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UNIVERSITY OF CALIFORNIA, SAN DIEGO

SAN DIEGO STATE UNIVERSITY

Evidence-Based Psychotherapy Utilization Among OEF/OIF/OND Veterans with
PTSD

A dissertation submitted in partial satisfaction of the requirements for the degree
of

Doctor of Philosophy

in

Clinical Psychology

by

Ursula Susan Myers

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The Dissertation of Ursula Susan Myers is approved, and it is acceptable
in quality and form for publication on microfilm and electronically:

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2016

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My friends, both in and outside this program, have been vitally important for my sanity throughout this process. I am so grateful for each and every one of them.

Finally, I would be remiss if I did not acknowledge both Diet Coke and Panera, without which, this dissertation might not have ever been written!

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RESEARCH PUBLICATIONS

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2. Norman, S.B., Davis, B., Haller, M., Colvonen, P., **Myers, U.S.**, Trim, R., Bogner, R., & Robinson, S. (2015). Prolonged Exposure with Veterans in a Residential Substance Use Treatment Program. *Cognitive and Behavioral Practice*, doi:10.1016/j.cbpra.2015.08.002.
3. Norman, S.B., Rosen, J.R., Himmerich, S.J., **Myers, U.S.**, Davis, B.C., & Piland, N. (2015). Student Veteran Perceptions of Facilitators and Barriers to Achieving Academic Goals. *Journal of Rehabilitation Research Development*, 52, 701-712.
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7. Norman, S.B., Wilkins, K.C., **Myers, U.S.**, & Allard, C.B. (2014). Trauma Informed Guilt Reduction Therapy With Combat Veterans. *Cognitive and Behavioral Practice*, 21, 78-88.

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12. Filbey, F.M., Schacht, J.P., **Myers, U.S.**, Chavez, R.S., & Hutchison, K.E. (2009). Marijuana Craving in the Brain. *Proceedings of the National Academy of Sciences*, 106, 13016-13021.
13. Filbey, F.M., Schacht, J.P., **Myers, U.S.**, Chavez, R.S., & Hutchison, K.E. (2009). Individual and Additive Effects of the *CNR1* and *FAAH* Genes on Brain Response to Marijuana Cues. *Neuropsychopharmacology*, 35, 967-975.

Book Chapters

1. **Myers, U.S.**, Wilkins, K.C., Allard, C., & Norman, S.B. (2012). Trauma-Related Guilt Inventory: Review of Psychometrics And Directions for Future Research. *Psychometrics: New Research*.
2. Norman, S.B., Harrop, E., Wilkins, K.C., Pedersen, E., **Myers, U.S.**, Chabot, A., & Rogers, C. (2012). Development of sexual relationships. The Oxford Handbook of Adolescent Substance Abuse, Edited by Sandra Brown and Robert A. Zucker.

Under Review

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Predicting Engagement in Psychotherapy, Pharmacotherapy, or Both
Psychotherapy and Pharmacotherapy among Returning Veterans Seeking
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2. Allen, N., Gros, D., **Myers, U.S.**, Korte, K. J. & Acierno, R. Predictors of and Predicting from Growth Mixture Modeled Trajectories across an Exposure-Based PTSD Intervention. Submitted to *Behaviour Research and Theory*.

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Unpublished Treatment Manuals

1. **Myers, U.S.**, Davis, B.C., & Carlson, M. (2014). *PTSD Treatment Manual for Veterans in the SARRTP unit*.
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Presentations and Abstracts

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ABSTRACT OF DISSERTATION

Evidence-Based Psychotherapy Utilization Among OEF/OIF/OND Veterans with
PTSD

by

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Doctor of Philosophy in Clinical Psychology

University of California, San Diego, 2016

San Diego State University, 2016

Professor Sonya Norman, Chair

Rationale. Posttraumatic stress disorder (PTSD) is characterized by a constellation of symptoms including intrusive thoughts, avoidance, negative thoughts and mood, and alterations in reactivity following exposure to a traumatic event. Despite the availability of effective treatments for PTSD in the Veterans Administration (VA) Healthcare System, PTSD treatment utilization and completion is low. The goal of this study was to better understand how person-level demographic, psychosocial, and psychiatric variables as well as treatment setting systems variables are related to evidence-based treatment utilization, completion, and symptom improvement among OEF/OIF/OND veterans with PTSD.

Design. OEF/OIF/OND veterans with PTSD ($N = 311$) were recruited at a pre-treatment orientation group at a VA outpatient PTSD clinic and classified into one of six groups based on their utilization of evidence-based psychotherapy

within a 12-month period: (1) decliners of all treatment options, (2) medication only, (3) non-EBP psychotherapy utilizers, (4) EBP dropouts, (5) EBP treatment completers, and (6) EBP high utilizers. Next, Andersen's Behavioral Model of Health Care Utilization was used as a framework to better understand factors associated with utilization, completion, and symptom improvement through three specific aims. Aim 1: Using analyses of variance, explore differences in baseline predisposing characteristics, enabling resources, and need factors among utilization groups. Aim 2: Using logistic regression, explore the predictive utility of predisposing characteristics, enabling resources, and need factors as they related to evidence-based psychotherapy treatment completion. Aim 3: Using repeated measures ANOVAs, explore how predisposing characteristics, enabling resources, and need variables related to PTSD and depression symptom change following evidence-based psychotherapy treatment completion.

Results.

Aim 1: Reporting use of the GI Bill was much less likely among EBP high utilizers than veterans in the other groups. Distance to the hospital was associated with utilization, such that decliners of all treatment and non-EBP psychotherapy users traveled an average of 27-29 miles to the VA, while veterans in the other utilization groups traveled an average of 19-22 miles. Previously receiving psychiatric care prior to attending the PTSD clinic was associated with increased utilization.

Aim 2: Receiving EBP through a research study or a comorbid substance use disorder were significantly associated with being an EBP dropout. Reporting a problem with family members or significant others at intake was associated with being an EBP treatment completer.

Aim 3: Participating in EBP in a group format, a comorbid diagnosis of depression, or reporting problems with anger or sleep were all associated with less change in PTSD symptoms following EBP. Reporting use of the GI Bill or problems with anger were associated with larger decreases in PTSD symptoms after treatment.

Conclusions. Using Andersen's Behavioral Model, we found that certain enabling resources and need factors were related to aspects of utilization, completion and symptom change while predisposing characteristics were not. These results are relevant to improving veteran treatment outcomes because enabling resources (e.g., treatment format) and need factors (e.g., comorbid depression) are potentially modifiable targets for intervention while predisposing factors (e.g., age, gender) are not. Future work seeking to better understand if a causal relationship between these variables and treatment engagement is the next step to better inform if modification will lead to improved EBP utilization and completion.

Introduction

As of March 2014 nearly 1.8 million veterans have served in the Afghanistan (Operation Enduring Freedom) and Iraq wars (Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn; Veterans Affairs, 2014). Of these veterans, 19.5% have been diagnosed with posttraumatic stress disorder (PTSD) at the Veterans Affairs (VA) Healthcare System or Vet Centers across the United States, making PTSD the most commonly diagnosed mental health disorder among OEF/OIF/OND veterans. PTSD is characterized by a constellation of symptoms including intrusive thoughts, avoidance, negative thoughts and mood, and alterations in reactivity (e.g., hypervigilance) following exposure to a traumatic event (American Psychiatric Association, 2013). The impact of PTSD on psychosocial functioning is wide reaching, and it often contributes to increased prevalence of social, physical, and mental disorders. When left untreated, PTSD is a chronic, deleterious disorder; however, effective treatments for PTSD exist. There is a substantial body of work evaluating both psychotherapy and psychopharmacology interventions for PTSD. Clinical guidelines and other published reviews support the use of trauma-focused cognitive behavioral therapy, selective serotonin reuptake inhibitors (SSRIs), and noradrenergic antidepressants (Foa, Keane, & Friedman, 2000; Foa, Keane, Friedman, & Cohen, 2008; Institute of Medicine, 2007; VA-DOD, 2010).

Evidence-based Treatment for PTSD

Trauma-focused cognitive behavioral therapies have been proven efficacious for PTSD in many randomized controlled trials; as such, the Institute of Medicine and the VA-DOD Clinical Guidelines recommend trauma-focused cognitive behavioral therapy as frontline treatment for PTSD (Institute of Medicine, 2007; VA-DOD, 2010). Based on these guidelines, VA policy requires all veterans with a primary diagnosis of PTSD be offered Cognitive Processing Therapy (CPT) and Prolonged Exposure (PE), two trauma-focused cognitive behavioral psychotherapies designed to treat PTSD (Foa et al., 2000; Foa et al., 2008; Institute of Medicine, 2007; VA-DOD, 2010). CPT is one of the leading evidence-based psychotherapies (EBP) for the treatment of PTSD (Foa et al., 2008; Resick & Schnicke, 1993). A primarily cognitive treatment for PTSD, CPT consists of 12 sessions that can be delivered in individual, group, or combined group and individual format. The proposed mechanism underlying PTSD symptoms that CPT seeks to address is the negative alteration of ones' view of oneself, others, and the world following the trauma (e.g., "I'm not safe in crowds," "I can't trust authority"). CPT uses thought challenging techniques to help individuals examine the accuracy and helpfulness of these thoughts. CPT has demonstrated efficacy and effectiveness with combat veterans who served during the Vietnam war (Monson et al., 2006) and during the Iraq and Afghanistan wars (Chard, Schumm, Owens, & Cottingham, 2010). Two published versions of CPT manuals exist; the original CPT uses a "trauma account," which asks individuals to write out detailed narratives of their trauma, including thoughts and feelings

that occurred during the trauma. The second version of the manual, CPT-C, removes the trauma account, but retains all other components of CPT. In a dismantling study Resick et al. (2008) found that CPT and CPT-C were equally effective, suggesting that the trauma account may not be necessary for patients to benefit from CPT.

The second EBP treatment for PTSD disseminated widely in the VA is PE. The proposed mechanism underlying PTSD symptoms that PE addresses is avoidance. Individuals with PTSD avoid trauma-related triggers (e.g., trauma memories, crowded places, smells, fellow veterans) as these memories, places, and people feel unsafe. By avoiding these triggers, individuals are unable to learn that their beliefs may not be accurate and that they are able to tolerate the distress that occurs when they are exposed to their trauma reminders. The goal of PE is to reduce PTSD symptoms through repeated exposure to trauma-related memories (i.e., imaginal exposure: revisiting and processing the traumatic memory) and stimuli (i.e., *in vivo* exposure: confronting objectively safe, but feared situations). Exposure allows individuals the opportunity to habituate to their distress while gathering accurate information about the safety of situations. Both the efficacy and the effectiveness of PE have been demonstrated with veterans (Cahill, Rothbaum, Resick, & Follette, 2009).

Starting in 2007, initiatives to disseminate and implement CPT and PE began at VAs across the country as part of the VA Mental Health Strategic Plan (Karlin et al., 2010). As a result, since 2007, the VA has worked to provide

reliable access to the “gold standard” treatments for PTSD (Cook, Dinnen, Simiola, Thompson, & Schnurr, 2014; Eftekhari et al., 2013). However, success of implementation has varied across VAs. A study published in 2013 showed that fewer than ten percent of veterans in an outpatient PTSD clinic received at least one session of an EBP, suggesting not all veterans are being offered EBPs (Shiner et al., 2013). Among veterans who are offered PE by a VA trained provider, utilization and completion rates are equivalent to those found in randomized controlled trials (Eftekhari et al., 2013). However, little is known about characteristics of who chooses to utilize and complete EBPs among those who are offered the treatments.

Psychopharmacology is another evidence-based treatment for PTSD. The selective serotonin reuptake inhibitors (SSRIs) paroxetine and sertraline are the only Federal Drug Agency (FDA) approved medications to treat PTSD, and are recommended as front-line treatment for PTSD by the VA/DOD clinical practice guidelines (VA-DOD, 2010).

Treatment Utilization: Initiation, Engagement, and Completion

Despite the availability of effective treatment for PTSD, treatment utilization is low. Individuals with PTSD symptoms may avoid seeking mental health treatment as a function of the trauma-related avoidance symptoms that characterize the disorder (Schwarz & Kowalski, 1992).

Research has demonstrated that the amount of time that passes from intake assessment until initiation of treatment is high for OEF/OIF/OND veterans

experiencing PTSD symptoms. Maguen, Madden, Cohen, Bertenthal, and Seal (2012b) found that the median length of time from the end of deployment to the first mental health visit was more than two years for OEF/OIF/OND veterans. Further, the median length of time from deployment to receipt of “minimally adequate mental health care” (defined by the authors as eight or more sessions in a 12-month period) was 7.5 years. Only 35% of veterans with a mental health diagnosis who had been enrolled in VA healthcare for at least one year had initiated mental health treatment, and among those veterans, only 30% received “minimally adequate mental health care” within one year of their first visit to mental health treatment (Maguen et al., 2012b). Hoge et al. (2004) found that after screening positive for mental health problems, only 23-40% of OEF/OIF/OND veterans went on to seek mental health care services in the following year. Another study following a cohort of National Guard soldiers who spent 16 months in Iraq found that, among those who screened positive for PTSD or depression, less than half had obtained mental health care within two to three months after returning from deployment (Kehle et al., 2010).

