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Group-Delivered Cognitive/Exposure Therapy for PTSD in Women Veterans: A Randomized Controlled Trial

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Objective: Group delivery of posttraumatic stress disorder (PTSD) treatment has several advantages, however group research is not comparable to individual trials. This study extends the group literature by improving methodology in examining the efficacy of a 3-module (cognitive, exposure, skills) group treatment for PTSD, establishes a format for the delivery of group exposure therapy, and compares 3 treatment modules within the group. ***Method:*** Eighty-six Operation Enduring Freedom (OEF)/Operation Iraqi Freedom (OIF) women veterans were randomized to a 16-week, 3-member group treatment (Tx) or a waitlist (WL) condition. The primary (Clinician Administered PTSD Scale [CAPS]) and secondary (Medical Outcomes Study Short Form-36 [SF-36], Quality of Life Inventory [QOLI], and PTSD Checklist [PCL]) outcome measures were administered at baseline, post Tx/WL, and at 3- and 6-months post Tx (PCL additionally at pre/post for each treatment module). ***Results:*** PTSD symptoms significantly improved in Tx arm participants ($p < .001$, $ES = 1.72$; unit of analysis group: $n = 14$), as did mental and physical life functioning (SF-36; $p < .001$), and quality of life (QOLI; $p < .001$). The WL significantly improved on the SF-36 (mental; $p = .04$) and QOLI ($p = .02$). Clinical improvement (CAPS) in the Tx arm reflected a treatment response (≥10-point decrease) in 77% and loss of PTSD diagnosis (<45) in 52% of participants, comparable to individual prolonged exposure (PE) treatment. Finally, PCL scores significantly lowered in exposure and cognitive modules. ***Conclusions:*** This study supports the use of group format for PTSD with 3 modules using improved methodology, with a novel, 3-member group which allows repeated in-session weekly imaginal exposures. The results suggest future examination of group delivered PE.

Keywords: PTSD, group treatment, women, cognitive, imaginal exposure therapy

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The standard of care for the treatment of PTSD has been established in exposure and cognitive therapies provided in an individual format (Cahill, Rothbaum, Resick, & Follette, 2009; Institute of Medicine [IOM], 2008). However, group delivery of treatment is thought to have advantages, such as curative factors (universality, instillation of hope, imparting information, altruism, corrective emotional experience, and catharsis; Yalom, 1995). In addition, group for PTSD offers validation of traumatic experiences, normalization of trauma responses, and reduction of isolation (Shea, McDevitt-Murphy, Ready, & Schnurr, 2009), resulting in high participant satisfaction (Sloan, Feinstein, Gallagher, Beck, & Keane, 2013). Use of a group format can address practical issues like efficiency by increasing the patient-to-therapist ratio.

While use of a group format is practical, multiple problems exist in the group literature. A recent meta-analysis (Sloan et al., 2013) revealed that few randomized controlled trials (RCTs) tested the efficacy of a group format ($k = 16$); further, group protocols varied widely in structure, length, and outcome. The types of treatment represented in the RCTs included cognitive restructuring, behavioral activation, spirituality integrated treatment, interpersonal treatment, anger management, eye movement desensitization and reprocessing, affect management, and trauma coping (Sloan et al., 2013) for either PTSD alone or for PTSD with comorbid conditions (e.g., seeking safety for substance abuse, Zlotnick, Johnson, & Najavits, 2009). Additionally, the protocols blended treatments in a manner that did not allow the examination of different treatments within the protocol (e.g., cognitive restructuring compared to behavioral activation). Only one (Chard, 2005) implemented one of the two standard-of-care treatments for PTSD—cognitive processing therapy (CPT; Resick & Schnicke, 1993). However, the study included group and individual sessions, limiting conclusions about the efficacy of a group-alone intervention. Regarding the other standard-of-care treatment—PE therapy (Foa, Hembree, & Rothbaum, 2007)—only one RCT conducted in-session, repeated imaginal exposures (two/member) in a group format (Schnurr et al., 2003) to the index trauma, compared to eight in the PE protocol. No other group format for exposure has been examined in an RCT. Thus, the content of existing group protocols differed widely from individually delivered PE and CPT. Lack of standard content and variability of treatment suggests a need for group treatments similar to the individual PE and CPT protocols.

The duration and length of group RCTs (Sloan et al., 2013) typically exceeded the standard of care individual protocols (PE: ten 90-min sessions; CPT: twelve 60-min sessions). Only four of the 16 studies had 12 or fewer sessions, one which had as many as 30; and only half (seven of 16) had sessions 90 min or less in length, with some as long as 2.5 hr. The greater number and/or length of sessions in group therapy offsets the efficiency argument as an option for the use of group therapy.

