

Evaluation of brief treatment of symptoms of psychological trauma among veterans residing in a homeless shelter by use of Accelerated Resolution Therapy

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ABSTRACT

Background: Posttraumatic stress disorder (PTSD) is prevalent in both homeless and nonhomeless veterans.

Purpose: To examine unique characteristics of being homeless that may influence PTSD treatment completion and clinical success.

Methods: Twenty-three veterans who were homeless and residing in a homeless shelter, along with 94 veterans from the community, were enrolled to receive one to five sessions of Accelerated Resolution Therapy (ART), an emerging trauma-focused therapy for symptoms of PTSD. Rates of treatment completion with ART and acute and 6-month change in symptoms of PTSD were compared in an observational (nonrandomized) manner by housing status.

Findings: Compared to veterans recruited from the community, veterans residing in the homeless shelter were older and presented with more extensive psychopathology yet had less combat exposure while being more likely to have experienced sexual assault. Rates of treatment completion were 52.2% (12 of 23) among homeless veterans compared to 81.9% (77 of 94) among veterans from the community ($p = .005$). Among treatment completers, both groups received an average of four sessions of ART. Reduction of symptoms of PTSD was substantial and nonsignificantly greater among homeless veterans vs. those treated from the community ($p = .14$), as were comorbidity reductions in depression, anxiety, sleep quality, pain, and improved quality of life. Results at 6-month posttreatment follow-up were similar.

Conclusions: Although limited by small sample size and a nonrandomized design, ART appears to be an effective, brief treatment for symptoms of PTSD among veterans residing in a homeless shelter. However, development of effective strategies to maximize treatment completion among homeless veterans is needed.

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Introduction

There are nearly 20 million veterans living in the United States today with 14% from the post-9/11 era (9/2011 or later), 18% from the Gulf War (1990–2001), 36% from the Vietnam era, and 17% from earlier conflicts (United States Census Bureau, 2015). In 2009, Secretary Eric Shinseki of the Department of Veterans Affairs (VA) pledged to end homelessness among veterans in the ensuing 5 years, in part, via millions of dollars in federal funding being allocated to create and expand VA services for homeless veterans (U.S. Department of Veterans Affairs, 2009). Although this federal commitment is laudable, veterans remain overrepresented in the U.S. homeless population with a prevalence estimate of 12.3% vs. 9.7% of nonveteran adults in the general population (U.S. Department of Veterans Affairs, 2013). On the other hand, the disparity in the rate of homelessness between veterans and non-veterans appears to be diminishing over time (U.S. Department of Housing and Urban Development, 2013; Veterans Healthcare Administration Office of Rural Health, 2013). Still, it is estimated that on any single night, more than 50,000 veterans are homeless (U.S. Department of Housing and Urban Development, 2013).

A recent comprehensive review of risk factors for homelessness among U.S. veterans revealed similarities and differences compared to the civilian population (Tsai & Rosenheck, 2015). In brief, substance abuse problem(s) is a strong, consistent risk factor for homelessness among U.S. veterans (Elbogen, Sullivan, & Wolfe, 2013; O'Connell, Kaspro, & Rosenheck, 2008) as is lack of social support (Rosenheck & Fontana, 1994), being unmarried (among females) (Blackstock, Haskell, Brandt & Desai, 2012; Washington et al., 2010), lower military pay grade (Metraux, Clegg, Daigh, Culhane, & Kane, 2013), and being denied a disability claim for posttraumatic stress disorder (PTSD) (Murdoch et al., 2011). Many of these risk factors mirror the civilian population. In contrast, there appear to be cohort effects, including male Vietnam veterans being substantially more likely to be homeless than males of the same age and period in the civilian population (Gamache, Rosenheck, & Tessler, 2001; Rosenheck, Frisman, & Chung, 1994), yet no apparent higher prevalence for veterans of Operation Enduring Freedom and Operation Iraqi Freedom (Edens, Kaspro, Tsai, & Rosenheck, 2011). Importantly, studies of homeless veterans have revealed exceptionally high rates of significant psychiatric disorders, alcohol and drug abuse, and chronic medical conditions (Kushel, Vittinghoff, & Haas, 2001). In addition, there is an increased prevalence of suicidal behavior in homeless veterans (Schinka, Schinka, Casey, Kaspro, & Bossarte, 2012).

For recent deployments related to the wars in Iraq and Afghanistan, the prevalence of PTSD averages

approximately 6% in general military population samples and 13% for operational infantry units exposed to direct combat (Kok, Herrell, Thomas, & Hoge, 2012). The presence of PTSD among veterans has long been considered as a potential risk factor for homelessness. However, the literature is inconsistent, with some (O'Donnell, Creamer, & Pattison, 2004; O'Toole, Conde-Marte, Gibbon, Hanusa, & Fine, 2003; Washington et al., 2010), but not all studies (Rosenheck, Frisman, Fontana, & Leda, 1997) implicating PTSD as a risk factor for homelessness. Irrespective of this inconsistency, of major importance is the potential for effective treatment of PTSD among veterans who are homeless. In this regard, there are no controlled trial data or formal guidelines for trauma-focused therapy for homeless veterans with PTSD (Dinnen, Kane, & Cook, 2014; Hopper, Bassuk, & Oliver, 2010).

Formal guidelines (U.S. Department of Veterans Affairs, 2010; American Psychiatric Association, 2004; Foa, Keane, & Friedman, 2008; Forbes et al., 2010; National Institute for Health and Clinical Excellence, 2005) uniformly recommend use of trauma-focused interventions as first-line treatment for adults with PTSD. The most frequently endorsed and practiced cognitive behavioral therapies for treatment of PTSD among veterans are prolonged exposure (PE) therapy (Ballenger et al., 2004; Foa, Hembree, & Rothbaum, 2007; Nemeroff et al., 2006), cognitive processing therapy (CPT) (Ballenger et al., 2004; Resick & Schnicke, 1992; Resick, Williams, Suvak, Monson, & Gradus, 2012), and eye movement desensitization and reprocessing (Friedman, 2003; Nemeroff et al., 2006; Shapiro, 2001). Despite decades of empirical evidence, a recent review of randomized controlled trials conducted primarily among civilians reported that approximately two-thirds of patients who receive PE therapy or CPT (i.e., standard-of-care), retain their diagnosis post-treatment (Steenkamp, Litz, Hoge, & Marmar, 2015). Therefore, the applicability of these established therapies, which typically require 8–12 treatment sessions, is unknown within the setting of homeless veterans and overall transient status that may impede completion of a full course of therapy.

