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Timing of Evidence-Based Psychotherapy for Posttraumatic Stress Disorder Initiation among Iraq and Afghanistan War Veterans in the Veterans Health Administration

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Abstract

Objective—Cognitive Processing Therapy (CPT) and Prolonged Exposure Therapy (PE) were widely disseminated to treat posttraumatic stress disorder (PTSD) in the Veterans Health Administration (VHA). However, few Iraq and Afghanistan war veterans (OEF/OIF/OND) diagnosed with PTSD have received CPT/PE and many initiate CPT/PE after substantial delay. Veterans who do not initiate CPT/PE or initiate CPT/PE after delay may have poorer treatment outcomes. This study aimed to identify predictors of CPT/PE initiation and timing.

Methods—Participants included OEF/OIF/OND veterans diagnosed with PTSD who received psychotherapy between 2001–2017 in the VHA ($n=265,566$). Logistic regression analysis was utilized to predict initiating CPT/PE (vs. no CPT/PE). Multinomial logistic regression analysis was utilized to predict initiating “early CPT/PE” (<1 year after first mental health visit) vs. delayed or not initiating. Analyzed predictors included demographic, military, and clinical complexity variables (e.g., comorbidities, reported military sexual trauma [MST] history).

Results—78% of veterans did not initiate CPT/PE, with 7% initiating early and 15% initiating delayed CPT/PE. Reported MST history (OR=1.45, CI₉₅:1.39–1.51) and history of suicidal ideation/attempt (OR=1.42, CI₉₅:1.38–1.46) were strong predictors of CPT/PE initiation vs. no CPT/PE. Comorbid pain (RRR=1.35, CI₉₅:1.30–1.42) and depressive disorders (RRR=1.37, CI₉₅:1.32–1.43) were associated with increased likelihood of delayed vs. early CPT/PE.

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Conclusions—Most veterans in our study did not initiate CPT/PE. Generally, clinical complexity variables increased likelihood of initiating CPT/PE and initiating CPT/PE more than one year after first mental health visit. Additional research is needed to understand whether CPT/PE delay results from receipt of alternative intervention due to clinical complexity variables.

Keywords

Posttraumatic stress disorder; Veteran; Cognitive Processing Therapy; Prolonged Exposure Therapy; Evidence-based Psychotherapy

Posttraumatic stress disorder (PTSD) is one of the most common mental health diagnoses among Iraq and Afghanistan war veterans (i.e., Operation Enduring Freedom [OEF], Operation Iraqi Freedom [OIF], Operation New Dawn [OND]), affecting approximately 23% of OEF/OIF/OND veterans (Fulton et al., 2015). The Veterans Health Administration (VHA) has widely disseminated two empirically supported treatments, cognitive processing therapy (CPT) and prolonged exposure therapy (PE), to effectively treat PTSD (Karlin & Cross, 2014). These treatments are efficacious in randomized clinical trials with veterans (Monson et al., 2006; Schnurr et al., 2007) and effective in reviews of VHA clinical care (Rutt, Oehlert, Krieschok, & Lichtenberg, 2018). Despite this widespread effort to disseminate CPT/PE, these treatments remain underutilized in practice. Only approximately 20% of OEF/OIF/OND veterans in VHA care diagnosed with PTSD have initiated (i.e., received at least one session) CPT/PE (Maguen et al., 2018). Even among veterans who initiate PTSD treatment, there is often a substantial delay between first mental health visit and CPT/PE initiation (Maguen, Madden, Cohen, Bertenthal, & Seal, 2012). Decisions regarding whether to initiate CPT/PE or delay CPT/PE initiation have multiple potential consequences, including risk of poorer treatment outcomes (Maguen, Madden, Neylan, Cohen, & Seal, 2014), delaying symptom improvement, and reinforcing that the veteran cannot tolerate CPT/PE (Resick, Monson, & Chard, 2017). Therefore, it is important to identify factors that affect this decision-making process. Many variables may influence decisions regarding treatment initiation and timing, including clinical complexity, concerns regarding treatment readiness, and patient preferences.

Psychiatric conditions that are frequently comorbid with PTSD likely affect the timing of CPT/PE initiation. Both the CPT and PE treatment manuals have identified certain psychiatric comorbidities as reasons to consider delay, but do not state that CPT/PE are contraindicated based on these comorbidities. Specifically, CPT suggests considering delay for patients with “unmedicated mania or psychosis,” a depressive disorder that greatly affects functioning, substance use disorder (SUD) that requires “medical detoxification,” an “imminent plan or intention to harm self or others,” and “potentially lethal self-harm” (p. 34, 41–44; Resick et al., 2017). In PE, stabilization is recommended for “imminent threat of suicidal or homicidal behavior,” “serious self-injurious behavior,” “current psychosis,” “current high risk of being assaulted,” and “insufficient memory” of the trauma (p. 24–25; Foa, Hembree, & Rothbaum, 2007). In clinical practice, providers’ criteria for treatment selection may vary from manual recommendations. Providers have reported that other comorbidities (e.g., traumatic brain injury [TBI]) and clinical complexity variables (e.g., any

history of suicidal ideation/attempts) influence their decisions regarding CPT/PE timing and initiation (Osei-Bonsu et al., 2017; Raza & Hologan, 2015; Wolf et al., 2015).

Readiness for treatment is also frequently discussed as a rationale to delay or not begin treatment. The CPT manual recommends one to three information gathering sessions prior to initiating CPT (Resick et al., 2017), and the PE manual recommends a thorough assessment and building a solid foundation before beginning PE (Foa et al., 2007). Readiness may also refer to the need for psychotherapy prior to CPT/PE initiation, including development of coping/distress tolerance skills (Lu, Plagge, Marsiglio, & Dobscha, 2016; Osei-Bonsu et al., 2017; Sayer et al., 2017; Zubkoff, Carpenter-Song, Shiner, Ronconi, & Watts, 2016) or building a sufficient therapeutic alliance (Doran, O'Shea, & Harpaz-Rotem, 2019; Lu et al., 2016; Osei-Bonsu et al., 2017; Sayer et al., 2017). Veterans echo this rationale, reporting concern about their ability to tolerate CPT/PE and lack of familiarity with their providers as reasons to delay or never initiate CPT/PE (Hundt et al., 2018; Lu et al., 2016; Stecker, Shiner, Watts, Jones, & Conner, 2013). Certain veterans, such as those with a reported history of military sexual trauma (MST), may distrust the VHA and building trust in the VHA institution may result in delayed initiation of CPT/PE (Burnam et al., 2009; Holliday & Monteith, 2019). Further, veterans may choose to begin pharmacotherapy for PTSD to reduce symptoms before CPT/PE or instead of CPT/PE.

Existing research on CPT/PE decision-making has been limited to regional/local investigations (e.g. Shiner et al., 2018), reliance specific note templates for documenting CPT/PE (e.g., Rosen et al., 2019; Sripada, Pfeiffer, Ganoczy, & Bohnert, 2018), and provider/veteran surveys that may not accurately reflect behavior (e.g., Hundt et al., 2018; Osei-Bonsu et al., 2017; Raza & Hologan, 2015). Importantly, these and other studies of initiation have mostly been restricted to the dichotomous outcome of whether a veteran initiated CPT/PE. Considering the complexity of this decision-making process and the possible effects on treatment outcome, it is also important to identify which veterans are more likely to initiate CPT/PE after a delay. The goal of the current study was to determine how clinical complexity (e.g., comorbidities, reported MST history), military, and demographic factors affect CPT/PE initiation and timing in VHA among OEF/OIF/OND veterans who received at least one PTSD-related psychotherapy session. Natural language processing (NLP) was used to determine provision of CPT/PE, an automated strategy for information extraction that is more comprehensive than note templates and can be applied on a larger-scale than manual chart review (Maguen et al., 2018). It was hypothesized that clinical complexity would be associated with decreased likelihood of receiving CPT/PE and increased likelihood of delayed CPT/PE initiation.