The outcomes of group RCTs (Sloan et al., 2013) revealed all treatments significantly reduced PTSD, with medium-to-high within treatment effect sizes (Cohen's $d = .7$, range = .09–2.16), smaller than those found in the individual literature (range = .40–4.18; Cahill et al., 2009). Importantly, while efficacy was found (i.e., improvement compared to no treatment controls), effectiveness was not (i.e., improvement of the targeted treatment over an active control), as has been demonstrated in the individual literature. That is, the targeted group treatments for PTSD were equivalent to the nonspecific effects produced by a support group. The smaller effect sizes and lack of superiority of group therapies over support groups challenge the use a group format.

Finally, problems with statistical analysis (Baldwin, Murray, & Shadish, 2005) and methodology (IOM, 2008) have plagued the group literature. Group studies failed to account for clustering effects (intraclass correlation [ICC]) within groups with analyses erroneously conducted at the individual level, which violated the assumption of independence, and resulted in significant findings where none existed (Baldwin et al., 2005). Of the 16 RCTs reviewed (Sloan et al., 2013), only three accounted for ICC, calling into question the significant results of the others. ICCs can be accounted for statistically or by use of group as the unit of analysis, rather than the individual. Finally, the IOM (2008) identified the inadequate handling of missing data in PTSD outcome research by use of last observation carried forward, problematic when dropout rates exceed 10%; statistical imputation for missing data was recommended.

The present study attempted to address some of the existing problems in the group literature by combining groups from a clinical program (Castillo, 2004), which included cognitive, imaginal exposure, and skills (behavioral) treatments effectively (Castillo, C'de Baca, Qualls, & Bornovalova, 2012; Castillo, Lacefield, C'de Baca, Blankenship & Qualls, 2014) delivered in separate groups. This study condensed the clinical program into a single, 16-week, 90-min protocol with the three modules. The content of the exposure module utilized an early exposure model (Keane, Fairbank, Caddell, & Zimering, 1989) and was included for all participants randomized to the treatment arm; each group consisted of three members.

The primary aim of this RCT was to examine the overall efficacy of the 16-week, 3-module group protocol on PTSD severity compared to a minimal attention WL control in a sample of Afghanistan (OEF) and Iraq (OIF) women veterans. The secondary aim was to establish and examine a group imaginal exposure treatment model, and lastly, to examine the contribution of each treatment module on PTSD improvement. Our hypotheses were: (a) the group treatment will improve PTSD symptoms and functioning over a 16-week minimal attention wait-list arm, with PTSD improvements maintained at 3- and 6-month follow-up, and (b) as in the individual literature, the cognitive and exposure treatment modules will produce greater PTSD changes than the skills module.

Method

Participants

Participants were 97 women veterans who were classified as OEF/OIF service members (served active duty after September 11, 2001) and recruited from outpatient mental and medical health clinics at a large southwestern Veterans Affairs (VA) hospital. Inclusion/exclusion criteria and assessment methodology followed an RCT by Schnurr et al. (2007). Inclusion criterion were: presence of a current PTSD diagnosis, based on the Diagnostic and Statistical Manual for Mental Disorders, 4th edition (*DSM–IV*; American Psychiatric Association [APA], 1994), no change of prescribed psychiatric medications for a minimum of one month prior to study entry, no active drug or alcohol dependence, one clear trauma memory (regardless of type), and agreement not to

participate in other PTSD treatments during the study. Exclusion criteria were: less than 3-months alcohol/drug dependence remission, presence of psychotic or bipolar/manic symptoms within the past month, cognitive impairment, suicidal/homicidal ideation, current involvement in a violent relationship, or engagement in self-mutilation, all of which were determined by self-report screens and/or medical record review. Of the 97 screened, 11 were excluded (Figure 1) and of the remaining 86, 44 were randomized to treatment (Tx), and 42 to the minimal attention WL control arm in groups of three, resulting in 14 groups in each arm. The data from two participants randomized to the Tx arm were assigned to a nonstudy treatment group, due to low recruitment at the time of enrollment. The two were included in the baseline data and comparisons, but excluded from outcome analyses. The average age of the total sample was 35.9 (SD = 11.0); 43.0% (n = 37) were Hispanic, 31.4% (n = 27) non-Hispanic White, and 17.4% (n = 15) Native American (see Table 1 for partial and supplemental table for full demographic and baseline characteristics). Participants were reimbursed $75 for initial and $65 for follow-up assessments. The study was approved by the Department of Defense and the New Mexico VA Health Care System at the University of New Mexico Institutional Review Boards.

