Comparison of Accelerated Resolution Therapy for PTSD Between Veterans With and Without Prior PTSD Treatment

Tiantian Pang, MPH[*]*; Lindsay Murn, PhD*[†]*; Dana Williams, MSW*[‡]*; Maayan Lawental, PhD*[*]*; Anya Abhayakumar*[§]*; Kevin E. Kip, PhD*[‖]

ABSTRACT

Introduction:

Post-traumatic stress disorder (PTSD) is a psychiatric disorder commonly caused by a traumatic event(s) and prevalent among service members and veterans. Accelerated Resolution Therapy (ART) is an emerging "mind-body" psychotherapy for PTSD that is generally briefer and less expensive than current first-line treatments, such as cognitive processing therapy (CPT) and prolonged exposure (PE) therapy. This study examined the results of ART for treatment of military-related PTSD, with stratification by prior PTSD treatment types, including service members/veterans with reported residual PTSD symptoms following receipt of first-line recommended psychotherapy.

Materials and Methods:

Four groups were constructed and compared based on self-reported prior PTSD treatment history: treatment-naïve ($n = 33$), pharmacotherapy only ($n = 40$), first-line psychotherapy (CPT and/or PE) ($n = 33$), and other psychotherapy ($n = 42$). Participants were assessed for PTSD symptoms at baseline, post-treatment, and 6-month follow-up using the 17-item Military PTSD Checklist (PCL-M), as well as assessment of depressive, anxiety, and sleep symptoms. The study was approved by the Institutional Review Board at University of South Florida.

Results:

Among 148 veterans/service members who enrolled and started treatment with ART, 106 (71.6%) completed treatment in a mean of 3.5 treatment sessions, and 55 (51.9%) provided 6-month follow-up data. Mean age was 43.8 years, 95% were male, and 84% were of white race. Within-group standardized effect sizes for pre-to-post changes in PTSD scores (PCL-M) were large at 1.48, 1.11, 1.88, and 1.03 for the treatment-naïve, pharmacotherapy only, first-line psychotherapy, and other psychotherapy groups, respectively. Among treatment completers, the clinically significant treatment response rate (reduction of $\geq$10 points on the PCL-M) was highest in the treatment-naïve (83%) and first-line psychotherapy (88%) groups. Similar significant symptom reductions were observed for measures of depression and anxiety, and favorable treatment effects were generally sustained at 6-month follow-up.

Conclusion:

In a brief treatment period, ART appears to result in substantial reductions in symptoms of PTSD among veterans, including those with residual PTSD symptoms after prior treatment with first-line psychotherapies endorsed by the U.S. Department of Defense and Veterans Affairs. These results suggest that ART be considered as a potential first-line treatment modality for veterans with PTSD.

INTRODUCTION

Post-traumatic stress disorder (PTSD) is a chronic, disabling, and stress-related psychiatric disorder that may occur after exposure to traumatic event(s) and may result in persistent re-experiencing of details related to the trauma(s), avoidance symptoms, negative alterations in cognitions and mood, and alterations in trauma-related arousal and reactivity.[1] As of 2019, there are 17 million military veterans in the USA with 35.6% from the Vietnam era, 22% from the Gulf War (8/1990-8/2001), 21.7% from the post-911 era (9/2001 or later), 6.6% from the Korean War, and 2.2% from World War II.[2] Among the military personnel who had a recent deployment to Iraq and Afghanistan, the prevalence of PTSD has been estimated at 10-20%.[3] A recent longitudinal cohort study found that at least 50% of U.S. service members and veterans who screened positive for PTSD at baseline suffered from persistent PTSD symptoms and impairment at 3-year follow-up; of those, 71% remained positive for PTSD 9 years from the initial diagnosis.[4] Moreover, approximately 11% of Vietnam War veterans experience persistent PTSD-related impairment.[5] The large number of military personnel in the USA with debilitating PTSD illustrates a paramount interest and need for effective treatments. Untreated and/or inadequately treated PTSD can cause distress and lead to a series of health-related comorbidities,

[*]College of Public Health, University of South Florida, Tampa, FL 33612, USA

[†]Minnesota State University-Mankato, Mankato, MN 56001, USA

[‡]College of Behavioral and Community Sciences, University of South Florida

[§]Cary Academy, Cary, NC 27513, USA

[‖]Clinical Analytics, University of Pittsburgh Medical Center, Pittsburgh, PA 15213, USA

Military Health System Research Symposium (MHSRS) – 2020 (virtual), Abstract published.

doi:https://doi.org/10.1093/milmed/usab335

such as cardiovascular diseases, obesity, and inflammation, interfering with social, educational, and occupational functioning.[6]

