-A, and this interaction reflected significant improvement in the SM group and worsening in the CR group.

3.3.2. Adjustment for pre-treatment scores

Table 3 illustrates differences between the SM and the CR groups in the intention-to-treat sample ($n = 126$) analysed with adjustment for pre-treatment scores and using Full Information Maximum Likelihood regression. No significant post-treatment differences between the two treatment groups were found on the primary outcome measure. On the other outcome measures, we found a significant group difference on HAM-A in favour of SM. The effect estimate of a mean difference of 3.22 between the two treatment groups was quite close to the estimate of 3.42 in the mixed analysis unadjusted for pre-treatment scores. Neither of the two analyses found evidence of differential treatment effects for any other outcome variable. When the regression model was repeated on the completer sample ($n = 105$), the treatment group differences on HAM-A remained statistically significant.

The variable being Muslim was unevenly distributed between SM and CR. When examining the association between this variable and the outcome ratings, the variable was significantly associated with a poorer outcome in HAM-A, SCL and HSCL-25. Consequently, the variable was added to the previous regression model, but the treatment group difference on HAM-A remained significant in this supplementary analysis.

4. Discussion

This study is one of the largest randomised trials on trauma-affected refugees focusing on psychotherapy and the first to compare SM with CR. We found no difference between SM and CR as to the primary outcome measure, but a possible advantage of SM on the secondary outcome HAM-A. Thus the hypothesis that SM would be more effective in decreasing PTSD symptoms compared to CR was falsified. In previous RCTs at CTP no interventions have shown superiority in decreasing PTSD symptoms (Buhmann et al., 2016; Sonne et al., 2016a). The participants in this trial are similar to previous CTP trial participants and are characterised by having severe symptoms, comorbidity, lengthy stay in Denmark and low level of functioning. For many, the mental health problems should probably be considered chronic and the results of this study seen in this light. The current sample is not easily comparable to populations with less severe trauma load or shorter history of mental health problems. A small study ($n = 28$) comparing Stress Inoculation Training (with similarities to the SM offered in this study) to NET found an advantage to NET in mainly recently arrived refugees and asylum seekers (Hensel-Dittmann et al., 2011). Several studies have been able to reproduce good results with NET on different refugee populations although none with populations having been in exile as long as the present CTP population (mean 14.8 years) (Nosè et al., 2017). In a recent Dutch trial, which used broad inclusion of trauma-affected refugees, no difference in outcome was found between those randomised to EMDR or "stabilisation as usual" (ter Heide et al., 2016). The pre-treatment ratings in the Dutch sample were slightly lower in HTQ and HSCL-25 (fewer symptoms) compared to the CTP sample and the population had been in the Netherlands for 8/10 years, which is less than the present sample, but substantially more than most psychotherapy studies on trauma-affected refugees (Hensel-Dittmann et al., 2011; Stenmark et al., 2013). It is plausible that study samples with a shorter stay in the new country include fewer participants with chronic conditions compared to our CTP sample, and preliminary findings in another CTP study showed length of stay to be a negative

Table 2
Score differences between pre- and post-treatment.