Measures

Demographics. A 22-item self-report demographic form documented age, ethnicity, marital status, education, employment status, head injury, PTSD disability status, and history of psychiatric treatment.

CAPS. The CAPS (Blake et al., 1990) was administered to assess PTSD, determine inclusion eligibility, and as the primary

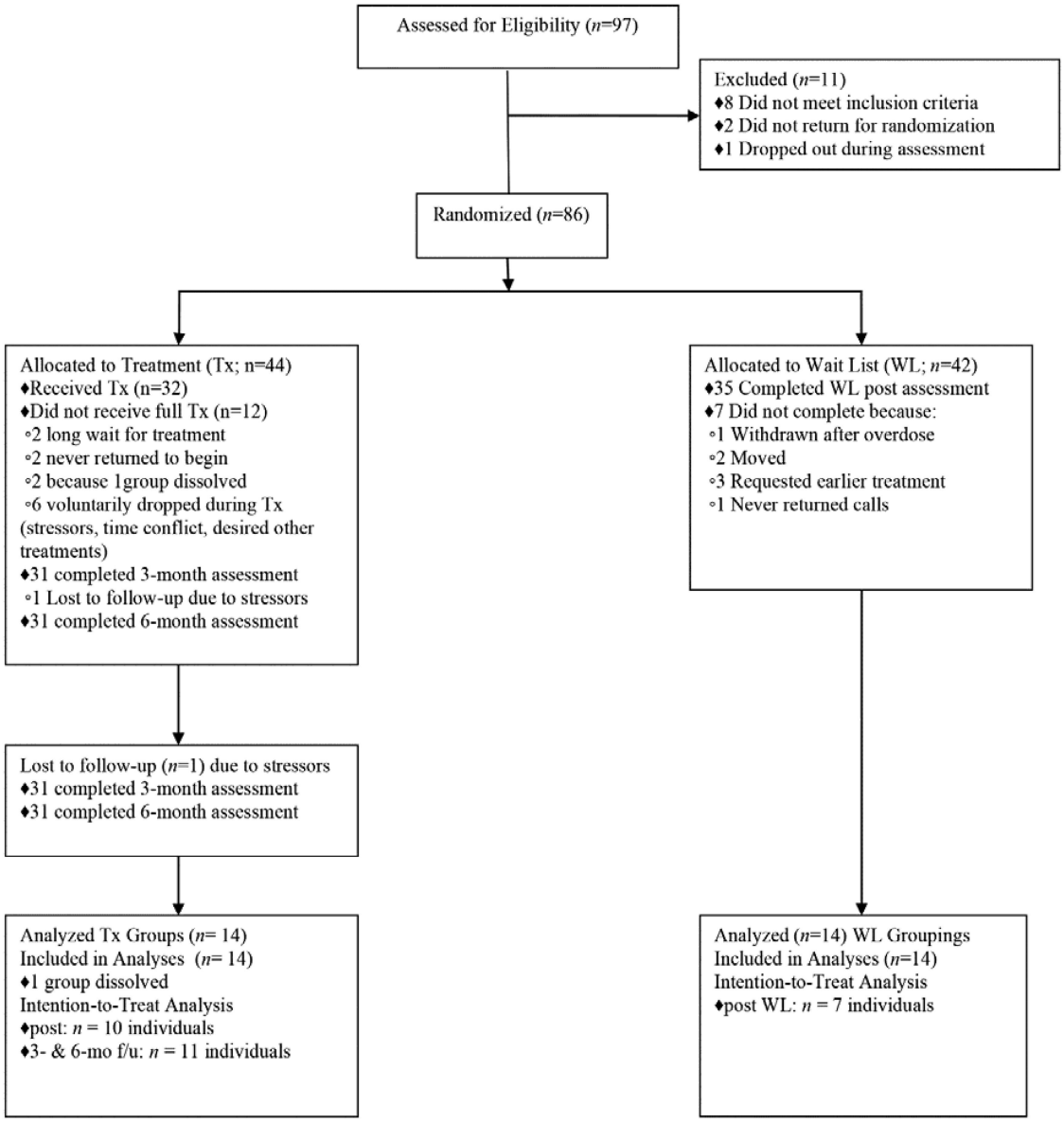

Figure 1. CONSORT flow of participants diagram.