Accelerated Resolution Therapy (ART) is an emerging, brief psychotherapy developed and delivered with the core components used in most A-level trauma-focused psychotherapies: (narrative component, in vivo and/or imaginal exposure, cognitive restructuring, and relaxation/stress modulation) (Hoge, 2011). Unlike current first-line psychotherapies for PTSD, ART is delivered in just one to five treatment sessions and without a requirement for homework or skills practice. At academic and community clinical facilities, ART has indicated evidence of efficacy in the treatment of symptoms of PTSD in adult civilian and military populations in an average of less than four treatment sessions and with a completion rate of approximately 90% (Kip et al., 2012, 2013, 2015). In

addition, ART has been recently recognized at the federal level as being an effective treatment for psychological trauma and depression (Substance Abuse and Mental Health Services Administration, n.d.). Whereas previous studies of ART for treatment of symptoms of PTSD among veterans have reported substantial reductions in comorbidities including depression, anxiety, sleep dysfunction, aggression, and pain (Kip et al., 2013), none of the published research data on ART has been among persons with a known history of homelessness or being homeless.

Given initial empirical evidence of efficacy and the brief treatment protocol of ART, we sought to investigate the feasibility of delivering and corresponding effectiveness of ART in treating symptoms of PTSD among a cohort of homeless veterans residing in a homeless shelter. Our theoretical rationale was based on the brevity of the treatment protocol (i.e., might be expected to facilitate treatment completion), coupled with reported characteristics of homeless vs. non-homeless veterans which could potentially influence differential treatment response. To illustrate, characteristics associated with homeless veterans which could influence treatment response include female gender, prior history of sexual assault during service, lack of employment, presence of a disability, and history of alcohol and drug abuse (Washington et al., 2010; Kushel et al., 2001). In addition, homeless veterans tend to be older in age than nonhomeless veterans, in addition to remaining chronically homeless (Alvin & Robert, 2012; Tessler, Rosenheck, & Gamache, 2002).

Methods

The present analysis is derived from a prospective cohort treatment study of ART registered at ClinicalTrials.gov (NCT02030522). Inclusion and

exclusion criteria are listed in [Table 1](#). In brief, inclusion in the study required being a U.S. service member or veteran with prior deployment(s) to major conflict zone(s) and/or experienced military sexual trauma and significant symptoms of PTSD, as determined through a clinician interview and screening that included use of the 17-item Military PTSD Checklist (PCL-M) (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Weathers, Litz, Herman, Huska, & Keane, 1993) and PTSD subscale of the 125-item Psychiatric Diagnostic Screening Questionnaire (PDSQ) (Zimmerman & Chelminski, 2006; Zimmerman & Mattia, 2001). Other comorbidities reviewed during screening included subscales scores of the PDSQ (e.g., depression, agoraphobia, substance use/abuse, and so forth), medical history, use of medications, and clinician completion of the Brief Mental Status Exam. Exclusion criteria included suicidal or homicidal ideation (appropriate referral thereafter) and contraindications to the ART protocol including significant brain injury (mild traumatic brain injury acceptable) and currently undergoing substance abuse treatment (e.g., detox program). The study protocol was approved by the institutional review board at the University of South Florida (USF), and all veterans provided written informed consent. All subjects received a \$50 gift card for completion of study data collection forms before and after treatment with ART, and at 6-month follow-up.

The parent site for the study is the College of Nursing at USF in Tampa, Florida. As part of recruitment efforts, the Homeless Emergency Project (HEP) located in Clearwater, Florida, was selected as an outreach site. Since 1986, the mission of HEP has been to provide homeless and low-income individuals and families, including veterans, with housing, food, clothing, and support services necessary to obtain self-sufficiency and improved quality of life. Referral of veterans to HEP is typically coordinated through the

Table 1 – Study Inclusion and Exclusion Criteria

Inclusion criteria

1. U.S. service member or veteran with prior deployment(s) to major conflict zones(s) (e.g., Vietnam War, Persian Gulf conflict, wars in Iraq/Afghanistan, and so forth) and/or experienced military sexual trauma.
2. Age 18 years or older.
3. Symptoms indicative of psychological trauma (e.g., score of ≥ 40 on PCL-M and positive endorsement of PTSD on PTSD subscale of the PDSQ).
4. Ability to read and speak English.
5. Denial of current suicidal ideation or intent, including homicidal ideation or intent and no evidence of psychotic behavior or being in psychological crisis.

Exclusion criteria

1. Brain injury prohibiting speech, writing, and purposeful actions (mild traumatic brain injury is acceptable).
2. Currently engaged in another PTSD psychotherapy treatment regimen.
3. Major psychiatric disorder (e.g., bipolar disorder) concomitant to symptoms of psychological trauma deemed likely to interfere with treatment.
4. Currently undergoing alcohol and/or drug abuse treatment (participation in self-help programs is acceptable).
5. Any medical condition that in the judgment of the Principal Investigator and/or ART clinician may place the individual at high risk due to a potential heightened emotional reaction (e.g., previous heart attack, seizure disorder).

Note. ART, Accelerated Resolution Therapy; PDSQ, Psychiatric Diagnostic Screening Questionnaire; PTSD, posttraumatic stress disorder.

Veterans Administration. For this analysis, treatment results with ART were compared between homeless veterans with temporary residence at HEP vs. veterans treated at community-based sites included in the parent study (Figure 1). For appropriate comparison of the HEP (homeless) facility vs. community-based sites, veterans who were incarcerated ($n = 2$) were excluded due to major differences in life circumstances. In addition, veterans with temporary shelter at the Eagles Healing Nest in Sauk Center, Minnesota, were excluded due to the fact that the study team conducted a one-time mobile outreach effort with ART for a limited 4-day period (i.e., restricted number of possible treatment sessions).