Methods

Participants

OEF/OIF/OND veterans with a post-deployment PTSD diagnosis at one of 1,250 VHA facilities between October 2001 and September 2015 ($N=308,556$) were retrospectively identified using the VHA medical record. Only data from veterans who had an initial post-deployment mental health visit and at least one post-deployment psychotherapy procedure code that was linked to a note with PTSD as the primary or secondary diagnosis by June

2017 were utilized for analysis ($n=265,566$). Using these guidelines, veterans had at least two years following PTSD diagnosis to initiate CPT/PE, and veterans were known to have initiated psychotherapy. Methods were approved by the local institutional review board and human research protection program.

Data Sources

Demographic variables (age, gender, race, ethnicity, marital status, education), reported MST history, encounter data, diagnostic information and pharmacy data were collected from the VA Corporate Data Warehouse, a national repository of VHA clinical and administrative data (Fihn et al., 2014). Military service information (service branch, service component, military rank, number of deployments) was collected from the OEF/OIF/OND Roster.

PTSD diagnosis and comorbidities were defined using ICD-9 codes documented prior to September 2015. PTSD diagnosis and comorbid diagnoses of schizophrenia, other psychotic spectrum disorder, bipolar disorder, depressive disorder, pain disorder, or TBI were coded when two or more outpatient encounters, one inpatient encounter, or one encounter with a VHA reimbursed provider documented that diagnosis during the study period (Frayne et al., 2010; Gravelly et al., 2011). Comorbid SUD was coded when two or more outpatient encounters, one inpatient encounter, or one encounter with a VHA reimbursed provider documented alcohol abuse, alcohol dependence, drug abuse, and/or drug dependence during the study period. History of suicidal ideation and/or attempt was coded based on a single diagnosis at any setting. History of smoking within the year before first mental health visit was determined based on VHA specialty codes (i.e., stop codes), ICD codes, and current procedural terminology codes for medications for smoking cessation and nicotine use.

Pharmacy data was utilized to identify prescription of medications recommended for treating PTSD in the year before or after their first mental health visit. Selection of these medications was based on the VHA PTSD treatment guidelines in place for most of the treatment period (Departments of Veterans Affairs and Defense [DoD/VA], 2010), including selective serotonin reuptake inhibitors (citalopram, escitalopram, fluoxetine, fluvoxamine, paroxetine, sertraline), serotonin-norepinephrine reuptake inhibitors (desvenlafaxine, duloxetine, venlafaxine), tricyclic antidepressants (amitriptyline, imipramine), mirtazapine, and prazosin. Nefazodone and phenelzine were not included because these were found to be very rarely prescribed to veterans with PTSD in VHA clinical practice (Krystal et al., 2017). During subsequent revisions to these guidelines, some previously recommended medications are longer recommended (e.g., mirtazapine) and some are now suggested against (e.g., citalopram; DoD/VA, 2017).

CPT/PE initiation was identified using clinical notes associated with psychotherapy visits. Using NLP, machine-learning algorithms were developed to classify clinical note text as: individual CPT, group CPT, PE, other psychotherapy, or not psychotherapy. Randomly-selected clinical notes were first classified by annotators to establish receipt of CPT or PE. Classification accuracy of the algorithm was strong overall (0.920) as well as for CPT (0.965 for individual and 0.968 for group) and PE (0.991) (see Maguen et al., 2018 for additional details). Veterans who received at least one session of individual CPT, group CPT, or PE during the study period were coded as initiating CPT/PE. Veterans whose first CPT/PE

session was within one year of their first mental health visit were classified as initiating an “early CPT/PE,” whereas those whose first CPT/PE session was more than one year after their first mental health visit were classified as initiating a “delayed CPT/PE” (Maguen et al., 2012; 2014).

Statistical Analysis

Demographic characteristics, military service characteristics, clinical complexity variables, and prescription of medications recommended to treat PTSD were compared between veterans who did not initiate CPT/PE, initiated early CPT/PE, and initiated delayed CPT/PE, as well as between veterans who did and did not initiate CPT/PE. Statistically significant differences between groups were identified using Kruskal Wallis or Mann-Whitney tests for continuous variables and Chi-Square or Fisher’s Exact tests for categorical variables.

A logistic regression was fit to compare factors associated with initiating versus not initiating CPT/PE. Predictors included demographic characteristics, military characteristics, comorbidities, reported MST history, history of smoking, prescription of medication recommended to treat PTSD, and year of first mental health visit. Additionally, a multinomial logistic regression was fit to assess predictors of either not initiating CPT/PE (vs. early CPT/PE) or initiating a delayed (vs. early CPT/PE) using the same predictors. Models were fit after testing multicollinearity, which required the exclusion of education and ethnicity as potential predictors. The statistical significance threshold was set to $p < 0.001$ due to the large sample size. Analyses were completed using SAS 9.4 (SAS Institute, 2013) and StataMP 15 (Statacorp, 2017).

Results

Differences in CPT/PE Initiation Groups

In this sample, 19,755 (7.4%) veterans initiated early CPT/PE (i.e., within one year), 40,879 (15.4%) initiated delayed CPT/PE (i.e., after more than a year), and 204,932 (77.2%) did not initiate CPT/PE. These groups significantly differed regarding all measured characteristics (Table 1). Comorbidities were prevalent throughout the sample, with pain disorders (74.8%) and depressive disorders (63.9%) representing the most frequently diagnosed comorbidities (Tables 2 & 3). On average, veterans were diagnosed with 2.5 ($SD=1.8$) comorbidities, and 68.3% veterans were diagnosed with two or more comorbidities. Veterans in the delayed CPT/PE group more frequently had two or more comorbidities compared to the no CPT/PE and early CPT/PE groups. Further, veterans in the delayed CPT/PE group had higher rates of almost every measured comorbidity than those in the no CPT/PE and early CPT/PE groups.

Factors Associated with CPT/PE Initiation

Logistic regression results are shown in Table 4. Clinical complexity variables generally increased odds of CPT/PE initiation, with the greatest increase observed in veterans with a reported MST history (OR=1.45, CI_{95} :1.39–1.51). However, veterans with schizophrenia (OR=0.61, CI_{95} :0.56–0.67) and a history of smoking (OR=0.88, CI_{95} :0.85–0.91) had lower odds of initiating CPT/PE. Increased odds of CPT/PE initiation were observed among older veterans, females, officers, members of the National Guard, reservists, and veterans with

multiple deployments. Never married or divorced/separated/single veterans were less likely to initiate CPT/PE. Veterans whose first mental health visit was between 2006–2017 were more likely to initiate CPT/PE compared to veterans whose first mental health visit was between 2001–2004.