Table 1
Demographic and Baseline Characteristics of Treatment (n = 44) and Wait List (n = 42)

Characteristics	Treatment arm		Wait list arm	
	M (*SD*)	[95% CI]	*M* (*SD*)	[95% CI]
Age, mean years	36.7 (12.6)	[32.9 to 40.5]	35.1 (9.2)	[32.3 to 38.0]
CAPS, current	70.6 (19.9)	[64.6 to 76.6]	73.7 (20.0)	[67.5 to 80.0]
QOLI	1.8 (1.0)	[1.5 to 2.2]	1.6 (1.0)	[1.3 to 1.9]
SF-36				
Physical Summary	52.4 (24.8)	[44.8 to 59.9]	47.7 (22.1)	[40.8 to 54.5]
Mental Summary	38.2 (48.2)	[23.6 to 52.9]	31.7 (23.6)	[24.4 to 39.1]
	n (%)		*n* (%)	
Life Events Checklist[a]				
8–17 trauma types	31 (70.5)		29 (69.1)	
≥25 trauma incidents	28 (63.6)		29 (69.1)	
≥1 month combat environment[b]	34 (77.3)		34 (81.0)	
≥1 military sexual assault	21 (47.7)		19 (45.2)	
SCID I*				
Mood disorder	30 (68.2)		23 (54.8)	
Anxiety disorder	29 (65.9)		23 (54.8)	
Substance use/abuse	2 (4.6)		1 (2.4)	

Note. *M* = mean; *SD* = standard deviation; CI = confidence interval; CAPS = Clinician Administered PTSD Scale; QOLI = Quality of Life Inventory; SF-36 = Medical Outcomes Study Short Form-36.
[a] Reflect trauma events experienced and witnessed. [b] Combat environment was highest of combat items.
* $p = .02$.

outcome measure. Based on the *DSM–IV* (APA, 1994), the CAPS consists of 17 PTSD symptoms in three categories—reexperiencing, avoidance/numbing, and hyperarousal. It has good psychometric properties, with internal consistency ranging from $\alpha = .73$ to .85, and moderate to strong convergent validity with the Mississippi Scale ($r = .70$) and the Keane PTSD scale ($r = .84$) of the Minnesota Multiphasic Personality Inventory (MMPI)-2 (Weathers, Keane, & Davidson, 2001). Current (past month) and lifetime PTSD symptoms were assessed.

Structured Clinical Interview for *DSM–IV*-I (SCID-I) and Structured Clinical Interview for *DSM–IV*-II-Personality Questionnaire (SCID-II-PQ). Psychiatric comorbidity was assessed with the SCID-I and II, standard in the assessment of psychiatric diagnoses. SCID-I (Spitzer, Williams, Gibbon, & First, 1995) is a structured interview with high levels of reliability for symptoms (kappas ≥ .75), 90% accuracy in diagnosis (Lobbestael, Leurgans, & Arntz, 2011), and superior validity when compared to information from family informants, review of medical records, and observations of clinical staff over other diagnostic interviews (Ramirez Basco et al., 2000). The SCID-II-PQ (Jacobsberg, Perry, & Frances, 1995) is a self-report questionnaire with interviewer follow-up on endorsed items with strong sensitivity and high specificity and a low rate of false negatives compared to the full interview, and an overall kappa of .78 (Ball, Rounsaville, Tennen, & Kranzler, 2001).

Life Events Checklist (LEC) and Military Stress Exposure Scale (MSEQ). Trauma events were assessed with the LEC (Gray, Litz, Hsu, & Lombardo, 2004) and MSEQ (Fontana & Rosenheck, 1997). The 17-item, self-report LEC was developed with the CAPS (Blake et al., 1990), empirically validated, and found to have high temporal stability for both total and individual items (mean $\kappa = .6$, retest $r = .82$, $p < .001$; Gray et al., 2004). Two summary scores for the number of trauma types and number of trauma incidents were summarized from the 17 items. The MSEQ, which captures 14 incidents of combat and sexual traumas experienced by active duty and veteran women during military service, supplemented the LEC.

SF-36, QOLI, and PCL. The SF-36 (Ware & Sherbourne, 1992), QOLI (Frisch, Cornell, Villanueva, & Retzlaff, 1992), and PCL (Weathers, Litz, Herman, Huska, & Keane, 1993) were secondary outcome measures. The SF-36 measures social functioning and life quality with Mental and Physical Component Summary scales. Sensitivity and concurrence have been demonstrated in PTSD change with the SF-36 (Shiner, Watts, Pomerantz, Young-Xu, & Schnurr, 2011). The QOLI measures importance of and satisfaction in 16 life domains for a total life quality score ranging from *Very Low* to *High*. Sensitivity to psychiatric change has been found with the QOLI and it has been used as an outcome measure in psychiatric populations (Frisch et al., 2005). The self-report, 17-item PCL has a high correlation (.93) with the CAPS, high internal consistency (Cronbach's alpha = .94), a sensitivity of .78, specificity of .86, and diagnostic efficiency of .83 (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996).