The Veterans Affairs (VA)/Department of Defense (DoD) Clinical Practice Guideline recommends the use of individual, manualized, trauma-focused psychotherapy for PTSD that has a primary exposure and/or cognitive restructuring intervention before pharmacotherapy or other forms of therapy.[7] The most well-established "first-line" treatments for PTSD are cognitive processing therapy (CPT), prolonged exposure (PE) therapy, and eye movement desensitization and reprocessing.[7,8] Studies have provided evidence that first-line therapy is more efficacious in treating PTSD than other interventions.[9,10] A recent meta-analysis of 24 randomized controlled trials (RCTs) among active duty and ex serving personnel also reported that individual trauma-focused cognitive behavioral therapy was associated with the largest effect in reducing PTSD symptoms post-treatment compared to other psychological interventions.[11] Unfortunately, many studies have challenged the prominence of first-line psychotherapies for PTSD in recent years due to mixed results and high rates of dropout. A review of first-line psychotherapy for military-related PTSD that included four RCTs examining PE and five examining CPT reported that clinical outcomes were heterogeneous, nonresponse rates were high, and the benefit of PE and CPT relative to non-trauma-focused treatments was small.[12] More recent trials have suggested that active treatments such as PE, CPT, and pharmacotherapy all reduced PTSD symptoms with moderate-to-large effect sizes, but types of treatment did not significantly differ in their outcomes, non-completion rates were high, and PTSD symptoms improved yet rarely remitted post-treatment.[13–18] Thus, there is an urgent need to address high dropout rates and post-treatment residual symptoms by identifying alternative types of psychotherapy beyond first-line interventions that are potentially efficacious for treatment of PTSD.

In this realm, Accelerated Resolution Therapy (ART) is an emerging "mind-body" psychotherapy that may be considered an alternative treatment for PTSD. Unlike current first-line psychotherapies, ART is short term—typically delivered in 1-5 sessions over an approximate 2-week timeframe. Furthermore, ART does not require additional therapeutic homework or medication, which reduces patient time (and financial) commitment when compared to the 8-15 sessions recommended for PE, CPT, and eye movement desensitization and reprocessing protocols.[19] The ART has shown effective reduction in PTSD symptoms in adult civilian and military populations within an average of four treatment sessions with a completion rate of approximately 90%.[19–21] In addition, ART does not require verbalization of the traumatic event, which may be particularly beneficial for military personnel who cannot share the confidential and sensitive details of the events[21] or for those who are reticent to do so, as is required in emotionally demanding therapies like CPT and PE.[15] Therefore, the treatment protocol of ART may potentially address some of the limitations of the current first-line psychotherapies. The ART has a solid theoretical basis and is a promising approach for consideration as an effective trauma-focused treatment modality to meet the specific needs of military service members and veterans who have either never received treatment and or who have received prior treatment for PTSD but remain symptomatic.[22,23] Thus, the present analysis examines results of ART for treatment of military-related PTSD, with stratification by prior PTSD treatment history, including service members/veterans with reported residual PTSD symptoms following receipt of first-line recommended psychotherapy.

METHODS

The present study is a subgroup analysis based on a prospective cohort treatment study of ART. Detailed study protocols have been published previously.[24] The study included 188 U.S. Military service members and/or veterans with significant symptoms of military-related PTSD, as determined through clinical assessment using the 17-item Military PTSD Checklist (PCL-M).[25,26] Other comorbidities assessed during the screening included the 20-item Center for Epidemiologic Studies Depression Scale (CES-D) for depression[27]; the 21-item State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA) for anxiety[28]; the 18-item Brief Symptom Inventory (BSI) for psychological distress[29]; and the Pittsburgh Sleep Quality Index (PSQI) for sleep quality.[30]

Participants were recruited from community organizations such as Veteran centers, American Legion, 501C3 veteran organizations (e.g., Camaraderie Foundation), and word of mouth. Some participants may have previously received treatment from VA facilities, but no formal recruitment efforts were made at VA facilities. The use of veteran self-reporting of symptoms for PTSD, as opposed to formal clinical diagnoses (e.g., Clinician Administered PTSD Scale), was purposely done with the goal of achieving candid responses (and enhanced recruitment) from veterans. Specifically, all veterans were informed that their responses before and after completion of treatment with ART would have no bearing whatsoever on either removal or addition of a formal diagnosis of PTSD. Thus, we aimed to eliminate the potential for secondary gain from potential biased reporting of symptoms (e.g., such as might be used to acquire or maintain PTSD disability payments).

Of the 188 screened participants, 148 met the inclusion criteria and initiated treatment with ART. Clinical assessment was performed at baseline, post-treatment, and 6-month follow-up. The study was approved by the Institutional Review Board (IRB) at University of South Florida (USF) and all participants provided written informed consent.

Definitions for Subgroup Cohort

For the subgroup analysis, classification of previous PTSD treatment history was based on participant (veteran) self-report on prior type(s) of treatment received specifically for PTSD. Using this information, U.S. military service

members/veterans were grouped based on self-reported prior PTSD treatment types as follows: treatment-naïve ($n = 33$), pharmacotherapy only ($n = 40$), first-line psychotherapy ($n = 33$), or other psychotherapy ($n = 42$). Treatment-naïve was defined as participants who had never received any type of therapy for PTSD. Pharmacotherapy only was defined as participants who reported prior medication use for treatment of PTSD, yet no psychotherapy. First-line psychotherapy was defined as participants who previously reported receiving PE and/or CPT. Other psychotherapy was defined as participants who reported receiving any other form(s) of psychotherapy other than PE and/or CPT.

ART Intervention

The ART was delivered in 1-5 treatment sessions with a typical session duration of 60-75 minutes. In brief, each session consisted of two core components of trauma-focused therapy—imaginal exposure (IE) and imaginary rescripting (IR)—facilitated with the use of sets of bilateral (side-to-side) eye movements. The bilateral eye movements were performed throughout the treatment session by having the participant follow the ART clinician's oscillating hand, silently moving their eyes from right to left horizontally, with a fixed number of 40 bilateral eye movements per set.

