UNDERSTANDING MENTAL HEALTH CARE UTILIZATION ALONG THE POSTTRAUMATIC STRESS DISORDER CLINICAL CARE PATHWAY IN THE VETERANS HEALTH ADMINISTRATION

By

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A DISSERTATION

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ABSTRACT OF THE DISSERTATION

Over 600,000 patients who use the Veterans Health Administration (VHA) have been diagnosed with PTSD and prevalence estimates range from 10% to 30% among Veterans. To address this health burden, the VHA screens for PTSD annually and offers evidence-based psychotherapy for PTSD (EBP). In the VHA, patients who screen positive should receive a diagnostic clinical evaluation and patients diagnosed with PTSD should be referred to EBP. However, less than 20% of patients diagnosed with PTSD engage in EBP. Previous research has identified numerous patient-level drivers of EBP engagement, including patient sociodemographic and clinical characteristics, practical barriers, and PTSD symptom specific barriers. However, past evaluations have not focused on the connection from a positive PTSD screen to initiating EBP nor have they evaluated system-level factors associated with EBP engagement. In this dissertation we designed three studies to describe the mental health care patients receive following a new positive PTSD screen and evaluate patient and health system factors associated with engagement in EBP. **Study 1** measured EBP engagement among patients with a new PTSD diagnosis between 2017 and 2019. Overall, 263,018 patients started PTSD treatment between 2017 and 2019 and 11.6% (n=30,462) initiated EBP within the first year after their PTSD diagnosis. Of those who initiated EBP, 32.9% (n=10,030) received a minimally adequate dose. Older patients were less likely to initiate EBP, but more likely to complete a minimally adequate dose when they did initiate. Patients with comorbid bipolar or psychotic disorders were less likely to initiate EBP, however, these patients did not have a lower likelihood of receiving a minimally adequate dose of treatment once engaged in EBP. **Study 2** described the mental health care patients receive following a

new positive PTSD screen in primary care and identified health system factors associated with engaging in EBP. Overall, 20,853 patients screened positive for PTSD in VHA primary care clinics in 2018; of these 76% were connected to a diagnostic clinical evaluation, and 86% of patients evaluated received a confirmatory PTSD diagnosis within one year of a positive screen. One in ten patients (n = 1,372) who screened positive and received a PTSD diagnosis engaged in EBP. Confirmatory evaluation location (in a PTSD specialty clinic) and timing (within 3 months of screening) were each associated with increased likelihood of engaging in EBP. **Study 3** evaluated patient and health system factors associated with time (i.e., number of days) from screening to EBP engagement during the first year after a new positive PTSD screen and diagnosis. On average, patients initiated EBP 339 days after being diagnosed with PTSD. Several patient and health system factors were associated with earlier EBP initiation including clinical evaluation location, timing of confirmatory PTSD diagnosis, female sex, patients identifying as Pacific Islander, and patients with prior high risk for suicide. The studies presented in this dissertation provide specific information that can be used to address patient level disparities and improve engagement in EBP through health system design. We provide several system-level recommendations and propose a telemedicine-based intervention to increase EBP engagement.

Chapter 1 – Integrated Introduction

Posttraumatic Stress Disorder (PTSD) is a major source of disability associated with reduced quality of life and increased morbidity, mortality and suicide.[1–6] An estimated 8 million people in the US meet criteria for PTSD in a given year.[7] Over 600,000 patients who use the Veterans Health Administration (VHA) have been diagnosed with PTSD, and prevalence estimates range from 10% to 30% among Veterans.[8–12] To address this health burden, the VHA initiated a program to screen for PTSD yearly during routine clinical care and implemented evidence-based psychotherapy for PTSD (EBP) in all VHA medical facilities,[13–16] the purpose of which was to identify patients with PTSD and facilitate a connection to EBP. However, only 10%-20% of VHA patients diagnosed with PTSD engage in EBP,[17–19] suggesting efforts to connect patients to EBP are not as effective as desired. A systematic review of the VHA's population-level screening programs concluded that more research is needed to determine if screening for PTSD leads to appropriate follow-up care.[20] The purpose of this dissertation is to understand the care pathway from PTSD screening to appropriate follow up care and EBP engagement.

PTSD is a mental health disorder resulting from exposure to one or more traumatic events in which an individual has been personally or indirectly exposed to actual or threatened death, serious injury, or sexual violence.[21] Examples include military combat, rape, serious motor vehicle accidents, critical illness, or injury requiring intensive care. A PTSD diagnosis requires the following criteria to be met: at least one symptom of intrusive reexperiencing of traumatic events, at least one symptom of avoidance of associated stimuli and reminders, at least two symptoms of alteration in

mood and cognition, and at least two symptoms of persistent physiological arousal and reactivity. PTSD is diagnosed when these symptoms are present at least one month after the traumatic event and symptoms have a significant impact on the individual's functioning.[21] Onset of PTSD symptoms can be delayed well beyond the first month after a traumatic experience and individuals who are symptom free at one point may become symptomatic later.

PTSD is associated with physical health problems, mental health comorbidities, and increased health risk behaviors. Patients diagnosed with PTSD have increased morbidity and mortality.[1,2] PTSD is also associated with an increased risk of suicide, homicide, and alcohol- and drug-related mortality.[3,4] A causal mechanism between traumatic exposure, PTSD, and poor health is currently unknown. Nonetheless, theoretical mechanisms of the relationship between PTSD and health outcomes have been proposed and are well supported by nonexperimental research findings.[22] Exposure to traumatic stress is associated with biological alterations in hypothalamic-pituitary-adrenal systems that decrease immune system functioning and lead to poor health.[22–24] Increased symptoms of depression and anxiety are also common in PTSD and have been associated with increased risk of cardiovascular disease.[25–28] In addition, individuals with PTSD often have increased health risk behaviors (e.g., increased smoking and alcohol abuse, and decreased preventive care behaviors), which can contribute to poor health.[29–31] Thus, PTSD is a significant health burden and a complex problem for health systems to address.

PTSD is common among Veterans of all wartime service eras, particularly those who receive VHA services.[32] Veterans may develop symptoms of PTSD resulting from events that occurred during military service or from traumatic experiences that occurred

outside of the military. Up to 20% of Veterans from the Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) service era, 10-12% from the Gulf War era, and approximately 15% from the Vietnam era screen positive for probable PTSD.[7,33–36] The high prevalence of PTSD in the VHA patient population represents a significant health burden. In response, the VHA has enacted system-wide changes to screen patients for PTSD and provide access to effective treatments.

The VHA is a national healthcare system that provides care for over 9 million enrolled patients across 171 medical centers and 1,113 outpatient clinics.[37] Systematic PTSD screening began in 2004[16] and approximately 300,000 patients are screened for PTSD each year. The purpose of the VHA's population-based PTSD screening program is to identify patients with symptoms of PTSD. Once a patient has been identified, the health care system should facilitate a connection to specialty mental health care for diagnosis and treatment. Many patients with PTSD first present in primary care and not in specialty mental healthcare settings.[38] In 2008, the VHA began implementing Primary Care-Mental Health Integration (PC-MHI) clinics nationwide, which co-locate mental health within primary care.[39] The purpose of co-locating mental health providers in primary care is to support patients with common mental health conditions that first present in primary care through screening and brief intervention.[40] In the VHA, PTSD treatment is delivered by trained providers in general mental health clinics or, more often, in specialty PTSD clinics.[41] The VHA is the largest health care system in the world with a systematic approach to addressing PTSD.

VHA primary care providers (PCPs) use the Primary Care PTSD Screen for DSM-IV (PC-PTSD) to screen patients for PTSD annually during the first five years after

separation from military service.[42] After five years of annual PTSD screening, patients are screened for PTSD at five-year intervals. PTSD screening is discontinued when a new PTSD diagnosis. PCPs are prompted to screen for PTSD by an electronic health record clinical reminder. The PC-PTSD is a short, self-report screening measure that asks individuals to respond to questions that assess the presence of symptoms that correspond to the criteria for PTSD.[43] There is validity evidence for the PC-PTSD in older, non-Hispanic white VHA primary care patients. The optimally sensitive cutoff score is 3, which has sensitivity of 0.78 and specificity of 0.87.[43] In VHA clinical care, a score of 0, 1 or 2 on the PC-PTSD is defined as a negative screen for PTSD and a score of 3 or 4 is defined as a positive screen. A new positive PTSD screen initiates a process of follow-up care steps intended to facilitate access to VHA mental health care.

Patients who screen positive for PTSD should be referred for a mental health diagnostic clinical evaluation of their PTSD symptoms, which can be performed by a mental health provider on the same day as screening, if the clinic has the capacity (e.g., a PC-MHI clinic), or at a follow-up visit in a specialty mental health clinic.[13] A confirmatory PTSD diagnosis is made based on the results of the diagnostic clinical evaluation. Patients diagnosed with PTSD are referred for EBP.[13] A patient's journey from PTSD screening to diagnostic clinical evaluation, confirmatory PTSD diagnosis, and EBP is referred to as the PTSD care pathway. A positive PTSD screen in primary care represents a potential new patient with PTSD and an opportunity for the health care system to facilitate access to the appropriate mental health services.

In terms of treatment, the VHA clinical practice guideline for PTSD recommends patients who are diagnosed with PTSD receive EBP. Specifically, EBP should be

individual, manualized trauma-focused psychotherapy that has a primary exposure or cognitive restructuring component over other pharmacologic or non-pharmacologic interventions.[13] The VHA-recommended EBPs are prolonged exposure (PE), Cognitive Processing Therapy (CPT), Eye Movement Desensitization and Reprocessing, specific cognitive behavioral therapies for PTSD, Brief Eclectic Psychotherapy, Narrative Exposure Therapy, and written narrative exposure. When EBPs are unavailable or not preferred, pharmacologic treatment options include sertraline, paroxetine, fluoxetine, or venlafaxine as monotherapy for PTSD. Other, non-pharmacologic alternatives to EBPs are Stress Inoculation Training (SIT), Present-Centered Therapy (PCT), and Interpersonal Psychotherapy (IPT).[13]

Shortly after implementing routine PTSD screening, the VHA began a nationwide effort to implement CPT and PE at all medical facilities.[14,15] Throughout this dissertation we refer to these two recommended treatment options as EBP. CPT is a manualized treatment that consists of 12 sessions. CPT is a cognitive therapy that focuses on challenging inaccurate self-statements, called "stuck points," which interrupt the normal processing of traumatic experiences. Stuck points cause the patient to believe they are to blame for the traumatic experience or that the world is a dangerous place. Both thought patterns maintain symptoms of PTSD. In CPT, patients learn cognitive restructuring strategies that identify stuck points and evaluate whether facts support their thoughts. PE is a manualized treatment that consists of at least five sessions.[44,45] PE is an exposure-based therapy that focuses on addressing the tendency for patients with PTSD to avoid anything that reminds them of the traumatic experience. Avoidance maintains and reinforces symptoms of PTSD through a process of conditioning that generalizes fear to

stimuli that most people would consider safe. PE helps patients face their fears by talking about details of their traumatic experience and confronting safe situations they have been avoiding. CPT and PE both have strong efficacy and are effective in patients with complex presentations and comorbidities.[46–51] Most patients experience symptom improvement by the eighth treatment session of CPT or PE.[52] In VHA health services research, a minimally adequate dose of treatment is defined as eight or more EBP treatment sessions, with the same therapist, within 14 weeks from the first session to the last session. This definition aligns with a VHA performance metric for delivery of minimally adequate EBP treatment.[19]

While access to EBPs in the VHA is available and utilization has increased modestly since these therapies were implemented,[14,53] overall utilization is low.[18] In the most recent national evaluation, the prevalence of CPT and PE engagement was 14.6% and 4.3%, respectively.[19] A systematic review of the VHA's mental health screening program concluded that more research is needed to determine if screening for PTSD leads to improved patient care, such as access to and engagement in EBP following a positive screen and confirmatory PTSD diagnosis.[20] A recent assessment of PTSD screening in VHA primary care found that 41,570 patients screened positive for PTSD in primary care between October 2017 and September 2018 and approximately 56% of these patients were referred to a VHA mental health clinic.[54] This represents the initial step in the process of being diagnosed with PTSD and accessing mental health treatment. Unfortunately, many patients who receive a PTSD diagnosis do not engage in EBP for PTSD,[17–19,55] or in other pharmacologic and non-pharmacologic treatments.[56–58] This suggests that the VHA's screening program is generally successful at identifying new

patients with PTSD symptoms, but follow up mental health treatment may not be optimized.

PTSD first must be recognized for effective treatment to take place.[59] The goal of screening for PTSD is to identify patients with symptoms of PTSD and connect them to a follow up diagnostic clinical evaluation, with the implicit assumption that this process will improve patient outcomes. The implementation of systematic PTSD screening in the VHA is based on US Preventive Services Task Force (USPSTF) recommendations for depression and anxiety screening,[13] which state patients who screen positive should receive a follow-up clinical evaluation and be provided or referred to evidence-based care.[60,61] Assuming screening for PTSD would operate on similar USPSTF assumptions, then patients diagnosed with PTSD should be provided EBP. Yet, if the health care system cannot provide the appropriate follow up care after a positive screen, the system misses an opportunity to improve patient care.

Prior evaluations of EBP utilization and qualitative research on patients' decisions to engage in PTSD treatment have identified several drivers of EBP engagement. Research shows patient age, race, ethnicity, and mental health comorbidities are associated with engagement in mental health care for PTSD.[55,62–64] Patients have reported practical barriers to engaging in EBPs such as employment or school responsibilities, transportation, and scheduling.[65–68] Patients have also described PTSD symptom specific barriers such as difficulty being in public, avoidance of trauma memories, and hesitations about the trauma-focused component of EBPs.[65–69] Additionally, patients may have other health priorities and decide not to engage in EBPs.[70] Provider decisions to offer EBPs are also an important determinant for engagement. Studies have found that patients who are

not considered "ready" for PE or CPT may not be offered these treatments.[71,72] While these factors all contribute to the observed EBP engagement rate (18.9%),[18] we believe it is unlikely that they account for the approximately 81.1% of patients who do not engage in EBP.