A limited number of studies have focused on veterans’ psychotherapy engagement following therapy initiation within the VA system. Seal et al. (2010) found that 80% of OEF/OIF/OND veterans diagnosed with PTSD had at least one follow-up appointment for PTSD following intake; however, only 27% of their sample received at least nine sessions of psychotherapy (i.e., the authors’ definition of a recommended minimum dose for EBP), and only 9% of the sample

received nine or more sessions of the psychotherapy within a 15-week time period. Harpaz-Rotem and Rosenheck (2011) compared PTSD treatment utilization across different service eras (i.e., Korean, Vietnam-era, Post-Vietnam, Persian Gulf, and OEF/OIF/OND) and found that veterans from all eras who were enrolled in treatment attended an average of only one PTSD specialty mental health appointment per month, well-below the recommended dose for EBP (Foa et al., 2008; Resick & Schnicke, 1993). It is important to note that these administrative data studies identified psychotherapy sessions by counting the number of billing codes attached to the appointments. Billing codes only indicate (a) if a session included psychotherapy and/or medication management, (b) length of appointment, and (c) the diagnosis for which the veteran was treated. However, type of treatment is not included; as such, EBP sessions are counted the same as non-EBP sessions (e.g., supportive therapy appointments, etc.). This methodology may overestimate the number of EBP psychotherapy sessions veterans have attended. A recent study which examined the content of psychotherapy notes in a PTSD outpatient clinic reported that only 6.3% of Veterans received at least one session of EBP (Shiner et al., 2013).

Among veterans with PTSD who do utilize mental health care, treatment completion rates are low. Rates of treatment completion vary widely depending on the definition of completion used. When completion is defined by number of sessions attended (e.g., 12 sessions of treatment), 71% of veterans complete treatment (Gros, Yoder, Tuerk, Lozano, & Acierno, 2011). However, when

treatment completion is defined by clinician confirmation that treatment goals were met, the rate of veterans completing treatment drops to 32% (Garcia, Kelley, Rentz, & Lee, 2011). Risk factors associated with early termination of treatment included being male, African American, and having comorbid diagnoses of alcohol/drug use disorders, schizophrenia, or bipolar disorder (Harpaz-Rotem & Rosenheck, 2011). The data are mixed as to whether OEF/OIF/OND veterans drop out of treatment at higher rates than veterans of previous eras. Erbes, Curry, and Leskela (2009) reported that OEF/OIF/OND veterans attended fewer sessions and dropped out of treatment at higher rates than Vietnam veterans in a VA outpatient PTSD treatment clinic. However, Harpaz-Rotem and Rosenheck (2011) compared mental health treatment retention rates between Korean, Vietnam-era, Post-Vietnam, Persian Gulf, and OEF/OIF/OND veterans, and reported that after adjusting for confounding factors such as age and comorbid diagnoses, OEF/OIF/OND veterans actually completed treatment at slightly higher rates than veterans who served during other eras.

It has been postulated that low treatment completion rates may also be related to the therapeutic process and time investment of trauma-focused EBP for PTSD. More specifically, while a minority of individuals may experience a sudden improvement in symptom severity following the first few sessions of treatment, the majority experiences either a very small reduction in symptoms, no change, or an increase in symptoms in the first few weeks of psychotherapy (Foa, Zoellner, Feeny, Hembree, & Alvarez-Conrad, 2002; Hackmann, Ehlers,

Speckens, & Clark, 2004). Early termination can have long-term negative consequences for both the veterans who continue to feel distress and for the healthcare system, as unresolved PTSD is associated with risk of other mental and physical health problems (Tuerk et al., 2013). These findings highlight the need to understand factors related to utilization and treatment completion among OEF/OIF/OND veterans with PTSD.

Andersen Behavioral Model of Health Care Utilization

The Andersen Behavioral Model of Health Care Utilization is one of the most frequently used models for examining factors associated with health care use (Andersen, 1995). This model provides a conceptual framework that can be used to organize and understand different variables that are associated with mental health service utilization (see general model in Figure 1). The underlying assumption of this model is that there are a number of characteristics that contribute to an individual's use of health services. These characteristics are grouped into three categories: *predisposing characteristics* (e.g., sociodemographic variables that make a given individual more or less likely to use mental health services; Andersen, Rice, & Kominski, 2011), *enabling resources* that can facilitate or impede treatment use (e.g., distance to health care providers), and *need factors* (e.g., symptom severity).

Despite being widely used in the healthcare utilization literature, only a limited number of PTSD psychotherapy utilization studies have used the Andersen model to guide their studies (Elhai, Reeves, & Frueh, 2004; Koenen,

Goodwin, Struening, Hellman, & Guardino, 2003; Rosenheck & Fontana, 1995), and only two of these studies looked at OEF/OIF/OND veterans specifically (Hundt et al., 2014; Mott, Hundt, Sansgiry, Mignogna, & Cully, 2014). Instead, the majority of the PTSD psychotherapy utilization studies have examined variables believed to influence utilization without the use of a guiding model. As so few studies have examined PTSD psychotherapy utilization among veterans, findings on traumatized civilian populations will aid in the identification of gaps in the literature for veterans.

The Andersen model provides a framework to evaluate utilization and completion in a PTSD clinic that offers EBP to every appropriate veteran as part of standard clinical care. Below, findings from studies that have examined engagement and completion using variables available in the present study will be reviewed in the context of Andersen's model. Research with the following populations will be reviewed: (1) civilians with PTSD, (2) veterans with PTSD from pre-OEF/OIF/OND eras (e.g., World War II, Korea, Vietnam, Persian Gulf), and (3) OEF/OIF/OND veterans with PTSD. Additionally this information has been summarized in Table 1.

Predisposing Characteristics. Predisposing factors are typically factors that are not modifiable through treatment. These include age, gender, race/ethnicity, service era, and trauma type.

Age. In civilian studies, age has been negatively associated with psychotherapy engagement, such that older individuals use psychotherapy at

lower rates (Lewis et al., 2005). The opposite of this finding is seen in pre-OEF/OIF/OND veterans, with older veterans engaging in psychotherapy at higher rates (Boscarino, Galea, Ahern, Resnick, & Vlahov, 2002; Koenen et al., 2003). This relationship between older age and increased psychotherapy engagement appears to hold true until age 65, after which psychotherapy usage decreases. The psychotherapy engagement curve appears to mimic a normal distribution curve, with the greatest amount of mental health service engagement occurring between ages 40-65 (Burnet-Zeigler, 2012; Fasoli, 2010; Chermack, 2008). Among veterans with PTSD, older veterans have been shown to engaged in treatment at higher rates than younger veterans (Seal et al., 2010).

Additionally, treatment completion has been positively associated with older age among civilian samples with PTSD (Foa et al., 2005; New & Berliner, 2000). Similarly, older, pre-OEF/OIF/OND veterans complete treatment at higher rates than younger Veterans (Gros et al., 2011). Among mixed-age studies of OEF/OIF/OND veterans, this relationship appears to hold true, with older OEF/OIF/OND veterans completing treatment at higher rates than younger veterans of the same era (Lu et al., 2011).

Gender. In studies of civilian samples, women engage in psychotherapy at higher rates than males (Elhai, North, & Frueh, 2005; New & Berliner, 2000); the opposite has been shown for both pre-OEF/OIF/OND and OEFOIF/OND veteran samples, where male veterans are more likely to receive psychotherapy than female veterans (Seal, Bertenthal, Miner, Sen, & Marmar, 2007a). The type

of mental health service use also differs by gender for OEF/OIF/OND veterans, with women less likely to use inpatient and more likely to use outpatient treatment compared to their male counterparts (Maguen et al., 2012a).

Among civilians with PTSD, women complete treatment at higher rates than men (Van Minnen, Arntz, & Keijsers, 2002). Among OEF/OIF/OND veterans, female veterans take part in evidence-based treatment sooner than male veterans (approximately two years earlier; Maguen et al., 2012a).

Race and Ethnicity. A number of studies have reported no associated between ethnicity and psychotherapy use (Boscarino et al., 2002; Elhai et al., 2004; Fontana & Rosenheck, 1994; Frueh, Elhai, Monnier, Hamner, & Knapp, 2004; Hamner, & Knapp, 2004; Price, Davidson, Ruggiero, Acierno, & Resnick, 2014; Rosenheck & Fontana, 1996). Conversely, a handful of studies have found that ethnic minorities (e.g., African Americans and Hispanics) were less likely to engage in mental health services as compared to Caucasians (Fontana & Rosenheck, 1994; New & Berliner, 2000; Rosenheck & Fontana, 2001; Ullman & Brecklin, 2002). When looking specifically at PTSD-treatment engagement, African Americans were less likely to use PTSD-specific services, but more likely to utilize substance use services (Rosenheck & Fontana, 1996). Several studies have looked at factors that may help explain these disparities and have shown that African Americans were less likely to have health insurance than Caucasians, which may reduce their ability to engage in treatment (Alvarez et al., 2011). Race and ethnicity have not been found to be significantly associated with treatment

engagement among OEF/OIF/OND veterans in national samples (Seal et al., 2010), but studies with smaller samples have found that Caucasian veterans engaged in treatment at higher rates than those reporting other races (Blais, Hoerster, Malte, Hunt, & Jakupcak, 2014; Seal et al., 2008).

In a study of civilian women who had survived sexual assault, race was associated with treatment completion; African Americans women completed PTSD treatment at a significantly lower rate than their Caucasian counterparts (45% vs. 73%; Lester, Resick, Young-Xu, & Artz, 2010). However, for both pre-OEF/OIF/OND veterans and OEF/OIF/OND veterans, race has not found to be significantly associated with treatment completion (Gros et al., 2011).

Service era. Pre-OEF/OIF/OND veterans have been shown to engage in psychotherapy at higher rates than OEF/OIF/OND veterans in some studies (Brooks et al., 2012); however, service era is commonly confounded with age. After controlling for age and other confounding factors, one study reported that OEF/OIF/OND veterans use more services than other eras (Harpaz-Rotem & Rosenheck, 2011).

Only one study to-date compared treatment completion rates between service eras; Vietnam veterans completed treatment at higher rates than OEF/OIF/OND veterans in a PE study (Gros et al., 2011).

Trauma type. Among civilian samples, sexual assault was associated with higher risk of developing PTSD than other trauma types among both men and women (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995); 19%-39% of

sexual assault survivors go on to utilize treatment (Campbell, Wasco, Ahrens, Sefl, & Barnes, 2001; Kimerling & Calhoun, 1994; Ullman, Filipas, Townsend, & Starzynski, 2007). Sexual assault survivors engage in twice as many psychotherapy sessions as survivors of physical assaults or other crimes (e.g., motor vehicle accidents; New, 2000). Further, exposure to multiple traumas was associated with greater mental health engagement among sexual assault survivors (Amstadter & Vernon, 2008; Ullman & Brecklin, 2002). Among veterans, trauma type and gender is commonly confounded in studies; women are more likely to report military sexual trauma (MST), and men are more likely to report combat trauma. Length of time in a combat zone has been associated with greater mental health service utilization among Vietnam-era combat veterans (Rosenheck & Fontana, 2001). Similarly, among OEF/OIF/OND veterans, the number of combat deployments has been positively associated with likelihood of mental health engagement (Blais et al., 2014; Seal et al., 2010).

Summary of predisposing characteristics. The most frequently examined predisposing characteristics in PTSD treatment engagement studies are age, gender, and race/ethnicity. The majority of civilian studies found individuals who engaged in and completed treatment to be older, female, and Caucasian. Less is known about veterans with respect to these variables. Further, less is known about how service era and trauma type affect service engagement and completion; notably, these variables are commonly confounded with age and gender.

Enabling Resources. Enabling resources encompass the means that must be available to individuals in order for utilization to occur (Andersen et al., 2011). Enabling resources associated with increased psychotherapy utilization include geographic proximity to the nearest VA (i.e., distance traveled for appointments), employment, service connected disability status (i.e., the ability to receive free treatment and compensation for travel), and availability of EBPs.

Geographic Distance. Among civilians, distance to healthcare providers has been associated with lower treatment engagement (Zakour & Harrell, 2004). Only one study of pre-OEF/OIF/OND veterans examined the relationship between distance to the VA and treatment engagement. This study of 87 male combat veterans did not find a significant association between distance to the VA and engagement (Elhai et al., 2004). Across studies of OEF/OIF/OND veterans, greater distance from the VA has been associated with lower psychotherapy engagement (Brooks et al., 2012; Cully et al., 2008; Seal et al., 2007a). A recent study compared engagement between rural and urban OEF/OIF/OND veterans; rural veterans received psychotherapy at Vet Centers at higher rates than non-rural veterans, but there were no other differences in engagement between rural and urban veterans (Whealin et al., 2014).