In the IE phase, participants were asked to recall the traumatic event(s) or scene, with a focus on identifying the somatic, emotional, and physiological sensations that emerged. Each sensation was identified by the participant to the clinician, who instructed the participant to notice (focus on) the sensation while following the clinician's oscillating hand to facilitate bilateral eye movements. After each set of eye movements, participants were asked if their sensations had decreased to a level where they were comfortable moving forward in the protocol. This phase of identifying and processing sensations was considered complete when the participant was able to re-imagine the entire traumatic experience with a low level of physiological reaction to the original distressing scene. In the IR phase, participants were instructed to visualize and imagine a new way to change or substitute the original negative traumatic experience with positive imagery, while also performing bilateral eye movements, as directed by the therapist. This technique of imaging new material to be added to or overwrite the original traumatic material is consistent with the process of memory reconsolidation.[31] The IR phase was considered complete when the participant reported "seeing" (imagining) the memory in the new, preferred manner, as opposed to the original traumatic imagery. Participants were asked to scale their level of distress using 0-10 subjective units of distress scale at the beginning of the session and again at the end following completion of the entire ART protocol, to ensure acceptable change in level of distress related to the traumatic event. Additional information on the ART protocol has been previously published.[19,32,33]

Statistical Methods

Demographic and clinical characteristics of study participants by prior history of PTSD treatment status were compared using χ^2 or Fisher's exact test for categorical variables and analysis of variance for continuous variables. Comparisons were made among the subjects who received and completed treatment with ART. Treatment outcomes were assessed based on mean score changes (pre-to-post ART treatment) on the PCL-M, CES-D, STICSA, BSI, and PSQI instruments, as well as by calculation of Cohen's d effect size and corresponding 95% confidence intervals. To examine potential differences in ART treatment response among groups based on classification of prior PTSD treatment, analysis of covariance models were fit, including adjustment for baseline value of the evaluated outcome which included symptoms of PTSD, depression, anxiety, and sleep dysfunction. Moreover, the proportion of subjects who experienced a clinically and statistically meaningful reduction in symptoms of PTSD was defined using the established metric of $\geq$10-point reduction on the PCL-M and compared by prior self-reported treatment history group by chi-square analysis. Statistical significance was set at $P < .05$.

RESULTS

Demographic Characteristics

Among the 148 participants who enrolled and started treatment with ART, 106 (71.6%) completed treatment in a mean of 3.5 treatment sessions (Table I). Of those who completed ART, 55 participants (51.9%) provided 6-month follow-up data. The mean age of study participants was 43.8 years, with 94.6% identifying as male and 84.3% identifying as white. The study population was predominantly veterans (87.1%) with prior army service (57.4%) and who had experienced high combat-related activity (81.8%) and frequently reported having witnessed death or execution (71.6%). Over half of the participants reported having trauma-related symptoms for 11 or more years (53.8%). Of note, 56.3% of participants in the first-line psychotherapy group were on disability for PTSD or other mental health disorders as compared to just 15.6% in the treatment-naïve group ($P = .01$).

Clinical Presentation and Treatment Results

Study participants in the prior treatment groups (pharmacotherapy only, first-line psychotherapy, and other psychotherapy) had significantly higher mean baseline scores on the PCL-M for PTSD and PSQI for sleep quality compared to the treatment-naïve group ($P = .01$, Table I). Clinically significant treatment response rates defined as $\geq$10-point reduction on PTSD symptoms (PCL-M) are presented in Figure 1. The treatment-naïve group (83.3%) and first-line psychotherapy group (88%) had the highest and similar rates of clinically significant symptom reduction. Similarly, at 6-month follow-up, the treatment-naïve group (87.5%) and first-line psychotherapy group (75%) reported the highest clinically

TABLE I. Demographic and Clinical Characteristics of Study Participants by Prior Post-Traumatic Stress Disorder (PTSD) Treatment Types