ART Intervention

Description of the ART protocol has been published (Kip et al., 2012, 2013; Kip, Shuman, Hernandez, Diamond, & Rosenzweig, 2014). In brief, the technique of imaginal exposure was first used whereby veterans were asked to recall (verbally or nonverbally) details of traumatic events experienced (typically one event per session) while focusing their attention on physiological sensations, thoughts, and emotions. The veteran was composed into a relaxed and alert state of mind and was then exposed to reactivation of the targeted memory for a short period (~30–45 s). This short period of exposure to the memory was immediately followed by identification and diminishment of the emergence of any uncomfortable emotional or somatic

symptoms. Two phases of intermittent exposure to the targeted memory were performed.

Imagery rescripting was then used whereby the veteran imagined a new way to think about the trauma(s) to change (replace) the negative traumatic narrative, including sensory material and images, to positive material. This approach is consistent with memory reconsolidation and the tenet that much of the cognitive-affective disturbance associated with intrusive trauma-related memories is embedded in the traumatic images themselves, and that modifying the traumatic imagery becomes a powerful, if not preferred, means of processing the traumatic material (Smucker, 1997).

During the imaginal exposure and imagery rescripting components, the veteran followed the therapist's hand back and forth moving their eyes from right to left, with 40 bilateral eye movements performed per set. The veteran was not speaking, but rather "watching" his or her original or newly imagined scene. By protocol, the number of planned treatment sessions per veteran ranged from one to five based on extent of prior trauma history and individual treatment response achieved. This included fully addressing the specific number of traumatic exposures reported by the veteran as perceived to be contributing to their PTSD symptomatology and irrespective of the specific type(s) of traumatic exposure(s) experienced (e.g., sexual vs. nonsexual trauma). Treatment sessions were scheduled for approximately 1 hr with additional time allocated so as to achieve within-session

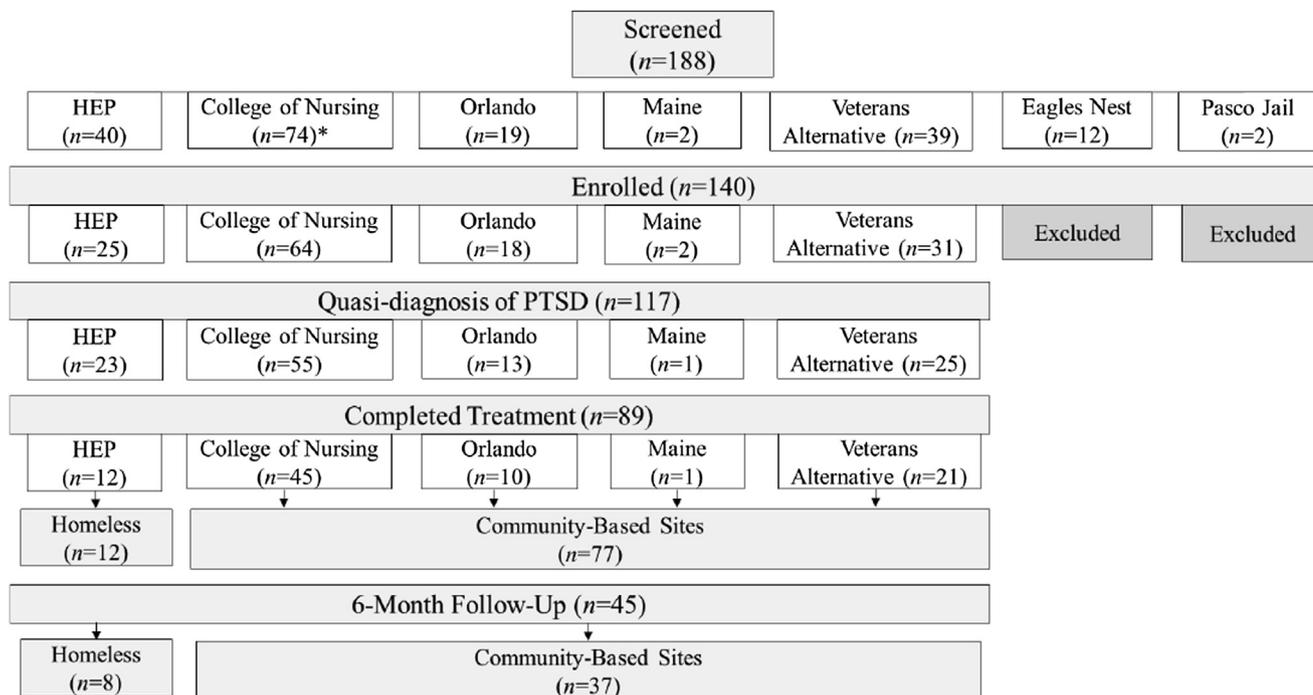


Figure 1 – Consort diagram of service members and veterans screened, enrolled, and included in the study analysis. *Five veterans living in the community who were enrolled at the USF College of Nursing were actually treated at the Homeless Emergency Project (HEP) in Clearwater, Florida. PTSD, posttraumatic stress disorder.

resolution of the specific traumatic scene(s) being addressed. Each treatment session was considered complete (successful) when: (a) the veteran reported being able to recall (in their mind) the details of the original traumatic experience without experiencing corresponding physiological arousal and (b) reporting “seeing” only the new images envisioned during the imagery rescripting component and not being able to “see” the original traumatic images. In general, a minimum of one treatment session per week was scheduled so that treatment completion could generally occur within a one-month period. All treatment sessions (homeless and nonhomeless veterans) were conducted in a private, quiet room with only the veteran and clinician present. All ART clinicians were trained by the developer of ART using a standard training protocol and training manual. During the study, all clinicians completed an intervention fidelity checklist after each treatment session documenting adherence in delivery of the standard ART protocol.