The impact of geographic distance on treatment completion has not yet been examined. As distance to the VA has been associated with how much veterans are able to engage in treatment (see above), understanding the role of distance on treatment completion is needed.

Employment. Unemployment has been associated with greater treatment engagement in civilians with PTSD (Alvidrez et al., 2008; Bruwer et al., 2011). Among veterans from other eras, findings on the relationship of employment status to treatment engagement has been mixed. Koenen et al. (2003) found that being unemployed was significantly associated with greater use in pre-OEF/OIF/OND veterans. Conversely, Elhai et al. (2004) did not find a significant relationship between employment and treatment engagement in their study of pre-OEF/OIF/OND veterans. Among 200 OEF/OIF/OND veterans seeking treatment for PTSD, employment was associated with a greater likelihood of treatment use and completion (DeViva, 2014).

Access to EBP. The VA began disseminating and implementing CPT and PE in 2007 with the intention that all veterans with PTSD will be offered appropriate EBP; however, the success of the implementation has varied across sites. For example, a recent examination of 1,928 veterans seen in one outpatient PTSD clinic revealed that only 6.3% of the Veterans received at least one session of an EBP (Shiner et al., 2013). This study included all veterans seen in the PTSD clinic, and did not examine differences between service era. Results of this study suggest that EBPs are not used as part of standard care in all VA hospitals. We do not yet know what treatment utilization and completion looks like in a setting where all veterans with primary PTSD are offered EBP.

Service Connection. Among civilian sexual assault survivors, having health insurance is associated with an increased likelihood of mental healthcare

use (Ullman & Brecklin, 2002). For veterans, being service connected (i.e., access to free treatment and receipt of disability compensation for military-related disorders) enables veterans to receive care regardless of their income levels or employment status. VA service connection is a complicated issue with respect to mental health engagement. PTSD is the third most common service connected disability and the most common mental health disability (McNally & Frueh, 2013). A report by the VA Office of the Inspector General (VAOIG) examining the relationship between PTSD service connection rating and psychotherapy use stated that veterans who were rated at a service connection award of less than 100% continued to attend treatment appointments until a 100% rating was received; once a full award was received, mental health visits dropped by 82% (VAOIG, 2006). These findings are contrary to the findings that that the more severely symptomatic a veteran, the more treatment for their disorder they attend (see symptom severity section below), and led some researchers to suggest that some veterans were using mental health appointments for the sole purpose of strengthening their disability claim (McNally & Frueh, 2013). Others have disputed this hypothesis using evidence that a number of clinical trials have not shown a significant relationship between service connection and mental health utilization (Elhai et al., 2004; Grubaugh, Elhai, Monnier, & Frueh, 2004) or response to treatment (Belsher, Tiet, Garvert, & Rosen, 2012; Miller et al., 2012; Monson et al., 2006; Schnurr et al., 2007). A recent study of 200 OEF/OIF/OND veterans with PTSD seeking treatment in an

outpatient VA clinic replicated these findings, reporting no significant relationship between service connection status and treatment engagement or retention (DeViva, 2014). Of note, one study has reported that veterans with service connection status utilize more services (Koenen et al., 2003), but this study did not examine the amount of service connection rating, which was found to effect the relationship in the VAOIG report. Thus, these results must be interpreted with caution (VAOIG, 2006).

Summary of enabling resources. Research attempting to understand how enabling resources such as geographic distance, employment, and service connection affect treatment engagement and completion is just emerging. It appears that greater geographic distance to healthcare facilities decreases treatment engagement; however, how geographic distance effects treatment completion remains unknown. The few studies that examined the impact of employment on treatment engagement and completion have reported mixed findings; thus, the role of employment in engagement and completion remains unknown. Further, employment and service connection may be confounded among veterans. Veterans rated 100% service connected (i.e., 100% disabled) are unlikely to be employed even though service connection is not contingent on employability (as opposed to social security disability). Studies separating the effects of employment from service connection on treatment engagement and completion are needed.

Need Factors. Need factors include evaluated need (e.g., clinician diagnosis) and perceived need (e.g., self-reported distress and impairment caused by symptoms; Andersen et al., 2011). Need factors previously identified include symptom severity, psychiatric comorbidity, past inpatient psychiatric hospitalizations, increased suicidality risk, aggression, and reintegration problems.

Symptom Severity. Among civilians, more severe PTSD symptoms have been associated with increased psychotherapy use (Amstadter & Vernon, 2008; Lewis et al., 2005), with the exception of one study that found decreased service utilization among those with greater severity (Schwarz & Kowalski, 1992). Greater PTSD symptom severity has also been associated with higher psychotherapy utilization among both pre-OEF/OIF/OND (Elhai, Don Richardson, & Pedlar, 2007; Rosenheck & Fontana, 1995) and OEF/OIF/OND veterans (Kehle et al., 2010; Meis, Barry, Kehle, Erbes, & Polusny, 2010). A recent study examined the relationship of each PTSD symptom cluster (i.e., intrusions, avoidance, negative thoughts/mood, and re-experiencing) to treatment engagement; OEF/OIF/OND veterans with higher avoidance symptoms utilized treatment less, while those with higher re-experiencing symptoms utilized treatment more (Blais et al., 2014).

In a study of civilians receiving EBP for PTSD, more avoidance, greater arousal, and higher total PTSD severity scores at intake were associated with treatment dropout (Zayfert et al., 2005). A recent study looking at a brief

telephone intervention to improve PTSD treatment utilization among OEF/OIF/OND veterans did not find a significant relationship between PTSD symptom severity and treatment completion (Stecker, McHugo, Xie, Whyman, & Jones, 2014).

Psychiatric Comorbidity. Increased number of comorbid diagnoses has been associated with increased mental health treatment utilization among civilians (Rosenthal, Nunes, & Le Fauve, 2012; Talbot et al., 2005), pre-OEF/OIF/OND veterans (Amstadter & Vernon, 2008; Boscarino et al., 2002; Lewis et al., 2005; Ullman & Brecklin, 2002), and OEF/OIF/OND veterans (Chermack et al., 2008; DeViva, 2014).

Among civilians, comorbid diagnoses and symptom severity have been negatively associated with treatment completion (Rosenthal et al., 2012; Talbot et al., 2005). The relationship between psychiatric comorbidity and treatment completion has been mixed among OEF/OIF/OND veterans. Seal et al. (2010) found that increased comorbid diagnoses were associated with a greater likelihood of receiving at least one or more sessions of psychotherapy in a 15-week period (i.e., the authors' definition of a therapeutic dose of treatment). Another study of 200 OEF/OIF/OND veterans with PTSD found that comorbid depression decreased the likelihood of completing treatment (DeViva, 2014).

Mental Health Inpatient Hospitalization. Mental healthcare exists on a continuum from outpatient to inpatient treatment; the majority of patients are seen on an outpatient basis. When patients are unable to keep themselves safe for

a host of reasons such as medication stabilization or endorsing imminent high risk for suicidality, inpatient hospitalization may be deemed necessary. Inpatient hospitalization is usually designed to be a short-term, stabilization period, after which individuals are expected to go on to evidence-based care on an outpatient basis. It is important to understand whether these hospitalized individuals go on to utilize and complete outpatient treatment. In civilians with PTSD, lifetime prior inpatient hospitalization was positively associated with increased outpatient psychotherapy utilization (Price et al., 2014). Among OEF/OIF/OND veterans with PTSD, veterans with a history of inpatient hospitalization used outpatient mental health services at higher rates within a 12-month period than veterans without previous inpatient hospitalizations (Blais et al., 2014; Elbogen et al., 2013; Hundt et al., 2014). The role of prior inpatient hospitalizations on PTSD treatment completion has not yet been examined. As greater symptom severity is associated with lower likelihood of treatment completion (see above), a better understanding of how inpatient hospitalizations relate to treatment completion is needed.

Suicidality Risk. Another indicator of severe distress is higher risk of suicidality (i.e., suicidal ideation, suicidal behaviors, suicide attempts). Higher incidence of suicidality among individuals with PTSD have been documented (see reviews Krysinaka & Lester, 2010; Panagioti, Gooding, & Tarrier, 2009). This association holds true across many different populations, including adult survivors of interpersonal childhood traumas, survivors of sexual assault, and

combat veterans (Krysinska & Lester, 2010; Wunderlich, Bronisch, & Wittchen, 1998). In the VA, risk of suicidality is measured with a comprehensive suicide risk assessment that looks at risk and protective factors for suicide. Veterans at a moderate or high risk for suicidality have a suicidality flag placed in their record. Little work has been done examining the relationship between suicide risk and mental health treatment utilization. In a civilian study comparing women with borderline personality disorder with and without PTSD, there was no significant relationship between suicide risk and mental health utilization (Harned, Rizvi, and Linehan, 2010). There has not been work published to date examining the relationship between suicide risk and mental health treatment utilization or completion among OEF/OIF/OND veterans. As PTSD is associated with an increased risk of suicide, understanding how veterans at higher risk for suicide utilize and complete treatment is important.

Aggression. Work examining the relationship of aggression to treatment utilization is limited, and has relied on self-report measures that group verbal, emotional, and physical aggression together in total frequency scores. More frequent aggression has been associated with less symptom improvement following treatment among Vietnam veterans (Beckham, Feldman, Kirby, Hertzberg, & Moore, 1997; Forbes et al., 2008; Taft, Vogt, Marshall, Panuzio, & Niles, 2007). The association between self-reported aggression and psychotherapy engagement among OEF/OIF/OND veterans has only been examined in one study. Naragon-Gainey, Hoerster, Malte, and Jakupcak (2012)

found that self-reported aggression was positively associated with more mental health use among OEF/OIF/OND veterans.

One study looked at the relationship between treatment completion and aggressive behavior among both Vietnam-era and OEF/OIF/OND veterans. This study found that completing PTSD treatment did not reduce self-reported aggressive behavior (Shin, Rosen, Greenbaum, & Jain, 2012).

Reintegration. Reintegration (i.e., readjusting to civilian life after military service) is a factor unique to veterans that has not been well-studied in relation to mental health treatment. In fact, there have not been any studies to date specifically examining the role of reintegration problems in psychotherapy utilization. However, Sayer et al. (2010) reported that 83% of OEF/OIF/OND veterans with reintegration problems expressed interest in receiving treatment for mental health problems. The question of whether or how reintegration difficulties are related to mental health utilization remains unanswered.

Summary of Need Factors. The most frequently examined need factors in PTSD treatment utilization studies are symptom severity, psychiatric comorbidity, and inpatient hospitalization; collectively, individuals who have greater symptom severity, greater number of comorbidities, and a history of hospitalizations for mental health reasons are more likely to engage in psychotherapy for PTSD. However, much less is known about how these factors impact treatment completion. Very little is known regarding how aggression and reintegration relate to veteran engagement in or completion of treatment. As OEF/OIF/OND

veterans are reporting problems with aggression and reintegration (Elbogen et al., 2014; Sayer et al., 2010), these need factors deserve further exploration.

Summary and limitations of prior research

PTSD is the most commonly diagnosed mental health disorder among OEF/OIF/OND veterans. Despite the availability of effective treatments for PTSD in the Veterans Administration (VA) Healthcare System, PTSD treatment engagement and completion is low. To date, only a few studies have examined the factors associated with these problems among Veterans offered evidence-based psychotherapy.

The limited number of studies examining mental health utilization among veterans with PTSD have either looked at overall visit counts (with differing definitions of completion) or created dichotomous “attended/did not attend” variables, without confirming receipt of evidence-based treatment (e.g., number of mental-health related sessions was used as a proxy for receipt of evidence-based treatment rather than looking at the content of therapy notes) or the dose of psychotherapy. Further, these studies have not included evidence-based psychopharmacology in measures of evidence-based treatment, limiting the understanding of factors that lead veterans to choose to receive medication-only treatment for their PTSD.

The majority of previous studies of factors that affect mental health care utilization have only examined information extracted from medical records, limiting the ability to comment on psychosocial mechanisms that are not typically

gathered in VA mental health care. Additionally, age has been confounded with service era, so the relationship between age and treatment engagement and completion needs to be examined separately from service era.

Similarly, male veterans have been found to seek mental health services at higher rates than female veterans, but it is unknown if this finding reflects true gender differences, or is a proxy for differences across trauma types (e.g., combat vs. MST). The relationship between factors such as aggression and previous inpatient hospitalization on mental health engagement for OEF/OIF/OND veterans with PTSD remains unstudied. Furthermore, previous studies have not examined the relationship of utilization factors to symptom improvement following evidence-based psychotherapy.