Characteristics	All ($n = 148$)	Prior PTSD treatment types				*P*-value
		Treatment-naïve ($n = 33$)	Pharmacotherapy only ($n = 40$)	First-line psychotherapy ($n = 33$)	Other psychotherapy ($n = 42$)	
Demographic characteristics						
Age (years)[a]	43.8 ± 13.4	45.7 ± 15.2	45.6 ± 13.1	42.5 ± 12.3	41.7 ± 12.8	.43
Male gender[b]	94.6	93.9	90.0	93.9	100.0	.25
Race[b]						.99
White	84.3	81.8	82.1	84.4	88.1	
Black	13.0	15.2	15.4	12.5	9.5	
Other	2.7	3.0	2.6	3.1	2.4	
Years of education[a]	14.4 ± 2.7	14.2 ± 3.2	14.4 ± 3.0	14.9 ± 2.5	14.2 ± 2.0	.70
Current military status[b]						.64
Active duty	6.8	9.4	10.0	0.0	7.1	
Reservist	6.1	9.4	5.0	6.1	4.8	
Discharged/veteran	87.1	81.3	85.0	93.9	88.1	
Four or more overseas tour[b]	25.2	20.7	22.2	34.4	23.8	.58
Branch of service[b]						.18
Army	57.4	42.4	62.5	57.6	64.3	
Navy	12.8	24.2	10.0	12.1	7.1	
Marine Corps	13.5	12.1	15.0	24.2	4.8	
Air Force	9.5	12.1	7.5	3.0	14.3	
National Guard	6.8	9.1	5.0	3.0	9.5	
Clinical characteristics						
PCL-M[a]	58.5 ± 13.8	52.3 ± 15.5	58.8 ± 12.2	64.6 ± 9.9	58.4 ± 14.8	.01*
BSI[a]	28.4 ± 13.7	24.5 ± 15.3	28.6 ± 12.4	32.3 ± 14.1	27.1 ± 13.6	.18
CES-D (depression)[a]	27.6 ± 11.4	24.2 ± 12.2	30.2 ± 11.0	29.6 ± 10.9	25.9 ± 11.3	.11
STICSA (cognitive)[a]	24.2 ± 7.2	22.8 ± 8.1	25.3 ± 7.3	25.9 ± 6.7	22.9 ± 6.8	.20
STICSA (somatic)[a]	20.3 ± 5.9	20.2 ± 6.7	20.7 ± 6.3	20.5 ± 6.1	19.7 ± 4.8	.90
PSQI (sleep quality)[a]	13.4 ± 3.9	12.0 ± 3.8	13.9 ± 3.8	15.0 ± 3.3	12.6 ± 4.0	.01*
On disability for PTSD/MH[b]	36.1	15.6	35.0	56.3	37.5	.01*
Previous trauma history[b]						
Sexual trauma	10.1	12.1	17.5	9.1	2.4	.15
Physical assault/homicide of civilian	16.9	18.2	17.5	21.2	11.9	.75
Combat-related activity	81.8	73.3	73.7	87.9	90.5	.11
Witness death/execution	71.6	66.7	67.5	78.8	73.8	.64
5+ traumas/major injuries	54.6	50.0	51.3	65.6	52.6	.56
Trauma for 11+ years[b]	53.8	65.6	55.0	40.6	53.7	.26
Current medications[b]						
Antidepressant[c]	46.0	12.1	77.5	51.5	38.1	<.01*
Antianxiety[c]	21.6	3.0	32.5	39.4	11.9	.01*
Sleep	20.3	0.0	22.5	45.5	14.3	<.01*
Antipsychotics	12.2	3.0	12.5	24.2	9.5	.06
Pain	33.8	15.2	37.5	36.4	42.9	.07
Treatment completion rate[b]	71.6	54.6	77.5	75.8	76.2	.11
Total ART sessions[a]	3.5 ± 1.4	3.0 ± 1.5	3.6 ± 1.3	3.7 ± 1.5	3.5 ± 1.4	.19

[a]Data are presented as mean ± SD, *P*-value from analysis of variance;
[b]Data presented as percentage (%), *P*-value from χ^2 or Fisher exact test;
[c]Subjects reported no previous use of this medication for treatment of PTSD, but reported current medication use for conditions other than PTSD.
Abbreviations: ART = Accelerated Resolution Therapy; BSI = Brief Symptom Inventory; CES-D = Center for Epidemiologic Depression Scale; MH = mental health; PCL-M = Military PTSD Checklist; PSQI = Pittsburgh Sleep Quality Index; PTSD = post-traumatic stress disorder; SD = standard deviation; STICSA = State-Trait Inventory for Cognitive and Somatic Anxiety.
*Significant difference at $P < .05$.

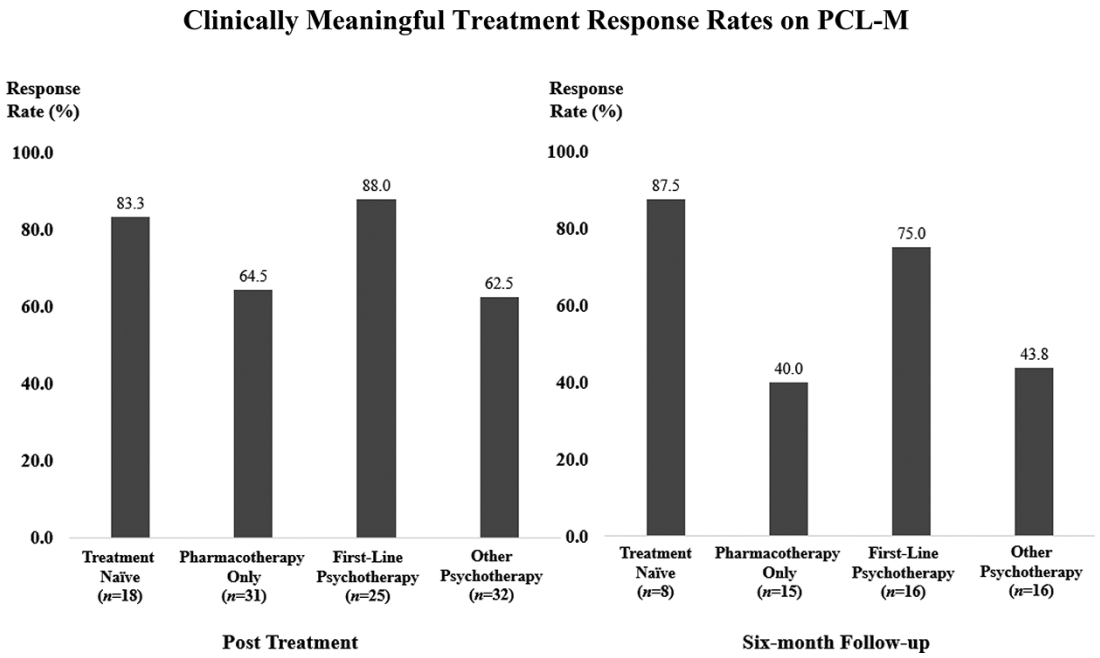

FIGURE 1. Histogram of clinically meaningful treatment response rates on post-traumatic stress disorder (PTSD) symptoms (PCL-M) among participants post-treatment (left) with ART and at 6-month follow-up (right). Clinically meaningful reduction is defined as ≥10-point reduction on the PCL-M. ART: Accelerated Resolution Therapy; PCL-M: Military PTSD Checklist.

