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Research Paper

Trauma-focused group music and imagery with women suffering from PTSD/Complex PTSD: A randomized controlled study

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ARTICLE INFO

ABSTRACT

Background: Women with a history of physical, sexual, and/or emotional abuse often suffer from post-traumatic stress disorder (PTSD) or complex posttraumatic stress disorder (CPTSD). Meta-analyses report that cognitive behavioural therapies (CBTs), followed by eye movement desensitization and reprocessing (EMDR) are the most studied psychotherapies for trauma treatment. Focus primarily lies on individual therapy — even though some studies on group therapy for trauma treatment also exist. Few studies exist regarding other alternative therapy forms, such as art-based psychotherapies or body-focused therapies.

Aim: This study investigated effects from the group music and imagery (GrpMI) method — a type of receptive music therapy — on trauma-related symptoms in women suffering from PTSD or CPTSD after physical, psychological, and/or sexual abuse.

Material and methods: Using a randomized controlled parallel-group design, a sample of 45 women were either assigned to a treatment group (T) who received 12 weekly treatment sessions of GrpMI or to a waiting list control group (WLC). Self-report scales were administered immediately before and after the intervention and at a three-month follow-up

Results: A two-way mixed ANOVA showed a large group-by-time interaction effect on PTSD symptom severity ($F(1, 42) = 8.68$, $p = .005$ and Cohen's $d = 0.94$). A repeated-measures ANOVA showed a large effect within the T group ($F(1, 20) = 16.6$, $p = .001$, $d_{av} = 1.02$), and the improvement remained at follow-up. The drop-out rate in the T group was as low as 4.5%.

Conclusion: The findings suggest that GrpMI may be efficacious for treating women with PTSD/CPTSD, but further controlled studies with larger samples are warranted. The study is registered at ClinicalTrials.gov (Registration number: NCT03503526)

1. Introduction

The European Union (EU) Agency for Fundamental Rights reported that the prevalence of women in the EU, who experienced physical or sexual violence since age 15, is about 33%. And 35% of the study cohort reported a history of physical/ sexual and psychological childhood abuse (European Union Agency for Fundamental Rights, 2015). Victims of such abuse often suffer from post-traumatic stress disorder (PTSD) or complex PTSD (CPTSD) (Cloitre et al., 2013; Ehring et al., 2014; Elklit et al., 2014; Karatzias, Murphy, et al., 2019). As per the 11th revision to the WHO International Classification of the Diseases (ICD-11), CPTSD includes the core PTSD symptoms of re-experiencing, active avoidance, and hyper-reactivity — and symptoms that reflect disturbances in self-organization; affective dysregulation, negative self-concepts, and disturbances in relationships (World Health Organization, 2019). Prolonged, repeated exposure to traumatic events — especially if experienced in circumstances where escape is difficult (such as childhood abuse) — is associated with an increased risk for CPTSD (Karatzias et al., 2019).

Several guidelines (e.g., Swedish National Board of Health and Welfare (2017), and World Health Organization (2013)) list trauma-focused cognitive behavioural therapy (CBT), prolonged exposure (PE), and eye movement desensitization and reprocessing (EMDR) as treatments of choice for PTSD. These psychotherapy methods are also the most studied. Meta-analyses have shown overall good results

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with these methods (Bradley et al., 2005; Cloitre, 2009; Cusack et al., 2016; Ehring et al., 2014; Karatzias et al., 2019; Watts et al., 2013). In a meta-analysis of 51 studies, CBT exposure alone and EMDR were all superior to treatment as usual (TAU) with Hedges' *g* effect size (ES) ranging from -0.90 to -1.26 (Karatzias et al., 2019).

Drop-out rates, however, are high (Bradley et al., 2005; Cloitre, 2009; Goetter et al., 2015; Imel et al., 2013; Kehle-Forbes et al., 2016; Lewis et al., 2020; Najavits, 2015; Schottenbauer et al., 2008) – and even higher in cases of more severe PTSD and CPTSD, which might be due to the strong avoidance component in the diagnosis, especially for more severely traumatized individuals (Cloitre, 2009; Dorrepaal et al., 2014; Najavits, 2015). In consideration of these concerns regarding established treatment options, research on additional treatment methods is relevant and warranted (Cloitre, 2015; Dorrepaal et al., 2014; Najavits, 2015; Watts et al., 2013). In a discussion of effective treatment methods for childhood abuse survivors, three main viewpoints on treatment strategies emerge (1) trauma-focused treatments without adaptation, (2) trauma-focused treatments with modifications for the specific needs of this group (phase-based treatment), and (3) that trauma-focused treatment is not suitable for this group due to emotional regulation difficulties and symptom exacerbation risk (Ehring et al., 2014). The two latter treatment approaches are focused on stress management, affect regulation, modulation of negative self-concepts, and activation of the social engagement system (Porges, 2003), altogether with the aim to increase the capacity to tolerate arousal. The arousal span within which an individual can feel calm, safe, and connected with self and others has been called the *window of tolerance* (WoT) (Siegel, 2001). As per this perspective on trauma treatment, a sufficient feeling of safety is crucial for the capacity to process traumatic memories (van der Hart, Nijenhuis, & Steele, 2006; Levine, 2010; Siegel, 2019).

To facilitate the above process, imagery and nonverbal methods were suggested. (Arntz et al., 2005; Brom et al., 2017; Garrido et al., 2015). Imagery has been used in hypnosis for the treatment of intrusive aversive memories in PTSD. Individuals with PTSD tend to have high imagery ability (Cardeña et al., 2000). Imaginal techniques are used to help the client titrate the traumatic memory's intensity. Examples of such techniques are fractionated abreaction, projective screen techniques, and imaginal memory container. Furthermore, suggestions and images are used to enhance the experience of personal power and ego strength (Cardeña et al., 2000; Kluft, 2013; McNeal, 2020). The imagery rescripting (IR) method was developed within cognitive behavioural therapy. Techniques (such as psychodrama and hypnosis) inspired the therapy, where, for example, imaginal expression of inhibited defence responses are used to dissolve feelings of victimization and helplessness (Arntz et al., 2007; Holmes et al., 2007). A meta-analysis including 19 trials (whereof eight with clients suffering from PTSD), showed that IR reduced symptoms in comparison with waitlist control with a large ES (g = 0.90) at posttreatment (Morina et al., 2017). In contrast to imagery exposure (IE) alone, treatments with IE + IR had a lower dropout rate, 51% vs. 25% in a series of 10 individual sessions (Arntz et al., 2007).