Data Collection

After consent, determination of eligibility, and enrollment into the study, a battery of self-report questionnaires were completed. Before the first ART session, participants completed a brief demographic and medical history form, the Brief Traumatic Brain Injury Screen (BTBIS), a three question screening tool for mild traumatic brain injury (Schwab et al., 2006), and the Combat Exposure Scale (CES), a tool used to assess and categorize wartime stressors experienced from “light” to “heavy” (Keane et al., 1989). Furthermore, in addition to the PCL-M and PDSQ collected at screening, the following validated measures were collected at baseline, posttreatment, and 6-month follow-up: 18-item Brief Symptom Inventory to measure psychological distress (Meachen, Hanks, Millis, & Rapport, 2008), 20-item Center for Epidemiologic Studies Depression Scale to measure depressive symptoms (Radloff, 1977), 21-item State-Trait Inventory for Cognitive and Somatic Anxiety (Dros, Antony, Simms, & McCabe, 2007), Pittsburgh Sleep Quality Index (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989), to measure sleep quality, 20-item Pain Outcomes Questionnaire-Short Form to measure key domains of pain (Clark, Gironda, & Young, 2003), 34-item Clinical Outcomes in Routine Evaluation Measures and System to measure psychological distress comprised of four domains: well-being, symptoms, functioning, and risk (Barkham et al., 2001) and the 36-item Short Form Health Survey (SF-36) to measure both mental and physical health quality of life (Ware & Sherbourne, 1992).

Statistical Analysis

Because symptom measures and not formal diagnoses were used in the study, the analysis was restricted to subjects who presented with a “quasi-diagnosis” of PTSD, as defined as: (a) positive screen on the PDSQ for

PTSD, (b) PCL-M checklist score of ≥ 40 , and (c) meeting the PCL-M checklist algorithm for PTSD consisting of symptom rating of “Moderately” or above for at least one “B” item (questions 1–5), three “C” items (questions 6–12), and at least two “D” items (questions 13–17) (Weathers et al., 1993). Descriptive statistics for demographic and clinical characteristics are presented as means (\pm standard deviation) for continuous variables and percentages for categorical variables. Student *t* tests for continuous variables and chi-square tests for categorical variables were used to compare presenting characteristics between homeless veterans and those recruited from community sites. Comparisons were made among enrolled subjects and the subset of enrolled subjects who completed treatment with ART. To compare treatment response with ART for symptoms of PTSD and related comorbidities (homeless vs. community-based veterans), analysis of covariance was used with statistical adjustment for baseline value of the outcome of interest, baseline PDSQ T-score (global psychopathology), age, level of combat exposure, on disability for PTSD or another mental health disorder, and trauma for 11 or more years. Pre-to-post ART outcome change scores by group were used to calculate Cohen’s *d* effect sizes and 95% confidence intervals. Because potential differences in treatment response by homeless status were not hypothesized a priori, paired *t* tests were also conducted to examine the magnitude of within-group treatment response with ART. Sensitivity analyses were conducted to account for noncompletion, whereas conservatively assuming no treatment response for noncompleters and retaining standard errors from those with complete data (i.e., to avoid artificially reducing the variance). *p* values $< .05$ were considered to be statistically significant.

Findings

A total of 188 service members/veterans were screened for enrollment in the study (Figure 1). Of these, 140 (74.5%) met eligibility criteria and were enrolled. Of those enrolled, 117 (83.5%) were deemed to have a quasi-diagnosis of PTSD and 89 (76.1%) completed treatment with ART. For the 23 subjects from the homeless facility (HEP), 12 (52.2%) completed treatment as compared to 77 of 94 (81.9%) subjects from community-based sites ($p = .005$). For the 11 of 23 homeless subjects who did not complete treatment, six moved away, three reported work conflicts, and two withdrew for other reasons.

Demographic Characteristics

For both enrolled subjects and those who completed treatment with ART, the mean age was 43 ± 13 years (Table 2). Homeless veterans were on average about 10 years older than those recruited from community-

based sites. Other notable demographic differences included homeless veterans being nominally less educated than veterans from the community, and not unexpectedly, significantly less likely to be married or living with someone. On the other hand, homeless veterans tended to have had fewer overseas tours than veterans from the community and had experienced a much lower level of combat-related activity.

Clinical Presentation

Among all subjects, the mean PCL-M score was 63 ± 10 and was nearly identical between homeless veterans and those recruited from the community (Table 3). Comorbidity was high in both groups, as evidenced by screening positive for major depressive disorder (79%), generalized anxiety disorder (77%), and agoraphobia (86%). The percentage of subjects who screened positive for alcohol abuse or drug abuse/dependence was 44% and 22%, respectively. Of note, the mean global psychopathology PDSQ-T score was nominally higher in homeless veterans compared to those recruited from the community (64.8 ± 16.1 vs. 58.6 ± 15.6 , $p = .09$) and was even more pronounced among the subset of enrolled subjects who completed treatment (71.0 ± 18.1 vs. 58.5 ± 16.2 , $p = .02$). Approximately two in five veterans were currently taking antidepressant medications, whereas veterans from the community were

more likely than homeless veterans to be taking prescription pain medications. The mean SF-36 mental and physical component scores of 37.6 and 64.3, respectively, indicated that veterans reported overall better physical health, yet substantially lower mental health, compared to the standardized population mean score of 50. Finally, veterans from the community were more likely than homeless veterans to be on disability for PTSD or another mental health disorder.