The structure and process of care delivery along the PTSD clinical care pathway may also impact patients' engagement in EBP.[73] The referral process from primary care to EBP treatment is complex and presents a potential barrier. Patients who are identified in primary care may receive three separate assessments of their PTSD symptoms from three different providers before being assigned to an EBP therapist. Patients have expressed frustration with the lack of continuity of care in this referral process.[66] Understanding how modifiable health system factors are associated with EBP utilization will provide important information that can be used to increase engagement.

The purpose of this dissertation is to describe VHA patients' progression through the PTSD care pathway from a new positive PTSD screen to engagement in EBP. We will evaluate patient characteristics and health system factors associated with engagement in EBP following a new PTSD diagnosis. First, in **Study 1** we will provide an updated measurement of EBP utilization during our study period and identify sociodemographic characteristics associated with engagement in EBP and receipt of a minimally adequate dose of treatment among patients who received a new PTSD diagnosis between 2017 and 2019. Prior evaluations of EBP engagement have not extended beyond 2017 and have included only OEF/OIF patients with an existing diagnosis of PTSD. We focus on EBP engagement among patients with a new PTSD diagnosis to evaluate the health care system's ability to connect newly diagnosed patients to the appropriate level of follow up

mental health care. The findings from this study will characterize the magnitude of the gap between diagnosing patients with PTSD and connecting them to EBP.

Second, **Study 2** focuses on the identification of new patients through screening and their flow through the PTSD care pathway to EBP. Past evaluations of the follow up care patients received after a positive PTSD screen have not specifically investigated engagement in EBP,[56,74–76] and only one study has evaluated system-level barriers and facilitators to engaging with any psychotherapy for PTSD.[77] We will describe the proportion of patients who screened positive for PTSD in primary care that receive a diagnostic clinical evaluation, a confirmatory PTSD diagnosis, and finally who engage in EBP. This study will identify health system level barriers to engaging in EBP. We will use the Donabedian model of health care quality to identify key quality measures along the PTSD clinical care pathway.[73] Health care quality measures consist of structural, process, and outcome measures. Structural measures describe the environment in which care is provided, process measures are what providers do on behalf of the patient to maintain and improve health, and outcome measures are the result of the healthcare system's action on patients or populations. The findings from this study will describe how the health care system facilitates connections to EBP for new patients.

The results of study 1 and 2 will identify patient characteristics and health system factors associated with engagement in EBP following a new PTSD diagnosis. **Study 3** will build on these findings to investigate which factors are associated with a rapid connection to EBP. The timing of treatment initiation following a new PTSD diagnosis is an important determinant of treatment outcomes. Patients who wait longer to engage in EBPs are less likely to experience significant PTSD symptom improvement.[78]

Additionally, screening positive for PTSD is associated with an increased risk of suicide-related mortality,[6] underscoring the importance of timely follow up care. We will evaluate patient characteristics and health system factors associated with time (i.e., number of days) from screening to EBP engagement among patients who were screened and diagnosed with PTSD.

In summary, studies 1, 2, and 3 in this dissertation will provide an updated measurement of EBP utilization (study 1), identify sociodemographic characteristics associated with engagement in EBP and receipt of a minimally adequate dose of treatment (study 1), describe the flow of patients through the PTSD care pathway in the VHA (study 2), identify health system quality measures associated with engagement in EBP (study 2), and identify patient characteristics and health system factors associated with time from screening to EBP engagement (study 3). This dissertation will present the completed and published 1st and 2nd studies, and the completed 3rd study, with an integrated commentary of all three studies.

Chapter 2 – Study 1

Title: Factors associated with engaging in evidence-based psychotherapy during the first year of posttraumatic stress disorder treatment between 2017 and 2019

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Abstract:
To address the burden of posttraumatic stress disorder (PTSD), the Veterans Health Administration (VHA) implemented evidence-based psychotherapies (EBPs) for PTSD at all VHA medical centers. Prior investigations show EBP utilization has increased following the initial nationwide implementation. However, most patients still do not engage in EBPs and those who do often have substantial delays between diagnosis and treatment which is associated with poorer treatment outcomes. The goal of the current study is to identify patient and clinical factors associated with initiating EBP and completing a minimally adequate dose of treatment within the first year of a new PTSD diagnosis. Overall, 263,018 patients started PTSD treatment between 2017 and 2019 and 11.6% (n=30,462) initiated EBP during their first year of treatment. Of those who initiated EBP, 32.9% (n=10,030) received a minimally adequate dose. Older patients were less likely to initiate EBP, but more likely to receive an adequate dose when they did initiate. Black, Hispanic/Latino/a, and Pacific Islander patients' likelihood of initiating EBP was not significantly different than White patients, but these patients were less likely to receive an adequate dose. Patients with comorbid depressive disorders, bipolar disorder, psychotic disorders, or substance use disorders were less likely to initiate EBP, while patients reporting MST were more likely to initiate EBP. This study identifies several patient-level disparities that could be prioritized to increase EBP utilization. In our evaluation, most patients did not engage in EBP during their first year of PTSD treatment, which is consistent with previous evaluations of EBP utilization. Future research should focus on understanding the flow of patients from PTSD diagnosis to treatment to support effective PTSD care delivery.

Introduction

Posttraumatic Stress Disorder (PTSD) is common among military Veterans; prevalence estimates range between 10% and 30%,[8–10] and are highest among patients who receive care at the Veterans Health Administration (VHA).[11] The VHA/Department of Defense (DOD) Clinical Practice Guideline (CPG) recommends trauma-focused evidence-based psychotherapies (EBPs) as first-line treatment for PTSD.[13] In 2006, the VHA began a nationwide effort to disseminate and implement two EBPs: cognitive processing therapy (CPT) and prolonged exposure (PE). CPT generally consists of 12 individual or group therapy sessions and PE consists of at least five individual therapy sessions;[44,45] prior research has established at least eight sessions as being a minimally adequate dose for both of these treatments.[52] A 2008 mandate required all VHA medical centers to provide access to either CPT or PE.[14,53] However, available evaluations have found that most patients starting PTSD treatment do not receive CPG-recommended EBP treatment.

In the VHA, patients who are diagnosed with PTSD should be offered EBP treatment once they establish care in a mental health clinic.[13] CPT and PE have strong efficacy and are effective in patients with complex presentations and comorbidities.[46–51] While CPT and PE are widely available in the VHA, most patients do not receive these therapies.[18] Patients who do initiate EBPs often have substantial delays between diagnosis and initiation,[63] which has been associated with poorer treatment outcomes.[78] While there are many factors that may influence PTSD treatment engagement,[70–72,79] understanding EBP utilization patterns is particularly important given the existing delays in EBP treatment among VHA patients diagnosed with PTSD.

Early in the VHA's nationwide dissemination efforts, program evaluation data demonstrated low utilization rates of EBPs for PTSD.[80] A study of VHA patients initiating PTSD specialty care in six New England outpatient clinics in 2010 showed that only 6.3% received any EBP sessions within their first year of treatment.[81] A similar study following VHA patients in the Pacific Northwest who initiated EBP for PTSD between 2006 and 2008 showed that only one third received a minimally adequate number of therapy sessions.[82] Thus, based on early reports, there were concerns that few patients initiated EBP for PTSD and even fewer patients completed treatment.[83] At this time, national evaluations of EBP utilization were challenging because accurately identifying EBPs required manual review of Veterans' health records.[84]

To address this challenge and improve the methods for measuring EBP utilization, Shiner and colleagues developed an approach to identify CPT and PE from electronic health record (EHR) note text using natural language processing (NLP).[81] Maguen and colleagues extended this method and scaled it to a national population of Veterans.[17] This approach has been used to evaluate the VHA's nationwide implementation of EBPs. [85] Overall, EBP utilization has increased following the VHA's implementation efforts, however, available evaluations show that many patients still do not engage in EBPs. Accurate and timely measurement of EBP utilization can support the VHA's mission of providing access EBPs to all patients diagnosed with PTSD.

Recently, the VHA implemented a strategy for measuring EBP utilization that relies on therapists completing structured note templates to document EBPs in the EHR. In 2015, the VHA mandated all providers use the structured note templates to document EBP delivery.[15] Structured note templates make it possible to measure EBP utilization

without the use of manual chart review or NLP. The VHA maintains a dashboard that tracks EBP template use monthly to monitor the reach of these treatments. Over time, template use has increased and become a close approximation to the true rate of EBP delivery as measured by NLP.[86] These templates are an easily accessible, discrete measurement of EBP utilization that can be leveraged to identify patient factors associated with engaging in EBP treatment.

Previous evaluations have described several patient and clinical factors associated with lower likelihood of initiating EBP or completing a minimally adequate dose of treatment, including older age[64,87] and mental health comorbidities.[52,62,63] These evaluations of EBP utilization have typically included all post-9/11 Veterans with a prevalent diagnosis of PTSD.[17,18,62,88,89] Yet the timing of treatment initiation following a new PTSD diagnosis is an important determinant of treatment outcomes. Patients who wait longer to engage in EBPs are less likely to experience significant PTSD symptom improvement.[78] Further investigation of factors associated with EBP utilization among patients with an incident diagnosis of PTSD will provide important information about engaging patients in treatment during the critical period of time following a new PTSD diagnosis.

The goal of the current study is to identify patient characteristics and clinical comorbidities associated with initiating EBP and completing a minimally adequate dose of treatment after a new PTSD diagnosis in a recent clinical cohort. We focused our evaluation on measuring patients' EBP utilization over the first 12-months following a new PTSD diagnosis to provide clinically relevant information about patients' EBP utilization. The purpose of this study is to (1) describe the proportion of patients who

initiate EBP within one year of being diagnosed with PTSD, (2) identify patient and clinical factors (e.g., comorbidities, reported history of miliary sexual trauma) associated with initiating EBP within one year of being diagnosed with PTSD, (3) describe the proportion of patients who receive a minimally adequate dose of EBP within one year of being diagnosed with PTSD, and (4) identify patient and clinical factors associated with completing a minimally adequate dose of EBP. We measured EBP utilization starting in 2017 to account for the initial adoption of the templates following the VHA mandate. Additionally, our evaluation did not extend beyond 2019 because of changes in VHA EHR documentation due to the pandemic and the implementation of a new EHR system in the VHA, both of which started in 2020. This study provides an updated estimate of national EBP utilization and is the first study to our knowledge that uses structured note templates to investigate factors associated with initiating EBP and completing a minimally adequate dose of treatment in patients newly diagnosed with PTSD.

Methods

Data sources

We obtained patients' VHA utilization history, sociodemographic information, and mental health diagnoses from the VHA Corporate Data Warehouse (CDW). This study was approved by the Institutional Review Board (IRB) at the Portland VA located in Portland, OR.

Participants

We identified a cohort of patients who had a diagnosis of PTSD (International Classification of Diseases (ICD)-9: 309.81; ICD-10: F43.10, F43.11, or F43.12) at two or more outpatient mental health encounters over the course of 90 days between January 1,

2017 and December 31, 2019. The first qualifying encounter was defined as the index date. Patients who met these criteria prior to 2017 were excluded. We examined one year of treatment following the index date and patients who died before the end of follow up were excluded. We excluded patients who had any encounters for psychotherapy in a mental health clinic in the two years prior to their index date to focus on psychotherapy-naïve patients starting a new episode of PTSD treatment. This resulted in a cohort of 263,018 patients.

Evidence-based psychotherapy for PTSD:

We evaluated whether patients in our cohort had engaged in EBP during their first year of PTSD treatment using health factors (hierarchical string-type data produced when standardized templates are completed). In 2015, the VHA mandated all providers use a standardized note template to document EBP delivery,[15] which automatically generate health factors that are stored in the VHA CDW. We used the health factor categories 'MH CPT' and 'MH PEI' to identify sessions that involved CPT and PE respectively. We identified all encounters with a health factor for CPT or PE within one year of the index date. An EBP treatment session was defined as a health factor for EBP associated with an outpatient mental health encounter.

Initiating EBP was defined as at least one EBP treatment session during the follow up period. Patients without any EBP treatment sessions were categorized as Not Initiating EBP. For patients who initiated treatment, we identified patients who received a minimally adequate dose of treatment, which was defined as eight or more EBP treatment sessions, with the same therapist, within 14 weeks from the first session to the last session. This definition aligns with a VHA performance metric for delivery of minimally

adequate EBP treatment.[19,52] Unique treatment sessions were identified using visitSID, which identifies each unique encounter. Therapists were identified using providerSID, which is unique to each provider in the VHA. The providerSID is associated with the visitSID when an encounter is documented in the EHR and both unique identifiers are stored in the VHA CDW.

Covariates

We examined the following patient characteristics: age, gender, race, ethnicity, VHA service-connected disability status. We also examined the following clinical comorbidities: history of military sexual trauma (MST), history of traumatic brain injury (TBI), and comorbid diagnoses of depression, anxiety, substance use disorder, bipolar disorder, and schizophrenia. Race and ethnicity are collected via self-report during clinical care in the VHA. Patients who did not have any race category indicated in their health record were classified as "Not reported" and patients who indicated more than one race category were classified as "multi-racial." Comorbid mental health diagnoses were identified by ICD-9/10 codes associated with any mental health encounter in the 12 months prior to the index date and consisted of other anxiety disorders, depressive disorders, bipolar disorder, psychotic disorders, and substance use disorders. History of TBI was assessed from the VHA's Comprehensive TBI Evaluation module. Age and service-connected disability status were measured at the index date. All other covariates were measured in the two years prior to the index date.