Body-oriented therapies (i.e., somatic experiencing (SE) and sensorimotor psychotherapy) and creative art therapies (CAT) (i.e., art therapy, music therapy, and dance therapy) are used as ways of increasing tolerance of bodily sensations and emotions, thus widening the WoT and strengthening the social engagement system (Brom et al., 2017; Garrido et al., 2015; Gerge et al., 2019; Körlin, 2009; van der Kolk, 2015). Imagery and movements are used to express inhibited defence responses in a similar way as in IR (Levine, 2010; Ogden et al., 2006; van der Kolk, 2015).

Although research is limited, there is some evidence that CATs are effective in reducing symptoms relevant to PTSD. In a systematic review on CATs, significant stress reduction was reported in 30 of the included 37 studies (Martin et al., 2018). Likewise, the effectiveness of music therapy – to reduce stress and anxiety and improve psychological functioning – was demonstrated in several Cochrane reviews on the treatment of different conditions, including depression, dementia, and schizophrenia (Aalbers et al., 2017; Geretsegger et al., 2017; van der Steen et al., 2018). In a study by Körlin (2000), effects of CAT groups for psychiatric patients with different diagnoses showed significantly better outcomes related to anxiety and depression for those with a trauma-related disorder than for those without a trauma history. In another study on group music therapy for women who had experienced domestic violence, significant effects on depression and anxiety were found (Teague et al., 2006). The usefulness of music therapy as a tool for affect regulation and stress management has been supported by research that shows that music listening activates brain structures involved in pleasure, reward, and emotional processing (Chanda & Levitin, 2013; Koelsch, 2009, 2014) such as the insula, ventral medial prefrontal cortex, amygdala, hippocampus, and ventral striatum (including nucleus accumbens) (Brown et al., 2004; Koelsch, 2009). Music seems to facilitate access to implicit memory, formulate content with nonverbal means, and regulate emotions (Juslin, 2019; Körlin et al., 2000).

In a theoretical review of music therapy for PTSD in adults, four empirical studies were found (Landis-Shack et al., 2017). Amongst these four studies, only one was a randomized controlled study with PTSD symptoms as the primary outcome (Carr et al., 2012). Patients in the music therapy group showed a significantly greater reduction of PTSD symptoms than in the control group.

In studies of psychotherapy with guided imagery and music (GIM) in individual formats and group settings, small to large ES were reported for improvement of trauma-related symptoms such as anxiety, depression, mood disturbance, interpersonal problems, sleep disturbance, and quality of life (Blake & Bishop, 1994; Blake, 1994; Bonde & Nygaard Pedersen, 2015; Goldberg, 1994; Körlin et al., 2000; McKinney & Honig, 2017). A few studies also addressed the effect of GIM and/or modifications of the method, on PTSD/ CPTSD specifically. For example, Maack (2012), Beck et al. (2017), and Story & Beck (2017) studied the effects of individual GIM on women with CPTSD, traumatized refugees, and female military veterans. They reported reduced PTSD symptoms after treatment. In a recent randomized controlled study comparing trauma-focused music and imagery (TFMI) with psychological treatment as usual (TAU) in the treatment of traumatized refugees, it was found that TFMI was non-inferior regarding change of trauma symptoms (Beck et al., 2021). The TFMI group had a lower dropout rate of 5% compared to a dropout of 40% in the TAU group. A feasibility pilot study with trauma-focused group music and imagery (TFGrpMI) for women suffering from PTSD or CPTSD, found promising results regarding the efficacy of the method (Rudstam et al., 2017).

This study investigated the effect of phase-based TFGrpMI on PTSD symptoms in traumatized women. The primary hypothesis was that PTSD symptom severity will decrease in the active T group in comparison to a waiting-list control arm. Secondary outcomes were self-rated anxiety, depression, dissociation, level of function, and symptoms related to CPTSD.

2. Method

2.1. Ethical considerations

The Regional Ethical Review Board in Stockholm, Sweden (Registration number: 2015/895-31) approved this study, which is registered at the ClinicalTrials.gov trial registry (Registration number: NCT03503526). Informed written consents were obtained from all participants and are retained by the first author.

2.2. Participants

A total of 78 females, referred for treatment of PTSD to a private clinic specialized in trauma treatment in the Stockholm area (Sweden), were recruited for assessment of eligibility, based on their possible history of sexual or physical abuse. Subjects who agreed to participate in the study completed questionnaires that measure symptoms of PTSD, dissociation, comorbid depression, anxiety, and self-assessed functioning. The assessments were conducted by a certified psychotherapist and a psychologist with (i) extensive experience working with traumatized clients and (ii) specific training in GIM and expressive arts. They asserted whether the patients had understood the questions in the self-rating scales and helped them clarify symptom levels. During an assessment phase of two to three sessions, the clients were asked to (i) make a lifeline with significant experiences (positive and negative) and (ii) participate in a short, individual, music and imagery (MI) session that tested the capacity for using music to spontaneously access images and memories. In this short MI session, the client was helped to find and explore a peaceful place while listening to a calm, slow classical music piece of 2–6 minutes in length.

To meet the inclusion criteria, the participant had to be: (1) at least 18 years old, (2) female, (3) referred for treatment of PTSD/CPTSD, and (4) interested in using artistic media for trauma processing. Reasons for candidates to be excluded from the allocation process were: (1) severe dissociative disorder, (2) difficulties in understanding and expressing themselves in Swedish, (3) severe personality disorder, psychotic disorder, and/or neuropsychiatric disorder, (4) ongoing alcohol or drug abuse, (5) suicidality, (6) serious ongoing medical conditions, (7) apparent inability to, or dislike of, symbolizing or processing via creative arts, or (8) other ongoing psychotherapeutic treatments.