Even less is known about the role of predisposing characteristics, enabling resources, and need factors in PTSD treatment completion. The majority of studies have used proxies for treatment completion (e.g., more than 9 sessions) without looking at content of therapy notes, which can provide concrete evidence that treatment was completed. Additionally, categorizing veterans as treatment completers based solely on the number of sessions may both over- and underestimate the true number of treatment completers. Galovski, Blain, Mott, Elwood, and Houle (2012) have shown that the number of psychotherapy sessions needed for an individual to complete EBP varies; some individuals have reached maximum benefit after eight or fewer sessions, others require closer to 18.

There is a paucity of information about the role of different person-level and system settings variables in relation to symptom improvement. There is a lack of information about how different predisposing characteristics, enabling resources, and need factors relate to how much a veteran's symptoms improve following receipt of an EBP for PTSD. Identification of the factors that relate to how a veteran benefits from treatment is needed.

Present Study

The goal of this study was to better understand how person-level demographic, psychosocial, and psychiatric variables as well as treatment setting system variables were related to evidence-based treatment utilization, completion, and symptom improvement among OEF/OIF/OND veterans with PTSD seeking treatment in a clinic that has implemented evidence-based treatment as part of standard care.

Design

OEF/OIF/OND veterans with PTSD ($N = 311$) were classified into six utilization groups based on their utilization of evidence-based psychotherapy in a VA outpatient PTSD clinic within a 12-month period. The utilization groups were the following:

- (1) Individuals who declined EBP treatment (e.g., received referral, no follow up)
- (2) Psychotherapy Decliners (medication only)

- (3) EBP Dropouts (1-7 sessions and indicated in therapy note that patient dropped out)
- (4) EBP Treatment Completers (8-18 sessions and indication in psychotherapy note that treatment was completed)
- (5) High EBP Utilizers (19+ sessions without completing treatment; based on requirements of EBP treatment protocols and previous utilization studies; Hundt et al., 2014)
- (6) Non-EBP Treatment Utilizers (e.g., attended only anger management, PTSD skills)

Andersen's Behavioral Model of Health Care Utilization was used as a framework to better understand factors associated with utilization, completion, and symptom improvement through three specific aims.

Aim 1: Using analyses of variance, differences in baseline predisposing characteristics (e.g., demographic and psychosocial variables), enabling resources (e.g., treatment setting variables), and need factors (e.g., psychiatric variables) were explored among utilization groups

Relevant post-hoc comparisons were conducted using the Scheffe procedure, and effect sizes were examined.

Aim 2: Using logistic regression, the predictive utility of predisposing characteristics, enabling resources, and need factors were examined as they related to evidence-based psychotherapy treatment completion.

Predisposing characteristics, enabling resources, and need factors found to be statistically significant in univariate analyses in Aim 1 were entered into a conditional logistic regression analysis. Veterans identified in the “EBP treatment completers” group from Aim 1 were coded as 1, while veterans in the “EBP dropout group” were coded as 0 in the logistic regression analysis. This approach allowed for identification of unique predictors of EBP treatment completion.

Aim 3: Using repeated measures analyses of variance, predisposing characteristics, enabling resources, and need variables were explored as predictors PTSD and depression symptom change following evidence-based psychotherapy treatment completion.

Predisposing characteristics, enabling resources, and need factors found to be significant in univariate analyses were entered into repeated measures analyses of variance examining the contribution of these factors on change in PTSD and depression symptom scores from the start of treatment to treatment completion.

Method

Participants

Data from 311 OEF/OIF/OND veterans presenting for clinic orientation and/or intake assessment at the VA San Diego La Jolla PTSD clinic were used for this investigation. This clinic provided treatment to combat veterans who served in the Iraq and Afghanistan wars. All veterans who presented to this clinic between December, 2011 and May, 2014 and diagnosed with PTSD were eligible to participate. In addition to the present clinic evaluation study, there were number of PTSD-treatment focused psychotherapy randomized clinical trials (RCTs) recruiting participants from this clinic during the data collection window. There were RCTs studying both EBP treatments (e.g., Progress study comparing PE, PE + sertraline, or sertraline only; telehealth versus in-person PE) and non-EBP treatments (e.g., Acceptance and Commitment Therapy (ACT) for PTSD; mantram meditation). Veterans with significant alcohol or substance use problems, active psychosis, psychotic depression, mania, active suicidality or without PTSD were referred to other specialty clinics within the VA San Diego Healthcare System and were not seen at the OEF/OIF/OND PTSD clinic. As such, these individuals were not included in the present investigation. This sample is 93% male, and 59% Caucasian, 23% Hispanic/Latino, 18% African American, and 10% Asian American.

Procedures

Veterans referred for PTSD specialty care first attended an orientation to the clinic, where they completed a battery of measures (see below), and were scheduled for an intake appointment. Veterans seeking treatment in this clinic were offered evidence-based psychotherapy, evidence-based psychopharmacology, or a combination of both therapy and medication. Veterans who desired non-EBP supportive therapy were referred for treatment at other clinics within the hospital, to the local Vet Center, or for non-VA treatment. Veterans who were diagnosed by clinical interview with a primary diagnosis of anything other than PTSD (or subsyndromal PTSD) were referred for treatment at a more appropriate clinic; for example, veterans with a primary diagnosis of major depressive disorder and a desire to receive depression treatment were referred for depression treatment at the mood clinic in the VA. Veterans were asked if they were interested in allowing their measures and clinic usage to be used for research purposes; interested veterans provided written informed consent. This study used data provided by veterans who entered the study between December, 2011 and May, 2014 to allow for examination of the treatment utilization through May, 2015. Human subjects research approval was obtained from the VA Internal Review Board (IRB), the VA Research and Development (R&D) committee, as well as University of California, San Diego Human Research Protections Program (UCSD HRPP).

Data for this project were extracted from the VA Computerized Patient Record System (CPRS) by the primary author and a research assistant trained by

the author unless otherwise noted below. A coding manual was developed for this study based on a manual obtained from researchers who completed similar studies (Hundt et al., 2014; Mott et al., 2014). The tailored manual for this project included operational definitions and data extraction rules (see Appendix I). The data extraction pulled the following information from a veteran's medical record: age, gender, race, marital status, student status, overall and PTSD service connection level, number of EBP sessions (CPT, PE, medication management), number of non-EBP visits (e.g., supportive therapy), prior inpatient hospitalizations, suicide risk (e.g., suicide flag), comorbid mental health diagnoses, military sexual trauma (MST) disclosure, distance to the VA, origin of treatment referral, and housing status. All categorical variables were dummy coded. Extracted data and self-report data (see below) were entered into an SPSS (version 22) database.

Measures

Predictors.

Predisposing characteristics. Age, gender, race, ethnicity, and MST were extracted from CPRS.

Enabling resources. Distance to the VA, service connection status, student status, and housing status were extracted from CPRS.

Need factors. Psychiatric comorbidities (e.g., depression, substance use), suicidality flags, and psychiatric inpatient hospitalizations at any VA hospital

were extracted from CPRS. Psychiatric symptom severity were assessed with the following self-report measures:

(a) PTSD symptom severity was assessed with the *Posttraumatic Stress Disorder Checklist* (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL is a widely used instrument that measures distress related to PTSD symptoms. It consists of 17 items that correspond to DSM-IV PTSD diagnostic criteria. Individuals were asked to rate how much they were bothered by a problem on a 5-point scale (ranging from 1 “not at all” to 5 “extremely”), and totals range from 17 to 85 with higher scores indicating greater symptom severity. The PCL has well-established reliability and validity (Wilkins, Lang, & Norman, 2011). In this study, PCL scores from three separate visits were used: first, at the orientation session, second, at the start of treatment, and finally at the end of treatment. PCL scores from start of treatment and end of treatment were used to examine symptom change.

(b) Depression symptom severity was measured with the nine-item *Patient Health Questionnaire* (PHQ-9; Kroenke, Spitzer, & Williams, 2001). This measure assesses the severity and frequency of mood symptoms over the preceding two weeks, is based on the DSM-IV diagnostic criteria for major depressive disorder, and has well-established reliability and validity (Kroenke et al., 2001). Total scores range from 0 to 27, and a score of 10 or higher indicates significant depression. The PHQ-9 was administered at orientation session, start

of treatment, and end of treatment. PHQ-9 scores from start of treatment and end of treatment were used to examine symptom change.

(c) Alcohol and drug use severity were assessed with the *Alcohol Use Disorder Identification Test-Consumption* (AUD-C; Babor, Higgins-Biddle, Saunders, & Monteiro, 1993; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993), and the *Drug Abuse Screen Test* (DAST; Skinner, 1982) respectively. The 3-item AUD-C is a screening measure asking about behaviors related to alcohol-consumption. A positive screen on the AUD-C indicates the need for more thorough evaluation of alcohol-related problems. The AUD-C has well-established validity and reliability (Babor et al., 1993). The DAST is a 10-item questionnaire that screens for illicit substance use and related problems. The DAST has shown high internal consistency ($\alpha = .92$) in psychiatric samples.

(d) Aggression was measured with the *Retrospective Overt Aggression Scale* (ROAS; Sorgi, Ratey, Knoedler, Markert, & Reichman, 1991). This 16-item questionnaire asks about act of aggression that occurred over the past 30 days. The ROAS evaluates verbal aggression, physical aggression towards self, physical aggression towards others, and physical aggression towards objects. The ROAS has evidenced good internal consistency ($\alpha = .86$) and high reliability (Angkaw et al., 2013; Moffitt et al., 1997).

(e) Reintegration was examined with the 16-item *Military to Civilian Questionnaire* (M2C-Q; Sayer et al., 2011), which measures post-deployment

community reintegration difficulty. Only two studies have reported use of the M2C-Q; the internal consistency was high ($\alpha = .92-.95$).

Treatment Utilization and Completion.

Veterans were divided into six categories of psychotherapy utilization, based on both the number and type of sessions attended. Specifically, they were grouped as: EBP treatment decliners, medication-only, EBP dropouts, EBP treatment completers, high utilizers, and non-EBP treatment users. Veterans who (a) failed to return for an intake appointment and did not receive any further mental health treatment at the VA, (b) received a referral for EBP treatment but did not follow-up or (c) requested supportive therapy were categorized as EBP treatment decliners. Veterans who attended their intake appointment and requested psychopharmacology only were in the medication-only group. Veterans were categorized as EBP dropouts if they (a) attended fewer than eight sessions and (b) had a psychotherapy note which designated they have dropped out of treatment (e.g., termination note, note by treatment provider indicating drop out prior to treatment completion). Veterans were categorized as EBP treatment completers if they (a) attended eight to eighteen sessions (as full course EBPs require this number of sessions; Foa, Hembree, & Rothbaum, 2007; Resick & Schnicke, 1993) and (b) they had a psychotherapy note which designated they completed treatment (e.g., termination note, note by treatment provider in CPRS reporting treatment completion). For both EBP dropouts and EBP treatment completers, the provider note overrode any conflicts. For example, if a veteran

attended more than eight sessions but their clinician noted that the veteran dropped out of treatment, that veteran was considered an EBP dropout. The high utilization group will consist of veterans who attend 19+ sessions, as this is more than the recommended dose for CPT or PE. Of note, defining 19+ sessions as high utilization has been used in a previous study of treatment utilization in OEF/OIF/OND veterans (Hundt et al., 2014). Veterans which chose to attend psychotherapy treatments other than CPT or PE (e.g., attended PTSD skills or anger groups) were classified into the non-EBP treatment group.

Changes in symptom severity.

PCL and PHQ-9 scores at start of treatment and at the end of treatment were extracted from CPRS, and the difference between pre-treatment and post-treatment scores was used as a measure of symptom change.

Data Analytic Plan

Aim 1. Chi-square tests and analysis of variance (ANOVA) analyses were used to examine which independent variables significantly differed across utilization groups. Relevant post-hoc comparisons were conducted, and effect sizes were examined.

Aim 2. Independent variables found to be significant at $p < .05$ were included in a multivariate logistic regression model predicting EBP treatment completion.

Aim 3. Variables found to be significant at $p < .05$ will included in repeated measures ANOVAs examining change in PTSD and depression

symptom severity following treatment, accounting for baseline levels of symptoms.

Results

Utilization groups. Groups were classified according to their utilization, as follows: ‘Treatment decliners’ (21% of the sample, $n = 66$) attended only the orientation session for the PTSD clinic. ‘Medication only’ (24%, $n = 77$) engaged in evidence-based medication for PTSD, but not psychotherapy. Veterans who dropped out of treatment before 8 sessions with a treatment termination note describing treatment dropout were classified as ‘EBP dropouts;’ (14%, $n = 44$ veterans). Veterans who completed at least 8 EBP treatment sessions and had a treatment termination note that described treatment as completed were classified as ‘EBP completers;’ (12%, $n = 38$). 15 veterans (5%) who attended more than 19 psychotherapy appointments during the one-year period of this study and did not complete treatment were considered ‘High utilizers.’ The last utilization group engaged in non-evidenced based treatment for PTSD (e.g., anger management group, skills group, supportive therapy) and was classified as ‘Non-EBP users;’ (23%, $n = 71$).