Trauma and Treatment History

Approximately three-quarters of all subjects reported previously witnessing death or execution with slightly lower exposure among homeless veterans compared to those from the community (61% vs. 78%, $p = .11$; Table 4). Consistent with more combat exposure, veterans from the community were significantly more likely than homeless veterans to have been exposed to improvised explosive devices and combat explosions. In contrast, homeless veterans were significantly more likely to have a history of sexual assault. Consistent with older mean age, homeless veterans were more likely than veterans from the community to have lived with trauma for more than 11 years (83% vs. 43%, $p = .0009$). More than 70% of all subjects had received prior psychotherapy. With respect to ART, the mean number of sessions for subjects who completed treatment was

Table 2 – Demographic Characteristics of Study Participants by Residential Status

Demographic Characteristic	Enrolled Participants				Participants Who Completed Treatment			
	All (n = 117)	Homeless (n = 23)	Community (n = 94)	p value	All (n = 89)	Homeless (n = 12)	Community (n = 77)	p value
Age in years, mean \pm SD	43.2 \pm 13.2	51.3 \pm 9.4	41.2 \pm 13.2	.0008	43.0 \pm 13.2	51.3 \pm 8.9	41.7 \pm 13.3	.02
Male gender, %	93.2	91.3	93.6	.65	92.1	83.3	93.5	.24
Race, %				.09				.24
White	81.2	65.2	85.1		83.1	66.7	85.7	
Black	16.2	30.4	12.8		13.5	25.0	11.7	
Other	2.6	4.4	2.1		3.4	8.3	2.6	
Years of education, mean \pm SD	14.4 \pm 2.7	13.2 \pm 2.2	14.6 \pm 2.8	.02	14.7 \pm 2.8	13.2 \pm 2.7	14.9 \pm 2.8	.06
Married or living with someone, %	47.9	0.0	59.6	<.0001	51.7	0.0	59.7	<.0001
Current military status, %				.34				.52
Active duty	6.9	0.0	8.6		8.0	0.0	9.2	
Reservist	4.3	4.4	4.3		5.7	8.3	5.3	
Discharged/veteran	88.8	95.6	87.1		86.4	91.2	85.5	
Primary branch of service, %				.10				.36
Army	59.8	65.2	58.5		60.7	75.0	58.4	
Navy	10.3	21.7	7.4		9.0	16.7	7.8	
Marine corps	13.7	4.4	16.0		12.4	0.0	14.3	
Air force	8.5	8.7	8.5		9.0	8.3	9.1	
National guard	7.7	0.0	9.6		9.0	0.0	10.4	
Three or more overseas tours, %	36.5	9.5	42.6	.04	40.5	8.3	45.5	.02
Combat exposure scale, mean \pm SD	20.1 \pm 10.5	14.1 \pm 10.5	21.5 \pm 10.0	.002	19.9 \pm 9.8	12.0 \pm 9.7	21.1 \pm 9.2	.002
Experienced combat-related activity, %	86.7	66.7	91.3	.007	87.5	58.3	92.1	.006

Note. SD, standard deviation.

Table 3 – Clinical Characteristics of Study Participants by Residential Status

Clinical Characteristic	Enrolled Participants				Participants Who Completed Treatment			
	All (n = 117)	Homeless (n = 23)	Community (n = 94)	p Value	All (n = 89)	Homeless (n = 12)	Community (n = 77)	p Value
PCL-M (PTSD checklist), mean ± SD	62.8 ± 10.0	62.4 ± 8.8	62.9 ± 10.3	.85	62.9 ± 10.3	63.7 ± 9.8	62.8 ± 10.4	.79
PDSQ T-score, mean ± SD	59.8 ± 15.8	64.8 ± 16.1	58.6 ± 15.6	.09	60.2 ± 16.9	71.0 ± 18.1	58.5 ± 16.2	.02
Brief Symptom Inventory, mean ± SD	30.4 ± 12.8	27.0 ± 10.6	31.3 ± 13.1	.15	30.5 ± 12.5	27.7 ± 9.2	31.0 ± 12.9	.40
CES-D (depression), mean ± SD	29.4 ± 11.0	29.0 ± 10.6	29.5 ± 11.1	.86	29.9 ± 10.7	30.4 ± 9.7	29.9 ± 11.0	.87
STICSA (anxiety), mean ± SD	46.0 ± 10.8	47.2 ± 11.8	45.7 ± 10.6	.55	46.0 ± 10.7	47.0 ± 11.5	45.9 ± 10.7	.75
PSQI (sleep quality), mean ± SD	13.8 ± 3.7	13.7 ± 3.1	13.8 ± 3.8	.96	13.8 ± 3.8	13.9 ± 3.1	13.8 ± 3.9	.92
Pain Outcomes Questionnaire, mean ± SD	70.5 ± 33.5	66.3 ± 35.9	71.5 ± 33.0	.51	69.7 ± 33.0	64.5 ± 27.9	70.5 ± 33.8	.56
CORE-OM (quality of life), mean ± SD	62.2 ± 21.5	60.9 ± 51.8	62.5 ± 21.8	.76	63.3 ± 21.0	65.6 ± 19.5	63.0 ± 21.4	.74
SF-36; mental component, mean ± SD	37.6 ± 20.2	43.2 ± 23.1	36.2 ± 19.3	.14	37.4 ± 18.7	41.3 ± 21.7	35.7 ± 18.3	.36
SF-36; physical component, mean ± SD	64.3 ± 26.6	60.1 ± 30.0	65.2 ± 25.8	.40	66.0 ± 26.3	61.7 ± 33.7	66.4 ± 25.1	.56
PDSQ screening, %								
Psychosis	50.4	56.5	48.9	.64	50.4	75.0	51.9	.21
Major depressive disorder	79.3	73.9	80.7	.57	79.3	91.7	82.9	.68
Generalized anxiety disorder	76.9	87.0	74.5	.27	76.9	91.7	75.3	.29
Social phobia	68.4	82.6	64.8	.13	68.4	83.3	64.0	.32
Panic disorder	26.5	21.7	27.7	.79	26.5	33.3	24.7	.50
Somatization disorder	61.2	72.7	58.5	.33	61.2	75.0	55.8	.35
Agoraphobia	86.3	87.0	86.2	1.0	86.3	83.3	84.4	1.0
Hypochondriasis	49.6	56.5	47.9	.49	49.6	58.3	42.9	.36
Alcohol abuse	43.6	43.5	43.6	1.0	43.6	50.0	41.6	.76
Drug abuse/dependence	22.2	26.1	21.3	.59	22.2	25.0	18.2	.69
Current medications, %								
Antianxiety	40.5	47.8	37.6	.48	40.5	41.7	39.0	1.0
Antidepressant	44.0	43.5	44.1	1.0	44.0	33.3	42.9	.75
Antiseizure	9.5	8.7	9.7	1.0	9.5	0.0	7.8	1.0
Sleep	12.1	4.3	14.0	.30	12.1	0.0	13.0	.35
Pain	34.5	17.4	38.7	.08	34.5	8.3	39.0	.05
On disability for PTSD/MH disorder, %	39.1	22.7	43.0	.09	39.1	8.3	44.7	.02
Screen positive for mild TBI, %	53.9	56.5	53.3	.82	53.9	50.0	48.7	1.0