A calculation *a priori* of the estimated sample size, performed using G*Power software (version 3.1.6) with an alpha level of .05 and an assumed ES of 0.4 (Cohen's *f*), showed that 52 participants were desired to achieve a recommended minimum power of .80 (Cohen, 1988). This number, however, could not be achieved because the trauma centre changed its clinical focus, which reduced the influx of eligible patients. Finally, 45 individuals were included in the study and randomized to either a waiting-list control group (WLC, n = 23) or an experimental treatment group (T, n = 22). Out of the eligible 78 participants, five individuals refused to participate in group treatment, eight individuals couldn't participate due to their living situations, six individuals had other psychiatric diagnoses and/or did not meet the criteria for PTSD, six individuals could not fulfil the assessment, and eight individuals had other ongoing psychotherapeutic treatments (see Fig. 1).

The pretest assessment showed no significant differences between the T and WLC groups on the demographic characteristics described in Table 1 (including age, trauma history, country of origin, labour status, marital status, having children or not, and education). The mean age was 43.7 years (SD = 9.93; T: M = 45.2 years, SD = 10.7; WLC: M = 42.2, SD = 9.10; t(44) = 1.02, ns). Most participants were of Swedish origin (n = 35, 77.8%); the rest were from a Nordic country (n = 3, 6.7%) or from other countries (n = 7, 15.6%). About half of the subjects were on sick leave (51.1%), a third (31.2%) were actively employed or students, one was retired (2.2%), and the rest were unemployed (15.6%). Education was at a university level for 42.2% of the sample, 40.0% had completed upper secondary school, and a smaller fraction of 17.8% had elementary education only. The degree of higher education in this sample was slightly lower than the average number of 48% officially reported in 2018 for the general population of Swedish women aged 24–64 (Statistics Sweden 2019).

Type of trauma and distinction between childhood and adult trauma was collected based on the participant's records and information during the drawing of the lifeline. They typically reported >3 adult trauma types and around three childhood trauma types. Thirty-seven participants (82,2%) had experienced traumatic events before 18 years of age.

Around 50% received antidepressant treatment. Other stable medications were sporadic. Medication was unchanged during the study.

2.3. Procedures

Data collection occurred between March 2016 and September 2018. The randomized controlled trial with repeated measurements and two groups (T and WLC) also included psychophysiological profiling using a script-driven imagery method and semi-structured interviews, reported elsewhere.

After the assessment, participants were pairwise matched based on age, trauma type, and severity of PTSD and dissociation, and randomized (by rolling dice) to either T or WLC by a blinded co-worker, not otherwise involved in the study.

Measures were obtained by self-report questionnaires administered before and after treatment or waiting, and at a three-month follow-up. The WLC group received the same treatment as the T group following the completion of the waiting period, with subsequent assessments of clinical variables posttreatment and at follow-up. Thus, the WLC group completed the self-rating scales on four occasions while the T group completed them three times.

The treatment intervention consisted of 12 weekly 2.5-hour sessions of TFGrpMI, and each treatment group consisted of 5-7 individuals. The protocol used is a group adaptation by the first author (Rudstam et al., 2017) of the Bonny Method of Guided Imagery and Music (BMGIM), which is an internationally acknowledged receptive music therapy method (Bonny & Summer, 2002; Grocke, 2019; Grocke & Moe, 2015). The BMGIM is implemented in individual sessions and primarily uses classical music from the western tradition to evoke client-generated images in a relaxation-based, slightly altered state of consciousness, assisted by a therapist, usually called a "guide" in the BMGIM, who dialogues with the client during a music program that lasts 30–45 min. Imagery is used for focused self-exploration, resourcing, building safety, and working through inner conflicts and trauma. After the music listening phase (the "travel"), there is time for further processing of what has been meaningful in the experience, using artmaking and verbal discussion.