Analysis

For the outcome of initiating treatment, we calculated the proportion of patients who initiated EBP in the first year of PTSD treatment. Among patients who initiated

treatment, we calculated the proportion of patients who received a minimally adequate dose of treatment. We used generalized estimating equations (GEE) with a logit link to identify factors associated with initiating EBP versus not initiating EBP and to identify factors associated with receiving a minimally adequate dose of treatment versus initiating EBP and not receiving a minimally adequate dose of treatment. For the outcome of receiving a minimally adequate dose of treatment, analyses were restricted to patients who initiated EBP. For analyses of both outcomes, unadjusted bivariate models were estimated for each of the following covariates: age, gender, race, ethnicity, VHA service-connected disability status, history of MST, history of TBI, and comorbid diagnoses of depression, anxiety, substance use disorder, bipolar disorder, and schizophrenia. For the adjusted multivariable models, all covariates were entered into models simultaneously. GEE models were specified with a compound symmetry correlation structure to account for correlations between patients within VHA facilities, which violates the assumption of independent observations. All analyses were performed in SAS, Version 9.4.[90]

Results:

The overall sample consisted of 263,018 patients who initiated a new course of PTSD treatment between 2017 and 2019 (Table 1). Patients were predominately male, white, and non-Hispanic or Latino/a, which is similar to the general VHA population. Forty-eight percent had a comorbid depressive disorder, 38% had a comorbid anxiety disorder, 28% had a comorbid substance use disorder, 14% had a history of military sexual trauma, and approximately 6% had a history of TBI.

Approximately 11.6% (n = 30,462) of the overall sample initiated EBP treatment within the first year of their PTSD treatment. Patients who initiated EBP were an average

of three years younger compared to patients who did not initiate EBP. Twenty percent of patients who initiated EBP had a history of military sexual trauma, compared to 13% of all patients starting PTSD treatment. Approximately 5.5% of patients who initiated EBP had comorbid bipolar disorder and 1.1% had a comorbid psychotic disorder, while 7.1% of all patients starting PTSD treatment had comorbid bipolar disorder and 2.1% had a comorbid psychotic disorder.

Table 1. Characteristics of patients who did and did not initiate evidence-based psychotherapy within the first year of posttraumatic stress disorder treatment.

Characteristic	Overall N = 263,018	Did not initiate EBP N = 232,556	Initiated EBP N = 30,462
Age (mean, SD)	48.76 (15.44)	49.12 (15.59)	46.00 (13.85)
Age Category (n, %)			
18 - 29	26,697 (10%)	23,240 (10.0%)	3,457 (11%)
30 - 44	95,130 (36%)	82,924 (36%)	12,206 (40%)
45 - 59	67,512 (26%)	58,463 (25%)	9,049 (30%)
60+	73,679 (28%)	67,929 (29%)	5,750 (19%)
Gender (n, %)			
Male	221,582 (84%)	197,332 (85%)	24,250 (80%)
Female	41,436 (16%)	35,224 (15%)	6,212 (20%)
Race (n, %)			
American Indian/Alaskan Native	3,041 (1.2%)	2,675 (1.2%)	366 (1.2%)
Asian	3,828 (1.5%)	3,391 (1.5%)	437 (1.4%)
Black	64,172 (24%)	56,664 (24%)	7,508 (25%)
Multi-racial[a]	3,556 (1.4%)	3,148 (1.4%)	408 (1.3%)
Not reported[b]	16,575 (6.3%)	14,716 (6.3%)	1,859 (6.1%)
Pacific Islander	3,019 (1.1%)	2,697 (1.2%)	322 (1.1%)

White	168,827 (64%)	149,265 (64%)	19,562 (64%)
Ethnicity (n, %)			
Hispanic or Latino/a	27,266 (10%)	23,998 (10%)	3,268 (11%)
Service-connected disability (n, %)	181,558 (69%)	160,666 (69%)	20,892 (69%)
History of military sexual trauma (n, %)	36,578 (14%)	30,364 (13%)	6,214 (20%)
Other anxiety disorders (n, %)	99,942 (38%)	89,052 (38%)	10,890 (36%)
Depressive disorders (n, %)	126,008 (48%)	112,696 (48%)	13,312 (44%)
Bipolar disorder (n, %)	20,250 (7.7%)	18,579 (8.0%)	1,671 (5.5%)
Psychotic disorders (n, %)	5,481 (2.1%)	5,157 (2.2%)	324 (1.1%)
Substance use disorders (n, %)	73,888 (28%)	66,028 (28%)	7,860 (26%)
History of traumatic brain injury (n, %)	17,344 (6.6%)	15,080 (6.5%)	2,264 (7.4%)

Notes: [a]Patients with multiple races recorded in their health record were categorized as multiracial; [b]Patients who did not have a race recorded in their electronic health record were categorized as missing; EBP = evidence-based psychotherapy.

Unadjusted and adjusted GEE models predicting EBP treatment initiation are presented in Table 2. In the adjusted model, patients between 30 and 44 years old and between 45 and 59 years old had a 1.05 (95% CI: 1.01, 1.09) and 1.10 (95% CI: 1.05, 1.15) greater odds of initiating EBP, respectively, compared to patients between 18 and 29 years old. Patients identifying Hispanic or Latino/a had a 1.05 (95% CI: 1.01, 1.09) greater odds of initiating EBP. Patients with a history of MST and patients with a history of TBI had a 1.65 (95% CI: 1.59, 1.71) and 1.05 (95% CI: 1.00, 1.09) greater odds of initiating EBP, respectively. Patients who were 60 years and older had a 0.65 (95% CI: 0.58, 0.72) lower odds of initiating EBP, compared to patients between 18 and 29 years old. Patients with a comorbid depressive disorder, bipolar disorder, psychotic disorder, or

substance use disorder had a 0.83 (95% CI: 0.79, 0.87), 0.70 (95% CI: 0.64, 0.76), 0.59 (95% CI: 0.45, 0.73), 0.91 (95% CI: 0.87, 0.95) lower odds of initiating EBP, respectively.

Table 2. Patient factors associated with initiating evidence-based psychotherapy within the first year of posttraumatic stress disorder treatment.

Variable	Odds ratio	95% CI	Adjusted Odds ratio	95% CI
Age category				
18 – 29	Ref		Ref	
30 - 44	0.99	0.95, 1.03	1.05*	(1.01, 1.09)
45 - 59	1.05	1.00, 1.10	1.11*	(1.06, 1.16)
60+	0.59*	0.52, 0.66	0.65*	(0.58, 0.72)
Gender				
Male	Ref		Ref	
Female	1.43*	1.38, 1.48	1.01	(0.96, 1.06)
Race				
White	Ref		Ref	
American Indian/Alaskan Native	1.06	0.95, 1.17	1.00	0.89, 1.11
Asian	1.03	0.91, 1.15	0.96	0.86, 1.06
Black	1.08*	1.04, 1.12	1.02	0.98, 1.06
Multi-racial[a]	1.04	0.93, 1.15	0.95	0.85, 1.05
Not reported[b]	1.03	0.98, 1.08	0.97	0.92, 1.02
Pacific Islander	0.97	0.87, 1.07	0.95	0.85, 1.05
Ethnicity				
Not Hispanic or Latino/a	Ref		Ref	
Hispanic or Latino/a	1.09*	1.05, 1.13	1.05*	1.01, 1.09
Service-connected disability	0.99	0.96, 1.02	0.98	0.95, 1.01
History of military sexual trauma	1.67*	1.61, 1.73	1.65*	1.59, 1.71
Other anxiety disorders	0.87*	0.83, 0.91	0.98	0.95, 1.01
Depressive disorders	0.80*	0.76, 0.84	0.83*	0.79, 0.87
Bipolar disorder	0.67*	0.60, 0.74	0.70*	0.64, 0.76
Psychotic disorders	0.49*	0.33, 0.65	0.59*	0.45, 0.73
Substance use disorders	0.85*	0.80, 0.90	0.91*	0.87, 0.95
History of traumatic brain injury	1.14*	1.09, 1.19	1.05	1.00, 1.10

Notes: Odds ratios are from the bivariate models for the association between each variable and the outcome. Adjusted odds ratios are from the multivariable model where all covariates were entered simultaneously. *Indicates a p-value of less than 0.05. [a]Patients with multiple races recorded in their health record were categorized as multiracial; [b]Patients who did not have a race recorded in their electronic health record were categorized as missing; CI = confidence interval; Ref = reference category.

Of those who initiated EBP, approximately 33% (n = 10,030) received a minimally adequate dose of treatment (Table 3). Patients who received a minimally adequate dose of treatment were an average of two years older compared to patients who initiated EBP but did not receive a minimally adequate dose of treatment. The proportion of patients with a history of military sexual trauma was similar among patients who did and did not receive a minimally adequate dose of treatment. The prevalence of comorbid mental health disorders was similar among patients who did and did not receive a minimally adequate dose of treatment.

Table 3. Characteristics of patients did and did not receive a minimally adequate dose of treatment within the first year of posttraumatic stress disorder treatment among who initiated evidence-based psychotherapy.

Characteristic	Overall N = 30,4621	Did not receive a Minimally adequate dose of EBP treatment N = 20,4321	Received a minimally adequate dose of EBP treatment N = 10,0301
Age (mean, SD)	46.00 (13.85)	45.03 (13.56)	47.97 (14.23)
Age Category (n, %)			
18 - 29	3,457 (11%)	2,504 (12%)	953 (9.5%)
30 - 44	12,206 (40%)	8,604 (42%)	3,602 (36%)
45 - 59	9,049 (30%)	5,916 (29%)	3,133 (31%)
60+	5,750 (19%)	3,408 (17%)	2,342 (23%)
Gender			
Male	24,250 (80%)	16,235 (79%)	8,015 (80%)

Female	6,212 (20%)	4,197 (21%)	2,015 (20%)
Race (n, %)			
American Indian/Alaskan Native	366 (1.2%)	253 (1.2%)	113 (1.1%)
Asian	437 (1.4%)	287 (1.4%)	150 (1.5%)
Black	7,508 (25%)	5,197 (25%)	2,311 (23%)
Multi-racial[a]	1,859 (6.1%)	1,238 (6.1%)	621 (6.2%)
Not reported[b]	408 (1.3%)	281 (1.4%)	127 (1.3%)
Pacific Islander	322 (1.1%)	238 (1.2%)	84 (0.8%)
White	19,562 (64%)	12,938 (63%)	6,624 (66%)
Ethnicity (n, %)			
Hispanic or Latino/a	3,268 (11%)	2,309 (11%)	959 (9.6%)
Service-connected disability (n, %)	20,892 (69%)	13,964 (68%)	6,928 (69%)
History of military sexual trauma (n, %)	6,214 (20%)	4,114 (20%)	2,100 (21%)
Other anxiety disorders (n, %)	10,890 (36%)	7,424 (36%)	3,466 (35%)
Depressive disorders (n, %)	13,312 (44%)	9,068 (44%)	4,244 (42%)
Bipolar disorder (n, %)	1,671 (5.5%)	1,119 (5.5%)	552 (5.5%)
Psychotic disorders (n, %)	324 (1.1%)	213 (1.0%)	111 (1.1%)
Substance use disorders (n, %)	7,860 (26%)	5,268 (26%)	2,592 (26%)
History of traumatic brain injury (n, %)	2,264 (7.4%)	1,631 (8.0%)	633 (6.3%)

Notes: [a]Patients with multiple races recorded in their health record were categorized as multiracial; [b]Patients who did not have a race recorded in their electronic health record were categorized as missing; EBP = evidence-based psychotherapy.

Unadjusted and adjusted GEE models predicting receipt of a minimally adequate dose of treatment are presented in Table 4. In the adjusted model, patients between 30 and 44 years old, between 45 and 59 years old, and patients 60 years and older had 1.14 (95% CI: 1.05, 1.23), 1.44 (95% CI: 1.34, 1.54) and 1.80 (95% CI: 1.69, 1.91) greater odds of receiving a minimally adequate dose of treatment, respectively, compared to patients between 18 and 29 years old. Patients with a service-connected disability had 1.06 (95% CI: 1.01, 1.11) greater odds of receiving a minimally adequate dose of treatment. Patients identifying as Black or as Pacific Islander had a 0.83 (95% CI: 0.76, 0.90) and 0.72 (95% CI: 0.47, 0.97) lower odds of receiving a minimally adequate dose of treatment, respectively, compared to white patients. Patients identifying as Hispanic or Latino/a had a 0.88 (95% CI: 0.79, 0.97) lower odds of receiving a minimally adequate dose of treatment. Patients with a comorbid depressive disorder had a 0.92 (95% CI: 0.85, 0.99) lower odds of receiving a minimally adequate dose of treatment compared to patients with PTSD only.

Table 4. Patient factors associated with receiving a minimally adequate dose of evidence-based psychotherapy within the first year of posttraumatic stress disorder treatment.