significant treatment response rates, indicating that treatment effects were generally sustained at 6-month follow-up. As seen at the top of Table II, all groups experienced significant pre-to-post within-group improvements in PTSD symptoms: 25.1 points reduction in the treatment-naïve group (effect size = 1.48), 15.4 points reduction in the pharmacotherapy only group (effect size = 1.11), 24.1 points in the first-line psychotherapy group (effect size = 1.88), and 19.2 points in the other psychotherapy only group (effect size = 1.03). Thus, participants with a prior history of first-line psychotherapy experienced substantial clinical benefit with ART, as did the treatment-naïve group. In assessing treatment-related changes in PTSD-related comorbidities, all groups showed similar modest-to-large improvements for symptoms of psychological distress, depression, anxiety, and sleep quality. At 6-month follow-up, the largest sustained reductions in symptoms of PTSD occurred in the treatment-naïve group (28.3 points, effect size = 1.48) and the first-line psychotherapy group (28.9 points, effect size = 1.53; Table II, bottom).

DISCUSSION

Post-traumatic stress disorder (PTSD) is a debilitating psychiatric disorder, particularly among U.S. Military service members and veterans. First-line treatments including CPT and PE therapy, while moderately successful in RCTs within the civilian population, produce less-than-optimal outcomes for military-related PTSD.[15] Poor treatment retention, emotionally taxing interventions, and non-response rates point to a need for alternative efficacious psychotherapies for PTSD among servicemen and women.[15,34]

This study showed immediate and sustained (6-month) reductions in PTSD and related mental health symptoms for U.S. Military service/veteran participants following completion of a new, innovative trauma-focused treatment modality—ART. Most participants reported having sought prior treatment, including psychotropic medications and first-line psychotherapies as recommended by guidelines from the VA/DoD (The Management of Posttraumatic Stress Disorder Work Group, 2017). For treatment completers, ART was shown to be effective in reducing post-traumatic stress symptoms and ancillary symptoms of psychological distress, depression, anxiety, and sleep quality after an average of 3.5 treatment sessions. Specifically, ART was shown to be effective at significantly reducing PTSD symptoms among groups with and without self-reported prior treatment history for PTSD. The treatment completion rate was 71.6%, which appears to be comparable or higher than most first-line trauma-focused therapies.[12–18,34] In secondary analyses, treatment completers and non-completers were similar on age, gender, prior PTSD treatment types, and baseline PCL-M scores (data not shown), suggesting that participants who dropped out were random in nature with reasons likely unrelated to clinical status, such as relocation. Moreover, participants' large symptom reductions were generally sustained up to 6 months after ART, particularly for individuals who had either never sought prior PTSD treatment or had reported previously receiving first-line psychotherapy. These findings are encouraging in that some prior studies have shown that PTSD symptoms tend to persist among service members and

TABLE II. Symptom Treatment Response with Accelerated Resolution Therapy (ART) by Prior Post-Traumatic Stress Disorder (PTSD) Treatment Types