The GrpMI used in this study is a modification of the BMGIM with guided relaxation, induction with focus shared by the whole group, a music listening phase of 2 10 min (without verbal interaction), giving space for spontaneous inner imagery (Grocke & Moe, 2015). Expressive arts with artmaking, musical improvisations, roleplay, writing, and verbal sharing in the group were used to further process the music-evoked imagery (Wärja, 2015). Examples of different methods used in the group treatment were increasing body awareness, using music for breathing and arousal regulation, imagining a safe/calm inner place, building resources, strengthening borders, imaginal releasing of inhibited defence responses, and imaginal nurturing (Arntz et al., 2007; Körlin, 2009; Levine, 2010). The GrpMI method was adapted to trauma treatment by following a phase-oriented flexible manual with emphasis on building safety and group cohesion during the initial sessions – before introducing exposure to imaginal traumatic material (Beck et al., 2017; Herman, 2001; Körlin, 2009; Rudstam et al., 2017). The music was adapted to the treatment phases, with different intensity profiles (calming or stimulating) according to a music taxonomy developed by Wärja and Bonde (2014). In the initial phases, supporting and calming music with a slow tempo, predictability, simple structure, and harmony were used to stabilise and build feelings of safety. When trauma processing was initiated, more challenging and stimulating music, with higher intensity and tempo – some surprises – and more complex structures and harmonies was used to accompany and mirror the imagery (Chanda & Levitin, 2013; Juslin, 2019; Körlin, 2019; Wärja &
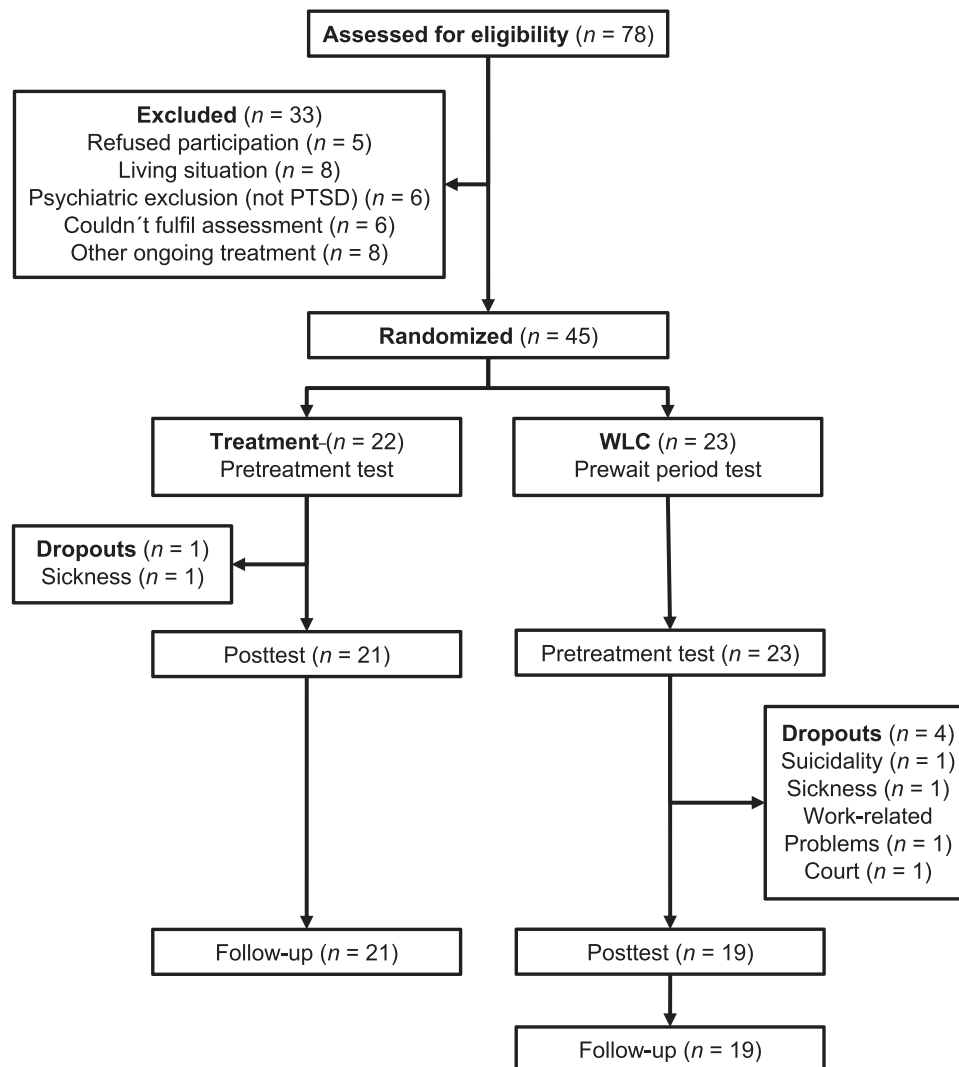
Fig. 1. Recruitment and retention flowchart.

Bonde, 2014). All groups went through the same treatment phases and worked with the same themes, but the specific music choices varied according to the clinicians' professional assessment of the groups' capacity to endure different intensities in the music – keeping arousal levels within the WoT. For a more comprehensive description of the treatment, see Rudstam et al. (2017).

After each group session, the first author wrote an account of the session with regard to fidelity to the flexible manual created in a previous feasibility study (Rudstam et al., 2017). The co-therapist checked the fidelity related to the flexible protocol.

2.4. Measures

Post-traumatic stress disorder symptoms. The primary study outcome was trauma symptom changes. This was assessed by using the PTSD Checklist for DSM-5 (PCL-5) self-report questionnaire (Weathers et al., 2013). PCL-5 measures PTSD symptoms, i.e., re-experiencing (cluster B), avoidance (cluster C), cognition and mode (cluster D), and hyper-reactivity (cluster E). The instrument has 20 items, with a rating scale of 0-4 for each symptom (0 = not at all, 1 = a little bit, 2 = moderately, 3 = quite a bit, 4 = extremely). Cut-off scores of 33 and 38 were suggested for PTSD detection – depending on factors such as population and trauma type (Bovin et al., 2016; Geier et al., 2019; Weathers et al., 2013). In this study, a cut-off score of 33 was used for dichotomization. PCL-5 has demonstrated good

internal consistency with a Cronbach's alpha of 0.94 (Blevins et al., 2015).

PTSD symptom change was also addressed by (i) assessing the rate of diagnostic change (RoDC), defined as the proportion of sample scoring below the PCL-5 cut-off score of 33, before and after the intervention, and (ii) the rate of clinical improvement (RoCI) showing the proportion of meaningful, significant improvement. Limits for clinically meaningful changes for PCL-5 have not yet been determined. These thresholds, however, can be expected to be in the same range as the change score for PCL for DSM-IV for which evidence exists that a 5−10 point change represents reliable change (i.e., a response to treatment not due to chance) and a 10-20 point change represents clinically significant change (U.S. Department of Veterans Affairs, 2022; Weathers et al., 2013).

The CPTSD diagnosis was introduced in ICD-11 (Cloitre et al., 2013). Besides PTSD symptoms, the diagnosis requires the presence of disturbances in self-organization (DSO), consisting of three core elements: affect dysregulation (AD), negative self-concept (NS), and interpersonal problems (IP). In population studies, distinct patterns were found in classic PTSD and CPTSD, respectively (Brewin et al., 2017). Further, the groups with CPTSD more often endorsed childhood trauma and/or repeated traumatization. Previous studies have used different PTSD instruments to estimate DSO symptoms (Cloitre et al., 2013; Eidhof et al., 2019; Knefel et al., 2015). In the present study, the following subset of items from PCL-5, relevant for

Table 1
Demographics and Trauma History of Participants.