Note. CES-D, Center for Epidemiologic Studies Depression Scale; CORE-OM, Clinical Outcomes in Routine Evaluation Measures and System; MH, Mental Health; PDSQ, Psychiatric Diagnostic Screening Questionnaire; PTSD, posttraumatic stress disorder; SD, standard deviation; SF-36, 36-item Short Form Health Survey; STICSA, State-Trait Inventory for Cognitive and Somatic Anxiety; TBI, Traumatic Brain Injury.

similar between homeless veterans and those from the community (4.1 ± 1.0 vs. 4.2 ± 0.9, *p* = .57).

Comparison of Treatment Response

Mean PCL-M (PTSD) scores from pre-ART to posttreatment completion were significantly reduced among both homeless veterans (63.7–35.9, *p* < .001) and veterans recruited from the community (62.8–41.2, *p* < .0001) (Table 5). Taking into account differences in clinical presentation at study entry, the mean adjusted reduction in scores on the PCL-M was nonsignificantly greater in homeless veterans compared to those from the community (–29.7 vs. –21.6, effect size = 0.59, *p* = .14). Thus, both groups experienced comparable significant reductions in symptoms of PTSD (Figure 2).

Using a reduction of ≥10 points on the PCL-M, which has been suggested to indicate reliable and clinically meaningful change (Monson et al., 2008), response rates were 83.3% among homeless veterans compared to 74.0% among veterans from the community (*p* = .72).

Reductions of comorbidities after treatment with ART were substantial, including symptom measures of depression, anxiety, pain, and quality of life (*p* < .05 for homeless veterans and those from the community). Of note, taking into account differences in clinical presentation, all the adjusted effect sizes were in the direction of a more favorable treatment response among homeless veterans, as compared to those recruited from the community. Whereas most effect sizes were small and statistically nonsignificant, suggesting overall comparable therapeutic benefit, there was an indication of

Table 4 – Trauma and Treatment History of Study Participants by Residential Status

Clinical Characteristic	Enrolled Participants				Participants Who Completed Treatment			
	All (n = 117)	Homeless (n = 23)	Community (n = 94)	p Value	All (n = 89)	Homeless (n = 12)	Community (n = 77)	p Value
Previous trauma history, %								
Witness death or execution	74.4	60.9	77.7	.11	75.3	58.3	77.9	.16
IED blast/combat explosion	63.2	26.1	72.3	<.0001	66.3	25.0	72.7	.002
Witness major injuries (nonlethal)	60.7	47.8	63.8	.23	60.7	33.3	64.9	.06
Physical assault	14.5	17.4	13.8	.74	14.6	25.0	13.0	.37
Sexual assault	12.0	34.8	6.4	.001	12.4	50.0	6.5	.0005
Five or more traumas impacting life, %	59.3	43.5	63.3	.09	57.6	41.7	60.3	.34
Guilt associated with trauma(s), %	84.1	77.3	85.7	.34	83.7	83.3	83.8	1.0
Trauma for 11 or more years, %	50.9	82.6	43.0	.0009	48.9	83.3	43.4	.01
Previous treatment history, %								
Prior psychotherapy	70.9	69.6	71.3	1.0	72.6	66.7	73.6	.73
Individual psychotherapy	59.5	52.2	61.4	.48	58.3	41.7	61.1	.22
Group psychotherapy	38.5	43.5	37.2	.63	37.4	33.3	38.0	1.0
Cognitive behavioral therapy	38.7	39.1	38.6	1.0	40.5	41.7	40.3	1.0
Prolonged exposure therapy	12.6	4.3	14.8	.29	14.3	8.3	15.3	1.0
Treatment provided, mean ± SD								
Total sessions of ART	3.7 ± 1.4	3.0 ± 1.6	3.9 ± 1.3	.006	3.7 ± 1.4	4.1 ± 1.0	4.2 ± 0.9	.57
ART sessions for nontrauma	0.8 ± 0.8	0.4 ± 0.5	0.8 ± 0.8	.14	0.8 ± 0.8	0.4 ± 0.5	0.8 ± 0.8	.14
Median days for ART sessions provided	28	26	28	.69	28	26	28	.67

Note. ART, Accelerated Resolution Therapy; IED, improvised explosive devices; SD, standard deviation.

homeless veterans experiencing greater reductions in mean scores for global psychopathology (PDSQ: effect size = 0.67, $p = .03$), anxiety (effect size = 0.65, $p = .06$), sleep quality (effect size = 0.66, $p = .10$), and aggregate SF-36 mental health (effect size = 0.91, $p = .03$).

Sensitivity Analysis

As described previously, the treatment noncompletion rate was 47.8% among homeless veterans compared to 18.1% among veterans from community sites. Conservatively assuming no change in PCL-M scores from study entry for all noncompleters (change score of 0), the imputed mean PCL-M change scores were -15.5 among homeless veterans compared to -17.7 among veterans from community sites. This resulted in an imputed intention to treat effect size of -0.15 (95% confidence interval: $-0.95, 0.65$; $p = .48$). These results suggest comparable treatment response with ART between homeless veterans and those from the community, conservatively assuming no treatment response for all subjects who did not complete treatment.