Variable	Odds ratio	95% CI	Adjusted Odds Ratio	95% CI
Age category				
18 – 29	Ref		Ref	
30 - 44	1.12*	1.03, 1.21	1.14*	1.05, 1.23
45 - 59	1.41*	1.31, 1.51	1.44*	1.34, 1.54
60+	1.80*	1.70, 1.90	1.80*	1.69, 1.91
Gender				
Male	Ref		Ref	
Female	0.99	0.92, 1.06	1.04	0.96, 1.12
Race				
White	Ref		Ref	
American Indian/Alaskan Native	0.84	0.60, 1.08	0.86	0.61, 1.11
Asian	1.00	0.79, 1.21	1.04	0.85, 1.23

Black	0.89*	0.83, 0.95	0.83*	0.76, 0.90
Multi-racial[a]	0.89	0.70, 1.08	0.93	0.74, 1.12
Not reported[b]	0.99	0.90, 1.08	1.01	0.92, 1.10
Pacific Islander	0.70*	0.46, 0.94	0.72*	0.47, 0.97
Ethnicity				
Not Hispanic or Latino/a	Ref		Ref	
Hispanic or Latino/a	0.85*	0.76, 0.94	0.88*	0.79, 0.97
Service-connected disability	1.06*	1.01, 1.11	1.06*	1.01, 1.11
History of military sexual trauma	1.05	0.98, 1.12	1.07	0.99, 1.15
Other anxiety disorders	0.92*	0.86, 0.98	0.98	0.91, 1.05
Depressive disorders	0.92*	0.86, 0.98	0.92*	0.85, 0.99
Bipolar disorder	0.98	0.87, 1.09	1.02	0.91, 1.13
Psychotic disorders	1.02	0.81, 1.23	1.04	0.83, 1.25
Substance use disorders	0.97	0.90, 1.04	1.02	0.95, 1.09
History of traumatic brain injury	0.78*	0.68, 0.88	0.90	0.80, 1.00

Notes: Odds ratios are from the bivariate models for the association between each variable and the outcome. Adjusted odds ratios are from the multivariable model where all covariates were entered simultaneously. *Indicates a p-value of less than 0.05. [a]Patients with multiple races recorded in their health record were categorized as multiracial; [b]Patients who did not have a race recorded in their electronic health record were categorized as missing; CI = confidence interval; Ref = reference category.

Discussion

The purpose of this study was to measure EBP utilization among VHA patients in their first year of PTSD treatment between 2017 and 2019. We used discrete data elements routinely collected in the VHA's EHR and EBP-specific note templates to measure the proportion of patients who initiated EBP. Overall, 263,018 patients started a new course of PTSD treatment between 2017 and 2019 and 30,462 (approximately 11.6%) initiated EBP within the first year. We used a previously described minimally adequate dose of treatment that aligns with a VHA performance metric[19,52] to measure the proportion of patients who received an adequate number of guideline concordant EBP sessions during their first year of PTSD treatment. Among those who initiated EBP, 10,030 patients (approximately 32.9%) received eight or more EBP sessions in 14 weeks with the same therapist, which we defined as a minimally adequate dose of treatment. It is possible that patients engaged in other non-EBP mental health care and were not captured in our analysis because of our focus on EBP for PTSD. Overall, only 3.8% of all

patients newly diagnosed with PTSD between 2017 and 2019 received a minimally adequate dose of EBP during their first year of treatment. This is because a small proportion (11.6%) of the patients seeking PTSD treatment initiated EBP, which is consistent with previous national evaluations of EBP utilization in the VHA.[17–19]

Several patient characteristics were associated with odds of initiating EBP and receiving a minimally adequate dose of EBP during the first year of PTSD treatment. In our sample, older patients had lower odds of initiating EBP, which is consistent with previous findings.[64,91] Specifically, compared to patients 18 to 29 years old, patients 60 years and older had 35% lower odds of initiating EBP, while patients between 30 and 59 years old had greater odds. However, all patients 30 years and older had greater odds of receiving a minimally adequate dose of EBP, compared to patients 18 to 29 years old. While older patients initiated EBP at a lower rate, patients 60 years and older had an 80% greater probability of receiving a minimally adequate dose of therapy compared to patients between 18 and 29 years old. There may be several possible explanations why older patients were less likely to initiate EBP, including medical comorbidities, lack of transportation, or lack of motivation to address past trauma. Despite these potential barriers, our findings suggest that older patients should be offered EBP when they begin PTSD treatment because they are likely to complete a minimally adequate dose of therapy once they begin. In addition, EBP trials conducted with older adults have shown positive effects on reducing PTSD symptoms.[92,93] Greater efforts to engage older patients in EBPs should be prioritized given that older patients are more likely to receive a minimally adequate dose of treatment once engaged in EBP.

Patients with comorbid depressive disorders, bipolar disorder, psychotic disorders, or substance use disorders had lower odds of initiating EBP, which is consistent with some[62,91,94,95], but not all[82] previous studies of EBP utilization. In particular, patients with comorbid bipolar disorder or psychotic disorders had a 30% and 41% lower probability of initiating EBP treatment. However, these patients did not have a lower likelihood of receiving a minimally adequate dose of treatment once engaged in EBP. Differences between our findings on comorbid mental health disorders and the findings of previous evaluations could be explained by differing inclusion criteria. We focused on incident cases of PTSD during the first year after a new PTSD diagnosis while other evaluations have included all prevalent cases of PTSD. Our findings suggest that patients with comorbid mental health diagnoses are likely to follow through with a minimally adequate dose of treatment once they engage in EBP.

One explanation for the findings that patients with comorbid bipolar disorder or psychotic disorders and older patients were less likely to initiate EBPs is a potential bias against offering these patients EBP treatment. Several studies investigating provider decisions to offer EBPs have found that patients who are not considered "ready" for PE or CPT may not be offered these treatments.[71,72] Providers may be less likely to offer EBPs to those who they consider psychologically unstable,[79] which limits access to patients who follow through with treatment when offered EBP. Older patients who developed PTSD prior to the release of EBPs may have different expectations about the effectiveness of PTSD treatment and symptoms improvement compared to their providers. Additionally, older patients may experience more stigma associated with their military service and therefore be less likely to seek mental health care for PTSD.[68] It is

also possible that older patients and patients with mental health comorbidities may have other treatment priorities,[70] which may partly explain our finding that patients with mental health comorbidities were less likely to engage in EBPs.

Patients with a history of MST had 65% greater odds of initiating EBP, which is consistent with previous evaluations of EBP utilization.[17,87] Patients with a history of MST also received a minimally adequate dose of treatment at similar rates to patients with other trauma histories, which is encouraging given that MST can be associated with shame, stigma, and a lack of trust in the VHA.[96] This finding is consistent with prior research that has found Veterans with a history of MST have higher VHA utilization rates compared those without a history of MST.[97,98] The VHA's efforts to provide EBP treatment to patients with a history of MST are promising and these patients successfully follow through with treatment once engaged.

Race and ethnicity were associated with lower odds of receiving a minimally adequate dose of treatment. Patients identifying as Black or Pacific Islander had 18% and 27% decreased odds of receiving a minimally adequate dose of treatment, respectively, compared to White patients. Patients identifying as Hispanic or Latino/a had a 12% decreased odds of receiving a minimally adequate dose of treatment. These findings are consistent with previously described racial and ethnic disparities in psychotherapy for PTSD.[99] There are many factors that may contribute to EBP engagement, including patient preference, access to resources/supports, readiness to change, and specific skills to manage trauma-focused therapy. Additionally, trust in the VA, positive or negative prior experiences with healthcare providers, and provider cultural competencies may particularly affect historically marginalized racial and ethnic groups. The VHA has made

efforts to engage historically marginalized racial and ethnic groups in care and should continue work to ensure that patients receive a minimally adequate dose of therapy once engaged in PTSD treatment.

Patients with a history of TBI also had slightly greater odds of initiating EBP treatment and a slightly decreased odds of receiving a minimally adequate dose of therapy. However, these results were not significant in the adjusted models. Nonetheless, engaging Veterans with TBI in PTSD treatment is important because there is significant overlap between TBI and PTSD symptoms.[100] Treating the specific effects of PTSD may reduce the overall symptom burden of patients with comorbid PTSD and TBI. Given the effectiveness of PTSD treatment and far more limited TBI-specific treatment options, starting with PTSD treatment in patients with comorbid PTSD and TBI could be warranted in many cases.

There are several limitations to the current study. First, it is important to note that measuring EBP utilization using EBP-specific note templates is a proxy measure of EBP delivery. Many of the associations with EBP utilization that we observed are consistent with previously identified factors that predict the receipt of an EBP-specific note template.[91] Our analyses accounted for clustering by VHA facility to mitigate the effect of system-level factors such as EBP documentation policies and focus on patient-level associations with EBP utilization. However, we cannot conclude with certainty that the observed associations reflect disparities in receipt of treatment versus disparities in the documentation of EBP templates. Second, EBP templates do not capture all instances EBP treatment in the VHA and likely underrepresent total EBP utilization.[86] Third, our approach to measuring EBP utilization only captures CPT and PE and does not include

other trauma-focused PTSD treatments such as Eye Movement Desensitization and Reprocessing Therapy. And fourth, we used data routinely collected in the VHA's EHR system. It is possible that unmeasured variables (e.g., distance to nearest VHA facility, comorbid medical health conditions, receipt of a referral for EBP, or patients' treatment preference) could confound the observed associations with initiating EBP or receiving a minimally adequate dose of therapy. While these factors are not easily accessible from routinely collected EHR data, future studies could incorporate these unmeasured factors via survey or manual chart review.

In conclusion, between 2017 and 2019, 11.6% percent of patients starting PTSD treatment in the VHA initiated EBP within the first year and 33% of patients who initiated EBP received a minimally adequate dose of treatment. Our work builds on previous research to provide an updated measurement of EBP utilization in the VHA following a VA-wide rollout of these interventions. Our examination of patient factors associated with receipt of EBP, along with updated treatment utilization estimates, can support efforts to engage patients diagnosed with PTSD in EBPs. We identified several patient-level disparities in EBP initiation, including older age and psychotic disorder diagnoses that are consistent with prior national evaluations of EBP utilization. Additionally, we found patients with comorbid psychotic disorder diagnoses and older patients had an equal or increased likelihood of following through with a minimally adequate dose of treatment, respectively. These findings suggest that the VHA should prioritize offering these patient populations in EBP for PTSD as efforts to increase EBP utilization continue. We also found that patients identifying as Black, Pacific Islander, and Hispanic/Latino/a were less likely to receive a minimally adequate dose of therapy.

The VHA should continue efforts to engage historically marginalized racial and ethnic groups in EBP treatment. Most VA patients do not engage in EBP within one year of being diagnosed with PTSD. Future research should focus on understanding the flow of patients from PTSD screening to diagnosis and treatment to identify potential access problems along this care pathway and support effective PTSD care delivery.

Chapter 3 – Study 2

Title: Mental health care utilization following a new positive PTSD screen in primary care in the Veterans Health Administration

Citation: Cameron, D., Shiner, B., Carlson, KF, Denneson, LM, Dieckmann, N, O'Neill, A., O'Neil, M.E. Mental health care utilization following a new positive PTSD screen in the VHA. Psychological Services [*Under review and not yet published as of May 21st, 2024*]

Abstract:

Although there is an active screening program for posttraumatic stress disorder (PTSD) in Veterans Health Administration (VHA) primary care clinics and empirically supported treatments for PTSD are available, many patients who are identified through screening and receive a new PTSD diagnosis do not engage in cognitive processing therapy (CPT) or prolonged exposure therapy (PE). CPT and PE are both widely promoted and recommended first-line treatments in the VHA that were the focus of the VHA's initial implementation of evidence-based psychotherapy for PTSD. We examined the mental health care patients received following a new positive PTSD screen in VHA primary care clinics and whether health system factors were associated with engaging in CPT or PE. A national cohort of VHA primary care patients who screened positive for PTSD in 2018 were followed for one year from the date of screening. Overall, 20,853 patients screened positive for PTSD; of these 76% received a diagnostic clinical evaluation, and 86% of these patients evaluated received a confirmatory PTSD diagnosis within one year of screening. Ten percent (n = 1,372) of patients who received a confirmatory PTSD diagnosis engaged in CPT or PE. Confirmatory evaluation location (in a PTSD specialty clinic) and timing (within 3 months of screening) were each associated with increased likelihood of engaging in EBP. Most patients who screen positive for PTSD in VHA primary care clinics are connected to follow-up clinical evaluations and receive confirmatory PTSD diagnoses. However, only one-in-ten patients who screen positive and receive a confirmatory PTSD diagnosis go on to receive CPT or PE. Screening appears to more effectively lead to patients with PTSD engaging in CPT or PE when the

confirmatory evaluation occurs quickly and in a setting prepared to deliver evidence-based treatment.

Introduction

Posttraumatic Stress Disorder (PTSD) is common among military Veterans; prevalence estimates range from 10% to 30%,[8–10] and are highest among Veterans who receive care at the Veterans Health Administration (VHA).[11] PTSD is associated with reduced quality of life, increased morbidity,[2] and an increased risk of suicide, homicide, and alcohol- and drug-related mortality.[3,4] To address the burden of PTSD, the VHA screens patients for PTSD yearly and provides access to evidence-based psychotherapies (EBPs) for PTSD. In 2006, the VHA began a system-wide implementation of cognitive processing therapy (CPT) and prolonged exposure (PE) as first-line treatments for PTSD.[14,46,47,101] CPT and PE are widely promoted in the VHA and were the focus of the initial implementation effort;[101] since then, additional first-line EBPs for PTSD have become available in the VHA.[13] Despite these efforts, only 10%-15% of patients diagnosed with PTSD engage in CPT or PE,[55,85] suggesting an opportunity for improvement in efforts to connect patients to CPT or PE.