52% of the sample ($n = 177$) received at least one session of psychotherapy during the one-year period of this study. Of veterans who engaged in at least one session of psychotherapy, 47% participated in an EBP ($n = 82$). Table 3 presents information about psychotherapy utilization. The average number of therapy sessions for ‘EBP dropouts’ was 6.47 ($SD = 4.82$, range = 1-17), and the average number of sessions for completers was 16.08 ($SD = 8.57$, range = 9-19). Two-thirds of veterans who received an EBP engaged in CPT

(individual CPT $n = 28$; group CPT $n = 29$), and the remaining 28 veterans participated in PE (individual treatment format only).

Aim 1: Treatment Utilization

Table 2 presents the results of the chi-square and ANOVA tests of differences among the six utilization groups in predisposing characteristics, enabling resources, and need factors.

Predisposing characteristics. There were no significant differences between utilization groups with respect to age, gender, ethnicity/race, or trauma type.

Enabling resources. Use of the GI Bill was significantly different among the utilization groups, such that individuals in the high utilization group were significantly less likely to report use of the GI Bill than veterans in the other groups ($\chi^2 = 14.206$, $df = 5$, $p = .01$, $\Phi = .20$). However, there were only 15 veterans in the High Utilizers group, and only one veteran that endorsed use of the GI Bill, so those results should be interpreted with caution. There was a trend level difference between groups with respect to distance traveled to the VA to receive care. Tx decliners and Non-EBP users traveled an average of 27-29 miles to the VA, while veterans in the other utilization groups traveled an average of 19-22 miles to the VA [$F(5, 251) = 2.104$, $p = .065$, $\eta_p^2 = .04$]. There were no other significant differences between the utilization groups related to the GI Bill use, distance to the VA, or source of their referral.

Need factors. There were significant differences between utilization groups with respect to seeing a psychiatrist prior to engaging in treatment. Only 30% of Tx decliners had previously seen a psychiatrist, while 50-70% of veterans in the other utilization groups had previously seen a psychiatrist ($\chi^2 = 25.31$, $df = 5$, $p < .001$, $\Phi = .30$). There were trend level differences in physical aggression between utilization groups; veterans in the high treatment utilization group reported significantly higher physical aggression toward self [$F(5, 156) = 2.04$, $p = .076$, $\eta_p^2 = .06$]. None of the other need factors were significantly different among utilization groups.

Aim 2. EBP Treatment Completion and Dropout

Table 3 presents the logistic regression results examining the relationship between predisposing characteristics, enabling resources, and need factors and EBP treatment completion among the 82 participants who engaged in an EBP.

Predisposing Characteristics. None of the predisposing characteristics were significantly related to treatment completion.

Enabling Resources. Veterans who were engaging in EBP through a research study were significantly more likely to dropout out of treatment compared to veterans who participated in an EBP through the clinic ($OR = 6.08$, 95% CI: 1.78, 20.78, $p = .004$). No other enabling resources were significantly related to treatment completion.

Need Factors. Veterans with substance use disorders were significantly more likely to drop out of treatment compared to veterans without a substance use

disorder (OR = 5.57, 95% CI: 1.007, 28.84, $p = .04$). Veterans who reported problems with family members or significant others at intake were more likely to complete treatment (OR = .26, 95% CI: .091, .76, $p = .014$). None of the other need factors were significantly related to treatment completion.

Logistic Regression. Problems with family members and/or significant others, participating in a research study, and substance use disorder diagnosis were all entered simultaneously into a logistic regression model, and were all significantly related to treatment completion in this model ($\chi^2 = 20.8$, $df = 3$, $p < .001$, Cox & Snell $R^2 = .24$; Table 3).

Aim 3. Symptom Improvement Following EBP

We compared EBP treatment completers ($n = 38$) and dropouts ($n = 44$). EBP completers had clinically and statistically significant decreases in PTSD symptoms (mean PCL decrease = 12.63) as compared to EBP dropouts [mean PCL decrease = 4.97; $F(1, 58) = 5.52$, $p = .022$, $\eta_p^2 = .08$]. However, completers did not differ significantly in regard to depression symptoms as compared to dropouts [average decrease 2.83 vs. 3; $F(1, 38) = 1.11$, $p = .75$].

Predisposing Characteristics. None of the predisposing characteristics were related to change in PTSD or depression symptoms.

Enabling Resources. Completers who were using the GI Bill showed greater decreases in PTSD symptoms compared to veterans who were not using the GI Bill [average decrease 6.14 points; $F(1, 55) = 5.37$, $p = .024$, $\eta_p^2 = .06$].

The type of EBP a veteran engaged in (CPT or PE) was not associated with a statistically or clinically significant difference in PTSD symptoms. However, veterans who received PE or CPT individually dropped an average of 21.9 ($d = 2.1$) and 13.1 ($d = 1.02$) points on the PCL (respectively), while veterans who received group CPT averaged a less than one point decrease on the PCL [$F(1, 58) = 6.91, p = .004, \eta_p^2 = .12$]. None of the other enabling resources were clinically or statistically related to PTSD and depression symptom improvement.

Need Factors. A comorbid diagnosis of MDD was associated with significantly higher pre- and post-treatment PTSD symptom scores (62 vs. 48 among those without comorbid MDD); however, veterans with this comorbid diagnosis did not have a clinically or statistically significant difference in how much their PTSD symptoms improved compared to veterans without comorbid MDD [13.13 vs. 13.71 average decrease; $F(1, 55) = 4.4, p = .04, \eta_p^2 = .08$]. Put another way, veterans with comorbid MDD improved comparably in regard to mean drop in PCL scores, but their scores remained higher compared to their counterparts without MDD.

Completers with sleep problems showed less change in their PTSD symptoms than did completers without sleep problems [average decrease of 10.18 versus 15.84 respectively; $F(1, 56) = 6.26, p = .015, \eta_p^2 = .13$]. Completers with work problems showed more change in their PTSD symptoms than completers without work problems [average decrease of 21.67 points vs. 11.63 points; $F(1, 56) = 4.56, p = .04, \eta_p^2 = .06$].

There were trend level statistical differences with respect to problems with anger and aggression. Completers with anger problems showed less change in PTSD symptoms compared to completers without anger problems [average decrease of 9.94 vs. 15.71; $F(1, 56) = 3.41, p = .07$]. Treatment completers with greater aggression showed less improved in PTSD symptoms than did treatment completers with lower aggression [$F(1, 27) = 3.65, p = .067$].

Discussion

This study examined a variety of factors to understand how they relate to treatment utilization, completion, and symptom improvement among treatment seeking veterans with PTSD. This study was novel in that all veterans in the sample were offered an EBP for PTSD, while in most previous studies of utilization, completion and/or symptom improvement it was not clear what percent of veterans had been offered an EBP. In the present study, 27% of veterans engaged in an EBP, which is substantially higher than rates in previous studies (Shiner et al., 2013). However, this rate is still quite low in that nearly 75% of the veterans in this study did not engage in EBP and not all veterans who did engage completed treatment or showed clinically meaningful improvement. Thus, the goal of the study was to understand what factors predicted utilization and completion of EBPs, as well as benefit from EBPs, when EBPs were widely available in a naturalistic treatment setting.

The Andersen Behavioral Model of utilization provided the framework for examining these factors. Based on this model, we grouped variables into three categories: predisposing characteristics (e.g., sociodemographic variables), enabling resources that may facilitate or impede treatment use (e.g., distance to health care providers), and need factors (e.g., symptom severity; Andersen, 1995). Overall we found that certain enabling resources and need factors were related to aspects of utilization, completion and symptom change while predisposing characteristics were not.

Utilization

Veterans who were determined to be appropriate for treatment were classified into six different *a priori* groups of evidence-based treatment utilization: all treatment decliners, medication-only, EBP dropouts, EBP completers, high EBP utilizers, and non-EBP users. These specific utilization groups were chosen as they are clinically-relevant categories that allow for meaningful interpretations of the findings. The groups used allowed for the exploration of factors associated with a range of evidence-based treatment use, from not at all (treatment decliners) to more than 1.5 times greater than the recommended dose without completing treatment (high EBP users). Utilization groups were compared to examine if there were significant differences in predisposing characteristics of age, gender, race/ethnicity, and trauma type.

Contrary to other studies that found predisposing characteristics such as age (Seal et al., 2010), gender (Seal, Bertenthal, Miner, Sen, & Marmar, 2007), race/ethnicity (Blais, Hoerster, Malte, Hunt, & Jakupcak, 2014; Seal et al., 2008), or trauma type (New & Berliner, 2000) were related to utilization, in our study, these predisposing characteristics did not significantly differ by utilization group.

Treatment decliners lived further from the VA (an average of 27-29 miles from their nearest VA), than veterans in the other utilization groups who lived an average of 19-22 miles away. This finding is consistent with previous studies that found that veterans who live further away from facilities were less likely to engage in psychotherapy treatment (Brooks et al., 2012; Cully et al., 2008; Seal,

Bertenthal, Miner, Sen, & Marmar, 2007b). As nearly 40% of veterans with PTSD across the U.S. live in rural areas (Brooks et al., 2012), this finding underscores the importance of finding alternatives to face to face in-person meetings for psychotherapy, such as making telehealth psychotherapy widely available. It would be interesting to know how many of the veterans in this study might have participated in weekly psychotherapy if telehealth treatment was an available option.

There were significantly fewer veterans in the high utilizers group (those who had an average of 28 psychotherapy visits in a year) using the GI Bill compared to the other utilization groups. The post-9/11 GI Bill is a factor that enables veterans to attend school by paying the costs of tuition and living expenses. One hypothesis is that veterans in this group may have been more severe, requiring more treatment visits and preventing them from attending school; however, there were no significant differences between veterans in the high utilization group and other utilization groups on indicators of severity such as symptom severity or comorbid diagnoses. It is possible that veterans in this group may have been unable to attend school as they were coming for services too frequently. A recent survey study found that 47% of student veterans utilized mental health services; however, this study did not examine the number of sessions these student veterans attended (Bonar, Bohnert, Walters, Ganoczy, & Valenstein, 2015). Starting in 2012, the VA launched the Veterans Integration to Academic Leadership (VITAL) program with the goal of increasing mental

health care access for student veterans on college campuses (VA Campus Toolkit, 2016). The program places a VA trained mental health professional onto college campuses so that student veterans can access VA mental health services at a location that may be more convenient than coming to a VA. It would be helpful to do research on the outcome of this initiative, to see if providing mental health treatment on campus would result in fewer, more effective treatment sessions.

Although rates of engagement in EBPs were higher in this study than in previous studies (27% compared to 6.3%; Shiner et al., 2013), there was still significant room for improvement as more than 70% of veterans chose not to engage in an EBP. More work is needed to understand the other factors that influence treatment engagement under conditions where all veterans are offered an EBP. For example, while EBP was offered to all veterans in this study, wait times were long. Veterans waited an average of 75 days between attending the orientation session, and beginning psychotherapy. This wait was slightly shorter for veterans who participated in group treatment (66 days) and longer for veterans that opted for individual treatment (87 days). Undoubtedly, access to treatment impacts engagement, and future studies that examine how veterans engage in EBP when wait time is not an issue are important.

Two need factors significantly related to utilization – previous psychiatric care and reporting problems with anger. Only one third of treatment decliners had previously seen a psychiatrist compared to 50-70% of veterans in the other

utilization groups. This finding is consistent with other work showing that veterans who have previously received mental health treatment are more likely to utilize treatment in the future (Hundt et al., 2014).

The second need factor associated with utilization was reporting problems with anger. There was an anger management group in the PTSD clinic during the time of this study that did not have a set limit for how many sessions veterans could attend, which may have resulted in veterans in the non-EBP treatment group utilizing services at higher rates than veterans who engaged in trauma-focused EBPs. It is also possible that some veterans with anger problems may have been mandated to receive treatment, requiring more session attendance; unfortunately we did not track whether participants were mandated to treatment in this study, limiting the ability to further examine this possible relationship.

Treatment Completion and Dropout

The second aim of the study was to explore which predisposing characteristics, enabling resources, and need factors predicted whether veterans completed treatment or dropped out. Thus, we tested the predictive utility of our variables of interest in differentiating the EBP completer group from the group of veterans that dropped out of an EBP. Veterans were categorized as EBP treatment completers if they (a) attended eight to 18 sessions (as full course EBPs require this number of sessions; Foa, Hembree, & Rothbaum, 2007; Resick & Schnicke, 1993) and (b) had a psychotherapy note which designated they completed treatment (e.g., termination note, note by treatment provider in CPRS reporting

treatment completion). Veterans were categorized as EBP dropouts if they (a) attended fewer than eight sessions and (b) had a psychotherapy note which designated they have dropped out of treatment (e.g., termination note, note by treatment provider indicating drop out prior to treatment completion).