Self-administered ratings of symptoms, quality of life and level of functioning						
Rating	Groups and differences	Mean pre-treatment score (SE)	Mean post-treatment score (SE)	Difference (SE)	*P*-value	Effect size
HTQ	SM	3.18 (0.06)	3.10 (0.08)	**0.08 (0.06)**	**0.19**	**0.19**
	CR	3.21 (0.05)	3.06 (0.07)	**0.15 (0.07)**	**0.03***	**0.35**
	Difference	−0.03 (0.08)	0.04 (0.11)	0.07 (0.09)	0.45	0.16
HSCL-25	SM	3.05 (0.05)	2.96 (0.08)	0.09 (0.07)	0.19	0.20
	CR	3.06 (0.06)	3.01 (0.08)	0.05 (0.06)	0.45	0.11
	Difference	−0.01 (0.08)	−0.05 (0.11)	0.04 (0.09)	0.60	0.09
SCL-90	SM	2.69 (0.09)	2.69 (0.12)	0.00 (0.09)	0.99	0.00
(somatic)	CR	2.51 (0.11)	2.58 (0.10)	*−0.07 (0.08)*	0.37	*0.09*
	Difference	0.18 (0.14)	0.11 (0.16)	0.07 (0.12)	0.54	0.09
VAS	SM	6.99 (0.27)	6.99 (0.31)	**0.00 (0.30)**	**0.99**	**0.00**
	CR	6.55 (0.31)	7.00 (0.30)	***−0.45 (0.22)***	**0.04***	***0.19***
	Difference	0.44 (0.42)	−0.01 (0.43)	0.45 (0.37)	0.22	0.19
	SM	14.52 (1.92)	17.96 (2.79)	−3.44 (2.44)	0.16	0.21
WHO-5	CR	13.76 (2.14)	16.52 (2.62)	−2.76 (2.98)	0.35	0.17
	Difference	0.76 (2.87)	1.44 (3.83)	0.68 (3.85)	0.86	0.04
	SM	22.90 (0.82)	22.93 (0.94)	*−0.03 (0.84)*	0.97	*0.02*
SDS	CR	23.28 (0.69)	23.63 (0.85)	*−0.35(0.77)*	0.66	*0.18*
	Difference	−0.38 (1.07)	−0.70 (1.27)	0.32 (1.14)	0.78	0.16
Observer ratings						
HAM-D	SM	23.83 (0.83)	21.98 (1.10)	**1.85 (0.90)**	**0.04***	**0.29**
	CR	24.34 (0.78)	23.60 (0.97)	**0.74 (0.94)**	**0.43**	**0.12**
	Difference	0.51 (1.14)	−1.62 (1.47)	1.11 (1.31)	0.40	0.18
HAM-A	SM	27.12 (0.95)	24.78 (1.25)	**2.34 (1.10)**	**0.03***	**0.32**
	CR	26.09 (0.95)	27.17 (1.24)	**−1.08 (1.16*)***	**0.35**	***0.15***
	Difference	1.03 (1.35)	−2.39 (1.76)	**3.42 (1.60)**	**0.03***	**0.46**
GAF-S	SM	47.43 (0.77)	50.83 (1.19)	**−3.40 (0.98)**	**<0.01***	**0.61**
	CR	45.94 (0.63)	49.21 (0.83)	**−3.27 (0.85)**	**<0.01***	**0.59**
	Difference	1.49 (0.99)	1.62 (1.45)	0.13 (1.29)	0.92	0.02
GAF-F	SM	49.05 (0.86)	50.95 (1.23)	**−1.90 (1.02)**	**0.06**	**0.29**
	CR	46.94 (0.79)	49.41 (0.99)	**−2.47 (1.01)**	**0.01***	**0.37**
	Difference	2.11 (1.17)	1.54 (1.58)	0.57 (1.44)	0.69	0.09

HTQ = Harvard Trauma Questionnaire, HSCL-25 = Hopkins Symptom Checklist-25, VAS = Visual Analogue Scale, WHO-5 = WHO-5 Well Being Index, SDS = Sheehan Disability Scale.
HTQ, HSCL-25, SCL = 1–4 (1 best score), Symptom Checklist-90 = SCL-90, VAS = 0–10 (0 best score), WHO-5 = 0–100 (100 best score), SDS = 0–10 (0 best score).
SE = standard error.
Hamilton Depression/Anxiety Rating Scales = HAM-D/-A.
Global Assessment of Functioning, Symptom/ Function = GAS-S/-F.
HAM-D = 0–52 (0 best score), HAM-A = 0–56 (0 best score), GAF = 0–100 (100 best score).
Overview of pre-and post-treatment rating scores for the intention-to-treat sample. The *p*-values refer to the significance of differences between pre- and post-treatment ratings in each group and the significance of group differences in the difference between pre-and post- treatment ratings (corresponding to the interaction between intervention group and rating time). Based on the mixed model for the full sample, group differences at the pre- and post-treatment assessments were estimated as simple main effects and so were the pre-post treatment differences for each intervention group. The group difference in pre-post treatment differences corresponds to the interaction coefficient in mixed model.
Bold = improvement, *Italic* = deterioration.
* $p <= 0.05$.

Table 3
Regression coefficients for group differences at follow up.