	Prior PTSD treatment types												*P*-value (B/T)[a]
	Treatment-naïve			Pharmacotherapy only			First-line psychotherapy			Other psychotherapy			
Symptom measure	Diff.	95% CI	ES (W/I)	Diff.	95% CI	ES (W/I)	Diff.	95% CI	ES (W/I)	Diff.	95% CI	ES (W/I)	
Post-treatment versus Pre-treatment (Treatment completion rate: 71.6%)													
	$n = 18$			$n = 31$			$n = 25$			$n = 32$			
PCL-M (PTSD checklist)	−25.1	−33.5, −16.7	−1.48	−15.4	−20.4, −10.3	−1.11	−24.1	−29.4, −18.8	−1.88	−19.2	−25.9, −12.4	−1.03	.02*
CES-D (depression)	−14.6	−21.7, −7.4	−1.02	−11.6	−15.9, −7.2	−1.00	−11.5	−16.0, −7.0	−1.06	−12.7	−16.7, −8.6	−1.12	.59
Brief Symptom Inventory	−17.1	−24.5, −9.8	−1.16	−14.0	−18.7, −9.3	−1.09	−17.6	−22.3, −13.0	−1.57	−14.6	−19.7, −9.6	−1.06	.24
STICSA (anxiety)	−9.8	−13.9, −5.6	−1.18	−7.1	−9.3, −4.9	−1.19	−10.2	−13.1, −7.2	−1.43	−6.7	−9.6, −3.7	−0.81	.08
STICSA (somatic)	−6.3	−9.5, −3.1	−0.98	−3.4	−5.4, −1.3	−0.60	−5.2	−7.7, −2.6	−0.85	−4.2	−6.5, −1.9	−0.65	.16
PSQI (sleep quality)	−4.9	−7.1, −2.6	−1.25	−1.7	−3.1, −0.4	−0.51	−4.0	−6.2, −1.7	−0.78	−2.5	−4.0, −1.0	−0.61	.07
6-month Follow-up versus Pre-treatment (Follow-up rate: 51.9%)													
	$n = 8$			$n = 15$			$n = 16$			$n = 16$			
PCL-M (PTSD checklist)	−28.3	−44.3, −12.3	−1.48	−9.9	−16.7, −3.0	−0.80	−21.4	−28.9, −14.0	−1.53	−10.8	−21.8, 0.1	−0.53	.20
CES-D (depression)	−17.9	−29.2, −6.5	−1.32	−8.9	−17.6, −0.2	−0.57	−8.2	−13.3, −3.2	−0.86	−5.0	−12.9, 2.8	−0.36	.49
Brief Symptom Inventory	−24.4	−34.1, −14.8	−2.11	−9.6	−17.9, −1.2	−0.64	−13.8	−21.9, −5.8	−0.91	−6.4	−15.8, 3.1	−0.36	.20
STICSA (anxiety)	−12.0	−19.3, −4.7	−1.38	−2.7	−7.4, 2.0	−0.31	−6.2	−10.1, −2.2	−0.84	−2.0	−6.4, 2.4	−0.24	.30
STICSA (somatic)	−6.6	−12.5, −0.8	−0.95	0.4	−3.7, 4.5	0.05	−2.6	−6.7, 1.4	−0.35	−0.5	−3.4, 2.4	−0.09	.27
PSQI (sleep quality)	−5.3	−10.2, −0.3	−0.89	−1.6	−4.3, 1.1	−0.36	−2.8	−5.8, 0.2	−0.54	−0.2	−2.0, 1.6	−0.07	.23

Abbreviations: CES-D = Center for Epidemiologic Depression Scale; CI = confidence interval; MH = mental health; PCL-M = Military PTSD Checklist; PSQI = Pittsburgh Sleep Quality Index; SD = standard deviation; STICSA = State-Trait Inventory for Cognitive and Somatic Anxiety. ES(W/I): within-group effect size comparing mean scores before and after treatment with ART.

[a]B/T: between-group comparison of treatment response adjusted for baseline value of the symptom measure, PCL-M, PSQI, disability, antidepressant, antianxiety, and sleep medication.

*Significant difference at $P < .05$.

veterans, particularly those with high combat experience and comorbid concerns like depression.[4]

The comparable favorable treatment response among treatment-naïve participants versus those who had previously received first-line psychotherapy may seem somewhat unexpected. However, by definition, the treatment-naïve group did not include individuals with residual PTSD symptoms despite prior treatment. On the other hand, the imaginal exposure component of ART is similar to CPT and PE treatment protocols; therefore, service members and veterans may have been familiar and/or generally comfortable with this element of psychotherapy. In addition, veterans who had previously received first-line psychotherapy were highly symptomatic at study entry and thus there was substantial numerical range for symptom reduction in this group. Although speculative, these counterbalancing conditions may have impacted the large comparable clinical response reported in these two patient groups.

Previous studies have attempted to isolate factors that have contributed to treatment dropout, poor response rates, low help-seeking, and risks for persistent PTSD symptoms, with varying results.[4,34,35] Although the reasons for unsuccessful prior treatment or lack of treatment-seeking in the past are not known about the current study's sample population, common factors that have been identified in previous studies are combat experiences, PTSD symptom severity, poor sleep quality, and comorbid depression, anxiety, and other mental health disorders that can complicate treatment outcomes. The findings in the present study indicate that not only did participants' PTSD symptoms improve significantly in a brief treatment period, but also did concomitant symptoms of depression, sleep quality, anxiety, and overall psychological distress after completing ART. This suggests that ART may be particularly helpful for more severe and complex symptom constellations for U.S. Military members and veterans.

Limitations and Future Directions

Results of this study are promising in identifying a brief affordable treatment that is efficacious for treating U.S. Military members and veterans who have received prior treatment for PTSD but remain symptomatic. However, this study has several notable limitations. First, both prior treatment history and PTSD symptom status were based on veteran self-report, rather than formal review of medical records and formal clinician diagnoses. The accuracy of this reporting is unknown, yet as stated in Methods, having veterans report symptoms with the explicit knowledge that their reporting would not impact their disability status (i.e., addition or removal of a diagnosis of PTSD) was done to enhance recruitment and limit motivation for secondary gain. In addition, while not diagnostic, the 17-item PCL-M used in this study maps directly onto Diagnostic and Statistical Manual of Mental Disorders criteria for PTSD has been shown to have good temporal stability, internal consistency, and convergent validity and thus may be useful as a guide to diagnostic assessment.[36] Third, therapists were not blinded to participant's prior treatment history, and in fact, may have used this information in tailoring delivery of the ART protocol—we find no apparent source of bias due to this lack of clinician blinding. Fourth, while the completion rate for ART was relatively high compared to most first-line trauma-focused psychotherapies, some participants did not complete treatment and did not complete follow-up assessments. Some hypotheses are that symptoms remitted, and the client did not wish to return, or perhaps they were no longer clients of the VA at the time of follow-up. However, those who completed treatment and provided follow-up data reported high rates of symptom reduction at follow-up. Finally, the present study's sample population was largely male and of Caucasian race. Thus, results may not be fully representative of VA clients or veterans at large.