Many patients with PTSD first present in primary care and not in specialty mental healthcare settings.[38] To identify these patients, an electronic health record (EHR) clinical reminder prompts VHA primary care providers (PCPs) to screen patients for PTSD. Patients are screened for PTSD annually during the first five years after separation from military service.[42] After five years of annual PTSD screening, patients are screened for PTSD at five-year intervals. PTSD screening is discontinued when a new PTSD diagnosis. A new positive PTSD screen initiates a process of follow-up care steps intended to facilitate access to VHA mental health care. This process begins with a referral for a clinical interview to confirm the PTSD diagnosis, which can be performed

by a mental health provider on the same day as screening, if the clinic has the capacity, or at a follow-up visit in specialty mental health.[13] Patients diagnosed with PTSD are referred to EBP,[13] which is often delivered in a specialty PTSD clinic,[41] but can also be administered by trained providers in other mental health clinics. CPT and PE are effective in patients with complex presentations and comorbidities.[48–51] A positive PTSD screen in primary care represents a potential new patient with PTSD and an opportunity for the health care system to facilitate access to the appropriate mental health services.

A systematic review of the VHA's mental health screening program concluded that more research is needed to determine if screening for PTSD leads to improved patient care, such as access to and engagement in EBP following a positive screen and confirmatory PTSD diagnosis.[20] A recent assessment of PTSD screening in VHA primary care found that approximately 56% of Veterans who screened positive were referred to a VHA mental health clinic.[54] This represents the initial step in the process of being diagnosed with PTSD and accessing mental health treatment. Unfortunately, many patients who receive a PTSD diagnosis do not engage in mental health treatment[56–58] or first-line evidence-based treatment including CPT or PE for PTSD.[17–19,55] This suggests that the VHA's screening program is generally successful at identifying new cases of probable PTSD but follow up mental health treatment may be suboptimal. These evaluations have identified several patient characteristics associated with engagement in mental health care for PTSD, such as age, race, ethnicity, and mental health comorbidities.[55,62–64]

In addition to patient factors, the structure and process of care delivery may also impact patients' engagement in care along the PTSD clinical care pathway.[73] However,

past evaluations of the VHA's PTSD screening program have not specifically investigated engagement in CPT and PE,[56,74–76] and only one study has evaluated system-level barriers and facilitators to engaging with any psychotherapy for PTSD.[77] The purpose of this study is to describe the proportion of patients screening positive for PTSD in primary care that progress through the PTSD clinical care pathway and for those who receive a confirmatory PTSD diagnosis, to evaluate health system factors associated with patient engagement in CPT or PE. Specifically, the primary objectives of this study are to (1) describe the incidence and proportion of patients who received a clinical evaluation for PTSD, a confirmatory PTSD diagnosis, and CPT or PE for PTSD following a new positive PTSD screen, and (2) to measure the association between health system factors and engagement in CPT or PE among patients who screened positive for PTSD and received a confirmatory PTSD diagnosis. Based on previous evaluations of follow up mental health care after a new positive PTSD screen,[77] we hypothesized that shorter time between screening positive and receiving a confirmatory PTSD diagnosis would be associated with a higher probability of engaging in CPT or PE for PTSD.

Methods

This study was approved by the Institutional Review Board (IRB) at the Portland VA located in Portland, OR.

Setting

The VHA is a national healthcare system comprising 171 medical centers and 1,113 outpatient clinics serving over 9 million enrolled patients, approximately 300,000 of whom are screened for PTSD each year [37].

Participants

We used a retrospective study design to identify a cohort of patients who screened positive on the Primary Care PTSD Screen for DSM-IV (PC-PTSD) in any primary care clinic in calendar year (CY) 2018 and who were alive at the end of CY 2019. The PC-PTSD is a four-item measure [102]. Endorsed items are scored as 1 (versus 0). The PC-PTSD total score range is 0 to 4. The PC-PTSD accurately identifies PTSD diagnoses made by structured clinical interview. The optimally sensitive cutoff score is 3, which has sensitivity of 0.78 and specificity of 0.87. This was the definition of a positive screen used in VA clinical care at the time of this study. A score of 0, 1 or 2 on the PC-PTSD was defined as a negative screen for PTSD and a score of 3 or 4 was defined as a positive screen. Patients who screened positive for PTSD prior to CY 2018, who had an encounter with an International Classification of Diseases – 9th Revision or 10th Revision – Clinical Modification (ICD-9-CM or ICD-10-CM) code for PTSD prior to CY 2018, or who had an encounter at a mental health clinic in the 12-months prior to PTSD screening were excluded.

Data sources

We obtained patients' PC-PTSD, VHA utilization history, sociodemographic information, and diagnoses from the VA Corporate Data Warehouse.

Measures

Health system factors were organized into structural, process, and outcome measures [73]. Structural measures reflect the environment of care. Process measures reflect the actions health care providers take on behalf of patients. Outcome measures reflect the

impact of health services and interventions on the health status of patients. All measures were extracted from VHA healthcare data.

Structural measures

Clinical evaluation location: The mental health clinic where patients received their diagnostic evaluation for PTSD was defined as either a primary care-mental health integration (PC-MHI) clinic, a general mental health clinic, or a specialty PTSD clinic. Patients were categorized according to the location of their first mental health clinic encounter following a new positive PTSD screen.

Process measures

Clinical evaluation for PTSD: We identified patients with a mental health clinic encounter within 12 months after a positive PC-PTSD screen. This indicated a mental health diagnostic evaluation for PTSD.

Confirmatory PTSD diagnosis: A confirmatory PTSD diagnosis following a new positive PTSD screen was defined as a mental health clinic encounter associated with an ICD code for PTSD (ICD-9-CM: 309.81; ICD-10-CM: F43.10, F43.11, or F43.12).

Timing of Confirmatory PTSD diagnosis: We identified five *a priori,* clinically relevant, orthogonal time intervals from screening to confirmatory PTSD diagnosis: 0-7 days, 8-28 days, 29-84 days, 85-168 days, and 169-365 days.

Outcome measure

Cognitive Processing Therapy or Prolonged Exposure Therapy: Engagement in CPT or PE was the primary outcome as these therapies were the focus of the VHA's initial system-wide implementation of EBPs for PTSD [14,101]. Patients who screened

positive, received a confirmatory PTSD diagnosis, and had at least one CPT or PE encounter within 12 months of screening were defined as engaging in CPT or PE for PTSD. The VHA requires the use of structured EHR templates to document the provision of CPT and PE [15]. Sessions of CPT and PE were identified using the data these templates produce.

Patient characteristics

We categorized age (18-29 years old, 30-44 years old, 45-59 years old, and ≥60 years old), sex (male and female), race (American Indian/Alaskan Native, Asian, Black, Multi-racial, Not Reported, Pacific Islander, and White), and ethnicity (Hispanic or Latino/a or Not Hispanic or Latino/a) according to patients' health records. Sex is presumed to represent biological sex. Patients without race indicated in their health record were classified as "Not reported" and patients with more than one race were classified as "multi-racial." Marital status (married, not married, never married, or unknown) and VHA service-connected disability benefit (0%, >0% – 60%, and >60%) were measured prior to a patient's PTSD screening date. Prior comorbid mental health diagnoses (anxiety disorders, depressive disorders, bipolar disorder, psychotic disorders, and substance use disorders) and prior traumatic brain injury (TBI) diagnoses were identified using ICD-9-CM or ICD-10-CM codes associated with any mental health encounter in the 12 months prior to a patient's PTSD screening date. Prior high risk for suicide was measured by the presence of a high-risk flag or a suicide safety plan in a patient's health record in the 12-months prior to PTSD screening date.

Statistical Analyses

Frequency and percentage of demographic and clinical variables were calculated for the overall sample as well as by receipt of a confirmatory PTSD diagnosis. We used generalized additive models and natural splines to confirm patients' assignment to timing of confirmatory PTSD diagnosis groups (Supplemental Materials). The 169-365 days group was combined with the 85-168 days group based on this analysis and due to small cell size. The cumulative incidence and incidence proportion for each structural and process measure and the outcome of engagement in CPT or PE was computed over 12 months of follow-up from the date of the new positive PC-PTSD screen. To estimate associations between each structural and process measure and patients' engagement in CPT or PE, among patients who screened positive and received a confirmatory PTSD diagnosis in 2018 (n = 12,544), we used bivariable and multivariable generalized estimating equations (GEE) with a logit link to generate odds ratios, predicted probabilities, and their 95% confidence intervals (CIs), respectively. Patients who received a confirmatory PTSD in 2019 were excluded from this analysis to allow for a 12-month follow-up period for all patients. For multivariable models, we specified that timing of confirmatory PTSD diagnosis was on the pathway between clinical evaluation location and initiating CPT or PE. To account for potential confounding effects on structural, process and outcome measures we employed a model specification strategy based on a causal modeling and directed acyclic graphing [103]. Covariates considered for each model included age group, sex, race, ethnicity, VHA service-connected disability benefit, prior comorbid mental health diagnoses and TBI diagnoses, prior high-risk for suicide, and PC-PTSD total score. GEE models were specified with a compound symmetry correlation structure to account for correlations between patients within VHA

facilities, which violates the assumption of independent observations. All analyses were performed using R statistical software version 4.3.1 [104].

Results

Descriptive characteristics of patients who screened positive for PTSD in 2018 are presented in Table 1. Patients who went on to receive a confirmatory PTSD diagnosis were predominately between 30 and 44 years old, male, white, and non-Hispanic/Latino/a. Fifty one percent of patients 60 years or older and 75% of female patients received a confirmatory PTSD diagnosis.

Table 1. Characteristics of primary care patients who did and did not receive a confirmatory diagnosis of posttraumatic stress disorder (PTSD) among patients who screened positive for PTSD in Veterans Health Administration primary care clinics in 2018.

Characteristic	Overall N = 20,852 n (%)[a]	Confirmatory PTSD Diagnosis N = 13,739 n (%)[b]	No PTSD Diagnosis N = 7,114 n (%)[b]
Age category			
18 - 29	2,941 (14%)	2,214 (75%)	727 (25%)
30 - 44	7,291 (35%)	5,256 (72%)	2,035 (28%)
45 - 59	5,315 (25%)	3,588 (68%)	1,727 (32%)
60+	5,306 (25%)	2,681 (51%)	2,625 (49%)
Sex			
Female	2,761 (13%)	2,083 (75%)	678 (25%)
Male	18,092 (87%)	11,656 (64%)	6,436 (36%)
Race			
American Indian/Alaska Native	235 (1%)	139 (59%)	96 (41%)
Asian	285 (1%)	200 (70%)	85 (30%)
Black	3,564 (17%)	2,537 (71%)	1,027 (29%)
Multi-racial[c]	5,583 (27%)	3,649 (65%)	1,934 (35%)
Not Reported[d]	1,301 (6%)	845 (65%)	456 (35%)
Pacific Islander	213 (1%)	152 (71%)	61 (29%)
White	9,672 (46%)	6,217 (64%)	3,455 (36%)
Ethnicity			
Hispanic or Latino/a	2,201 (11%)	1,529 (69%)	672 (31%)

Not Hispanic or Latino/a	18,652 (89%)	12,210 (65%)	6,442 (35%)
Marital status			
Married	12,062 (58%)	7,834 (65%)	4,228 (35%)
Never married	3,504 (17%)	2,458 (70%)	1,046 (30%)
Not married	4,813 (23%)	3,130 (65%)	1,683 (35%)
Unknown	474 (2%)	317 (67%)	157 (33%)
Service-connected disability benefit			
None	7,036 (34%)	5,184 (74%)	1,852 (26%)
Service connected, 0%	1,098 (5%)	682 (62%)	416 (38%)
Service connected, >0-60%	7,597 (36%)	4,523 (60%)	3,074 (40%)
Service connected, >60%	5,122 (25%)	3,350 (65%)	1,772 (35%)
Prior comorbid mental health diagnoses			
Depressive disorders			
Yes	2,431 (12%)	1,882 (77%)	549 (23%)
No	18,422 (88%)	11,857 (64%)	6,565 (36%)
Anxiety disorders			
Yes	1,475 (7%)	1,118 (76%)	357 (24%)
No	19,378 (93%)	12,621 (65%)	6,757 (35%)
Bipolar disorder			
Yes	78 (<1%)	60 (77%)	18 (23%)
No	20,775 (99%)	13,679 (66%)	7,096 (34%)
Psychotic Disorders			
Yes	13 (<1%)	-[e]	-[e]
No	20,840 (99%)	-[e]	-[e]
Substance use disorders			
Yes	1,542 (7.4%)	1,093 (71%)	449 (29%)
No	19,311 (93%)	12,646 (65%)	6,665 (35%)
Prior traumatic brain injury diagnosis			
Yes	3,135 (15%)	1,679 (54%)	1,456 (46%)
No	17,718 (85%)	12,060 (68%)	5,658 (32%)
Prior high risk for suicide			
Yes	179 (1%)	114 (64%)	65 (36%)
No	20,674 (99%)	13,625 (66%)	7,049 (34%)
PC-PTSD total score			
3	7,204 (35%)	4,317 (60%)	2,887 (40%)
4	13,649 (65%)	9,422 (69%)	4,227 (31%)

Notes: [a]Column percentage; [b]Row percentage; [c]Patients with multiple races recorded in their health record were categorized as multi-racial; [d]Patients who did not have a race recorded in their electronic health record were categorized as missing; [e]Cells of n less than 10 were suppressed to preserve data
privacy. PC-PTSD = Primary Care-Posttraumatic Stress Disorder screen for DSM-IV.

The cumulative incidence and proportion of patient progression through the PTSD clinical care pathway are presented in Figure 1. Seventy-six percent (n = 15,939) of patients who screened positive for PTSD received a clinical evaluation for PTSD within 12-months of their positive screen. Forty seven percent of clinical evaluations (n = 7,548) occurred in a PC-MHI clinic, 51% (n = 8,061) occurred in a general mental health clinic, and 2% (n = 330) occurred in a specialty PTSD clinic. Eighty-six percent (n = 13,739) of patients who received a clinical evaluation received a confirmatory PTSD diagnosis. Thirty two percent (n = 4,370) of PTSD diagnoses occurred within 0-7 days of screening, 23% (n = 3,093) within 8-28 days, 23% (n = 3,165) within 29-84 days, and 23% (n = 3,111) within 85-365 days. Ten percent (n = 1,372) of patients diagnosed with PTSD engaged in EBP.