Six-Month Follow-Up

As shown in Figure 1, 37 of 77 veterans from community sites (48.1%) provided 6-month follow-up evaluation data compared to 8 of the 12 homeless veterans (66.7%) ($p = .35$). From the baseline assessment, the mean reduction in PCL-M scores at 6 months was 26.9

± 17.7 among homeless veterans compared to 16.7 ± 16.9 among veterans from community sites ($p = .13$). After statistical adjustment for differences in baseline characteristics, homeless status remained nonsignificant ($p = .24$). At 6 months, six of the eight veterans in the homeless group were now residing in the community, and reported a mean reduction in PCL-M score of 26.8 ± 20.9 .

Discussion and Recommendations

Ending homelessness among veterans is a national priority, as is providing timely and effective services and treatment for this population. In this backdrop, we examined rate of treatment completion and effectiveness of ART as a primary treatment modality for symptoms of PTSD among a group of veterans who were residing in a temporary homeless shelter. Overall, for treatment completers, clinical response was high and comparable if not nominally greater to that of veterans who were treated for symptoms of PTSD and referred from community-based sites. These results are encouraging, especially in light of the brevity of the ART protocol. However, despite the brevity of ART, only about half of the veterans residing in the homeless shelter completed treatment.

Table 5 – Comparison of Adjusted Mean Treatment Response of Study Participants by Residential Status

Treatment Outcome	Homeless (n = 12)				Community Based (n = 77)				Effect		
	Pre-ART	Post-ART	Change	Adj. Change*	Pre-ART	Post-ART	Change	Adj. Change*	Effect Size*	95% CI	p Value*
PCL-M (PTSD checklist)	63.7	35.9	-28.7	-29.7 ^c	62.8	41.2	-21.6	-21.6 ^d	0.59	-0.35, 1.42	.14
PDSQ T-score	71.0	27.7	-43.3	-39.5 ^d	58.5	31.3	-27.2	-27.5 ^d	0.67	-0.07, 1.42	.03
Brief Symptom Inventory	27.7	11.8	-15.1	-18.3 ^c	31.0	13.9	-17.1	-16.7 ^d	0.12	-0.51, 0.76	.71
CES-D (depression)	29.9	14.8	-13.4	-16.7 ^b	29.9	16.9	-12.9	-12.5 ^d	0.35	-0.40, 1.10	.34
STICSA (anxiety)	47.0	27.9	-19.0	-19.5 ^d	45.8	33.9	-11.9	-12.1 ^d	0.65	-0.02, 1.31	.06
PSQI (sleep quality)	13.7	10.1	-3.6	-5.8	13.7	10.7	-3.1	-2.9 ^d	0.66	-0.11, 1.43	.10
Pain Outcomes Questionnaire	64.5	38.5	-26.0	-30.8 ^a	70.5	50.7	-19.8	-19.4 ^d	0.35	-0.44, 1.14	.19
CORE-OM (quality of life)	65.6	31.9	-33.7	-37.4 ^b	63.0	33.9	-29.1	-28.4 ^d	0.38	-0.43, 1.20	.28
SF-36; mental component	41.3	74.0	32.7	43.2 ^b	36.1	60.0	23.9	23.3 ^d	0.91	0.11, 1.71	.03
SF-36; physical component	61.7	78.3	16.7	20.3	67.0	74.8	7.8	7.2 ^c	0.53	-0.27, 1.33	.08

Note. ART, Accelerated Resolution Therapy; CES-D, Center for Epidemiologic Studies Depression Scale; CORE-OM, Clinical Outcomes in Routine Evaluation Measures and System; PDSQ, Psychiatric Diagnostic Screening Questionnaire; PSQI, Pittsburgh Sleep Quality Index; PTSD, posttraumatic stress disorder; SF-36, 36-item Short Form Health Survey; STICSA, State-Trait Inventory for Cognitive and Somatic Anxiety.

Data are presented as mean values before treatment, after treatment, and mean change.

Within-group comparisons: ^ap < .05, ^bp < .01, ^cp < .001, ^dp < .0001.

* Adjusted mean change, effect sizes, and p-values include statistical adjustment for pre-ART value of the treatment outcome, pre-ART PDSQ T-score, age, Combat Exposure Scale score, on disability for PTSD/MH disorder, and trauma for 11 or more years.

Magnitude of Treatment Response

For subjects who completed treatment, the mean reduction on the 17-item PCL-M exceeded 20 points with both homeless and community-based veterans receiving an average of four treatment sessions with ART. Moreover, approximately three-quarters of all subjects who completed treatment achieved a clinical and statistically meaningful change of at least 10 points on the PCL-M (Monson et al., 2008). Whereas

formal diagnoses of PTSD, or absence thereof, were not made in the present study, these results compare favorably to those of a recent review of randomized controlled trials that reported that approximately two-thirds of patients who receive PE therapy or CPT retain their diagnosis post-treatment (Steenkamp et al., 2015). Of note, the approximate 75% response rate observed with ART in this study occurred among a cohort of veterans who, by majority (~70%), had previously tried other types of psychotherapy (i.e., treatment of

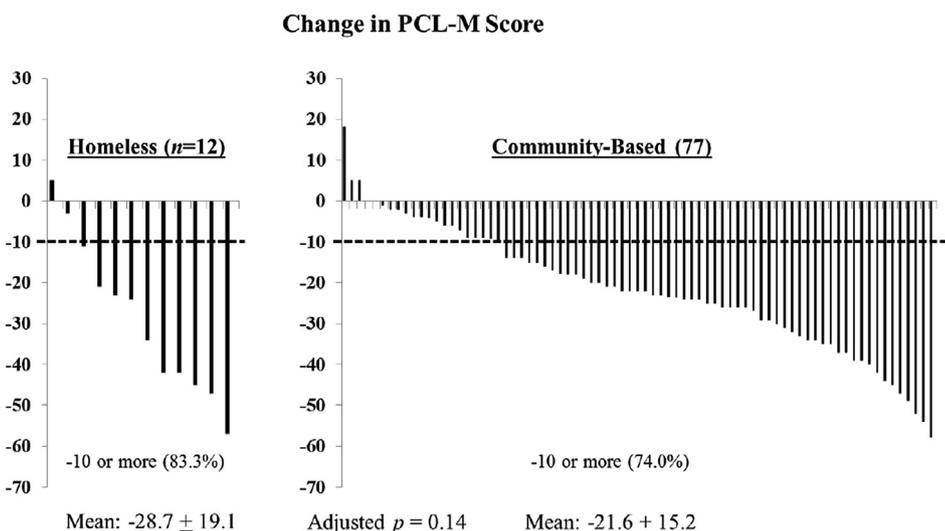


Figure 2 – ART, Accelerated Resolution Therapy; PTSD, posttraumatic stress disorder. Plot of change scores on the 17-item PCL-M (PTSD) checklist among homeless veterans (left) and veterans from the community (right) before and after treatment with ART. Each vertical line represents the response of an individual service member or veteran. The dashed horizontal line represents a clinically meaningful and reliable reduction of ≥10 points on the PCL-M.