Variable	T (n = 22)	WLC (n = 23)	Total (n = 45)	df	X^2 or t	p
Age	45.2 (10.7)	42.2 (9.10)	43.7 (9.93)	43	1.02	.32
Trauma history				2	1.22	.54
Adult only	2 (9.1%)	2 (8.7%)	4 (8.9%)			
Childhood only	3 (13.6%)	1 (4.3%)	4 (8.9%)			
Adult + childhood	17 (77.3%)	20 (87.0)	37 (82.2%)			
Country of origin				2	1.63	.44
Sweden	18 (81.8%)	17 (73.9%)	35 (77.8%)			
Nordic Country	2 (9.1%)	1 (4.3%)	3 (6.7%)			
Other	2 (9.1%)	5 (21.7%)	7 (15.6%)			
Labour status				3	3.45	.33
Active	9 (40.9%))	5 (21.7%)	14 (31.2%)			
Unemployed	2 (9.1%)	5 (21.7%)	7 (15.6%)			
Pensioner	0 (0.0%)	1 (4.3%)	1 (2.2%)			
Sick leave	11 (50.0%)	12 (52.2%)	23 (51.1%)			
Marital status				2	0.60	.74
Married	13 (59.1%)	11 (47.8%)	24 (53.3%)			
Divorced	7 (31.8%)	9 (39.1%)	16 (35.6%)			
Single	2 (9.1%)	3 (13.0%)	5 (11.1%)			
Children				1	1.09	.30
Yes	19 (86.4%)	17 (73.9%)	36 (80.0%)			
No	3 (13.6%)	6 (26.1%)	9 (20.0%)			
Education				2	2.45	.29
Elementary	2 (9.1%))	6 (26.1%)	8 (17.4%)			
Upper secondary	9 (40.9%)	9 (39.1%)	18 (40.0%)			
University	11 (50.0%)	8 (34.8%)	19 (42.2%)			

Notes: Means and standard deviations, or counts and within-groups percentages, are shown for the study participants by group (T and WLC) and pooled (Total), Columns 5, 6, and 7 display t-test results or Chi-Square results.

affect regulation and negatively changed self-perception, were selected as a proxy to estimate the DSO elements: items 11, 12, and 15 for affect dysregulation (AD), items 9 and 10 for negative self-concept (NS), and items 13 and 14 for interpersonal problems (IP). CPTSD can be proxied by the presence of at least one symptom score of 2 or higher from each of the three DSO elements, besides criteria for PTSD (Eidhof et al., 2019). In the present study, this rule was used to assess the occurrence of CPTSD amongst study participants.

Dissociative experiences. The Dissociative Experience Scale (DES; Carlson et al., 1993) is a 28-item self-report measure of psycho-form dissociative experiences. Each item presents 11 Likert-scale-response options ranging from 0% (never) to 100% (always). Higher total average scores indicate higher dissociation. The Swedish DES version demonstrates good internal consistency (Cronbach's alpha = .87) (Körlin et al., 2007), and a diagnostic cut-off of 30% has been suggested for identifying potential severe dissociative disorders (Carlson et al., 1993). The Dissociation Experience Scale Taxon (DES-T) is an eight-item subscale, with high sensitivity to pathological dissociation (Waller et al., 1996).

Somatoform dissociation. The SDQ-5 is a short version of SDQ-20 consisting of five items for discrimination of dissociative disorder symptoms amongst psychiatric patients (Nijenhuis et al., 1997). The steps range from 1 = not at all, to 5 = extremely. The possible scores range from 5 to 25. A cut-off of eight suggests somatoform dissociation and a total score over 11 indicates a dissociative disorder. SDQ-5 has a Cronbach's alpha of .80 (Nijenhuis et al., 1997). In the present study, the SDQ-5 was used mainly for screening for severe dissociation (contraindicated for trauma-focused group treatment).

Mental distress, depression, and anxiety. The Hopkins Symptom Checklist-25 (HSCL-25) has 25 items; the total mean score of all items (HSCL-25-Total) is often regarded as a measure of mental distress in general, while items 1−10 aim to assess anxiety (HSCL-25-I) and item 11-25 depression (HSCL-25-II) (Derogatis et al., 1974; Nettelbladt et al., 1993). The 25 items are scored with defined steps from 1 = not at all, to 4 = very much. A frequently used cut-off point for general distress is 1.75 for the mean score (Nettelbladt et al., 1993). Studies investigating different translations of the HSCL-25

reported Cronbach's alpha of ≥ .90 for the total score, ≥ .85 for the depression subscale, and ≥ .76 for the anxiety subscale (Glaesmer et al., 2014).

Self-assessed function. The Positive States of Mind scale (PSOMS) measures satisfying states of mind. It has six items with scoring options ranging from 0 = unable to have it to 3 = have it easily. The items are focused attention, productivity, responsible caretaking, restful repose, sensuous pleasure, and sharing. The scale showed an internal consistency of Cronbach's alpha = .77 (Adler et al., 1998; Horowitz et al., 1988). The Swedish version showed a Cronbach's alpha of .86 (Bränström, 2013).

2.5. Data analysis

All parametric statistical analyses and Chi-squared (χ^2) tests were performed with IBM SPSS 25.0 for Windows. The analyses were performed per protocol, including all participants that completed the treatment/intervention. Pretest (baseline) demographic characteristics and clinical variables were compared using a two-tailed independent *t*-test for continuous variables and a χ^2 test for categorical variables. After data screening for normal distribution using the Kolmogorov-Smirnov test with Lilliefors significance correction, a two-way mixed analysis of variance (ANOVA) was used to analyse treatment interaction effects, and a repeated-measures ANOVA was used to analyse within-group treatment effects. The SDQ-5 and DES-taxon were not normally distributed and analyzed using an R package for non-parametric ANOVA-type statistics (ATS) analyses (nparLD function) (Noguchi et al., 2012).

The magnitude of association for categorical variables was measured with Cramer's *V* (Cramér, 1999). For continuous variables, effect sizes were computed for (i) controlled changes (i.e., the between-groups difference from pretreatment to posttreatment) and (ii) uncontrolled changes (i.e., from pre- to posttreatment; from pretreatment to follow-up). For the controlled changes the effects sizes were obtained from the SPSS software as partial Eta-squared (η^2) and converted into Cohen's *d* using an online converter (Lenhard & Lenhard, 2017). Within effects were computed as Cohen's *d* using the

average standard deviation of both repeated measures as standardizer (Cohen's d_{av}) (Lakens, 2013). For non-parametric tests, approximate values for Cohen's d were calculated from ATS statistics and degrees of freedom according to Friedman (1982) with the use of the R package "effect size" version 0.6.0.3 by Ben-Shachar et al. (2020). Cohen (1988) suggested $d = 0.2$ be interpreted as a "small" effect size, $d = 0.5$ as a "medium" effect size, and $d = 0.8$ a "large" effect size.