Similar to the utilization findings, predisposing characteristics did not differ significantly between treatment completers and dropouts. A number of studies have found that younger veterans dropped out of treatment at higher rates than older veterans (Goetter et al., 2015; Gros et al., 2011; Lu et al., 2011); however, these differences were not found in this study. This sample was restricted to returning Iraq and Afghanistan combat veterans; thus, it is possible there was not a large enough age range in this sample to find age-related differences. However, while this sample did have a young mean age of 33, the sample ranged from 21-59, suggesting that age may not have been a useful predictor of treatment completion. Future work should examine if higher treatment dropout found with younger veterans may be better explained by enabling resources such as differences in employment and child care needs.

The relationship between distance to the hospital and treatment completion has not been examined before. There were no differences between treatment completers and dropouts with respect to how far away they lived from treatment in this study. These results may indicate that, once an individual is committed to treatment, an enabling factor such as distance to treatment is less critical.

One way that EBPs were made available to veterans was through research studies, which offered opportunities to receive either CPT or PE individually. Often, research studies provide a way to increase access to services, which was the case in this sample; veterans participating in EBP through a research study only waited an average of 41.85 days ($SD = 19.97$), compared to the 75 day average for the entire sample. However, these veterans were more likely to drop out than veterans who engaged in an EBP through the clinic. It is possible that research studies may not have been flexible enough for the veterans in this study. It is also possible that additional assessment sessions required by research studies may have decreased EBP treatment attendance by asking veterans to attend too many appointments before they begin to experience any symptom relief (Tuerk et al., 2014). There have not been previous studies that have examined rates of treatment completion in research study versus standard clinical care; more work is needed to better understand this finding, as many VA PTSD clinics offer opportunities to participate in treatment through research.

There were no differences in completion by type of EBP (CPT or PE) or format (individual or group). One similar study found a higher rate of treatment dropout in PE than CPT and in group CPT than individual CPT (Jeffreys et al., 2014). It is possible that the current study was not adequately powered to find differences in drop out between treatments and treatment formats. Alternatively, veterans may tolerate and complete trauma-focused treatments at similar rates regardless of the type of EBP or format.

Only two need factors were associated with treatment completion: comorbidity of substance use disorders (SUDs) other than AUD and reporting problems with family members and/or significant others. Veterans with SUDs dropped out of treatment at much higher rates than veterans without SUDs, which is consistent with other studies (see review Roberts, Roberts, Jones, & Bisson, 2015). Higher treatment dropout was not seen between veterans with and without comorbid diagnoses of AUDS or major depressive disorder, suggesting that veterans with SUD diagnoses may have additional barriers to completing treatment that need to be addressed. However, an important note about this sample is the veterans with severe AUDs or SUDs requiring addiction treatment would have been triaged to the addiction clinics. It is unknown how the results would have changed if there were a wider range of AUD and SUD severity in this sample.

Veterans who reported problems with their family members or significant others at intake were more likely to complete treatment than veterans who did not report similar problems. While this finding may appear counterintuitive at first glance, there are a number of reasons why problems with family members and significant others may be related to higher rates of treatment completion. As this is a sample of returning Iraq and Afghanistan veterans, the average age was 33 years old—a time when many people are getting married and having children. Individuals with PTSD are likely to endorse problems with family members and significant others (Galovski & Lyons, 2004). For these veterans, having problems

with their families and/or significant others may have been a strong motivator to complete treatment. Importantly, problems with family members or significant others was measured categorically, and we did not examine the quality of the relationship. More detailed assessment of the quality and type of relationship might have resulted in different findings.

Symptom Improvement

Predisposing characteristics, enabling resources, and need variables were explored as predictors of PTSD and depression symptom change following EBP treatment completion among veterans who completed an EBP. Veterans who completed treatment had significant decreases in their PTSD symptoms. However, contrary to recent reviews which report that depression symptoms consistently decrease following PTSD treatment (Galovski, Wachen, Chard, Monson, & Resick, 2015; Minnen, Zoellner, Harned, & Mills, 2015), EBP completers did not report a significant decrease in depression symptoms in this study. Depression symptom scores were not entered into the medical record as consistently as the PTSD measure, which may have resulted in decreased power to run these analyses.

There was no significant relationship between age and PTSD symptom improvement. Men and women benefitted from EBP for PTSD comparably well in this study. Minority veterans had the same PTSD symptom improvement following EBP for PTSD as the Caucasian veterans. Veterans with MST in addition to combat trauma improved similarly to veterans without MST.

Veterans who reported using the GI Bill showed a greater improvement in PTSD symptoms compared to the veterans not using the GI Bill. One hypothesis for this may be that student veterans are already “primed” for homework; as homework completion is essential to both PE and CPT (Cooper et al., 2016; Kazantzis, Deane, & Ronan, 2000; Kazantzis, Whittington, & Dattilio, 2010; Mausbach, Moore, Roesch, Cardenas, & Patterson, 2010), it is possible that these student veterans may have completed more homework assignments compared to non-student veterans engaged in treatment. Unfortunately, homework engagement was not measured in this study to provide data to support this hypothesis. Another explanation for this finding is that use of the GI Bill may be a proxy for higher functioning. Prior research suggests that those with higher functioning may be more likely to benefit from treatment (Schottenbauer, Glass, Arnkoff, Tendick, & Gray, 2008). Further, as the GI Bill pays for living expenses in addition to tuition, these veterans may have had more time to devote to treatment compared to veterans who were working a full-time job. Previous studies of student veterans involvement in mental healthcare have been survey or correlational studies; as such, these results need to be replicated in future work with treatment-seeking student veterans with PTSD.

Veterans who received either CPT or PE individually reported significant improvement in their PTSD symptoms (effect sizes of 1.02 and 2.1 respectively); however, veterans who received treatment in a group format (CPT-C) did not have significant improvements in PTSD symptoms. These findings replicate

recent studies that found that veterans did not benefit from group format treatment as much compared to veterans who received individual treatment (DeViva, 2014; Jeffreys et al., 2014). These findings add to the growing evidence that group-based psychotherapy for PTSD may not be as effective as individual therapy in real-life clinical settings. With demand for PTSD treatment in the Veteran Healthcare Administration growing nearly 10% each year since 2005 (Hermes et al., 2012; Rosenheck et al., 2007; Department of Veterans Affairs, 2010), group PTSD treatment offers a solution to help meet this need. It is assumed that group therapy can be a cost-effective tool to treat a higher number of individuals by specialty trained clinicians, and that it can have additional benefits beyond individual therapy such as peer support (Mott et. al, 2012; Ready et. al, 2008). Unfortunately, two reviews of the efficacy of group PTSD treatment have not found group treatment to evidence additional therapeutic benefit for PTSD over non-specific psychoeducational or supportive groups (Sloan et al., 2012; Haagen et al., 2015). Work looking at the cost-benefit and cost-effectiveness of group PTSD treatment is needed.

Veterans with a comorbid diagnosis of major depressive disorder (MDD) in addition to PTSD began treatment with higher PTSD symptom scores and ended with higher PTSD symptom scores; however, the rate of improvement did not differ between veterans with and without a MDD diagnosis. This finding replicates previous work with both civilian and veterans samples with comorbid PTSD and MDD (Green et al., 2006; Post, Zoellner, Youngstrom, & Feeny,

2011); individuals with both PTSD and MDD remain more impaired following mental health treatment compared to individuals with either diagnosis alone. As upwards of 50% of individuals with PTSD have comorbid depression (Elhai, Grubaugh, Kashdan, & Frueh, 2008; Haller et al., 2016), it may be important to modify treatment for comorbid individuals. For example, a study with non-veterans by Galovski et al. (2012) examined the utility of modifying the number of sessions of CPT, and allowed for up to an additional 50% (6 sessions; up to a total 18 possible sessions) of treatment for individuals who were not improving. Individuals in this study with higher pre-treatment depression severity required a higher number of sessions; however, these individuals then went on to improve significantly by the end of extended treatment (Galovski et al., 2012). Another alternative may be to increase the frequency of sessions. Ehlers et al. (2010) developed an intensive cognitive treatment for PTSD consisting of 18 hours of therapy over 5-7 days; individuals in the intensive treatment arm of the study had greater reductions in their depression symptoms compared to individuals in the weekly treatment arm. It is possible that particular aspects of depression treatment that are not addressed in PTSD treatments as thoroughly as they are in depression treatment (e.g., addressing core beliefs relevant to depression or explicit focus on behavioral activation) need to be addressed more thoroughly with veterans with comorbid PTSD and depression. Examining treatment length, frequency, and/or content modification are promising future directions to attempt to increase the

number of veterans with comorbid PTSD and depression who benefit from treatment.

In addition to depression, veterans who reported either problems with anger at intake or higher pre-treatment aggression on a self-report measure showed less improvement in PTSD symptoms following EBP compared to veterans who did not endorse anger problems or aggression. These findings are consistent with a previous CPT study with veterans that found high anger to be the only pre-treatment variable that significantly predicted who would not improve following treatment (Lloyd et al., 2014). Some have posited that veterans with higher anger and aggression may be reluctant to fully engage in treatment out of fear they may be at risk of harming others or themselves (Forbes et al., 2008; Lloyd et al., 2014). Validation and normalization of anger and aggression in PTSD may be vital early in treatment. Further, some veterans may benefit from learning anger management skills prior to engaging in EBPs as a way to increase their comfort with negative emotions.

Veterans with a comorbid diagnosis of AUD or SUD benefited from treatment comparably to veterans without these comorbidities. As discussed above, SUDs were associated with lower rates of treatment completion, so it may be encouraging for providers to know that if veterans with AUDs or SUDs complete treatment, they achieve comparable symptom reduction to veterans without these comorbidities. Veterans with AUDs or SUDs often have increased logistical barriers that impact their ability to attend and complete treatment, such

as loss of their driver's license as a result of a DUI or a restricted window of time to come to treatment due to rules of their sober living home. This finding suggests that providers should conduct a thorough assessment of logistical barriers associated with AUDs or SUDs prior to initiating trauma-focused therapy. If these barriers are understood and pre-emptively addressed, more veterans with comorbid AUDs or SUDs may complete and benefit from trauma-focused EBP.

Reporting problems at work was the only need factor related to increased symptom improvement. Veterans who reported pre-treatment problems at work experienced greater symptom reduction post-treatment compared to veterans who did not report problems at work. As these veterans had to be employed in order to report problems at work, it is possible that this finding reflects a higher level of functioning. As noted above, higher functioning is associated with greater likelihood of benefiting from treatment. A review with a non-veteran sample found that patients with PTSD with lower psychosocial functioning benefited less from PTSD treatment than those who had higher functioning (Schottenbauer et al., 2008). If working is a proxy for higher functioning, then our study may show that this finding also extends to a veteran sample as we found that veterans with higher psychosocial functioning benefitted more from treatment.

Summary

Overall this study adds to the literature that predisposing characteristics are not useful in understanding who is likely to utilize treatment, dropout, or show symptom improvement from treatment among OEF/OIF/OND veterans with

PTSD (Goetter et al., 2015; Jeffreys et al., 2014). Even younger age, which has been found to be predictive in some studies (Goetter et al., 2015), may be better explained by enabling resources such as differences in employment and child care needs. Cumulatively, these results suggest that non-modifiable variables do not appear to drive the rates of low utilization and completion; thus, underscoring the importance of examining other variables that can be modified by treatment such as enabling resources and need factors.

We identified modifiable enabling resources that impacted treatment utilization, completion, and symptom improvement. The distance a veteran had to travel to receive treatment impacted utilization, with treatment decliners and non-EBP users more likely to live further away. This finding supports the rapid expansion of telehealth opportunities in the VA. The format that EBPs were delivered significantly impacted how much a veteran benefitted from treatment, with veterans receiving individual treatment on average benefitting more than veterans who received individual treatment. This finding underscores the necessity for future work to study the cost-benefit and cost-effectiveness of group treatment compared to individual treatment for PTSD.

There were a number of need factors that were related to utilization, completion, and symptom improvement. Veterans who had previously seen a psychiatrist or who reported pre-treatment anger were more likely to utilize treatment. Veterans with substance use disorders were less likely to complete treatment, while veterans who reported more problems with their family members

or significant others were more likely to complete treatment. These findings support the increased investigation into integrated PTSD treatments. For example, Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure (COPE; Back et al., 2012; Mills et al., 2012) integrates relapse prevention with PE. By learning about the relationship between PTSD symptoms and substance use and how to cope with cravings, veterans may be better prepared for an increase in substance use cravings when treatment is difficult (e.g., during early *in vivo* and imaginal exposures during PE). This increased ability to tolerate distress without using substances may increase the number of veterans with SUDs who complete treatment. Similarly, Cognitive-Behavioral Conjoint Therapy for Posttraumatic Stress Disorder (CBCT; Monson & Fredman, 2012), which includes a significant other in PTSD treatment, may capitalize on how reporting a problem with family members or significant others can help to increase treatment completion. Veterans with comorbid depression began and ended treatment with greater symptom severity than veterans without depression, suggesting the need to modify the length, frequency, or content of EBPs for PTSD to address the treatment needs of these veterans.