Procedure

The study was conducted from 2008 to 2013. Participants were screened for eligibility, described the procedures, consented, and administered the assessments. Eligible participants were randomized by three to either a 16-week Tx or a 16-week minimal attention WL arm. Outcome assessment was conducted posttreatment and post-WL, and at 3- and 6-months for the Tx arm. One of the 14 groups in the Tx arm was dissolved at the first author's discretion after Session 9. One participant dropped early (Session 5), a second group member was disruptive, and the third was provided remaining sessions individually, with data imputed from time of dropout. WL subjects received bimonthly, 60-min unstructured individual sessions provided by the study psychologist, al-

ternating face-to-face and telephone contacts. Content of the WL sessions was on nondirective support and excluded treatments such as trauma review, cognitive restructuring, or behavioral treatment techniques. In the WL condition, one study participant was withdrawn (drug overdose) and three others dropped out (requested PTSD treatment). The PCL was administered five times during the 16-week WL condition (Sessions 1, 4, 8, 12, and 16).

Assessments were conducted by master's and bachelor's level trained assessment technicians (ATs), blind to randomization. All treatment groups were conducted by a doctoral-level psychologist, and the imaginal exposure module was cofacilitated by an AT independent of assessment assignments, as a safety measure to monitor the two patients during trauma review of the third.

Treatment Protocol

The 16-week, 90-min, three-module treatment protocol consisted of five imaginal exposure, five cognitive, and four behavioral skills sessions. Sessions 1 and 16 were orientation (education on treatment protocols) and wrap-up (gains and future directions), respectively. Six possible orders of the three treatment modules were identified and randomly provided.

Imaginal exposure module, Session 1, included education on the treatment, selection of the index trauma, trauma narrative writing homework, and identification of coping strategies. In Sessions 2–5, each member read aloud the trauma narrative and was followed by a guided imaginal exposure. The therapist-guided (Keane, Fairbank et al., 1989) imaginal exposure was 30-min per member (Castillo et al., 2012), with anxiety ratings solicited every 5 min. The therapist guided each member once through the narrative and slowed the pace of the imaginal at the most difficult points in the trauma description, which precluded hot spot review (repeated exposure to worst parts of trauma). The in vivo exposure (practicing avoided situations between sessions) from the PE protocol was also not conducted, because it was not part of the original Keane et al. (1989) protocol. Homework included weekly rewrites of the trauma narrative and, in Weeks 4–5, daily reading of the written trauma narrative. It should be noted the participants were not directed to identify similar traumas (e.g., only combat or only sexual assault) among group members, but rather their most distressing trauma.

Cognitive restructuring was conducted in the 5-session cognitive module (Beck, Emery, & Greenberg, 1985) and included the five themes (safety, trust, power/control, and esteem/intimacy) from CPT (Resick & Schnicke, 1993). Session 1 consisted of education on the association between distorted cognitions and problematic emotions; Sessions 2–5 focused on the impact of the trauma on each of the five themes, to highlight cognitive distortions. Homework consisted of writing one page on the impact of the trauma on one theme each week. In session, each member read aloud her writings, was encouraged to identify distorted beliefs produced by her trauma, assisted by the therapist and group members to modify distorted cognitions (accurate, realistic, or neutral), and to explore the impact of new thoughts on emotions. The therapist assured feedback provided by group members was productive and nonconfrontational and participants were instructed to avoid writing a trauma account.

The 4-session skills module included behavioral training on assertiveness (Lange & Jakubowski, 1976) and practicing relaxation techniques. Defining and differentiating assertive, aggressive, and passive behaviors and tactics for behavioral change occurred in Sessions 1 and 2. Videotaped assertiveness role-play, review of videotapes, and provision of feedback to shape assertive behaviors occurred in Sessions 3 and 4. One of four relaxation techniques (breathing retraining, sensory focusing, progressive deep muscle relaxation, and thought stopping) was reviewed and practiced in the last 30 min of each session. Homework consisted of daily relaxation practice with pre/post anxiety ratings and practice of assertiveness skills. Training tapes for study therapists on the group treatment module protocol were developed by the first author and based on a clinical protocol (Castillo, 2004). Completion of group treatment ranged from 16 to 20 weeks.