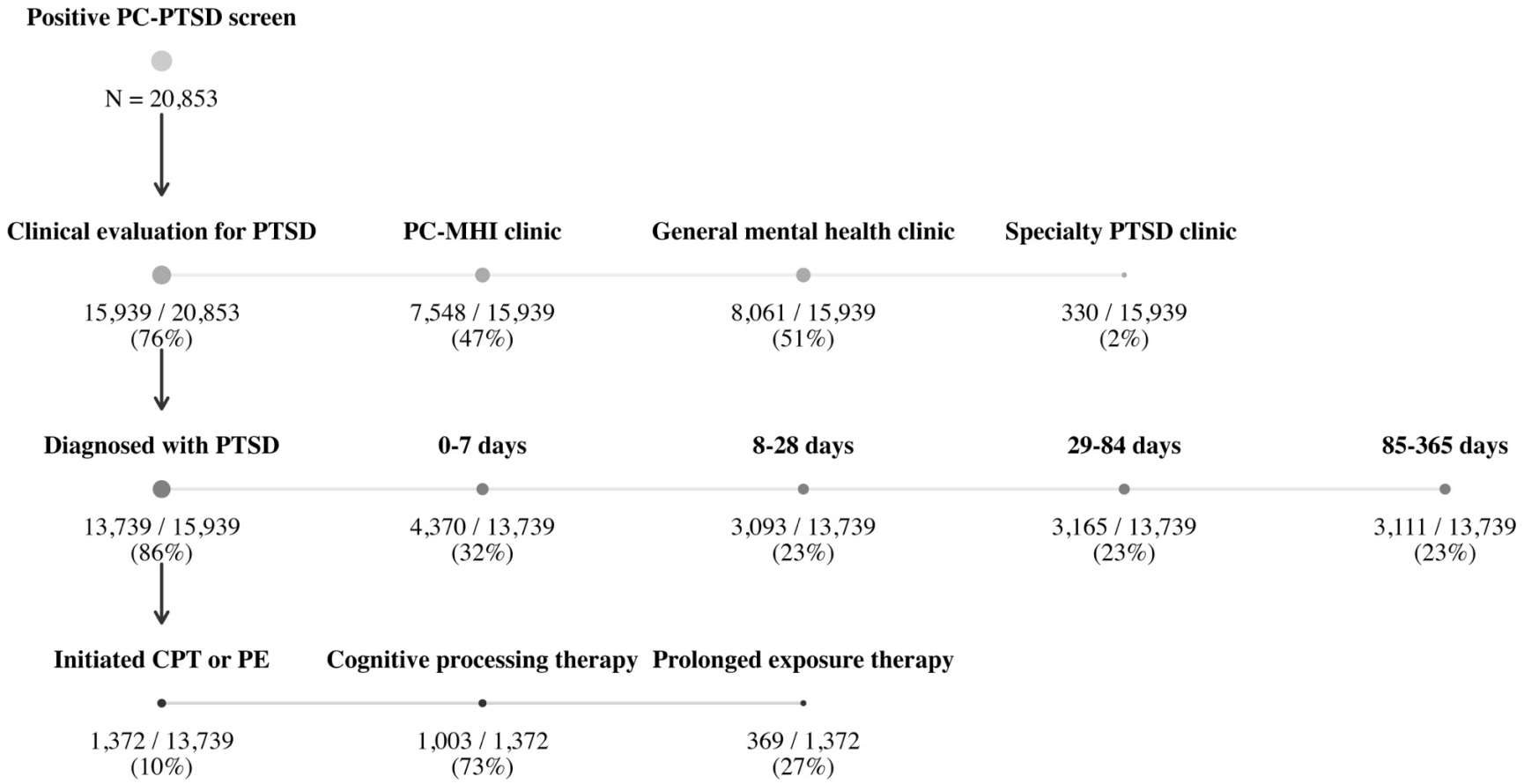


Figure 1

Title: Progression through the PTSD clinical care pathway among 20,853 patients who screened positive for PTSD in 2018.

Footnote: The PTSD care pathway is depicted on the left side of the figure. Patients enter the care pathway with a positive PC-PTSD screen and the vertical arrows depict the flow of patients. The structural and process measures we assessed are listed to the right of each step of the care pathway. PTSD = Posttraumatic stress disorder, PC-PTSD = Primary Care PTSD for DSM-IV, PC-MHI = primary care mental health integrated clinic, CPT = Cognitive Processing therapy, PE = Prolonged Exposure Therapy.

Results of GEE models are presented in Table 2 and predicted probabilities are presented in Figure 2. While controlling for potential confounders, patients who received a clinical evaluation in a specialty PTSD clinic had a 2.73 (95% CI: 2.04, 3.64) greater adjusted odds of engaging in CPT or PE within 12 months of screening positive relative to those who received a clinical evaluation in a PC-MHI clinic. The predicted probability of engaging in CPT or PE was 23.5% among patients who received a clinical evaluation in a specialty PTSD clinic. Similarly, patients who received a confirmatory PTSD diagnosis within 0-7 days, 8-28 days, and 29-84 days of screening had 1.56 (95% CI: 1.27, 1.92), 1.82 (95% CI: 1.48, 2.24), and 1.37 (94% CI: 1.11, 1.70) greater odds, respectively, of engaging in CPT or PE within 12-months of screening positive relative to those who received a confirmatory PTSD diagnosis within 85-365 days of screening. The predicted probability of engaging in EBP was greatest for patients who received a confirmatory PTSD diagnosis 8-28 days after screening (12.8%).

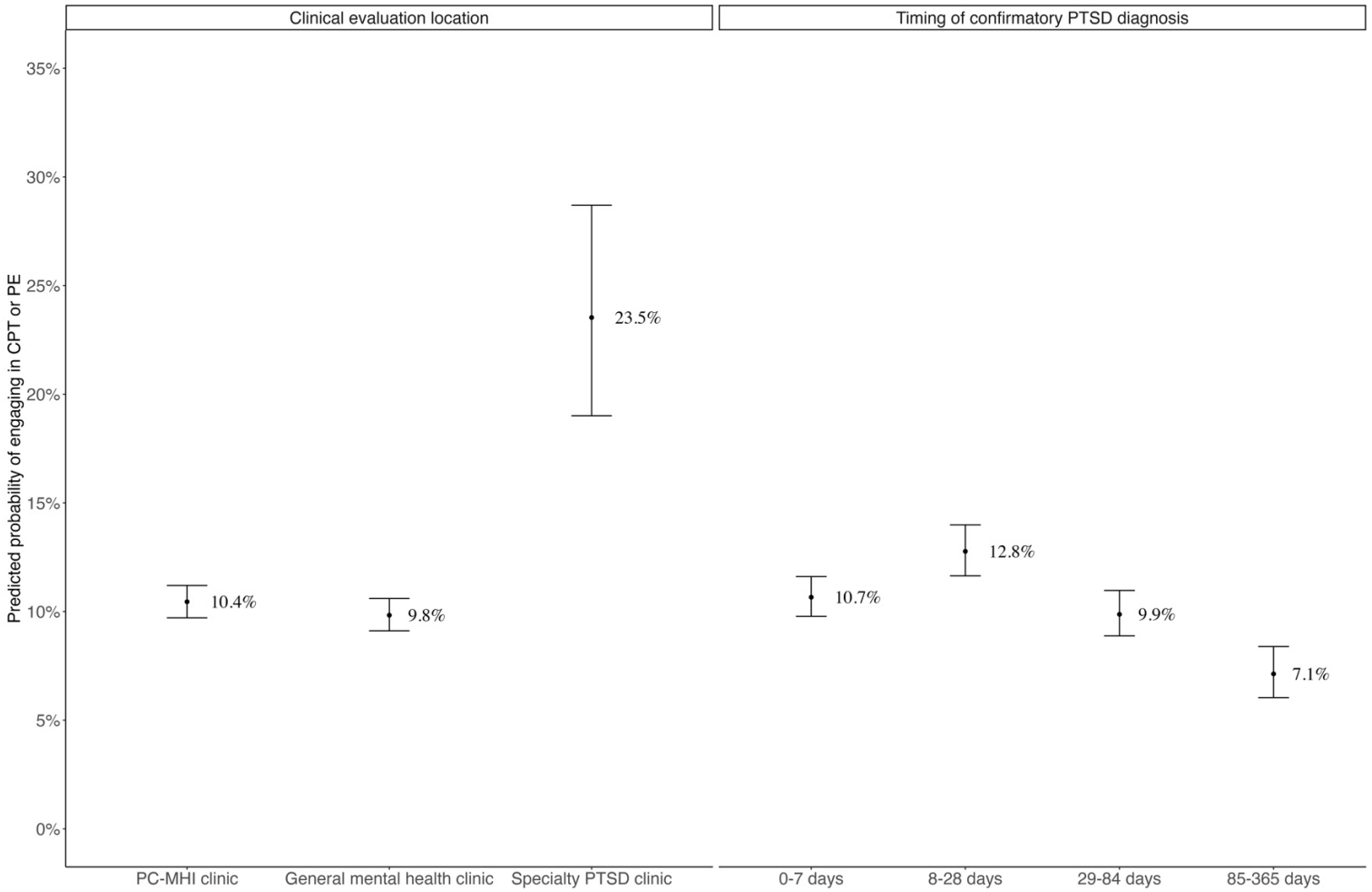


Figure 2

Title: Predicted probability of engaging in cognitive process therapy or prolonged exposure therapy within 12 months of screening positive for posttraumatic stress disorder among patients who were screened and diagnosed with posttraumatic stress disorder in 2018.

Footnote: Marginal probabilities produced from multivariable models. PTSD = Posttraumatic stress disorder, PC-MHI = Primary care-mental health integration clinic.

Table 2. Process and structural measures associated with engaging in cognitive processing therapy or prolonged exposure therapy within 12 months of a new positive posttraumatic stress disorder screen in primary care among 12,462 patients diagnosed with posttraumatic stress disorder in 2018.

Measure	N[a]	%[b]	Bivariable Odds Ratio	95% CI	Multivariable Odds Ratio	95% CI
Clinical Evaluation Location[c]						
PC-MHI clinic	644	10%	Ref		Ref	
General mental health clinic	591	10%	0.93	0.83, 1.05	0.92	0.81, 1.03
Specialty PTSD clinic	69	24%	2.64	1.99, 3.50	2.73	2.04, 3.64
Timing of Confirmatory PTSD Diagnosis[d]						
0-7 days	466	11%	1.55	1.27, 1.90	1.56	1.27, 1.92
8-28 days	395	13%	1.91	1.55, 2.35	1.82	1.48, 2.24
29-84 days	311	10%	1.43	1.15, 1.77	1.37	1.11, 1.70
85-365 days	132	7%	Ref		Ref	

Notes: [a]Number of patients who engaged in evidence-based psychotherapy treatment; [b]Proportion of patients who engaged in evidence-based psychotherapy treatment; [c]Multivariable regression model included age group, sex, race, ethnicity, marital status, VHA service-connected disability benefit, prior TBI diagnosis, prior high risk for suicide indicator, and prior comorbid diagnoses of depression, anxiety, substance use disorder, bipolar disorder, and schizophrenia, and PC-PTSD total score; [d]Multivariable regression model included clinical evaluation location, age group, sex, race, ethnicity, marital status, VHA service-connected disability benefit, prior TBI diagnosis, prior high risk for suicide indicator, and prior comorbid diagnoses of depression, anxiety, substance use disorder, bipolar disorder, and schizophrenia, and PC-PTSD total score. Ref = reference category; PC-MHI = Primary care-mental health integration, PTSD = PTSD Posttraumatic stress disorder.

Discussion

The purpose of this study was to describe the clinical care patients receive after screening positive for PTSD in primary care in the VHA nationwide. Overall, 21,018 patients screened positive for PTSD in 2018, 76% received a clinical evaluation, and 86% evaluated received a confirmatory diagnosis within one year of screening. Among patients who screened positive and received a confirmatory PTSD diagnosis, 10% (n = 1,372) engaged in CPT or PE. Most patients who screen positive in a VHA primary care clinic are connected to a follow-up clinical evaluation and receive a confirmatory PTSD diagnosis. Yet only one in every 10 patients newly diagnosed with PTSD engaged in CPT or PE, suggesting the pathway from clinical evaluation to CPT or PE is suboptimal. Our findings are consistent with previous prevalence estimates of CPT or PE utilization.[17–19,55]

We identified two structural and process measures associated with the outcome engagement in CPT or PE. First, patients who received an evaluation in a specialty PTSD clinic had greater odds of engaging in CPT or PE, relative to those who received a clinical evaluation in a PC-MHI clinic, even after controlling for important patient characteristics. Patients who receive a clinical evaluation in a specialty PTSD clinic may experience greater continuity of care between providers and fewer barriers engaging in CPT or PE because they are evaluated in the setting where CPT and PE are typically provided. In the VHA, specialty PTSD clinics are designed to provide a discrete episode of first line PTSD treatment to patients who have already been diagnosed with PTSD. However, specialty PTSD clinics are not designed nor staffed provide diagnostic clinical evaluations to patients who screened positive in primary care. Our results reflect this care delivery model; only 2% of patients received their subsequent clinical evaluation in a

specialty PTSD clinic. Most patients who screened positive for PTSD received a clinical evaluation in either a PC-MHI clinic (47%) or a general mental health clinic (51%). At the time of this study, CPT and PE were offered in general mental health clinics, but not in PC-MHI clinics. PC-MHI clinics are designed to provide rapid access to clinical evaluation, PTSD education, and motivational enhancement. However, since 2018, brief protocols of PTSD treatment such as Prolonged Exposure for Primary Care or Written Exposure Therapy have been introduced in PC-MHI clinics.[105,106] As a result, access to first line EBPs for PTSD has likely improved and future research should investigate how patient referred to PC-MHI clinics for clinical evaluation engage in these brief first-line EBPs.