Nonresponse rates for the pre- and post-intervention assessments were 4.5% (1 of 22) for all measures in the T group and were due to one drop-out. For the WLC group, there were no non-responders (apart from one missing DES-scale pre-intervention due to administrative causes). The individual with a missing DES-scale pre-intervention was excluded from the pre-post analysis of DES but was included in the analysis of all other scales. Missing items were mean value substituted if the total number of missing items were less than 8% for an individual scale. No scales had to be excluded because of too many missing items. In total, 34 of 12305 (0.3%) possible data points were missing − equally distributed over the two experimental groups and ranging from 0.0% for the SDQ-5 and 0.5% for the HSC25-II.

3. Results

3.1. Baseline clinical data

Table 2 displays the baseline mean values of the dependent variables for the two experimental groups. As indicated by independent sample t-tests, there were no significant differences between the groups regarding the baseline primary outcome measure of PTSD

symptoms or any of the secondary outcome measures. Three participants in the WLC group did not meet the criteria for PTSD at baseline, although they had been clinically diagnosed with PTSD during assessment for eligibility (see Table 3).

In the T group, 17 of 21 individuals (81%) initially fulfilled the criteria used to proxy CPTSD in this study. In the WLC group, 17 individuals of 23 (74%) scored in agreement with the proxy for CPTSD. Interpersonal childhood trauma (ICT) was independently coded by the third author, and 16 participants (76%) in the T group versus 17 (74%) in the WLC group were coded positive for ICT.

3.2. Drop-out rates and attendance

The drop-out rate during treatment was as low as 4.5%, with 21 of 22 individuals completing. The single participant not completing the treatment left because of somatic disease (Fig. 1). All participants in the WLC group remained in the study following the waiting period. But when the WLC group (after waiting) received the same treatment as the T group, four WLC group members withdrew due to suicidality, disease within the family, work-related problems, and legal problems, respectively, which yielded a drop-out rate of 17.4% in this group. In the T group, the mean number of sessions attended was 10.66 out of 12. Eleven participants (52%) attended all 12 sessions.

3.3. Treatment effects

Table 2 shows the pre- and post-intervention results of the primary and secondary outcome measures. The interaction between

Table 2

Means, Standard Deviations, and Two-Way Repeated Measures Analyses of Variance in Pre- and Post-Intervention Measures in Treatment (T) and Waitlist Groups (WLC).

Variable	n	Pre		Post		Time x Intervention			Time		
		M	SD	M	SD	df	F^a	d	df	F^a	d_{av}
PCL-5						1, 42	8.68**	0.94			
T	21	49.84	8.55	38.68	13.39				1, 20	16.60***	1.02
WLC	23	48.52	15.29	47.78	14.94				1, 22	0.11	0.05
PCL-5 DSO						1, 42	5.37*	0.71			
T	21	16.86	4.43	13.28	6.20				1, 20	10.44**	0.67
WLC	23	16.82	6.10	16.84	6.73				1, 22	0.03	<0.01
HSCL-25						1, 42	7.29**	0.84			
T	21	2.68	0.48	2.42	0.54				1, 20	5.33*	0.51
WLC	23	2.60	0.60	2.71	0.58				1, 22	1.79	0.19
HSCL-25-I						1, 42	7.94**	0.87			
T	21	2.65	0.52	2.31	0.60				1, 20	6.83*	0.61
WLC	23	2.49	0.61	2.59	0.55				1, 22	1.23	0.17
HSCL-25-II						1, 42	4.45*	0.67			
T	21	2.70	0.57	2.50	0.58				1, 20	3.03	0.35
WLC	23	2.67	0.68	2.78	0.69				1, 22	1.36	0.15
DES						1, 41	5.59*	0.74			
T	21	19.22	13.41	15.00	10.08				1, 20	5.49*	0.36
WLC	22	15.24	11.19	17.16	13.57				1, 21	1.06	0.15
DES-T						1,41	2.28	0.46			
T	21	14.35	15.84	10.30	11.02				1, 20	0.16	0.09
WLC	22	8.41	8.83	11.08	13.74				1, 21	0.00	<0.01
SDQ-5						1, 42	0.12	0.11			
T	21	8.24	4.87	7.38	3.07				1, 20	0.16	0.09
WLC	23	6.70	2.34	6.44	2.04				1, 22	0.00	<0.01
PSOMS						1, 42	5.17*	0.70			
T	21	9.00	2.53	11.25	3.14				1, 20	16.7***	0.79
WLC	23	9.39	3.96	9.61	4.89				1, 22	0.11	0.05

Note. PCL-5 = PTSD Check List for DSM-5; PCL-5 DSO = PCL-5 items related to Dysregulated Self Organization; HSCL-25 = the Hopkins Symptom Check List − 25 items; HSCL-25-I = HSCL-25 Anxiety Subscale; HSCL-25-II = HSCL-25 Depression Subscale; DES = Dissociative Experience Scale; DES-T = Dissociative Experience Scale Taxon; SDQ-5 = Somatic Dissociation Questionnaire − 5 items; PSOMS = Positive States of Mind Scale.

[a] For SDQ-5 and DES-T, F represents the value of the nonparametric analysis of variance-type test statistic. In all other cases, F represents the test statistic for repeated measure analysis of variance.

*** $p \leq .001$

** $p \leq .01$

* $p \leq .05$

Table 3

Rate of Diagnostic Change (RoDC) and Rate of Clinical Improvement (RoCI) Between Pre- and Post-Intervention in the Treatment (T) and Waitlist (WLC) Group.