Therapist Adherence, Assessment Fidelity, and Participation

Essential elements for each session within each treatment module were identified and 15% of video recordings were independently rated for treatment adherence. Therapist adherence was 99% for imaginal exposure, 94% cognitive, and 91% skills. Fidelity of the CAPS and SCID-I interviews was captured by a rerating (15%) of video recordings by a trained, independent rater (study therapist or study psychologist not involved in the treatment). The ICC for CAPS severity was .98. The κ statistic for SCID-I diagnoses was .82, with 95% CI [.75, .89]. Overall participant attendance in treatment for completers was high, with only 4% of total possible sessions missed. Minimal make-up sessions were provided to ensure delivery of essential content (5 cognitive, 5 skills, and 1 imaginal exposure).

Data Analysis

Baseline and demographic data compared the Tx and WL arms using Fisher's exact test for categorical variables and Satterwaite's corrected t test for continuous variables. Dropouts exceeded 10% (Tx post $n = 10$ [24%], 3- and 6-month $n = 11$ [26%]; WL post $n = 7$ [17%]), therefore intention-to-treat (ITT) analyses (IOM, 2008) were conducted using SAS Proc Multiple Imputation (Proc MIANALYZE) programming for missing values on current CAPS, SF-36, and QOLI at post, 3-, and 6-month follow-up. Proc MIANALYZE was used to combine 50 imputations throughout the ITT analyses, as 200 imputations produced similar results. Group was used as the unit of analysis, where the values for members in each group at each assessment (pre, post, 3-, and 6-month) were averaged for groups within each condition (Tx = 42, WL = 42; $N = 14$ groups each). The latter was utilized to control for ICC within each group and inflation of Type I error (Baldwin et al., 2005). Our first hypothesis (group treatment will improve PTSD symptoms and functioning over a WL arm) was tested with a repeated measures analysis of variance (RM-ANOVA) to examine interaction, pre/post differences in Tx and WL samples, and longitudinal differences in the Tx arm. Post hoc analyses were computed using paired t tests. The second hypothesis (cognitive and exposure treatment modules will produce greater PTSD changes than the skills module) was tested with a RM-ANOVA for pre- and post-differences with PCL as the dependent measure in the Tx arm. Post hoc analyses were computed using paired t tests.

Results

One demographic baseline difference was found between the Tx and WL arms, with significantly more Axis I diagnoses ($p = .02$; select characteristics in Table 1) Tx arm. The latter was not used as a covariate in analyses, because a higher number of diagnoses would mitigate treatment.

Outcome

On the CAPS, there was a significant interaction in the Tx/WL by pre/post comparison ($F_{1,26} = 14.90$, $p < .001$); post hoc tests indicate a significant decrease in the Tx arm (pre $M = 71.60$, post $M = 47.23$; $p < .001$) and no change in the WL arm ($p = .37$; see Table 2 and Figure 2). There were no differences evident in the longitudinal analyses in the Tx arm (post and 3-month, $p = .62$; post and 6-month, $p = .54$).

Significant interactions were seen on the Mental and Physical Summary scale components of the SF-36 ($F_{1,26} = 6.76$, $p = .009$; $F_{1,26} = 7.18$, $p = .008$, respectively; Table 2). In the Tx arm, post hoc tests indicated significant treatment improvements on the Mental (pre $M = 34.28$, post $M = 54.70$, $p < .001$) and Physical (pre $M = 51.33$, post $M = 64.91$, $p < .001$) scales, with only one significant longitudinal difference ($p = .02$) on the Mental Summary scale from post to 6-month in the Tx arm. In the WL arm, post hoc tests showed significant improvement on the Mental Summary scale (pre $M = 31.52$, post $M = 38.35$, $p = .04$). In a comparison between the two arms, there was greater improvement in the Tx arm ($p < .01$, $ES = .98$).

There was no significant interaction for total QOLI score ($F_{1,26} = 2.10$, $p = .15$; Table 2); however, there were significant pre/post differences for both the Tx (pre $M = 1.76$, post $M = 2.33$, $p < .001$) and WL (pre $M = 1.60$, post $M = 1.88$, $p = .02$) arms, with no significant longitudinal differences in the Tx arm.

Clinical Improvement

Four indicators of clinical PTSD improvement on the CAPS (Schnurr et al., 2007) included: (a) response to treatment (≥10-point total score decrease), (b) ≥ 20-point decrease, (c) loss of diagnosis (total score ≤45), and (d) complete remission (total score ≤20). Percentage improvement and mean improvement for the Tx group are presented in Table 3 for post, 3-, and 6-month treatment. At posttreatment, 77% ($M = 2.32$) had a response to treatment; 63% ($M = 1.89$) dropped 20 points on the CAPS; 52% ($M = 1.56$) lost the PTSD diagnosis, and 14% ($M = .41$) were in complete remission.