refractory PTSD in the present study) and had lived with traumatic experiences/symptoms for more than a decade. However, our results refer to within subject pre/post intervention evaluation in the absence of a formal control group. Thus, at least a portion of the overall strong treatment response reported may be theoretically attributable to symptom change merely as a function of time, personal interaction with a clinician, or regression to the mean.

Recruitment and Retention Challenges in the Treatment for Homeless Veterans

Veterans are at increased risk of homelessness if they suffer from a mental health disorder such as PTSD or substance abuse. Arguably, the most important factor associated with successful treatment for PTSD is the ability to receive an adequate dose necessary to achieve a favorable response (Hoge et al., 2014). The treatment completion rate with ART in this analysis was 52% for the group of homeless veterans. Close review of the 48% rate of treatment noncompletion identified geographic relocation (generally sought by those residing in a shelter) as a primary reason, along with work conflict and other life circumstances seemingly unrelated to the treatment protocol itself. While reassuring, this reinforces the need among homeless populations for therapies that can be delivered in a brief manner and in the context of a range of comorbidities and other significant life challenges. However, as with other types of individual trauma-focused therapies, delivery of ART requires access to a private, quiet setting which may not be available for homeless veterans (i.e., not residing in a homeless shelter). In addition, rates of 6-month follow-up were 48% among community-based veterans and 67% among those residing in the homeless shelter. These rates illustrate the challenge in retaining veterans recruited from the community, as well as those residing in homeless shelters, many of whom frequently transition out of such facilities. Future studies should consider multiple follow-up contact assessment points (e.g., bimonthly) in which to potentially enhance long-term retention, in addition to innovative strategies for achieving remote completion of self-report measures (e.g., Smartphone applications).

Becoming and remaining homeless involves a constellation of life experiences including sociodemographic factors, interpersonal relations, clinical conditions, and overall life challenges. Specific pathways into homelessness among veterans include childhood adversity, trauma during military service, and post-military abuse or difficulties (Hamilton, Poza, Hines, & Washington, 2012). With regard to traumatic events, they are thought to indirectly lead to homelessness because of severity of related mental health symptoms, interference with the ability to maintain

employment, and strained interpersonal relationships and diminished social support (Dinnen et al., 2014). Whereas all these challenges may be expected to complicate delivery of effective treatment for PTSD, the present examination of ART indicates promise, so long as treatment completion can be achieved. These results are consistent with very limited available evidence of other brief treatment interventions for homeless veterans with mental health conditions. One such intervention is Critical Time Intervention (CTI) case management (Susser et al., 1997), an approach that uses time-limited assertive community treatment for homeless individuals with mental illness. Compared to treatment as usual, CTI case management has been reported to result in fewer days in institutional settings, lower alcohol, drug, and overall psychiatric symptom scores (Kasprow & Rosenheck, 2007) and better treatment engagement and continuity of care (Dixon et al., 2009). Effective delivery of both ART and CTI case management necessitate continuity of care for at least a brief period, despite the transient nature of individuals who are homeless.

Strengths and Limitations

Strengths of this study include delivery of the treatment protocol (ART) in a highly procedural manner by clinicians experienced with the protocol, and use of a range of established, well-validated instruments to measure change in PTSD symptomatology and comorbidities. In spite of these strengths, multiple study limitations exist, all of which suggest cautious interpretation of the results and conclusions. First, the analyzable sample size of 12 veterans who completed treatment with PTSD limited precision of study results. However, treatment outcome comparisons by housing status, while not statistically significant, tended to be in the direction of better results observed for homeless veterans. These results suggest that lack of observed statistical significance (i.e., potential poorer treatment results among homeless veterans) was principally not a function of low statistical power. Second, the study design lacked comparison of ART against another treatment modality. Whereas within-subject effect sizes for both homeless and nonhomeless veterans were large, they do not control for possible symptom response that might occur through time alone, personal interaction with a clinician, or as compared to an alternative therapeutic modality. Third, the present analysis refers to homeless veterans with temporary shelter and regular meals, as opposed to veterans without such basic amenities. Thus, results do not apply directly to homeless veterans without shelter, a group in which consistent delivery of trauma-focused therapy (such as ART) is likely to be even more challenging. Similarly, the extent to which the study financial incentive of \$50 for completing the study data collection forms before and after treatment with ART

ultimately influenced recruitment and treatment completion among homeless veterans is unknown. Participation and treatment completion rates may differ in the absence of such incentive. Finally, a “quasi-diagnosis” of pretreatment PTSD based on symptom measures was used in the analysis, as opposed to the use of formal PTSD diagnostic criteria.

Conclusions and Implications

Homeless veterans with symptoms of PTSD tend to present with different trauma exposure histories, sociodemographic characteristics, and clinical profiles than veterans recruited from the community for treatment. Despite these differences, the present analysis suggests that ART is an effective treatment for PTSD for veterans residing in a temporary homeless shelter, and with an observed response rate that appears to be comparable if not slightly greater to that of veterans treated with ART from the community. However, achieving treatment completion with ART for veterans who are homeless appears to remain a significant challenge. Future controlled trials of ART vs. current first-line endorsed therapies for PTSD appear to be warranted, including recruitment of homeless veterans. In this realm, new approaches by which to deliver the ART protocol to achieve full treatment completion among homeless veterans should be pursued.

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