Many of the questions raised by this study could be addressed through qualitative work. For example, interviewing veterans when they first come to the VA seeking treatment about their perceptions of what symptoms they find the most problematic and what type of treatment they feel would improve their lives would increase understanding of why veterans may accept or decline the

treatments offered to them. Relatedly, interviewing veterans about the reasons why they have stopped attending treatment would provide invaluable information that can be used to improve future interventions.

Limitations

Of the study. The sample consisted of veterans who presented for care at the VA; as such, it is not clear if these results can generalize to veterans seeking treatment outside of the VA. Further, this study was restricted to younger, returning combat veterans, making it difficult to know how these results would generalize to a full range of veterans from different eras.

By design, the groups in this study were non-randomized, which increases the risk of bias. Relatedly, as this study is a post-hoc review of medical records, causality cannot be inferred from these results. With respect to measurement, using data extracted from patient medical records is subject to provider accuracy and validity of patient report. Some items of interest were not gathered consistently during intake interviews, preventing extraction (e.g., information regarding children at home). It is possible that some variables that were gathered from the intake may have changed during the window of the study (e.g., distance to the VA, service connection level). Participating in EBP was verified through CPRS notes; however, provider fidelity to treatment protocols was not assessed, limiting information about how therapist adherence may have related to treatment outcome.

All veterans deemed appropriate were offered EBP in this clinic; however, the process that providers used to determine if veterans were appropriate for EBP is unknown. Relatedly, there were no self-report measures about pre-existing beliefs about treatment or treatment satisfaction; both of which have been previously associated with treatment choice and utilization (Angelo, Miller, Zoellner, & Feeny, 2008; Youngstrom, Feeny, Roy-Byrne, Mavissakalian, & Zoellner, 2013).

This study was exploratory in nature; as such, no correction for multiple comparisons was applied, which raised the possibility of type 1 error. It is important to conduct similar studies to replicate these findings. While this study utilized a large treatment-seeking sample, some of the utilization groups were small. Thus, we may have been underpowered to find differences in some analyses. Due to the low number of treatment completers, we were not adequately powered to run more complex statistical models.

Of the use of the Andersen Behavioral Model. Andersen's model has been criticized in the literature for not including a large enough focus on culture or social interaction (Guendelman, 1991; Portes, Kyle, & Eaton, 1992). Andersen has argued that culture and the society an individual interacts with is included in predisposing characteristics (Andersen, 1995); however, few studies have sought to include these elements in their investigations, including the current study. Ethnicity and race are gathered as part of standard demographic information, but this not the case for information about culture. It is unknown in this study how

veteran's culture may have impacted their use of treatment. Another criticism of the model is an overemphasis on evaluated need (which is measured more easily) and an under emphasis on perceived need (determined by health beliefs). This study was limited by a lack of information about veterans' beliefs about PTSD and EBP for PTSD. Further, some variables of interest in this study did not fit clearly in this model; for example, reporting problems with family members could be considered a predisposing characteristic or a need factor depending on how it was measured.

Conclusion

This study examined a variety of factors to understand how they relate to treatment utilization, completion, and symptom improvement among treatment seeking veterans with PTSD. Use of the Andersen Behavioral Model allowed for focus of how enabling resources, in addition to predisposing characteristics and need factors, relate to how veterans both utilize and benefit from EBP. This approach replicated and extended previous working looking at the use of EBP among combat veterans with PTSD. We found that enabling resources and need factors were related to utilization, completion, and symptom improvement. These results are relevant to improving veteran treatment outcomes because enabling resources and need factors are modifiable targets that can be the focus of interventions. Future work seeking to better understand if a causal relationship exists between these variables and treatment engagement is the next step to better inform if modification will lead to improved EBP utilization and completion.

FIGURES AND TABLES

Figure 1. Behavioral Model of Health Care Utilization (Andersen, 1995)

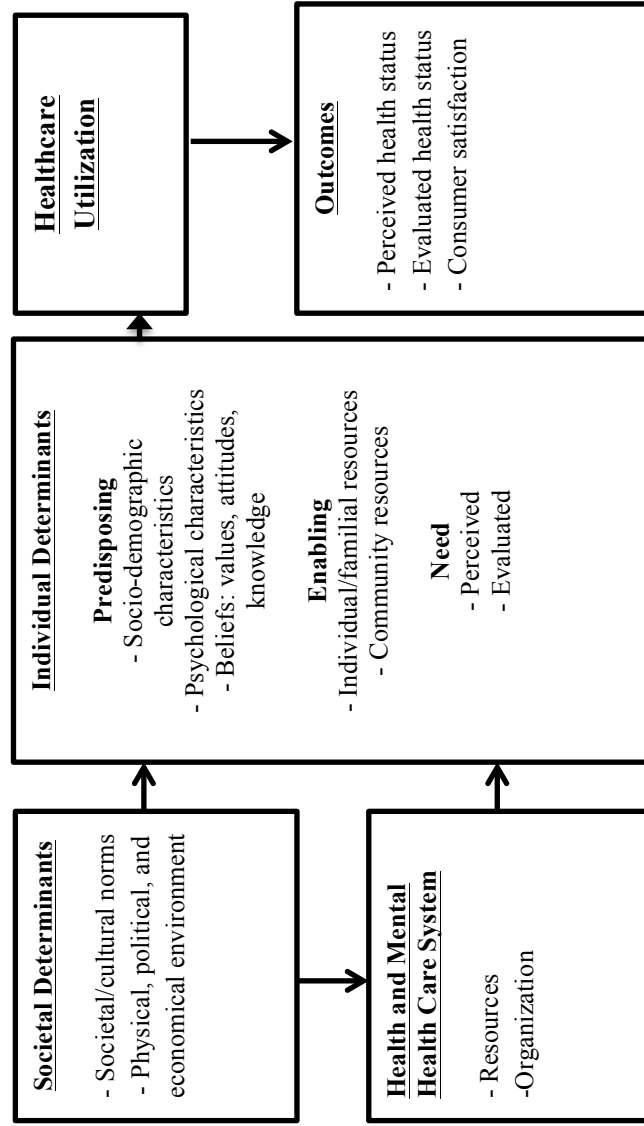


Figure 2. Proposed model for current study

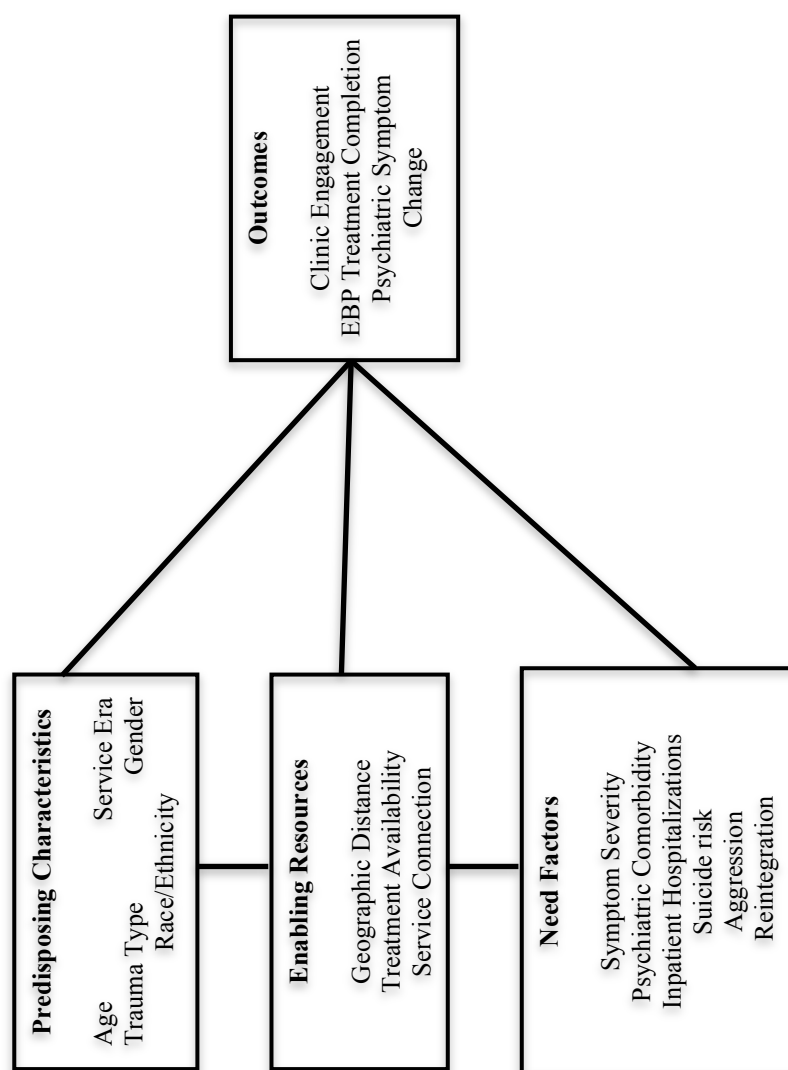
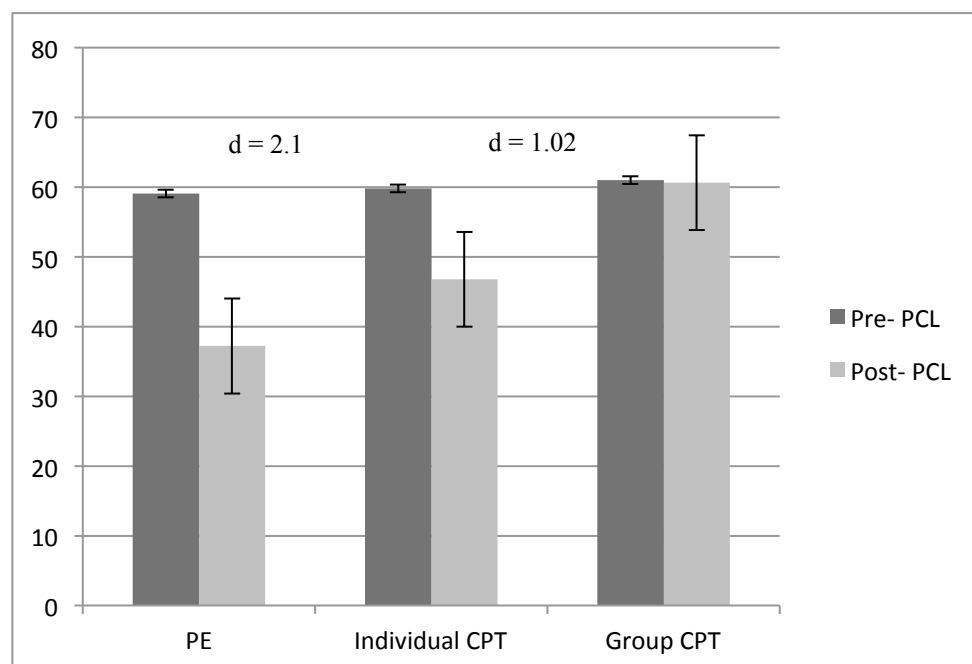


Figure 3. Pre- and post-treatment comparisons between PE, Individual CPT, and Group CPT



Note. PE = Prolonged exposure, CPT = cognitive processing therapy, PCL = posttraumatic stress disorder checklist.

Table 1. Results from Previous Psychotherapy Utilization Studies under Andersen’s Model

	<u>Utilization</u>			<u>Completion</u>		
	Non-Veterans	Non-OOO Veterans	OOO Veterans	Non-Veterans	Non-OOO Veterans	OOO Veterans
Predisposing Characteristics						
Age	-	+/-	+/-	+	+	+
Male Gender	-	+/-	+	-	-	-
Minority	-	-	-	**	-	+/-
Race/Ethnicity	n/a	+	+/-	n/a	+	+/-
Service Era	+	+	+	+	+	+
Trauma Severity	+	+	+	+	+	+
Enabling Resources						
Geographic Distance	-	**	-	**	**	**
Employment	-	-	+	**	**	+
Service Connection	n/a	+	+	n/a	**	+/-
Need Factors						
PTSD and MDD Symptom Severity	+	+	+	-	-	-
Psychiatric Comorbidity	+	+	+	-	-	-

Note. OOO = OEF/OIF/OND Veterans; + positive relationship; - negative relationship; +/- mixed results with positive and negative relationships reported; ** no studies found.