Factors Associated with CPT/PE Timing

Using multinomial logistic regression, factors were identified which discriminated between risk of not initiating CPT/PE versus initiating early CPT/PE (see Table 5). Regarding comorbidities, veterans with schizophrenia, bipolar disorder, and a history of smoking were at greater relative risk of not initiating CPT/PE versus initiating early CPT/PE. Veterans who took medications recommended to treat PTSD in year before or after their first mental health visit and those with a reported history of MST, comorbid TBI, comorbid depressive disorder, comorbid pain disorder, or a history of suicidal ideation or attempt were more likely to initiate early CPT/PE versus not initiating CPT/PE. Regarding demographic and military factors, older veterans, females, officers, reservists, and those with multiple deployments were more likely to initiate early CPT/PE versus not initiating CPT/PE. Divorced/separated/single veterans were at greater risk of not initiating CPT/PE versus early CPT/PE initiation. Compared to veterans whose first mental health visit was between 2001–2004, veterans whose first mental health visit was between 2006–2017 were more likely to initiate early CPT/PE than not initiate CPT/PE.

In the same multinomial logistic regression analysis, factors which discriminated between risk of initiating delayed versus early CPT/PE were identified (see Table 5). All comorbidities except schizophrenia, TBI, and other psychotic spectrum disorder were associated with increased risk of initiating delayed versus early CPT/PE, with the highest relative risk ratio in veterans with a depressive disorder (RRR=1.37, CI₉₅:1.32–1.43). Prescription of medication recommended to treat PTSD was associated with the lowest relative risk of delayed versus early CPT/PE initiation (RRR=0.56, CI₉₅:0.54–0.58). African Americans had increased relative risk of initiating delayed versus early CPT/PE. Older veterans, females, never married veterans, and officers were at reduced relative risk of delayed versus early CPT/PE initiation. Compared to veterans whose first mental health visit was between 2001–2004, veterans whose first mental health visit was between 2006–2017 were more likely to initiate early CPT/PE than delayed CPT/PE.

Discussion

Consistent with the multifaceted treatment decision-making process described in existing literature, many veteran-specific factors were predictive of CPT/PE initiation and timing in our national sample of OEF/OIF/OND veterans spanning over a decade. In general, the presence of clinical complexity factors (e.g., comorbidities, reported MST history, history of suicidal ideation/attempt) predicted initiating CPT/PE. Further, comorbidities were generally associated with increased likelihood of initiating CPT/PE more than one year after a veteran's first mental health visit. Results are consistent with manual recommendations that comorbidities should not preclude CPT/PE use (Foa et al., 2007; Resick et al., 2017) and consistent with providers' beliefs that veterans with certain clinical presentations may

benefit from delayed CPT/PE initiation (Osei-Bonsu et al., 2017; Raza & Hologan, 2015; Wolf et al., 2015; Zubkoff et al., 2016).

Except for schizophrenia comorbidity, veterans with comorbidities and other clinical complexity factors were more likely to initiate CPT/PE in our sample. Although there is very preliminary evidence that trauma-focused psychotherapies provide benefit to individuals diagnosed with psychotic spectrum disorders (Brand, McEnery, Rossell, Bendall, & Thomas, 2018), the finding that schizophrenia was associated with a reduced likelihood of initiating CPT/PE study is consistent with the manual recommendation to often exclude individuals with psychosis from CPT/PE (Foa et al., 2007; Resick et al., 2017). Among predictors of increased likelihood, reported MST history was associated with the greatest likelihood of initiating CPT/PE, which is particularly important considering MST is associated with poorer mental and physical health (Surís & Lind, 2008) and the established efficacy of CPT in treating MST-related PTSD (Surís, Link-Malcolm, Chard, Ahn, & North, 2013). This may reflect success in programs emphasizing screening, outreach, and appropriate mental health referrals for MST survivors who also meet criteria for PTSD (Office of Mental Health, 2008). Similarly, a history of suicidal ideation/attempt was associated with a greater likelihood of initiating CPT/PE, consistent with research supporting that CPT/PE can be implemented for veterans with elevated suicide risk (Bryan, 2016). CPT/PE have been shown to effectively reduce suicidal ideation (Bryan et al., 2016; Gradus, Suvak, Wisco, Marx, & Resick, 2013) and correlates of suicidal ideation/behavior (Holliday, Holder, Monteith, & Surís, 2018). It appears that veterans with more mental health concerns are more likely to receive CPT/PE, particularly when existing research supports that CPT/PE may effectively address this clinical complexity. Additionally, veterans diagnosed with both PTSD and other comorbidities may have more mental health appointments, providing more opportunities to be referred to CPT/PE.

While veterans with comorbidities were generally more likely to initiate CPT/PE, many comorbidities were also associated with a greater likelihood of initiating delayed versus early CPT/PE. On average, veterans were shown to attend 25 non-CPT/PE psychotherapy sessions in VHA prior to initiating CPT/PE (Maguen et al., 2018). It is possible that clinicians are providing empirically supported treatments that target these comorbid diagnoses or that address both PTSD and a comorbidity (e.g., Seeking Safety for SUD and PTSD; Najavits, 2002) during the time between first mental health visit and CPT/PE initiation. Specifically, comorbid pain and depressive disorders were associated with the greatest likelihood of initiating delayed versus early CPT/PE. In comparison to other comorbidities (e.g., depressive disorders, SUDs, TBI), less is known about how comorbid pain disorders influence PTSD treatment outcomes, how effective intervention for PTSD affects pain disorder symptoms, and how treatment of pain disorders affects PTSD symptoms. In fact, pain disorder comorbidity has not been discussed in the CPT/PE treatment manuals, provider surveys, or most previous investigations of CPT/PE initiation. Considering the high prevalence of comorbid pain and PTSD (Otis, Keane, & Kerns, 2003), it may be particularly important to understand the reasons for delayed initiation of CPT/PE and strategies for effective treatment sequencing among veterans with comorbid PTSD and pain disorders. Specific to comorbid PTSD and depressive disorders, it may be particularly important to understand reasons for delayed CPT/PE initiation and what (if any) treatment is

being provided during this delay, considering CPT/PE effectively treat depressive symptoms (Ronconi, Shiner, & Watts, 2015). Importantly, TBI comorbidity did not predict delayed CPT/PE in this study, inconsistent with a study with found that providers delay PE for veterans with TBI (Wolf et al., 2015). This result suggests that clinical complexity is not the only factor driving treatment decision making, and that specific diagnoses may uniquely motivate decisions to delay treatment. Providers may be more likely to treat comorbid TBI and PTSD concurrently, which is supported by a growing body of literature that suggests that CPT/PE are effective even among veterans with comorbid TBI (Ragsdale & Voss Horrell, 2016; Wolf et al., 2015).

Veterans whose first mental health visit occurred from 2006–2017 were more likely to receive early CPT/PE than delayed or no CPT/PE compared to veterans whose first mental health visit occurred from 2001–2004, indicating improvements in access following dissemination (Karlin & Cross, 2014). However, numerous demographic and military characteristics (e.g., gender, officer rank) were found to influence CPT/PE initiation and timing in this sample. While provider studies (Doran et al., 2019; Osei-Bonsu et al., 2017; Sayer et al., 2017) and the CPT/PE treatment manuals (Foa et al., 2007; Resick et al., 2017) have not reported that demographic and military characteristics influence decision making, this finding is consistent with some previous investigations of CPT/PE initiation (Bovin et al., 2018; Keller & Tuerk, 2016; Shiner et al., 2018; Sripada et al., 2018). Demographic (e.g., age, gender, race/ethnicity) may be associated with symptom presentation and/or severity, potentially influencing decisions to initiate CPT/PE (Koo et al., 2016; Magruder et al., 2004). Certain veterans, particularly male veterans, may have concerns with participating in psychotherapies such as CPT/PE which emphasize affective expression due to stigma associated with help-seeking behavior or fears of being perceived as weak (Lu et al., 2016; Possemato, Wray, Johnson, Webster, & Beehler, 2018). Compared to never married and divorced/separated veterans, married veterans may have increased flexibility (e.g., childcare arrangements, financial, transportation) to be able to attend specialized PTSD treatment such as CPT/PE, which may have more limited availability (Possemato et al., 2018).