Measure	Change Pre to Post	T n = 21	WLC n = 23	df	X^2	p	V
RoDC[a]	Below cut-off − No change	0 (0.0%)	1 (4.3%)	3	9.50	.023	.47
	Below to above cut-off	0 (0.0%)	2 (8.6%)				
	Above cut-off − No change	13 (61.9%)	19 (82.6%)				
	Above cut-off to below cut-off	8 (38.1%)	1 (4.3%)				
RoCI[b]	<5 points	5 (23.8%)	16 (69.6%)	2	9.83	.007	.47
	5 − 9 points	4 (19.0%)	3 (13.0%)				
	≥10 points	12 (57.1%)	4 (17.4%)				

Note. V = Cramer's v.

[a] Diagnostic Change is based on a cut-off of 33 PCL-5 total scoring points.

[b] A decrease of the individual PCL-5-total score of 10 points or more between pre- and post-measures indicates a clinically significant change, and a 5 to 9 points change represents a reliable change.

condition (treatment or waiting) and time (pre and post) on PTSD symptoms, as indicated by the PCL-5 total score, demonstrated a significant change in the T group compared to the WLC group with a large effect (F(1, 42) = 8.68, p = .005, d=0.94). The subscale of PCL-5 specifically measuring CPTSD symptoms (the proxy subscale DSO) also demonstrated a significant difference in DSO symptoms after treatment compared to no treatment (p = .025) with a medium effect (d = 0.71).

Regarding the secondary outcome measures, large interaction effects were found in mental distress (HSCL-25-Total) and anxiety (HSCL-25-I), with d = 0.84 and d = 0.87 respectively, whereas depression (HPCL-25-II), dissociation (DES), and positive states of mind (PSOMS) demonstrated medium effects in the range of d = 0.67 − 0.74. The SDQ-5 and DES-T (both scales used primarily for screening purposes) showed no significant changes during the initial intervention.

Table 3 shows that in the T group, from pre- to post-intervention, eight (38%) participants lost the diagnosis, while in the waiting list group, two became worse, and one improved in terms of diagnostic change (RoDC). Similarly, there was a significant difference between the groups regarding the rate of clinical improvement. In the T group, 12 (57%) showed a clinically significant change (≥ 10 points) versus four (17%) in the WLC group.

Table 4 shows within-analyses of preintervention to follow-up data in the T group and the WLC group before and after active treatment. There was a significant reduction in the primary outcome measure (PCL-5) in both T (F(1, 20) = 13.63, p < .001, d_{av} = 1.14) and WLC (F(1, 18) = 19.41, p < .001, d_{av} =1.10). Except for SDQ-5, significant changes from before active treatment to follow-up were found in all other measures with medium to large effects in the range of d = 0.51 −1.01. The analyses demonstrate that improvement in both groups persisted three months after the end of treatment.

4. Discussion

The present randomized controlled study of GrpMI treatment demonstrated favourable results for women suffering predominantly from CPTSD after exposure to physical, psychological and/or sexual abuse, with a high prevalence of childhood traumas. The primary outcome of self-rated PTSD improved significantly in the T group compared to the WLC group. The secondary outcomes; anxiety, depression, dissociation, positive state of mind, and CPTSD related DSO symptoms (affect regulation, negative self-concept, and interpersonal problems) also changed in a positive direction. Even though the rate of clinical improvement was obvious, less than half of the participants lost the diagnosis according to PCL-5. This is like other studies when this has been reported. The WLC group received the same treatment after completion of the waiting period and showed similar improvement after active treatment.

When comparing the results of this study to former studies, very few controlled studies in music therapy with PTSD symptoms as primary outcomes can be found. The results from the present study are consistent with the findings in a feasibility study by Rudstam et al., (2017), using the GrpMI method with a similar clinical sample. Other PTSD/CPTSD treatment studies using GIM, GrpMI, or active music therapy in general, have also shown similar results. For example, Carr et al. (2012) investigated group music therapy for PTSD and reported large pre-post treatment effects. Körlin (2000) found significant improvement in several trauma-related symptoms using the GrpMI method. Some authors also reported positive results on PTSD/CPTSD symptoms using individual GIM, for example, Maack (2012) in women suffering from CPTSD, (Beck et al. 2017, 2021) in refugees with PTSD, and Story & Beck (2017) in sexually traumatized female military veterans.

The effect sizes observed in this study are well in line with findings reported in different meta-studies on PTSD treatment using non-music therapy methods, such as individual CBT and EMDR, and different group settings (Bradley et al., 2005; Cusack et al., 2016; Ehring et al., 2014; Watts et al., 2013). Moreover, according to a recent review (Karatzias et al., 2019) that exclusively investigated studies of treatment effects in CPTSD and/or childhood abuse, the ES for CBT (g =-0.90) and EMDR (g =-1.26) regarding PTSD symptoms compared to TAU/Waitlist is similar to the ES in the present study.

A further important aspect of the current study's results was low attrition; only 4.5% (one participant) withdrew from the T group and none of the participants included in the T group deteriorated. This is in contrast with several published reviews and original research articles examining drop-out rates in trauma-focused treatments, where the attrition rate generally is higher, although with a large variation across studies (Cloitre, 2009; Dorrepaal et al., 2014; Garcia et al., 2011; Goetter et al., 2015; Gros et al., 2013; Imel et al., 2013; Kehle-Forbes et al., 2016; Lewis et al., 2020; Najavits, 2015; Schottenbauer et al., 2008; Szafranski et al., 2017).

Group treatment for PTSD is often found to be less efficacious than individual treatments (Ehring et al., 2014). But an aspect of group therapy, potentially beneficial for CPTSD, which can explain the relatively large ES found in the present study, is pervasive similarities between trauma experiences of group members. The group setting provides an opportunity to share (consensual validation), which might give a reduction of loneliness and shame and enhancement of self-soothing and self-care capacity. Furthermore, the nonverbal and imaginal methods used for trauma processing in art-based psychotherapy, compared to verbal-intensive trauma therapies, may result in a more tolerable experience of exposure to traumatic material. The GrpMI method seems to offer the ability to regulate the intensity of trauma exposure by the taxonomy-based selection of music that can increase or diminish degrees of tension − meeting the needs and strengths of the group (Wärja & Bonde, 2014). This is well in line with results from previous studies, using the GrpMI method with

Table 4

Means, Standard Deviation and One-Way Repeated Measures Analyses of Variance of Treatment Effects in Both Groups (T and WLC) Comparing Pre-Intervention to Last Follow-up.