Second, patients who received a confirmatory PTSD diagnosis within 0-84 days of screening also had greater odds of engaging in CPT or PE, relative to those who received a confirmatory PTSD diagnosis 85-365 days after screening, even after controlling for patient characteristics and clinical evaluation location. This finding was in line with our hypothesis. The probability of engaging in CPT or PE was greatest among patients who received a confirmatory PTSD diagnosis 8-28 days after screening, suggesting that completing a clinical evaluation for PTSD within 28 days is an optimal window to maximize the likelihood of engaging in EBP. A positive PTSD screen in primary care represents an opportunity to connect patients to mental health services. Patients have reported that asking about trauma through screening facilitates trauma disclosure to health care professionals.[107,108] Disclosing PTSD symptomatology in primary care may suggest a readiness to engage in treatment or an acute need for care. Approximately one quarter (23%) of patients did not receive a clinical evaluation within

12 weeks of screening positive for PTSD. Failing to promptly complete a follow-up clinical evaluation after a positive PTSD screen could result in missed opportunities to engage patients in EBP. Additionally, screening positive for PTSD is associated with an increased risk of suicide-related mortality,[6] underscoring the importance of timely follow up care.

We describe how the structure and process of a clinical evaluation following a positive PTSD screen that produces the outcome of initiating CPT or PE. In our evaluation we focused on initiating CPT or PE, which is the first step towards a complete dose of therapy. A complete dose of CPT or PE is associated with improvement in PTSD symptoms.[109] Understanding how the structural and process dimensions of the PTSD care pathway are associated with initiating CPT or PE provides valuable information for evaluating the effectiveness of the PTSD care pathway.

Patients' decisions to engage in PTSD treatment are complex and driven by patient-level and system-level factors. Prior evaluations have identified several patient-level drivers of CPT or PE engagement[55,62–64] Qualitative research has found that patients' knowledge of CPT or PE and buy-in to the rationale for the exposure-based treatment modality contributes to their decision to engage in these therapies.[66,68] PTSD is also associated with numerous comorbidities[2,22] and patients may choose to focus on other health priorities.[70] In addition to these patient-level factors, our results suggest that system-level factors also play a role in CPT or PE engagement.

Research exploring patients' experiences of care following a PTSD diagnosis have identified continuity of care and multiple intake assessments as barriers to CPT or PE engagement.[66] Patients who are diagnosed with PTSD in a general mental health or

PC-MHI clinic and referred to the specialty PTSD clinic for CPT or PE receive multiple clinical evaluations.[110] This lack of continuity can result in negative experiences if patients are asked to retell traumatic stories with multiple providers and has been hypothesized to decrease engagement in CPT or PE.[66,111] Direct referrals from primary care to specialty PTSD clinics have been proposed as a way to facilitate ease of access to CPT or PE and address this barrier.[77,111] However, this recommendation is challenging in the current treatment system for two reasons. First, specialty PTSD clinics use a time-limited care model designed to target PTSD symptoms in discrete episodes of care.[112] Second, specialty PTSD clinics may not be adequately staffed to accommodate the volume of diagnostic clinical evaluation referrals that are generated from primary care. Patients already experience long wait times for specialty PTSD clinic appointments and directing all positive PTSD screenings to specialty PTSD clinics would likely overwhelm these clinics and reduce access to CPT and PE.

Alternatively, we provide several recommendations to increase engagement in CPT and PE. First, implement a process measure to monitor the number of days between a new positive PTSD screen and clinical evaluation and revise clinic schedules to promote access to clinical evaluations within 28 days of a new positive screen. Second, prioritize use of shared decision making with patients who are diagnosed with PTSD by developing a structured note template to facilitate documentation of patients' decisions. The National Center for PTSD has published the PTSD Treatment Decision Aid[113] and mental health providers in PC-MHI clinics are well-positioned to engage patients who are diagnosed with PTSD in shared-decision making with this resource. Structured note templates were used to promote CPT and PE implementation and enable fidelity

monitoring.[101] A similar strategy could be used to support use of shared decision making. Third, implement Prolonged Exposure for Primary Care and Written Exposure Therapy in PC-MHI clinics and adjust appointment lengths to allow for adequate time to provide these EBPs for PTSD.

Limitations

There are several limitations to the current study. First, this study was observational; we cannot infer causality. Second, we evaluated PTSD screening and follow-up care that occurred in 2018, which is out of sync with current screening and care provision in the VHA. The PC-PTSD screening measure has been replaced with the PC-PTSD for DSM-V in order to align with the updated diagnostic criteria for PTSD. The PC-PTSD-5 has a higher sensitivity than the PC-PTSD while maintaining similar specificity,[114] which is an important improvement that should lead to fewer false negative screening results. Additionally, the proportion of virtual appointments has increased following the COVID-19 pandemic.[115–117] PTSD screening and referral to follow-up care may be conducted differently in virtual and in-person visits. Thus, changes in the PTSD screening measure and VHA primary care delivery may limit generalizability of these findings. Additional research is needed to understand the effectiveness of PTSD screening and referral to appropriate follow-up care in the virtual care environment. Third, measuring EBP utilization using structured EHR templates is a proxy measure of EBP delivery that pertains only to PE and CPT. Other effective psychotherapy protocols for PTSD such as Prolonged Exposure for Primary care, Written Exposure Therapy or Eye Movement Desensitization and Reprocessing Therapy are available in the VHA. At the time of our evaluation operational measures did not exist for these therapies and they

could not be reliably identified using structured EHR data. Fourth, we measured receipt of EBP, receipt and location of a clinical evaluation for PTSD, and receipt and timing of a confirmatory PTSD diagnosis using data routinely collected in the VHA EHR system, which is subject to variability in provider documentation practices. Fifth, the use of routinely collected EHR data subjects our results to misclassification and model misspecification biases. It is possible that unmeasured variables (e.g., distance to nearest VHA facility, comorbid medical health conditions, receipt of a referral for EBP, or patients' treatment preference) could confound the observed associations with initiating EBP. While these factors are not easily accessible from routinely collected EHR data, future studies could incorporate these unmeasured factors via survey or manual chart review.

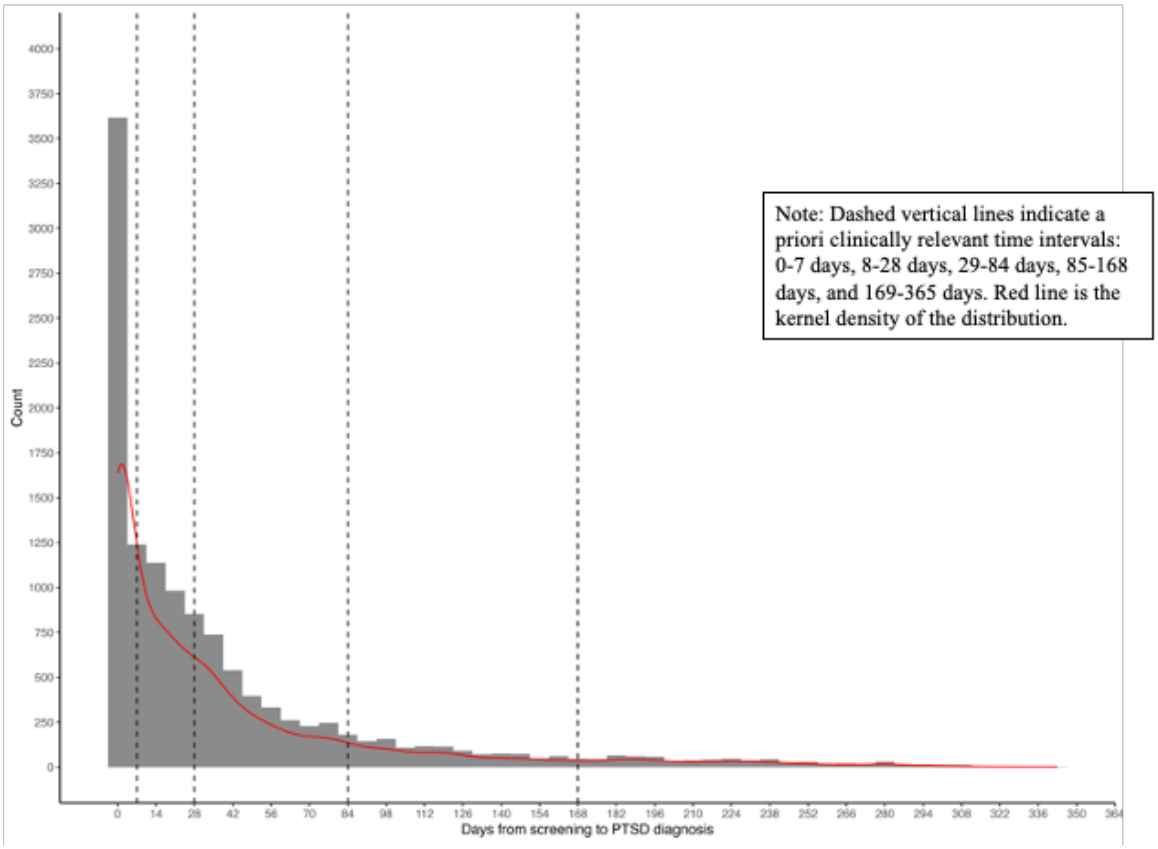
Conclusions

Over 20,000 patients screened positive for PTSD in VHA primary care clinic settings in 2018 and three-quarters received a clinical evaluation within 12 months of screening. Eighty-six percent of patients who received a clinical evaluation received a confirmatory PTSD diagnosis, yet only ten percent went on to engage in CPT or PE, representing a gap in care for this population. Our study of health system factors associated with patient engagement in CPT or PE may help address this gap. We identified that clinical evaluation location and timing of confirmatory PTSD diagnosis after screening were each associated with the likelihood of engaging in CPT or PE. Screening for mental health disorders is necessary but insufficient unless screening efforts are integrated with a system prepared to provide follow up clinical evaluation and

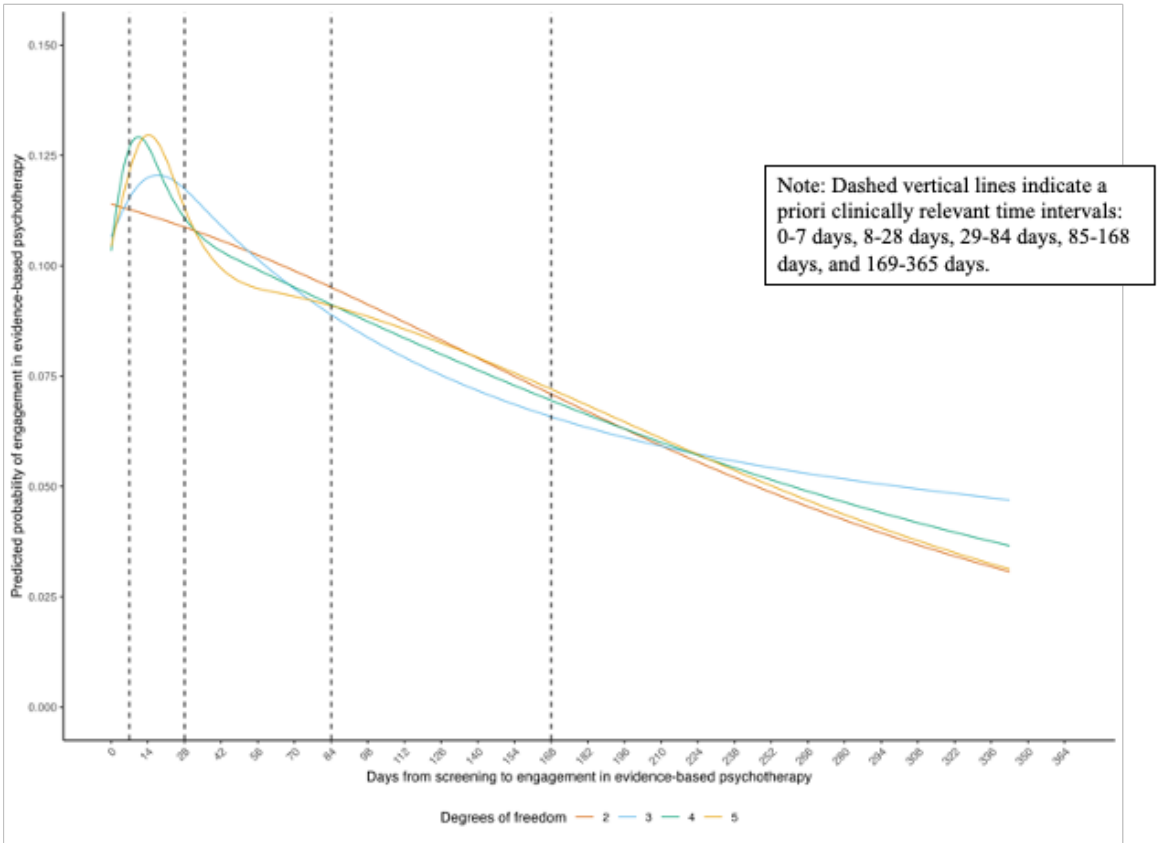
evidence-based treatment. Our results suggest PTSD screening appears to more effectively lead patients with PTSD to engage in CPT or PE when the confirmatory evaluation occurs quickly and in a setting prepared to deliver evidence-based treatment.