Alternatively, partners of married veterans may encourage them to seek care, providing support to initiate CPT/PE (Bovin et al., 2018). It remains unclear why certain demographic and military groups are less likely to initiate CPT/PE and more likely to initiate delayed versus early CPT/PE. Additional research is needed to understand how demographic and military characteristics may affect treatment decision making.

The results of the study should also be interpreted within the context of its limitations. Data regarding whether veterans were offered CPT/PE, veterans' preferences regarding treatment, provision of alternative treatments for PTSD or comorbid conditions, and some service delivery variables that may influence veterans' ability to initiate CPT/PE (e.g. number of providers trained in CPT/PE at a site; Sayer et al., 2017) were not available for the current analysis. Although we were not able to use gold-standard assessment tools and needed to rely on clinicians' diagnoses, comorbidities were identified by the presence of two instances of a chart diagnosis, which has been shown to have moderate to strong agreement other typical strategies for diagnosis (Frayne et al., 2010; Gravely et al., 2011). Predictor variables were largely categorical, precluding investigation of how more nuanced measurements may have affected results (e.g., comorbidity severity, MST related to assault versus harassment,

specific medications). There may be benefit in future research examining identified predictors in a more nuanced way (e.g., specific medication, dose, duration of treatment, adequacy of treatment). Similarly, delayed initiation was defined based on precedent of one year; however, other treatment initiation cutoffs may exist that help to explain variability in timing. Delay was measured from first mental health visit, and it is possible that veterans were not diagnosed with PTSD or did not meet criteria for PTSD at the time of their first mental health visit. As delay was measured in days rather than in number of sessions, delayed initiation of CPT/PE may be caused by not attending treatment and/or attending psychotherapy other than CPT/PE. Generalizability of results is limited to OEF/OIF/OND veterans seeking VHA mental health care and may not reflect predictors of treatment initiation and timing among veterans of other eras and of veterans seeking care outside of the VHA. It is also possible that some veterans who were categorized as not receiving CPT/PE in VHA received CPT/PE outside of the VHA (Finley et al., 2018), before the study period, or after the study period. Future research should explore if predictors differ outside of VHA. Potential interactions between predictor variables were not explored in the current study, and predictors of initiation may vary based on the year a veteran entered mental health treatment or between subgroups of veterans.

Conclusions

CPT/PE initiation among OEF/OIF/OND veterans with a diagnosis of PTSD remains low despite widespread dissemination of treatments, and often those that begin CPT/PE do so after a substantial delay. In the current study, numerous demographic, military, and clinical complexity factors were found to affect CPT/PE initiation and timing. Veterans with comorbidities (e.g., pain disorders, depressive disorders) and other clinical complexities (e.g., reported MST history) were generally found to have a greater likelihood of initiating CPT/PE than not. Veterans with comorbidities (e.g., pain disorders, depressive disorders) generally also had a higher relative risk of initiating delayed CPT/PE (i.e., more than a year after first mental health visit). Demographic (e.g., race, gender) and military characteristics (e.g., rank) that predict CPT/PE initiation and timing may relate to differential access to care or differences in perceptions of trauma-focused PTSD treatment. While the specific reasons for why these factors affect CPT/PE initiation and delay are likely diverse and were not investigated directly in the current study, they point to specific areas for additional investigation to increase access to CPT/PE and/or facilitate effective treatment guidelines. Additional research is needed to understand the services offered to veterans who delay or never initiate CPT/PE, and how clinical, military, and demographic characteristics may influence what services are offered and accepted.

References

- Bovin MJ, Miller CJ, Koenig CJ, Lipschitz JM, Zamora KA, Wright PB, ... & Burgess JF (2018). Veterans' experiences initiating VA-based mental health care. *Psychological Services*. Available online ahead of print. doi:10.1037/ser0000233.
- Brand RM, McEnery C, Rossell S, Bendall S, & Thomas N (2018). Do trauma-focused psychological interventions have an effect on psychotic symptoms? A systematic review and meta-analysis. *Schizophrenia Research*, 195, 13–22. [PubMed: 28844432]

- Bryan CJ (2016). Treating PTSD within the context of heightened suicide risk. *Current Psychiatry Reports*, 18, 73. [PubMed: 27314245]
- Bryan CJ, Clemans TA, Hernandez AM, Mintz J, Peterson AL, Yarvis JS, ... & Resick PA (2016). Evaluating potential iatrogenic suicide risk in trauma-focused group cognitive behavioral therapy for the treatment of PTSD in active duty military personnel. *Depression and Anxiety*, 33, 549–557. [PubMed: 26636426]
- Burnam MA, Meredith LS, Tanielian T, & Jaycox LH (2009). Mental health care for Iraq and Afghanistan war veterans. *Health Affairs*, 28(3), 771–782. [PubMed: 19414886]
- Departments of Veterans Affairs and Defense (2010). VA/DoD Clinical Practice Guideline for the Management of Posttraumatic Stress Disorder. Washington D.C.
- Departments of Veterans Affairs and Defense (2017). VA/DoD Clinical Practice Guideline for the Management of Posttraumatic Stress Disorder. Washington D.C.
- Doran JM, O’Shea M, & Harpaz-Rotem I (2019). In their own words: Clinician experiences and challenges in administering evidence-based treatments for PTSD in the veterans health administration. *Psychiatric Quarterly*, 90(1), 11–27. [PubMed: 30209719]
- Fihn SD, Francis J, Clancy C, Nielson C, Nelson K, Rumsfeld J, ... & Graham GL (2014). Insights from advanced analytics at the veterans health administration. *Health Affairs*, 33(7), 1203–1211. [PubMed: 25006147]
- Finley EP, Noel PH, Lee S, Haro E, Garcia H, Rosen CS, ... & Pugh JA (2018). Psychotherapy practices for veterans with PTSD among community-based providers in Texas. *Psychological Services*, 15(4), 442–452. [PubMed: 28301173]
- Foa EB, Hembree EA, & Rothbaum BO (2007). *Prolonged Exposure Therapy for PTSD: Emotional Processing of Traumatic Experiences*. New York: Oxford University Press.
- Frayne SM, Miller DR, Sharkansky EJ, Jackson VW, Wang F, Halanych JH, ... & Keane TM (2010). Using administrative data to identify mental illness: What approach is best? *American Journal of Medical Quality*, 25(1), 42–50. [PubMed: 19855046]
- Fulton JJ, Calhoun PS, Wagner HR, Schry AR, Hair LP, Elbogen E, & Beckham JC (2015). The prevalence of posttraumatic stress disorder in operation enduring freedom/operation Iraqi freedom (OEF/OIF) veterans: a meta-analysis. *Journal of Anxiety Disorders*, 31, 98–107. [PubMed: 25768399]
- Gradus J, Suvak M, Wisco B, Marx B, & Resick P (2013). Treatment of posttraumatic stress disorder reduces suicidal ideation. *Depression & Anxiety*, 30, 1046–1053. [PubMed: 23636925]
- Gravely AA, Cutting A, Nugent S, Grill J, Carlson K, & Spont M (2011). Validity of PTSD diagnoses in VA administrative data: Comparison of VA administrative diagnoses to self-reported PTSD checklist scores. *Journal of Rehabilitation Research and Development*, 48(1), 21–30. [PubMed: 21328160]
- Holliday R, Holder N, Monteith LL, & Surís A (2018). Decreases in suicide cognitions after cognitive processing therapy among veterans with posttraumatic stress disorder due to military sexual trauma: A preliminary examination. *Journal of Nervous and Mental Disease*, 206(7), 575–578. [PubMed: 29905663]
- Holliday R & Monteith LL (2019). Seeking help for the health sequelae of military sexual trauma: A theory-driven model of the role of institutional betrayal. *Journal of Trauma and Dissociation*, 20(3), 340–356. [PubMed: 30714879]
- Hundt NE, Helm A, Smith TL, Lamkin J, Cully JA, & Stanley MA (2018). Failure to engage: A qualitative study of veterans who decline evidence-based psychotherapies for PTSD. *Psychological Services*, 15(4), 536–542. [PubMed: 29265843]
- Karlin BE, & Cross G (2014). From the laboratory to the therapy room: National dissemination and implementation of evidence-based psychotherapies in the U.S. department of veterans affairs health care system. *American Psychologist*, 69(1), 19–33. [PubMed: 24001035]
- Keller SM, & Tuerk PW (2016). Evidence-based psychotherapy (EBP) non-initiation among veterans offered an EBP for posttraumatic stress disorder. *Psychological Services*, 13(1), 42–48. [PubMed: 26654474]