Treatment Comparisons

Finally, an RM-ANOVA was conducted on pre/post PCL scores for the treatment modules—imaginal exposure (E), cognitive (C), skills (S). A significant main effect for treatment module was found ($p = .01$) and post hoc t tests revealed significant decreases in PCL scores for the cognitive ($p = .03$) and imaginal exposure ($p = .002$) treatment modules, but not in the skills module ($p = .06$; Table 4). There were no significant differences in PCL scores in the WL condition compared across five administrations in the 16-week time period ($M_1 = 56.77$, $M_2 = 55.16$, $M_3 = 54.24$, $M_4 = 53.05$, $M_5 = 51.36$; $p = .79$).

Table 2
Means, Standard Deviations, and Confidence Intervals for CAPS, QOLI, and SF-36 in Treatment and Waitlist Arms

Outcome measure	Pre/post ES	$F(1, 13)$	Pre M (SD) [95% CI]	Post M (SD) [95% CI]	3-month M (SD) [95% CI]	6-month M (SD) [95% CI]
CAPS						
Tx	1.72	115.78	71.60 (10.32) [66.19, 77.01]	47.23 (16.42)*** [38.63, 55.84]	49.43 (19.07) [39.23, 59.24]	49.04 (17.54) [39.85, 58.24]
WL	*ns*	.81	73.99 (10.62) [67.50, 79.98]	70.61 (19.82) [60.23, 81.00]		
SF-36 Mental						
Tx	1.31	23.82	34.28 (10.02) [29.03, 39.53]	54.70 (15.41)*** [46.62, 62.78]	48.55 (17.62) [39.32, 57.79]	48.90 (14.59) [41.2, 56.54]
WL	.56	4.33	31.52 (14.18) [24.08, 38.95]	38.35 (17.20)* [29.34, 47.36]		
SF-36 Physical						
Tx	1.08	16.32	51.33 (14.18) [41.68, 59.41]	64.91 (17.95)*** [51.27, 70.08]	59.65 (15.63) [49.0, 67.39]	62.55 (15.71) [52.53, 70.52]
WL	*ns*	.32	47.88 (16.16) [39.40, 56.35]	49.44 (14.96) [41.60, 57.28]		
QOLI						
Tx	1.01	14.29	1.76 (.56) [1.46, 2.06]	2.33 (.52)*** [2.05, 2.61]	2.05 (.64) [1.7, 2.38]	2.33 (.71) [1.96, 2.70]
WL	.63	5.57	1.60 (.60) [1.29, 1.90]	1.88 (.82)* [1.46, 2.31]		

Note. M = mean; SD = standard deviation; CI = confidence interval; ES = effect size (Cohen's d); *ns* = nonsignificant; Tx = treatment arm; WL = wait list arm. CAPS = Clinician Administered PTSD Scale; QOLI = Quality of Life Inventory; SF-36 = Medical Outcomes Study Short Form-36. Treatment and waitlist arms ($n = 42$ individuals; $n = 14$ groups).
* $p < .05$; *** $p < .001$ for post hoc within arm pre/post paired comparisons.

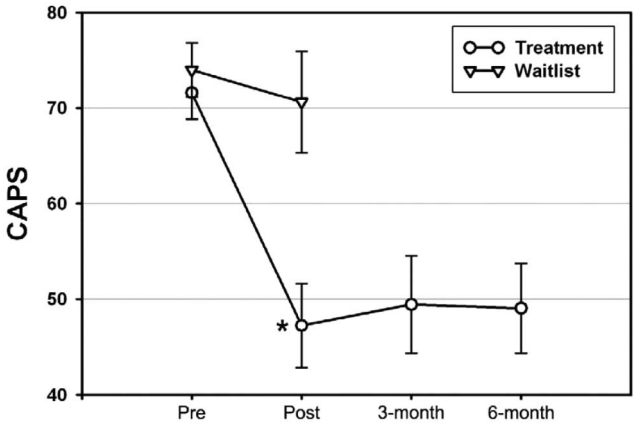

Figure 2. RM-ANOVA in intention-to-treat sample for CAPS scores in waitlist and treatment conditions across time. Error bars represent standard errors. RM-ANOVA = repeated measures analysis of variance. * $p < .001$.

Discussion

The study established the efficacy of a 16-week group protocol for PTSD consisting of three randomly ordered treatment components (exposure, cognitive, skills). Our hypothesis of PTSD improvement was supported with an effect size at the higher end (Cohen's $d = 1.72$) of group treatment outcomes (Sloan et al., 2013), results of which were maintained three and six months after treatment. In addition to PTSD improvement, quality of life and life functioning (mental and physical) improved. Clinical improvement was also demonstrated with treatment response (75%) and loss of diagnosis (47%) comparable to individual PE (Schnurr et al., 2007). The results comparing modules also support our hypothesis (cognitive and exposure modules improvement) and are consistent with the individual treatment literature.