Table 2. *Demographics and Between Group Comparisons*

	Tx Decliners (n = 66)	Meds Only (n = 77)	EBP Dropouts (n = 44)	EBP Completers (n = 38)	High Utilizers (n = 15)	Non-EBP Tx (n = 71)	Between Group Comparisons
Predisposing Characteristics							
Age, m (SD)	31.79 (6.84)	32.27 (8.27)	32.96 (8.35)	35.69 (8.3)	36.13 (9.46)	32.83 (8.39)	F(5, 303) = 1.68, p = .14
Male (n, %)	63, 95.5	71, 92.2	40, 90.1	31, 86.1	15, 100	67, 94.4	$\chi^2 = 4.85$, df = 5, p = .43
Caucasian (n, %)	38, 57.6	53, 68.8	23, 52.23	25, 65.79	7, 46.67	35, 49.3	$\chi^2 = 34.38$, df = 35, p = .50
African American (n, %)	13, 19.7	13, 16.88	11, 25	2, 5.26	3, 20	13, 18.3	
Asian (n, %)	7, 10.61	5, 64.94	3, 6.82	5, 13.16	4, 26.67	8, 11.27	
Hispanic (n, %)	13, 19.7	16, 20.78	9, 20.45	3, 7.89	4, 26.67	35.21	$\chi^2 = 13.4$, df = 10, p = .20
MST (n, %)^a	2, 4.65	2, 5	3, 13.64	2, 7.4	2, 22.22	2, 4.4	$\chi^2 = 4.61$, df = 5, p = .47
Enabling Resources							
Distance to VA, miles (SD)	27.01 (18.2)	22.5 (15.64)	20.19 (8.89)	19.94 (11.93)	21.86 (2.74)	29.1 (25.77)*	F(5, 251) = 2.10, p = .065
GI Bill (n, %)*	33, 54.1	26, 35.62	20, 47.62	12, 33.33	1, 6.67*	28, 42.24	$\chi^2 = 14.21$, df = 5, p = .014
Service Connection-total, m (SD)	21.23 (28.6)	34.52 (35.24)	28.65 (33.79)	34 (29.33)	37.33 (34.74)	31.67 (34.98)	F(5, 277) = 1.36, p = .24
Service Connection-PTSD, m (SD)	4.74 (15.25)	13.61 (22.29)	11.05 (23.11)	12.06 (20.42)	13.33 (25.26)	15.15 (24.57)	F(5, 276) = 1.64, p = .15

Table 2. *Demographics and Between Group Comparisons (continued)*

	Tx Decliners (n = 66)	Meds Only (n = 77)	EBP Dropouts (n = 44)	EBP Completers (n = 38)	High Utilizers (n = 15)	Non-EBP Tx (n = 71)	Between Group Comparisons
Need Factors							
PCL, m (SD)	62.47 (11.48)	65.22 (12.99)	61.79 (13.18)	59.59 (12.56)	64.5 (10.37)	60.64 (15.34)	F(5, 284) = 1.30, p = .26
PHQ-9, m (SD)	15.1 (5.36)	15.96 (6.13)	14.37 (5.94)	14.37 (5.61)	16.85 (6.96)	14.71 (6.64)	F(5, 284) = .80, p = .55
Comorbid Dx's							
MDD (n, %)	28, 44.44	41, 53.25	26, 60.47	18, 51.43	11, 73.33	37, 52.11	$\chi^2 = 5.36$, df = 5, p = .37
AUD (n, %)	16, 24.62	24, 31.58	10, 23.81	7, 20.59	8, 53.33	27, 38.57	$\chi^2 = 9.41$, df = 5, p = .09
SUD (n, %)	7, 10.77	8, 10.67	2, 4.65	7, 20	3, 20	10, 14.08	$\chi^2 = 5.66$, df = 5, p = .34
Previous Psychologist	20, 34.48	36, 48.65	18, 43.90	21, 58.33	8, 52.33	31, 44.93	$\chi^2 = 5.94$, df = 5, p = .31
Psychiatrist	17, 29.31	52, 70.27	27, 65.85	22, 61.11	8, 52.33	40, 59.70	$\chi^2 = 25.31$, df = 5, p < .001
Prior Inpatient Hospitalizations	3, 5.45	10, 14.49	5, 13.51	3, 8.82	4, 26.67	13, 20.31	$\chi^2 = 8.29$, df = 5, p = .14
Suicidality Risk (n, %)	18, 33.33	28, 40.58	12, 32.43	11, 32.35	6, 40	30, 47.62	$\chi^2 = 4.074$, df = 5, p = .54
Total Aggression, m (SD)	23 (24.65)	28.95 (27.51)	19.21 (17.05)	24.9 (23.37)	40.67 (43.32)	25.4 (28.82)	F(5, 149) = .64, p = .67
Verbal Aggression, m (SD)	11.6 (10.83)	12.28 (10.20)	8.21 (6.82)	10.48 (9.55)	13 (11.14)	9.94 (9.36)	F(5, 152) = .59, p = .71
Physical Aggression (Objects), m (SD)	7.43 (9.52)	7.58 (8.55)	7.32 (9.37)	7.62 (9.25)	11.33 (13.32)	7.16 (10.37)	F(5, 154) = .11, p = .99

Table 2. *Demographics and Between Group Comparisons (continued)*

	Tx Decliners (n = 66)	Meds Only (n = 77)	EBP Dropouts (n = 44)	EBP Completers (n = 38)	High Utilizers (n = 15)	Non-EBP Tx (n = 71)	Between Group Comparisons
Physical Aggression (Others), m (SD)	2 (6.64)	4.44 (7.97)	1.75 (2.99)	1.88 (5.34)	3.75 (7.5)	3.49 (7.07)	F(5, 164) = .91, p = .48
Physical Aggression (self), m (SD)	1.95 (4.56)	5.10 (8.22)	1.84 (3.29)	3.55 (4.72)	11.33 (11.02)*	4.32 (8.35)	F(5, 156) = 2.04, p = .076
Reintegration, m (SD)	52.11 (12.79)	51.62 (14.8)	44.87 (13.05)	49.71 (13.91)	49 (18.52)	50.68 (15.57)	F(5, 125) = .63, p = .68
Problems with							
Anger (n, %)	22, 36.67	39, 52.7	17, 40.48	21, 56.76	9, 60	32, 47.06	$\chi^2 = 6.67$, df = 5, p = .25
Sleep (n, %)	35, 58.33	47, 63.51	22, 52.38	17, 45.95	11, 73.33	33, 48.53	$\chi^2 = 6.92$, df = 5, p = .28
Work (n, %)	5, 8.33	12, 16.22	6, 14.29	3, 8.10	2, 13.33	9, 13.24	$\chi^2 = 2.71$, df = 5, p = .75
Family/Significant Other (n, %)	25, 41.67	23, 31.08	17, 40.48	7, 18.92	8, 53.33*	20, 29.41	$\chi^2 = 9.55$, df = 5, p = .089

Note. ^a = data only available for 199 Veterans, * = significantly different utilization group, Tx = treatment, EBP = evidence-based psychotherapy, Dxs = diagnosis, m = mean, SD = standard deviation, PCL = posttraumatic stress disorder checklist, PHQ-9 = patient health questionnaire.

Table 3. *Psychotherapy Utilization*

	EBP Dropouts (n = 44)	EBP Completers (n = 38)	Between EBP Group Comparisons	High Tx Utilizers (n = 15)	Non-EBP Tx (n = 71)	Between 4 Groups Comparisons
Number of sessions, mean (SD)	6.47 (4.82)	16.08 (8.57)	$t(80) = -6.4$, $p < .001$	28.47 (8.4)*	6.51 (4.93)	$F(3, 164) = 67.59$, $p < .001$
Individual Sessions, mean (SD)	3.87 (4.55)	9.95 (7.37)	$t(80) = -4.57$, $p < .001$	8.8 (10.1)	3.37 (4.31)	$F(3, 164) = 13.06$, $p < .001$
Group Sessions, mean (SD)	2.6 (3.93)	6.14 (9.14)	$t(80) = -2.35$, $p = .021$	19.67 (10.12)*	3.31 (4.29)	$F(3, 164) = 31.82$, $p < .001$
PE (n, %)	14, 50	14, 50		--	--	--
Individual CPT (n, %)	14, 50	14, 50	$\chi^2 = 2.12$, df = 4,	--	--	--
Group CPT (n, %)	15, 51.72	13, 44.83	$p = .71$	--	--	--

Note. * = significantly different utilization group in 4-way analysis.

Table 4. *Final Logistic Regression with Significant Predictors*

	OR	S.E.	95% CI	Sig
Step 1.				
SO/Family	.26	.54	.091, .76	.01
Research Study	6.08	.63	1.78, 20.78	.004
SUD Dx	5.57	.84	1.007, 28.84	.04
Step 2.				
SO/Family	.28	.62	.083, .94	.04
Research Study	6.74	.67	1.81, 25.08	.004
SUD Dx	6.19	.89	1.008, 35.24	.04

Note. $\chi^2 = 20.8$, $df = 3$, $p < .001$, Cox & Snell $R^2 = .24$.

Table 5. *Repeated Measures ANOVA for PTSD Symptom Change Following EBP*

	Mean PCL Difference (cohen's D)	F (p)
Completers	-12.63	5.52 (.02)
Treatment Format		6.91 (.004)
PE	-21.9 (2.1)	
Individual CPT	-13.08 (1.02)	
Group CPT	-0.37	
Comorbid MDD	-0.58	4.43 (.04)
GI Bill	-6.14	5.76 (.02)
Problems with Sleep	-5.66	8.51 (.005)
Problems with Work	-10.04	4.56 (.04)

Note. PCL = posttraumatic stress disorder checklist, PE = prolonged exposure, CPT = cognitive processing therapy, MDD = major depressive disorder.

Appendix I. Coding Manual

Consent Date

Enter date of consent note

Zip Code

From mailing address: enter as string variable

Calculate miles from VA (La Jolla-3350 La Jolla Village Dr. or Mission Valley-8810 Rio San Diego) depending on where services were received) using google maps (e.g., 90120 = 19 miles from La Jolla VA → Enter **19**)

Service Connection Rating

Service_Connection_total_current: Enter total percentage; **50** for 50%

Service_Connection_PTSD_current: Enter PTSD percentage; **50** for 50%

Service_Connection_total_intake: enter total percentage from intake note

Service_Connection_PTSD_intake: enter PTSD percentage from intake note

Admission status

****if Veteran was admitted to 2 south (inpatient), 2 west (sarrrp; residential); ASPIRE/3-RRP (dom)**

0 = no record of admit; 1 = admitted to 2 south; 2 = admitted to 2 west;

3 = admitted to ASPIRE

Admission length of stay = enter days (e.g., 105 days = 105)

Previously Attended Mental Health Treatment

Previous Psychiatrist Appointments: 0 = no, 1 = yes

Previous Psychology Appointments: 0 = no, 1 = yes

Presenting Compliant/Referral

Anger: 0 = no, 1 = yes

Sleep: 0 = no, 1 = yes

Family/GF/Wife: 0 = no, 1 = yes

Work Problems: 0 = no, 1 = yes

Student: 0 = no, 1 = yes

MST: 0 = no, 1 = yes

Source: 0 = primary care, 1 = self, 2 = psychiatry, 3 = social work, 4 =
 PEC
 # of Days from Consult to 1st appointment: enter number of days
 # of Days from Intake/Orientation to start of treatment: enter number of
 days

Past Psychiatric History

Reports history of previous suicide attempts: 0 = no, 1 = yes

Military History

MOS: enter name of MOS here

Number of Deployments: enter total number

Total number of months spent deployed: enter total number of months

Treatment- Interest and/or outside referrals

Veteran report interest in receiving tx at intake: 0 = no, 1 = yes

Veteran recommended to engage in tx at intake: 0 = no, 1 = yes

Veterans referred to Vet center: 0 = no, 1 = yes

EBP during Dissertation Window (1 year from consent date)

Start of therapy: enter date

End of therapy: enter date

of sessions: enter total number of psychotherapy sessions in 1 year
 period

of group psychotherapy sessions: enter total number of group
 psychotherapy sessions in 1 year period

of individual psychotherapy sessions: enter total number of individual
 psychotherapy sessions in 1
 year period

of psychoeducational group sessions: enter total number of
 psychoeducation group sessions (e.g.,

PTSD skills group)

of missed appointments: enter total number

EBPs – Session by Session

Session_1_Provider: 1 = psychology trainee (e.g., intern, practicum student), 2 = psychologist, 3 = social worker

Session_1_PrimaryDx: enter primary diagnosis associated with tx session

Session_1_SecondaryDx_a: enter secondary dx

Session_1_SecondaryDx_b: enter secondary dx

Session_1_SecondaryDx_c: enter secondary dx

Session_1_SecondaryDx_d: enter secondary dx

Session_1_TxType: 0 = supportive, 1 = PE, 2 = CPT, 3 = seeking safety, 4 = ACT

Session_1_Tx_Format: 0 = individual, 1 = group

Session_1_PCL: enter PCL score

Session_1_PHQ9: enter PHQ-9 score

Post_Treatment_PCL: enter PCL score

Post_Treatment_PHQ-9: enter PHQ-9 score

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