- Koo KH, Hebenstreit CL, Madden E, & Maguen S (2016). PTSD detection and symptom presentation: Racial/ethnic differences by gender among veterans with PTSD returning from Iraq and Afghanistan. *Journal of Affective Disorders*, 189, 10–16. [PubMed: 26402342]
- Krystal JH, Davis LL, Neylan TC, Raskind MA, Schnurr PP, Stein MB, ... & Huang GD (2017). It is time to address the crisis in the pharmacotherapy of posttraumatic stress disorder: A consensus statement of the PTSD psychopharmacology working group. *Biological Psychiatry*, 82, e51–e59. [PubMed: 28454621]
- Lu MW, Plagge JM, Marsiglio MC, & Dobscha SK (2016). Clinician documentation on receipt of trauma-focused evidence-based psychotherapies in a VA PTSD clinic. *Journal of Behavioral Health Services & Research*, 43(1), 71–87. [PubMed: 24158464]
- Magruder K, Frueh B, Knapp R, Johnson M, Vaughan J, Carson T, ... & Hebert R (2004). PTSD symptoms, demographic characteristics, and functional status among veterans treated in VA primary care clinics. *Journal of Traumatic Stress*, 17, 293–301. [PubMed: 15462536]
- Maguen S, Madden E, Cohen BE, Bertenthal D, & Seal KH (2012). Time to treatment among veterans of conflicts in Iraq and Afghanistan with psychiatric diagnoses. *Psychiatric Services*, 63(12), 1206–1012. [PubMed: 23070131]
- Maguen S, Madden E, Neylan TC, Cohen BE, & Seal KH (2014). Timing of mental health treatment and PTSD symptom improvement among Iraq and Afghanistan veterans. *Psychiatric Services*, 65, 1414–1419. [PubMed: 25082217]
- Maguen S, Madden R, Patterson OV, DuVall SL, Goldstein LA, Burkman K, & Shiner B (2018). Measuring use of evidence based psychotherapy for posttraumatic stress disorder in a large national healthcare system. *Administration and Policy in Mental Health and Mental Health Services Research*, 45(4), 519–529. [PubMed: 29450781]
- Monson CM, Schnurr PP, Resick PA, Friedman MJ, Young-Xu Y, & Stevens SP (2006). Cognitive processing therapy for veterans with military-related posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology*, 74(5), 898–907. [PubMed: 17032094]
- Najavits LM (2002). *Seeking Safety: A Treatment Manual for PTSD and Substance Abuse*. New York, NY: Guilford Press.
- Office of Mental Health. (2008). *Uniform Mental Health Services in VA Medical Centers and Clinics*. Washington D.C.: Department of Veterans Affairs.
- Osei-Bonsu PE, Bolton RE, Stirman SW, Eisen SV, Herz L, & Pellowe ME (2017). Mental health providers' decision-making around the implementation of evidence-based treatment for PTSD. *Journal of Behavioral Health Services & Research*, 44(2), 213–223. [PubMed: 26743770]
- Otis JD, Keane TM, & Kerns R (2003). An examination of the relationship between chronic pain and post-traumatic stress disorder. *Journal of Rehabilitation Research and Development*, 40(5), 397–406. [PubMed: 15080224]
- Possemato K, Wray LO, Johnson E, Webster B, & Beehler GP (2018). Facilitators and barriers to seeking mental health care among primary care veterans with posttraumatic stress disorder. *Journal of Traumatic Stress*, 31(5), 742–752. [PubMed: 30338576]
- Ragsdale KA, & Voss Horrell SC (2016). Effectiveness of prolonged exposure and cognitive processing therapy for U.S. veterans with a history of traumatic brain injury. *Journal of Traumatic Stress*, 29, 474–477. [PubMed: 27681034]
- Raza GT, & Hologan DR (2015). Clinical treatment selection for posttraumatic stress disorder: Suggestions for researchers and clinical trainers. *Psychological Trauma: Theory, Research, Practice, and Policy*, 7(6), 547–554.
- Resick PA, Monson CM, & Chard KM (2017). *Cognitive Processing Therapy for PTSD: A Comprehensive Manual*. New York, NY: Guilford Press.
- Ronconi JM, Shiner B, & Watts BV (2015). A meta-analysis of depressive symptom outcomes in randomized, controlled trials for PTSD. *Journal of Nervous and Mental Disease*, 203(7), 522–529. [PubMed: 26075838]
- Rosen C, Bernardy N, Chard K, Clothier B, Cook J, Crowley J, ... & Sayer N (2019). Which patients initiate cognitive processing therapy and prolonged exposure in department of veterans affairs PTSD clinics? *Journal of Anxiety Disorders*, 62, 53–60. [PubMed: 30550959]