Variable	n	Pre M	SD	Post M	SD	Follow-Up M	SD	df	F^a	d_{av}
PCL-5										
T	21	49.84	8.55	38.68	13.39	35.19	17.16	1, 20	13.63***	1.14
WLC	19	46.63	14.87	28.74	14.64	29.21	16.86	1, 18	19.41***	1.10
PCL-5 DSO										
T	21	16.86	4.43	13.28	6.20	11.14	6.90	1, 20	13.03**	1.01
WLC	19	16.84	6.72	10.11	6.27	10.74	6.77	1, 18	11.09**	0.90
HSCL-25										
T	21	2.68	0.48	2.42	0.54	2.22	0.60	1, 20	9.49**	0.85
WLC	19	2.66	0.57	2.09	0.61	2.10	0.63	1, 18	14.45***	0.93
HSCL-25-I										
T	21	2.65	0.52	2.31	0.60	2.14	0.65	1, 20	13.09**	0.87
WLC	19	2.52	0.52	2.03	0.62	2.00	0.63	1, 18	16.65***	0.90
HSCL-25-II										
T	21	2.70	0.57	2.50	0.58	2.28	0.65	1, 20	5.92*	0.69
WLC	19	2.76	0.70	2.14	0.66	2.16	0.72	1, 18	11.67**	0.85
DES										
T	21	19.22	13.41	15.00	10.08	11.86	9.05	1, 20	12.52**	0.66
WLC	19	17.07	13.63	7.82	6.33	7.61	6.98	1, 18	9.42**	0.92
DES-T										
T	21	14.35	15.84	10.30	11.02	6.37	7.55	1, 20	9.71**	0.70
WLC	19	11.05	13.99	2.30	2.83	2.50	3.49	1, 18	14.51***	0.90
SDQ-5										
T	21	8.24	4.89	7.38	3.07	7.00	3.10	1, 20	1.01	0.22
WLC	19	6.58	2.19	6.42	1.83	5.68	1.29	1, 18	4.16*	0.48
PSOMS										
T	21	9.00	2.53	11.25	3.14	11.29	2.94	1, 20	11.41**	0.84
WLC	18	9.84	4.80	11.95	4.09	12.11	4.16	1, 17	6.05*	0.51

Note. PCL-5 = PTSD Check List for DSM-5; PCL-5 DSO = PCL-5 items related to Dysregulated Self Organization; HSCL-25 = the Hopkins Symptom Check List − 25 items; HSCL-25-I = HSCL-25 Anxiety Subscale; HSCL-25-II = HSCL-25 Depression Subscale; DES = Dissociative Experience Scale; DES-T = Dissociative Experience Scale Taxon;

SDQ-5 = Somatic Dissociation Questionnaire − 5 items PSOMS = Positive States of Mind Scale.

[a] For SDQ-5 and DES-T, *F* represents the value of the nonparametric analysis of variance-type test statistic. In all other cases, *F* represents the test statistic for repeated measure analysis of variance.

*** $p \leq .001$

** $p \leq .01$

* $p \leq .05$

supportive and mixed supportive-challenging music intensity profiles during rehabilitation of psychiatric outpatients, cancer survivors, and clients with fibromyalgia (Bonde & Nygaard Pedersen, 2015; Hertrampf, 2015; Torres et al., 2018).

4.1. Limitations

The study has several limitations. First, the control group was a waiting-list control and not an active treatment group, which does not allow for a comparison to a previously validated treatment modality. Secondly, the standard method for severity assessment is a clinician assessed structured interview. In this study, severity assessments were done with self-rating scales. The weaknesses of using self-rating scales were compensated by combining them with physiological measurements during trauma script (to be reported elsewhere). To assess symptoms of CPTSD, we chose items from PCL-5 typical of CPTSD. Other studies used this method (Brewin et al., 2017), but not with PCL-5 items. A further limitation was that the first author also participated as a co-therapist, which could cause favourable scorings due to the Hawthorne effect.

From a statistical viewpoint, there is a possibility of a group-clustering effect, which could confound the results, but the number of groups would need to be much higher to exclude such an effect. From a practical viewpoint, participants' mean ratings improved significantly after treatment. In all T groups, the outcome was roughly similar, and they shared the same therapists and location.

4.2. Clinical implications

The study points to the usefulness of arts-based psychotherapies for therapeutic work in the non-verbal domain with persons suffering from severe childhood trauma that can be difficult to access and process verbally. Another implication is the consideration of group treatment, with a well-developed assessment procedure, where mutual support and validation between participants can be important therapeutic factors.

5. Conclusion

The result of the present study suggests that the phased trauma-focused modification of the GrpMI method may be a promising treatment modality for PTSD and CPTSD. Additional studies are warranted to confirm the efficacy of the method and to investigate the specific mechanisms relevant to the treatment effect.

Availability of data and materials

The datasets from the study will not be available publicly as per the Danish and Swedish Data Protection Agency rules. Also due to the sensitive nature of the collected information, the participants were assured that the raw data would remain confidential and would not be shared.

Funding

CRediT authorship contribution statement

Gabriella Rudstam: Conceptualization, methodology, investigation, formal analysis, writing original draft, funding acquisition. Ulf Elofsson: Conceptualization, methodology formal analysis, writing original draft, data curation, visualization. Hans Peter Söndergaard: Conceptualization, methodology, formal analysis, supervision, writing review and editing. Lars Ole Bonde: Conceptualization, methodology, funding acquisition, supervision. Bolette Daniels Beck: supervision, writing review and editing, formal analysis.

Declaration of Competing Interest

We have no known conflict of interest to disclose.

Acknowledgments

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