Future prospective studies should be conducted on ART and other promising emerging therapies among U.S. Military service members and veterans in both VA and non-VA outpatient settings, including long-term follow-up. Results of a recently completed RCT of ART versus CPT versus waitlist among civilians and veterans are pending.[37]

CONCLUSIONS

The ART continues to show evidence as an effective treatment modality for PTSD[19,24,33] and related mental health concerns like depression,[33] bereavement,[38] and even pain.[39] The ART is an individualized, manualized, trauma-focused psychotherapy which contains the most critical elements of trauma-focused therapy as defined in the VA/DoD clinical practice guideline.[7,40] Our results suggest that ART may be considered as a potential first-line treatment for PTSD, particularly for military service members and veterans who are at high risk of treatment dropout and/or have received prior treatment for PTSD yet remain symptomatic.

ACKNOWLEDGMENTS

We thank the U.S. service members and veterans who participated in this research.

FUNDING

This work was supported by the U.S. Army Medical Research and Materiel Command and Telemedicine and Advanced Technology Research Center under Contract W81XWH-10-1-0719 and by funding support from the Chris T. Sullivan Foundation.

CONFLICT OF INTEREST STATEMENT

None declared.

DATA AVAILABILITY STATEMENT

Inquiries related to the data that support the findings should be directed to the corresponding author. The data are not publicly available due to privacy and confidentiality requirements of the IRB at the USF, the parent institution for the study. Requests for data access, if approved through the corresponding author and USF IRB, require a Data Authorization and Data Sharing Agreement between USF and the requesting institution.

ETHICS STATEMENT

Ethical approval for this study was obtained from IRB at USF. All participants provided written informed consent.