- Rutt BT, Oehlert ME, Krieshok TS, & Lichtenberg JW (2018). Effectiveness of cognitive processing therapy and prolonged exposure in the Department of Veterans Affairs. *Psychological Reports*, 121(2), 282–302. [PubMed: 28886664]
- SAS Institute. (2013). *The SAS System for Windows (Release 9.2)*. Cary, NC: SAS Institute.
- Sayer N, Rosen C, Bernardy N, Cook J, Orazem R, Chard K, ... & Schnurr P (2017). Context Matters: Team and organizational factors associated with reach of evidence-based psychotherapies for PTSD in the Veterans Health Administration. *Administration and Policy in Mental Health and Mental Health Services Research*, 44, 904–918. [PubMed: 28597238]
- Schnurr PP, Friedman MJ, Engel CC, Foa EB, Shea MT, Chow BK, Bernardy N (2007). Cognitive behavioral therapy for posttraumatic stress disorder in women: A randomized controlled trial. *JAMA*, 297, 820–830. [PubMed: 17327524]
- Shiner B, Westgate C, Simiola V, Thompson R, Schnurr P, & Cook J (2018). Measuring use of evidence-based psychotherapy for PTSD in VA residential treatment settings with clinician survey and electronic medical record templates. *Military Medicine*, 183, e539. [PubMed: 29547909]
- Sripada RK, Pfeiffer PN, Rauch SAM, Ganoczy D, & Bohnert KM (2018). Factors associated with the receipt of documented evidence-based psychotherapy for PTSD in VA. *General Hospital Psychiatry*, 54, 12–17. [PubMed: 30029159]
- Statacorp. (2017). *Stata Statistical Software (Release 15)*. College Station, TX: StataCorp LLC.
- Stecker T, Shiner B, Watts BV, Jones M, & Conner KR (2013). Barriers for veterans of the Iraq and Afghanistan conflicts who screen positive for PTSD. *Psychiatric Services*, 64, 280–283. [PubMed: 23450385]
- Surís A, & Lind L (2008). Military sexual trauma: A review of prevalence and associated health consequences in veterans. *Trauma, Violence, & Abuse*, 9(4), 250–269.
- Surís A, Link-Malcolm J, Chard K, Ahn C, & North C (2013). A randomized clinical trial of cognitive processing therapy for veterans with PTSD related to military sexual trauma. *Journal of Traumatic Stress*, 26(1), 28–37. [PubMed: 23325750]
- Wolf G, Kretzmer T, Crawford E, Thors C, Wagner H, Strom T, ... & Vanderploeg R (2015). Prolonged exposure therapy with veterans and active duty personnel diagnosed with PTSD and traumatic brain injury. *Journal of Traumatic Stress*, 28, 339–347. [PubMed: 26201688]
- Zubkoff L, Carpenter-Song E, Shiner B, Ronconi JM, & Watts BV (2016). Clinicians' perception of patient readiness for treatment: An emerging theme in implementation science? *Administration and Policy in Mental Health and Mental Health Services Research*, 43, 250–258. [PubMed: 25735617]

Clinical Impact Statement

Among Iraq and Afghanistan war veterans who received Veterans Health Administration posttraumatic stress disorder-related psychotherapy, few began cognitive processing therapy (CPT) or prolonged exposure therapy (PE). Most veterans who received CPT/PE began more than a year after their first mental health visit. Generally, clinical need variables (e.g., history of suicidal ideation/attempt, comorbidities) predicted beginning CPT/PE, but also predicted beginning CPT/PE more than a year after first mental health visit. Understanding relevant mental health factors that affect the timing of CPT/PE will provide targets to improve treatment delivery by identifying how treatments are offered and accepted after first mental health visit.

Table 1

Veteran Characteristics by CPT/PE Initiation and Timing

	Early CPT/PE <i>n</i> =19,755		Delayed CPT/PE <i>n</i> =40,879		No CPT/PE <i>n</i> =204,932		<i>p</i> ^a
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Gender							<0.001
Female	2,540	12.9%	4,924	12.1%	20,692	10.1%	
Male	17,214	87.1%	35,954	88.0%	184,237	89.9%	
Missing	1	<0.1%	1	<0.1%	3	<0.1%	
Race							<0.001
White	14,007	70.9%	29,064	71.1%	145,900	71.2%	
Black or African American	3,352	17.0%	7,454	18.2%	34,498	16.8%	
American Indian or Alaska Native	255	1.3%	557	1.4%	2,358	1.2%	
Asian	363	1.8%	561	1.4%	3,340	1.6%	
Native Hawaiian or Other Pacific Islander	258	1.3%	521	1.3%	2,389	1.2%	
Multi-racial	251	1.3%	516	1.3%	2,442	1.2%	
Missing	1,269	6.4%	2,206	5.4%	14,005	6.8%	
Ethnicity							<0.001
Hispanic or Latino	2,427	12.3%	5,249	12.8%	25,060	12.2%	
Not Hispanic or Latino	16,502	83.5%	33,860	82.8%	169,755	82.8%	
Other	556	2.8%	1,185	2.9%	6,761	3.3%	
Missing	270	1.4%	585	1.4%	3,356	1.6%	
Marital status							<0.001
Married	10,408	52.7%	20,338	49.8%	100,088	48.8%	
Never married	4,614	23.4%	9,814	24.0%	52,954	25.8%	
Divorced, Separated, or Single	4,292	21.7%	9,995	24.5%	47,525	23.2%	
Widow, Widower, or Widowed	53	0.3%	126	0.3%	613	0.3%	
Missing	388	2.0%	606	1.5%	3,752	1.8%	
Education							<0.001
< High School Diploma	237	1.2%	483	1.2%	2,917	1.4%	
High School Diploma	15,914	80.6%	34,027	83.2%	172,686	84.3%	
College or Higher	3,346	16.9%	5,875	14.4%	26,767	13.1%	
Missing	258	1.3%	494	1.2%	2,562	1.3%	
Service branch							<0.001
Air force	1,376	7.0%	2,126	5.2%	11,130	5.4%	
Army	13,437	68.0%	29,812	72.9%	145,269	70.9%	
Coast Guard	6	<0.1%	17	<0.1%	123	0.1%	
Marine	3,418	17.3%	6,389	15.6%	34,570	16.9%	
Navy	1,518	7.7%	2,535	6.2%	13,840	6.8%	
Component							<0.001
Active Duty (Regular)	13,566	68.7%	26,038	63.7%	137,732	67.2%	
Guard	3,711	18.8%	9,594	23.5%	43,106	21.0%	

Reserve	2,478	12.5%	5,247	12.8%	24,094	11.8%	
Rank							<0.001
Enlisted	18,628	94.3%	39,353	96.3%	197,729	96.5%	
Officer	995	5.0%	1,350	3.3%	6,104	3.0%	
Warrant	132	0.7%	176	0.4%	1,099	0.5%	
Number of Deployments							<0.001
Single deployment	9,662	48.9%	22,643	55.4%	113,366	55.3%	
Multiple deployments	10,001	50.6%	18,089	44.3%	90,851	44.3%	
Missing	92	0.5%	147	0.4%	715	0.4%	
Military Sexual Trauma	1,718	8.7%	3,634	8.9%	11,950	5.8%	<0.001
Smoking ^b	1,592	8.1%	3,796	9.3%	20,280	9.9%	<0.001
PTSD Medication ^c	14,727	74.6%	26,048	63.7%	131,668	64.3%	<0.001
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>p</i> ^a
Age (Range 18–73)	33.6	8.8	32.0	8.5	31.9	8.5	<0.001

Note. CPT, cognitive processing therapy; PE, prolonged exposure therapy; PTSD, posttraumatic stress disorder

^aFor categorical variables, *p* values are based on Chi-Square or Fisher's Exact tests. For age, (continuous variable), *p* value is based on the Kruskal Wallis test.

^bSmoking in the year prior to the first mental health visit, identified using stop codes, ICD codes, and current procedural terminology codes for medications for smoking cessation and nicotine use

^cDocumented prescription of one or more of the following medications that are commonly prescribed for posttraumatic stress disorder in the year prior to the first mental health visit or at any time in the year after the first mental health visit: amitriptyline, citalopram, desvenlafaxine, duloxetine, escitalopram, fluoxetine, fluvoxamine, imipramine, mirtazapine, paroxetine, prazosin, sertraline, or venlafaxine.