Adjusted for pre-treatment rating scores					
Rating	Regression coeffiecient, B (95% CI)	Beta-cofficient	SE	*Z*-score	*P*
HTQ	*0.06 (−0.11–0.23)*	0.05	0.09	0.68	0.50
HSCL	**−0.05 (−0.23–0.13)**	−0.04	0.09	−0.58	0.57
SCL	**−0.03 (−0.26–0.19)**	−0.02	0.12	−0.29	0.77
VAS	−0.30 (−0.98–0.38)	−0.07	0.35	−0.87	0.38
WHO-5	**1.18 (−5.77–8.14)**	0.03	3.55	0.33	0.74
SDS	**−0.16 (−0.86–0.54)**	−0.04	0.36	−0.44	0.66
HAM-D	**−1.35 (−3.79–1.09)**	−0.09	1.25	−1.08	0.28
HAM-A	**−3.22 (−6.26- −0.18)**	−0.17	1.55	−2.07	**0.04***
GAF-S	**0.67 (−1.77–3.11)**	0.05	1.39	0.54	0.59
GAF-F	**0.15 (−2.57–2.86)**	0.01	1.26	0.11	0.92

CI = confidence interval.
Bold: in favor of SM, Italic: in favor of CR.
*$p <= 0.05$.

predictor of treatment outcome (Sonne et al., 2016a). The heterogeneous samples of trauma-affected refugees call for a differentiated evaluation of the results of outcome studies on trauma-affected refugees.

Although a difference was found between SM and CR and significant pre-post treatment improvement was found on several ratings, the pre-post rating score differences were, as in previous CTP trials, generally small (Buhmann et al., 2016; Sonne et al., 2016b). This in addition to the small effect sizes further support the chronicity of mental health symptoms in the study sample. In the light of positive results of NET it would be of interest to try replicating the promising results on NET in a more chronic population such as the present in order to assess the effect in a population with PTSD symptoms persisting over many years.

From a clinical perspective the advantage of SM on observer-rated anxiety is in line with core components in SM lowering anxiety by focusing on bodily relaxation, breathing and behavioural activation. The results from the mixed models analyses and the structural equation procedure both supported a possible difference in effect on observer-rated anxiety (HAM-A), but it is worth noting that the rest of the

measurements showed no significant evidence of group differences in treatment effects.

Furthermore, significant improvement was found over time across groups on the primary outcome HTQ as well as on both GAF-scores. The improvement over time was similar in both groups but cannot definitively be linked to treatment effects as there was no waiting list control group. It is an interesting finding that the most prominent improvements across groups were on the observer-rated GAF and points to a need to further explore possible differences between self-report versus observer-ratings and to identify suitable, reliable and cross-culturally appropriate measurements.

4.1. Strengths and limitations

The large size of the study as well as the pragmatic inclusion with only few exclusion criteria, make results relevant for treatment-seeking trauma-affected refugees broadly (Thorpe et al., 2009). There were several methodological limitations. Diagnoses of PTSD were made based on clinical interviews, rather than a validated structured interview. A waiting list control group used in the previous randomised trial at CTP showed no change in the ratings over time. This lack of change together with the fact that there was no natural waiting list at CTP at the time of the study led to the decision of keeping the present study to two active arms. Another potential limitation is the use of rating scales in culturally heterogeneous groups with unknown consequences for the psychometric quality of the scales. With regard to the intervention offered, it was not considered possible to blind clinicians or participants and only the ratings HAM-A and -D were blinded. Although manuals had been developed for both medical doctors and psychologists and the compliance with manuals was closely monitored, a certain variation in the therapy offered will occur according to emergent needs of the participants. Lastly, although the focus in this paper is on PTSD, the high level of comorbid depression only permits this study to conclude on treatment of PTSD with comorbid depression and the fact the participants received multidisciplinary treatment should be kept in mind when interpreting the results.

4.2. Perspectives

Based on these findings, SM, a less frequently used therapy in trauma-affected refugees, does not seem to be less effective than CBT with a focus on cognitive restructuring and may potentially be more effective for anxiety symptoms. This study suggests looking further into methods from SM as a part of the psychotherapy offered to trauma-affected refugees. The limited effect found repeatedly in the consecutive randomised trials at CTP points to the need for further research to explore treatment strategies for this patient group. One area is the search for new treatment modalities and testing existing approaches such as NET, which has shown promising results in slightly different settings. There is also a need for a better understanding of the consequences of a delay in offering treatment as well as the influence of post-migration stressors in relation to treatment outcome.

Conflicts of interest and source of funding

The study was funded by TrygFonden (J.nr. 7-10-1002). The authors have no conflicts of interest.

Acknowledgements

The authors thank all participants and employees, especially the psychologists at CTP and Morten Ekstrøm head of CTP for making this study possible.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2018.05.015.

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