The study improved upon the existing group literature in a number of ways. First, the treatment module approach allowed dedicated sessions for each treatment, which controlled for treatment dose and allowed for greater coherence of each treatment. The study contributed to the group literature through methodological and statistical improvements by controlling for ICC and other suggestions by Baldwin et al. (2005), such as increasing the number of groups and adjusting for covariates (reducing the size of the groups, increasing diagnostic and cultural homogeneity, increasing structure of treatments).

The study is limited by the modification of the standard of care in individual PE and CPT protocols for the modules, which questions the comparability of the treatments. The study also digressed from the typical group size of 8–12 members to three, limiting generalizability and lessens the efficiency argument for use of a group format. Life functioning and quality improvements found in the WL suggests the bimonthly meetings with the study psychologist were helpful, though not sufficient to improve PTSD. Because the WL sessions were not recorded, factors contributing to improvement could not be identified. Conclusions on module comparisons are limited in that the skills group contained one less session than the other two modules.

Practice implications of the study include addressing the logistic challenge of group-delivery of imaginal exposure therapy in a clinical setting. This is the first RCT to provide multiple in-session imaginal exposures in a group, beyond the two provided in trauma-focused group therapy (Schnurr et al., 2003). Group therapy is popular in the VA system and groups typically include some form of trauma review, however the efficacy and safety of repeated imaginal exposures has not been demonstrated until this study. While the exposure module was not comparable to the standard PE individual protocol, repeated exposure combined with the cognitive and skills modules allowed the treatment of more patients in the same amount of time, which also contributes to clinical practice knowledge. Finally, female veterans represent a unique PTSD sample, with high levels of sexual trauma. As such, the findings may generalize only to this population and not to male veterans with PTSD or populations with other traumas. Factors contributing to the success of this protocol might be social variables unique to women, however, are subject to empirical investigation. Our results demonstrate this group protocol and imaginal exposure therapy in group as a promising expansion to the clinical arena.

Research implications include a comparison to active control treatments to establish effectiveness, examination of group factors, such as reduction in stigma, therapist alliance, and group cohesion. Other future research could expand the PE module (e.g., 10-session group PE) and/or or combine only the two most effective modules (e.g., cognitive and exposure) in group. Such research could identify the relative value of group versus individual therapy for PTSD.

The present efficacy study demonstrated improvement in PTSD utilizing a module structure for combining cognitive–behavioral treatments. The structure represents a step closer to individual protocols and supports a format for future investigation of group treatment studies for PTSD with implications for developing a PE structure in a group setting. Future group studies may shed light on the individuals most likely to benefit from group versus individual

Table 3
Percent and Mean Clinical Improvement in PTSD on the CAPS in Treatment Groups (N = 14)

	Response to treatment % (*Mn*)	≥20-point decrease % (*Mn*)	Loss of diagnosis % (*Mn*)	Total remission % (*Mn*)
Posttreatment	77.38 (2.32)	62.95 (1.89)	51.86 (1.56)	13.52 (.41)
3-month follow-up	67.71 (2.03)	54.29 (1.63)	43.76 (1.31)	18.19 (.55)
6-month follow-up	73.10 (2.19)	54.62 (1.64)	46.29 (1.39)	12.62 (.38)

Note. % = percentage; *Mn* = Mean number of subjects per group improvement; Response to treatment = ≥10-point decrease on CAPS, Loss of diagnosis = CAPS ≤45; Total remission = total current CAPS ≤20. CAPS = Clinician Administered PTSD Scale; PTSD = posttraumatic stress disorder.

Table 4
PCL Means and Standard Deviations for Treatment Modules (N = 14)

	Pre		Post			
Treatment	*M* (*SD*)	[95% CI]	*M* (*SD*)	[95% CI]	$F_{1,26}$	ES
Cognitive	53.70 (9.18)	[48.40, 59.00]	47.19 (8.90)*	[41.48, 52.91]	5.67	.90
Exposure	52.20 (8.41)	[47.35, 57.06]	44.76 (11.90)**	[40.40, 49.60]	14.14	1.42
Skills	51.32 (9.79)	[45.67, 56.97]	47.82 (8.99)	[42.63, 53.01]	4.20	*ns*

Note. PCL = PTSD Checklist; *M* = mean; *SD* = standard deviation; CI = confidence interval; ES = effect size (Cohen's *d*).
* $p < .05$. ** $p < .01$.

evidence-based protocols and identify the factors that contribute to PTSD improvement with different treatment delivery modalities.

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