Table 2

Veteran Comorbidities by CPT/PE Initiation and Timing

	Early EBP <i>n</i> =19,755		Delayed EBP <i>n</i> =40,879		No EBP <i>n</i> =204,932		<i>p</i> ^c	Significant Pair-wise Comparisons ^d
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Bipolar Disorder	2,048	10.4%	7,202	17.6%	25,414	12.4%	<0.001	E vs. D D vs. N E vs. N
Depressive Disorder	12,605	63.8%	30,947	75.7%	126,028	61.5%	<0.001	E vs. D D vs. N E vs. N
Other Psychotic Spectrum Disorder	406	2.1%	1,613	4.0%	5,975	2.9%	<0.001	E vs. D D vs. N E vs. N
Pain Disorder	14,708	74.5%	34,473	84.3%	149,570	73.0%	<0.001	E vs. D D vs. N E vs. N
Schizophrenia	148	0.8%	581	1.4%	3,062	1.5%	<0.001	E vs. D D vs. N E vs. N
Any Substance Use Disorder ^d	6,018	30.5%	17,992	44.0%	67,021	32.7%	<0.001	E vs. D D vs. N E vs. N
Alcohol Abuse	4,065	20.6%	12,690	31.0%	43,126	21.0%	<0.001	E vs. D D vs. N
Alcohol Dependence	3,133	15.9%	10,456	25.6%	31,596	15.4%	<0.001	E vs. D D vs. N
Drug abuse	2,246	11.4%	8,688	21.3%	26,631	13.0%	<0.001	E vs. D D vs. N E vs. N
Drug Dependence	1,799	9.1%	7,311	17.9%	21,264	10.4%	<0.001	E vs. D D vs. N E vs. N
Suicidal Ideation or Attempt	2,269	11.5%	7,813	19.1%	21,367	10.4%	<0.001	E vs. D D vs. N E vs. N
Traumatic Brain Injury	3,519	17.8%	8,536	20.9%	28,519	13.9%	<0.001	E vs. D D vs. N E vs. N
Categorical Number of Comorbidities							<0.001	E vs. D D vs. N
0 Comorbidities	1,745	8.8%	1,402	3.4%	18,511	9.0%		

	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>p</i> ^b	Significant Pair-wise Comparisons ^c
1 Comorbidity	4,909	24.9%	6,170	15.1%	51,347	25.1%				
2+ Comorbidities	13,101	66.3%	33,307	81.5%	135,074	65.9%				
Continuous Number of Comorbidities	2.4	1.8	3.2	2.1	2.4	1.8		<0.001		E vs. D D vs. N

Note. CPT, cognitive processing therapy; PE, prolonged exposure therapy.

^aFor categorical variables, *p* values are based on Chi-Square. For number of comorbidities, (continuous variable), *p* value is based on the Kruskal Wallis test.

^bPair-wise comparisons used Chi-Square for categorical variables and Mann-Whitney test for continuous variables. To correct for multiple statistical tests, statistical significance level was set to $p < 0.0003$ (i.e., $p < 0.001/3$)

^cAny substance use disorder refers to the presence of any alcohol/drug abuse and/or dependence.

Table 3

Veteran Comorbidities by Treatment Initiation

	No CPT/PE <i>n</i> =204,932		Initiated CPT/PE <i>n</i> =60,634		<i>p</i> ^a
	<i>n</i>	%	<i>n</i>	%	
Bipolar Disorder	25,414	12.4%	9,250	15.3%	<0.001
Depressive Disorder	126,028	61.5%	43,552	71.8%	<0.001
Other Psychotic Spectrum Disorder	5,975	2.9%	2,019	3.3%	<0.001
Pain Disorder	149,570	73.0%	49,181	81.1%	<0.001
Schizophrenia	3,062	1.5%	729	1.2%	<0.001
Any Substance Use Disorder ^b	67,021	32.7%	24,010	39.6%	<0.001
Alcohol Abuse	43,126	21.0%	16,755	27.6%	<0.001
Alcohol Dependence	31,596	15.4%	13,589	22.4%	<0.001
Drug Abuse	26,631	13.0%	10,934	18.0%	<0.001
Drug Dependence	21,264	10.4%	9,110	15.0%	<0.001
Suicidal Ideation or Attempt	21,367	10.4%	10,082	16.6%	<0.001
Traumatic Brain Injury	28,519	13.9%	12,055	20.0%	<0.001
Categorical Number of Comorbidities					<0.001
0 Comorbidities	18,511	9.0%	3,147	5.2%	
1 Comorbidity	51,347	25.1%	11,079	18.3%	
2+ Comorbidities	135,074	65.9%	46,408	76.5%	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Continuous Number of Comorbidities	2.4	1.8	2.9	2.0	<0.001

Note. CPT, cognitive processing therapy; PE prolonged exposure therapy.

^aFor categorical variables, *p* values are based on Chi-Square. For number of comorbidities, (continuous variable), *p* value is based on the Mann-Whitney test.

^bAny substance use disorder refers to the presence of any alcohol/drug abuse and/or dependence.

Table 4

Logistic Regression Predicting CPT/PE Initiation (n = 265,556)

	OR ^a	CI ₉₅	p
Bipolar Disorder	1.05	1.02–1.08	<0.001
Depressive Disorder	1.38	1.35–1.41	<0.001
Other Psychotic Spectrum Disorder	0.98	0.92–1.03	0.406
Pain Disorder	1.41	1.38–1.44	<0.001
Schizophrenia	0.61	0.56–0.67	<0.001
Any Substance Use Disorder ^b	1.25	1.22–1.28	<0.001
Suicidal Ideation or Attempt	1.42	1.38–1.46	<0.001
Traumatic Brain Injury	1.41	1.38–1.44	<0.001
Age	1.01	1.01–1.01	<0.001
Gender (Reference: Male)			
Female	1.07	1.04–1.11	<0.001
Race (Reference: White)			
Black or African American	1.03	1.00–1.06	0.014
American Indian or Alaska Native	1.12	1.03–1.21	0.008
Asian	0.96	0.89–1.03	0.282
Native Hawaiian or Other Pacific Islander	1.08	0.99–1.17	0.074
Multiracial	1.03	0.94–1.12	0.532
Missing	0.90	0.86–0.93	<0.001
Marital Status (Reference: Married)			
Never Married	0.91	0.89–0.94	<0.001
Divorced, Separated, or Single	0.91	0.89–0.93	<0.001
Widowed, Widower, or Widow	0.82	0.70–0.98	0.025
Missing	0.89	0.83–0.96	0.003
Service Branch (Reference: Air Force)			
Army	0.99	0.95–1.03	0.678
Coast Guard	0.62	0.38–0.94	0.025
Marine	1.05	1.00–1.10	0.040
Navy	0.94	0.88–0.98	0.009
Component (Reference: Active Duty)			
Guard	1.05	1.02–1.08	<0.001
Reserve	1.08	1.05–1.11	<0.001
Rank (Reference: Enlisted)			
Officer	1.26	1.20–1.33	<0.001
Warrant	0.89	0.78–1.01	0.081
Number of Deployments (Reference: Single)			
Multiple	1.10	1.08–1.12	<0.001
Missing	1.14	0.98–1.33	0.080
Military Sexual Trauma	1.45	1.39–1.51	<0.001

	OR ^a	CI ₉₅	<i>p</i>
Smoking ^c	0.88	0.85–0.91	<0.001
PTSD Medication ^d	1.00	0.98–1.02	0.874
Year of First Mental Health Visit (Reference 2001–2004)			
2005	1.06	0.99–1.15	0.103
2006	1.17	1.09–1.26	<0.001
2007	1.18	1.11–1.27	<0.001
2008	1.24	1.15–1.32	<0.001
2009	1.25	1.17–1.34	<0.001
2010	1.22	1.14–1.31	<0.001
2011	1.24	1.16–1.33	<0.001
2012	1.31	1.22–1.40	<0.001
2013	1.37	1.28–1.46	<0.001
2014	1.31	1.22–1.41	<0.001
2015–2017	1.29	1.16–1.43	<0.001

Note. CI₉₅, 95% confidence interval; CPT, cognitive processing therapy; PE, prolonged exposure therapy; PTSD, posttraumatic stress disorder; OR, odds ratio.