REFERENCES

1. American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*. 5th. American Psychiatric Publishing; 2013.
2. United States Census Bureau: *Veteran Status: 2019 American Community Survey 1-year Estimates*. Available at https://data.census.gov/cedsci/table?q=veterans&t=Veterans&hidePreview=true&tid=ACSST1Y2019.S2101; 2019.
3. Kok BC, Herrell RK, Thomas JL, Hoge CW: Posttraumatic stress disorder associated with combat service in Iraq or Afghanistan: reconciling prevalence differences between studies. J Nerv Ment Dis 2012; 200(5): 444–50.
4. Armenta RF, Rush T, LeardMann CA, Millegan J, Cooper A, Hoge CW: Factors associated with persistent posttraumatic stress disorder among U.S. military service members and veterans. BMC Psychiatry 2018; 18(1): 48.
5. Marmar CR, Schlenger W, Henn-Haase C, et al: Course of posttraumatic stress disorder 40 years after the Vietnam war: findings from the National Vietnam veterans longitudinal study. JAMA Psychiatry 2015; 72(9): 875–81.
6. Levine AB, Levine LM, Levine TB: Posttraumatic stress disorder and cardiometabolic disease. Cardiology 2014; 127(1): 1–19.
7. Department of Veterans Affairs and Department of Defense: *VA/DoD Clinical Practice Guideline for the Management of Post-Traumatic Stress and Acute Stress Disorder*. Washington, DC: Veterans Health Administration, Department of Defense; 2017.
8. American Psychological Association: *Clinical Practice Guideline for the Treatment of Posttraumatic Stress Disorder (PTSD) in Adults*. Available at http://www.apa.org/about/offices/directorates/guidelines/ptsd.pdf, February 24, 2017; accessed January 2, 2021.
9. Norman SB, Trim R, Haller M, et al: Efficacy of integrated exposure therapy vs integrated coping skills therapy for comorbid posttraumatic stress disorder and alcohol use disorder: a randomized clinical trial. JAMA Psychiatry 2019; 76(8): 791–9.
10. Paintain E, Cassidy S: First-line therapy for post-traumatic stress disorder: A systematic review of cognitive behavioural therapy and psychodynamic approaches. Couns Psychother Res 2018; 18(3): 237–50.
11. Kitchiner NJ, Lewis C, Roberts NP, Bisson JI: Active duty and ex-serving military personnel with post-traumatic stress disorder treated with psychological therapies: systematic review and meta-analysis. Eur J Psychotraumatol 2019; 10(1): 1684226.
12. Steenkamp MM, Litz BT, Hoge CW, Marmar CR: Psychotherapy for military-related PTSD: a review of randomized clinical trials. JAMA 2015; 314(5): 489–500.
13. Resick PA, Wachen JS, Mintz J, et al: A randomized clinical trial of group cognitive processing therapy compared with group present-centered therapy for PTSD among active duty military personnel. J Consult Clin Psychol 2015; 83(6): 1058–68.
14. Nidich S, Mills PJ, Rainforth M, et al: Non-trauma-focused meditation versus exposure therapy in veterans with post-traumatic stress disorder: a randomised controlled trial. Lancet Psychiatry 2018; 5(12): 975–86.
15. Steenkamp MM, Litz BT, Marmar CR: First-line psychotherapies for military-related PTSD. JAMA 2020; 323(7): 656–7.
16. Rauch SAM, Kim HM, Powell C, et al: Efficacy of prolonged exposure therapy, sertraline hydrochloride, and their combination among combat veterans with posttraumatic stress disorder: a randomized clinical trial. JAMA Psychiatry 2019; 76(2): 117–26.
17. Foa EB, McLean CP, Zang Y, et al: Effect of prolonged exposure therapy delivered over 2 weeks vs 8 weeks vs present-centered therapy on PTSD symptom severity in military personnel: a randomized clinical trial. JAMA 2018; 319(4): 354–64.
18. Resick PA, Wachen JS, Dondanville KA, et al: Effect of group vs individual cognitive processing therapy in active-duty military seeking treatment for posttraumatic stress disorder: a randomized clinical trial. JAMA Psychiatry 2017; 74(1): 28–36.
19. Kip KE, Elk CA, Sullivan KL, et al: Brief treatment of symptoms of post-traumatic stress disorder (PTSD) by use of accelerated resolution therapy (ART((R))). Behav Sci (Basel) 2012; 2(2): 115–34.
20. Kip KE, Hernandez DF, Shuman A, et al: Comparison of accelerated resolution therapy (ART) for treatment of symptoms of PTSD and sexual trauma between civilian and military adults. Mil Med 2015; 180(9): 964–71.
21. Kip KE, Rosenzweig L, Hernandez DF, et al: Randomized controlled trial of accelerated resolution therapy (ART) for symptoms of combat-related post-traumatic stress disorder (PTSD). Mil Med 2013; 178(12): 1298–309.
22. Kip KE, Berumen J, Zeidan AR, Hernandez DF, Finnegan AP: The emergence of accelerated resolution therapy for treatment of post-traumatic stress disorder: A review and new subgroup analyses. Couns Psychother Res 2019; 19(2): 117–29.
23. Kip KE, Diamond DM: Clinical, empirical, and theoretical rationale for selection of accelerated resolution therapy for treatment of post-traumatic stress disorder in VA and DoD facilities. Mil Med 2018; 183(9-10): e314–21.
24. Kip KE, D'Aoust RF, Hernandez DF, et al: Evaluation of brief treatment of symptoms of psychological trauma among veterans residing in a homeless shelter by use of accelerated resolution therapy. Nurs Outlook 2016; 64(5): 411–23.
25. Blanchard EB, Jones-Alexander J, Buckley TC, Forneris CA: Psychometric properties of the PTSD checklist (PCL). Behav Res Ther 1996; 34(8): 669–73.
26. Weathers F, Litz TB, Herman SD, Huska AJ, Keane MT: The PTSD Checklist (PCL): reliability, validity, and diagnostic utility. *Paper presented at the Annual Convention of the International Society for Traumatic Stress Studies, San Antonio, TX*. 1993.
27. Radloff LS: The CES-D scale: a self-report depression scale for research in the general population. Appl Psychol Meas 1977; 1(3): 385–401.
28. Grös DF, Antony MM, Simms LJ, McCabe RE: Psychometric properties of the State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA): comparison to the State-Trait Anxiety Inventory (STAI). Psychol Assess 2007; 19(4): 369–81.
29. Meachen S-J, Hanks RA, Millis SR, Rapport LJ, Reliability T: Validity of the brief symptom inventory- 18 in persons with traumatic brain injury. Arch Phys Med Rehabil 2008; 89(5): 958–65.
30. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ: The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Res 1989; 28(2): 193–213.
31. Lee JLC, Nader K, Schiller D: An update on memory reconsolidation updating. Trends Cogn Sci 2017; 21(7): 531–45.
32. Kip KE, Shuman A, Hernandez DF, Diamond DM, Rosenzweig L: Case report and theoretical description of accelerated resolution therapy (ART) for military-related post-traumatic stress disorder. Mil Med 2014; 179(1): 31–7.
33. Kip KE, Sullivan KL, Lengacher CA, et al: Brief treatment of co-occurring post-traumatic stress and depressive symptoms by use of accelerated resolution therapy((R)). Front Psychiatry 2013; 4(11).
34. Najavits LM: The problem of dropout from "gold standard" PTSD therapies. F1000Prime Rep 2015; 7(43).
35. Xue C, Ge Y, Tang B, et al: A meta-analysis of risk factors for combat-related PTSD among military personnel and veterans. PLoS One 2015; 10(3): e0120270.
36. Wilkins KC, Lang AJ, Norman SB: Synthesis of the psychometric properties of the PTSD checklist (PCL) military, civilian, and specific versions. Depress Anxiety 2011; 28(7): 596–606.

37. University of Cincinnati, Cincinnati VA Medical Center: A comparison of CPT versus ART versus WL. https://ClinicalTrials.gov/show/NCT03384706, Published 2017. Updated September 6; accessed June 30, 2021.
38. Buck HG, Cairns P, Bpharm NE, et al: Accelerated resolution therapy: randomized controlled trial of a complicated grief intervention. Am J Hospice Palliative Med 2020; 37(10): 1049909119900641.
39. Kip KE, Rosenzweig L, Hernandez DF, et al: Accelerated resolution therapy for treatment of pain secondary to symptoms of combat-related posttraumatic stress disorder. Eur J Psychotraumatol 2014; 5(1): 24066.
40. Waits W, Marumoto M, Weaver J: Accelerated resolution therapy (ART): a review and research to date. Curr Psychiatry Rep 2017; 19(3): 18.