^aOR with no CPT/PE initiation as the reference category vs. CPT/PE initiation.

^bAny substance use disorder refers to the presence of any alcohol/drug abuse and/or dependence.

^cSmoking in the year prior to the first mental health visit, identified using stop codes, ICD codes, and current procedural terminology codes for medications for smoking cessation and nicotine use

^dDocumented prescription of one or more of the following medications that are recommended to treat PTSD in the year prior to the first mental health visit or at any time in the year after the first mental health visit: amitriptyline, citalopram, desvenlafaxine, duloxetine, escitalopram, fluoxetine, fluvoxamine, imipramine, mirtazapine, paroxetine, prazosin, sertraline, or venlafaxine.

Table 5

Multinomial Logistic Regression Predicting CPT/PE Initiation and Timing (n = 265,556)

	No CPT/PE vs. Early CPT/PE			Delayed CPT/PE vs. Early CPT/PE		
	RRR ^a	CI ₉₅	p	RRR ^b	CI ₉₅	p
Bipolar Disorder	1.14	1.08–1.20	<0.001	1.27	1.20–1.34	<0.001
Depressive Disorder	0.89	0.86–1.92	<0.001	1.37	1.32–1.43	<0.001
Other Psychotic Spectrum Disorder	1.15	1.03–1.29	0.011	1.16	1.03–1.31	0.016
Pain Disorder	0.86	0.83–0.89	<0.001	1.35	1.30–1.42	<0.001
Schizophrenia	1.52	1.28–1.82	<0.001	0.90	0.74–1.09	0.293
Any Substance Use Disorder ^c	0.97	0.94–1.00	0.078	1.32	1.26–1.37	<0.001
Suicidal Ideation or Attempt	0.81	0.77–0.86	<0.001	1.21	1.14–1.28	<0.001
Traumatic Brain Injury	0.71	0.68–0.74	<0.001	1.00	0.95–1.04	0.885
Age	0.98	0.98–0.99	<0.001	0.99	0.99–0.99	<0.001
Gender (Ref: Male)						
Female	0.85	0.80–0.99	<0.001	0.87	0.82–0.93	<0.001
Race (Ref: White)						
Black or African American	1.07	1.03–1.11	0.001	1.16	1.10–1.22	<0.001
American Indian or Alaska Native	0.96	0.84–1.10	0.551	1.11	0.85–1.29	0.180
Asian	0.99	0.86–1.08	0.916	0.92	0.80–1.06	0.236
Native Hawaiian or Other Pacific Islander	0.94	0.82–1.06	0.357	1.02	0.87–1.19	0.810
Multiracial	1.00	0.88–1.15	0.945	1.05	0.90–1.23	0.517
Missing	1.06	1.00–1.13	0.058	0.93	0.86–1.00	0.045
Marital Status (Ref: Married)						
Never married	1.03	0.99–1.07	0.139	0.91	0.87–0.96	<0.001
Divorced, Separated, or Single	1.14	1.10–1.19	<0.001	1.06	1.01–1.10	0.016
Widowed, Widower, or Widow	1.20	0.90–1.59	0.221	0.98	0.70–1.36	0.893
Missing	0.95	0.86–1.06	0.404	0.78	0.68–0.89	<0.001
Service Branch (Ref: Air Force)						
Army	1.08	1.01–1.14	0.019	1.11	1.03–1.20	0.005
Coast Guard	2.54	1.11–5.80	0.027	1.86	0.72–4.78	0.200
Marine	0.91	0.85–0.98	0.009	0.95	0.87–1.03	0.192
Navy	1.05	0.97–1.14	0.193	1.00	0.88–1.07	0.616
Component (Ref: Active Duty)						
Guard	0.98	0.94–1.02	0.357	1.05	1.00–1.10	0.075
Reserve	0.89	0.85–0.94	<0.001	0.95	0.90–1.01	0.084
Rank (Ref: Enlisted)						
Officer	0.72	0.67–0.77	<0.001	0.84	0.77–0.92	<0.001
Warrant	0.96	0.80–1.16	0.675	0.77	0.61–0.97	0.030
Number of Deployments (Ref: Single)						
Multiple	0.90	0.88–0.93	<0.001	0.99	0.96–1.03	0.638
Missing	0.83	0.66–1.04	0.100	0.91	0.70–1.19	0.500
Military Sexual Trauma	0.73	0.68–0.78	<0.001	1.09	1.01–1.18	0.026

	No CPT/PE vs. Early CPT/PE			Delayed CPT/PE vs. Early CPT/PE		
	RRR ^a	CI ₉₅	<i>p</i>	RRR ^b	CI ₉₅	<i>p</i>
Smoking ^d	1.19	1.13–1.26	<0.001	1.06	1.00–1.13	0.050
PTSD Medication ^e	0.67	0.64–0.69	<0.001	0.56	0.54–0.58	<0.001
Year of First Mental Health Visit (Ref: 2001–2004)						
2005	0.57	0.38–0.87	0.010	0.62	0.39–0.92	0.019
2006	0.24	0.16–0.35	<0.001	0.26	0.18–0.39	<0.001
2007	0.11	0.07–0.16	<0.001	0.11	0.07–0.16	<0.001
2008	0.07	0.05–0.11	<0.001	0.07	0.05–0.10	<0.001
2009	0.06	0.04–0.09	<0.001	0.05	0.04–0.08	<0.001
2010	0.06	0.04–0.08	<0.001	0.05	0.03–0.07	<0.001
2011	0.05	0.04–0.08	<0.001	0.04	0.03–0.07	<0.001
2012	0.04	0.03–0.06	<0.001	0.04	0.02–0.05	<0.001
2013	0.04	0.02–0.05	<0.001	0.03	0.02–0.04	<0.001
2014	0.03	0.02–0.04	<0.001	0.01	0.01–0.02	<0.001
2015–2017	0.03	0.02–0.04	<0.001	0.01	0.01–0.01	<0.001

Note. CI₉₅, 95% confidence interval; CPT, cognitive processing therapy; PE, prolonged exposure therapy; PTSD, posttraumatic stress disorder; RRR, relative risk ratio.

^aRRR with early initiation of CPT/PE as the reference category vs. no initiation of CPT/PE.

^bRRR with early initiation of CPT/PE as the reference category vs. delayed initiation of CPT/PE.

^cAny substance use disorder refers to the presence of any alcohol/drug abuse and/or dependence.

^dSmoking in the year prior to the first mental health visit, identified using stop codes, ICD codes, and current procedural terminology codes for medications for smoking cessation and nicotine use.

^eDocumented prescription of one or more of the following medications that are recommended to treat PTSD in the year prior to the first mental health visit or at any time in the year after the first mental health visit: amitriptyline, citalopram, desvenlafaxine, duloxetine, escitalopram, fluoxetine, fluvoxamine, imipramine, mirtazapine, paroxetine, prazosin, sertraline, or venlafaxine.