Supplemental materials

Supplemental figure 1. Distribution of the number of days from screening to PTSD diagnosis among patients who received a confirmatory PTSD diagnosis in 2018.



Supplemental figure 2. Smoothed association between the number of days from screening to PTSD diagnosis and engagement in evidence-based psychotherapy among patients who received a confirmatory PTSD diagnosis in 2018 using generalized additive models and natural spines.



Interpretation: After reviewing the distribution of days from screening to PTSD diagnosis and the smoothed predicted probability of the association between the number of days from screening to PTSD diagnosis and engagement in evidence-based psychotherapy, we concluded that the 169-365 days time interval should be collapsed with the 85-168 days time interval. The final categorization of Timing of Confirmatory PTSD diagnosis resulted in 4 categories: 0-7 days, 8-28 days, 29-84 days, 85-365 days.

Chapter 4 – Study 3

Title: Timing of evidence-based psychotherapy during the first year after posttraumatic stress disorder diagnosis among patients identified in primary care

Citation: *Cameron, D., Denneson, LM, Carlson, KF, Dieckmann, N, O'Neill, A., O'Neil, M.E.* Timing of evidence-based psychotherapy during the first year after posttraumatic stress disorder diagnosis among patients identified in primary care*. [Not submitted May 2024]*

Abstract

Objective: To examine patient- and system-level factors associated with the number of days between screening positive for PTSD and initiating evidence-based psychotherapy during the first year after posttraumatic stress disorder diagnosis among patients who screened positive in primary care.

Method: National retrospective observational cohort of VHA primary care patients who screened positive for PTSD in 2018 and received a confirmatory PTSD diagnosis were followed for one year from the date of screening.

Results: Overall, 12,545 patients screened positive and were diagnosed with PTSD in 2018 and 1,387 (11%) initiated EBP during the first 365 days after their PTSD diagnosis. On average, patients initiated EBP 339 days after being diagnosed with PTSD. Five percent of patients initiated EBP within the first 90 days after PTSD diagnosis. Clinical evaluation location (in a PTSD specialty clinic) and timing of confirmatory PTSD diagnosis (8-28 days after screening) were each associated with earlier EBP initiation. Several patient sociodemographic characteristics were also associated with earlier EBP initiation including female sex, patients identifying as Pacific Islander, and patients with prior high risk for suicide.

Conclusions: Understanding the timing of EBP initiation during the first year provides information to focus health system design efforts on modifiable factors that ensure patients with PTSD are receiving the best care possible in an efficient and effective manner. Systematic efforts to increase EBP engagement should focus on rapid access to clinical evaluation in settings prepared to deliver EBP.

Introduction

Approximately 600,000 patients who use the Veterans Health Administration (VHA) have been diagnosed with posttraumatic stress disorder (PTSD) and more than 10,000 patients are newly diagnosed each year.[12,32,118] Patients diagnosed with PTSD have increased morbidity, mortality,[1,2] and risk of suicide.[3,4] Increased symptoms of depression and anxiety are also common among those with PTSD and have been associated with elevated risk of cardiovascular disease.[25–28] Identifying patients with PTSD and connecting them to appropriate mental health care is essential for improving the health of this population. In the VHA, two of the most effective evidence-based psychotherapies (EBP) available for PTSD,[46–51,53] cognitive processing therapy (CPT) and prolonged exposure (PE), have been widely disseminated to effectively treat PTSD.[13–15] Early engagement in EBP is associated with better outcomes.[78,109] However, many VHA patients do not initiate these treatments, and the patients who do typically begin EBP several years after initially presenting to a VHA mental health clinic,[52,63] suggesting missed opportunities to improve patient care and outcomes.

The timing of EBP is a modifiable factor that can improve the health of this population. Patients who initiate EBP within one year of their first mental health visit are 22% more likely to experience significant symptom improvement.[109] The decision to initiate EBP or, conversely, to delay care, is complex and may involve patients or practitioners prioritizing the treatment of other comorbidities, patients' anxiety about engaging in trauma-focused treatment, and stigma associated with mental health and PTSD.[63,71,72,119,120] Ensuring timely access to EBP is essential to caring for patients with PTSD.

Routine PTSD screening in primary care is one pathway for connecting new patients to timely EBP treatment. In the VHA, many patients with PTSD first present in primary care.[38] VHA primary care providers (PCPs) use the Primary Care PTSD Screen for DSM-IV (PC-PTSD), which assesses the presence of symptoms that correspond to the criteria for PTSD.[43] Patients who screen positive for PTSD should be referred for a mental health diagnostic clinical evaluation of their PTSD symptoms.[13]

Disclosing PTSD symptoms in primary care may indicate a readiness to engage in treatment or an acute need for care. Patients have reported that asking about trauma through screening facilitates trauma disclosure to health care professionals.[107,108] Research suggests that endorsing more symptoms of PTSD on a self-report measure (e.g., greater PC-PTSD total score) is a significant predictor of receiving mental health care.[56,121] A positive PTSD screen in primary care represents an opportunity to connect patients to mental health services.

Unfortunately, only 10% of patients who screened positive for PTSD in primary care and subsequently received a confirmatory diagnosis initiated EBP within one year.[118] This represents a missed opportunity to engage newly diagnosed patients in EBP treatment and improve PTSD symptoms. Despite identifying numerous predictors of initiating EBP overall, [52,55,62] existing studies have not investigated drivers of treatment engagement within one year of a new PTSD diagnosis.[63,78] Understanding patient factors and health system barriers or facilitators to initiating EBP within one year will help to focus health system design efforts on modifiable factors that ensure patients with PTSD are receiving the best care possible in an efficient and effective manner.

The purpose of this study is to examine the critical period immediately after a positive PTSD screen and subsequent new PTSD diagnosis. We focus on the number of days between the receipt of a new PTSD diagnosis and patients' initiation of EBP. The primary objective of this study is to identify patient characteristics and health system factors associated with the number of days between receipt of a new PTSD diagnosis and EBP initiation among patients who screened positive in primary care and then received a confirmatory diagnosis of PTSD.

Methods

Participants

Using a retrospective cohort study design, we identified a cohort of patients who screened positive on the PC-PTSD in a primary care clinic in calendar year (CY) 2018, had a confirmatory PTSD diagnosis in CY 2018, and who were alive at the end of CY 2019. Patients were followed for 365 days from their confirmatory PTSD diagnosis. The PC-PTSD is a four-item measure.[102] Endorsed items are scored as 1 (versus 0). The PC-PTSD total score range is 0 to 4. We adopted the definition of a positive screen used in VA clinical care; a score of 0, 1 or 2 on the PC-PTSD was defined as a negative screen for PTSD and a score of 3 or 4 was defined as a positive screen. A confirmatory PTSD diagnosis was defined as an encounter in a mental health clinic associated with an International Classification of Diseases – 9th Revision or 10th Revision – Clinical Modification (ICD-9-CM or ICD-10-CM) code for PTSD (ICD-9: 309.81; ICD-10: F43.10, F43.11, or F43.12). Patients who screened positive for PTSD prior to CY 2018, who had an encounter with an ICD-9-CM or ICD-10-CM code for PTSD between CY

2000 and CY 2018, or who had an encounter at a mental health clinic in the 12-months prior to PTSD screening were excluded.

Data sources

We obtained patients' PC-PTSD screening results, VHA utilization history, sociodemographic information, and ICD-9-CM and ICD-10-CM diagnoses from the VA Corporate Data Warehouse, a relational database that combines electronic health record data from multiple VHA sources.

Measures

Timing of Evidence-Based Psychotherapy initiation: The number of days to initiate EBP was calculated from the date of PTSD diagnosis until EBP initiation. Patients who did not initiate EBP were censored at the end of the follow up period. The cumulative incidence of EBP initiation was defined as the number of patients who initiated EBP during the 365 days after PTSD diagnosis. Sessions of CPT or PE were measured by the presence of structured electronic health record templates, which VHA providers are required to use to document the provision of CPT and PE.[86]

Patient sociodemographic and clinical characteristics

We categorized age (18-29 years old, 30-44 years old, 45-59 years old, and ≥60 years old), sex (male and female), race (American Indian/Alaskan Native, Asian, Black, Multi-racial, Not Reported, Pacific Islander, and White), and ethnicity (Hispanic or Latino/a versus Not Hispanic or Latino/a) according to patients' health records. Sex is presumed to represent sex assigned at birth. Patients without race indicated in their health record were classified as "Not reported" and patients with more than one race were classified as "multi-racial." Race and ethnicity were conceptualized as social constructs

and analyzed as proxies for patient exposure to racism or discrimination, which can influence receipt of health care.[122] Marital status (married, not married, never married, or unknown) and VHA service-connected disability benefit (0%, >0% – 60%, and >60%) were measured prior to a patient's PTSD screening date. Prior comorbid mental health diagnoses (anxiety disorders, depressive disorders, bipolar disorder, psychotic disorders, and substance use disorders) and prior traumatic brain injury (TBI) diagnoses were identified using ICD-9-CM or ICD-10-CM codes associated with any mental health encounter in the 12 months prior to a patient's PTSD screening date. Prior high risk for suicide was measured by the presence of a high-risk flag or a suicide safety plan in a patient's health record in the 12-months prior to their PTSD screening date. PC-PTSD total score (3 versus 4) was measured at the PTSD screening date.

Health system factors

Health system factors were selected to capture structural and process factors relevant to PTSD psychotherapy initiation.[73]

Clinical evaluation location (structural measure): We identified patients who had an encounter in a mental health clinic within 12 months after screening positive on the PC-PTSD. This indicated a mental health diagnostic evaluation for PTSD. The mental health clinic where patients received their clinical evaluation for PTSD was defined as either a general mental health clinic, a PC-MHI clinic, or a specialty PTSD clinic. Patients were categorized according to the location of their first encounter in a mental health clinic following a new positive PTSD screen.

Timing of Confirmatory PTSD diagnosis (process measure): We identified 4 *a priori*, clinically relevant time intervals from screening to confirmatory PTSD diagnosis. The groups were orthogonal: 0-7 days, 8-28 days, 29-84 days, and 85-365 days.

Statistical analyses

Frequency and percentage of patient sociodemographic and clinical characteristics and structural and process measures were calculated for the overall sample. The cumulative incidence and proportion of patients initiating EBP was calculated from PTSD diagnosis to three *a priori* time points: 90, 180, and 365 days after receipt of a new PTSD diagnosis. To estimate associations between drivers of the number of days between receipt of a new PTSD diagnosis and EBP initiation, we used confounder-adjusted survival curves and restricted mean survival time (RMST).[123] RMST is the average time-to-event over a fixed period of follow-up time. In our study, RMST is interpreted as the average number of days for patients to initiate EBP during the first 365 days after PTSD diagnosis. RMSTs were calculated for each level of independent variables. The difference in RMST and 95% confidence intervals were calculated between levels of the independent variable and the reference level. Negative differences are interpreted as earlier EBP initiation, on average, and positive differences are interpreted as later average EBP initiation. To account for confounding between independent variables and timing of EBP initiation we employed a multivariable model specification strategy based on a causal modeling approach in which a separate *a priori* directed acyclic graph was specified for each independent variable.[103] Covariates considered for each model included age group, sex, race, ethnicity, VHA service-connected disability benefit, prior comorbid mental health or TBI diagnoses, prior high-risk for suicide, PC-PTSD total

score, timing of confirmatory PTSD diagnosis, and clinical evaluation location. Confounder-adjusted survival curves were estimated using the G-computation method from the "adjustedCurves" library in R to account for the effects of *a priori* specified confounding variables in each multivariable model.[124,125] All analyses accounted for clustering by VHA facility and robust standard errors were obtained using the cluster option from the "Survival" library. All analyses were performed using R statistical software version 4.3.1.[104]

Results

Descriptive characteristics of patients who screened positive and were diagnosed with PTSD in 2018 are presented in Table 1. More than two thirds (69%) of patients endorsed all items on the PC-PTSD screen. Patients who initiated EBP within one year of diagnosis were predominately 30 – 44 years old, male, white, and not Hispanic or Latino/a.

Table 1. Characteristics of patients who did and did not initiate EBP during the first 365 days after PTSD diagnosis among patients who screened positive for PTSD in Veterans Health Administration primary care clinics and were diagnosed with PTSD in 2018.

Measure	**Overall[a] (N = 12,545)**	**Initiated EBP[b] (N = 1,387)**	**Did not initiate EBP[b] (11,158)**
Patient sociodemographics			
Age category			
18 – 29 years	2,038 (16%)	222 (11%)	1,816 (89%)
30 – 44 years	4,800 (39%)	531 (11%)	4,269 (89%)
45 – 59 years	3,221 (26%)	414 (13%)	2,807 (87%)
60+ years	2,404 (19%)	211 (9%)	2,193 (91%)
Sex			
Male	10,581 (85%)	1,096 (10%)	9,485 (90%)
Female	1,882 (15%)	282 (15%)	1,600 (85%)
Race			

American Indian/Alaska Native	121 (1.0%)	10 (8.3%)	111 (92%)
Asian	180 (1.4%)	7 (3.9%)	173 (96%)
Black	2,273 (18%)	266 (12%)	2,007 (88%)
Multi-racial[c]	3,279 (26%)	341 (10%)	2,938 (90%)
Not Reported[d]	778 (6%)	79 (10%)	699 (90%)
Pacific Islander	142 (1%)	21 (15%)	121 (85%)
White	5,690 (46%)	654 (11%)	5,036 (89%)
Ethnicity			
Hispanic or Latino/a	1,426 (11%)	139 (9.7%)	1,287 (90%)
Not Hispanic or Latino/a	11,037 (89%)	1,239 (11%)	9,798 (89%)
Marital status			
Married	7,077 (57%)	804 (11%)	6,273 (89%)
Never married	2,240 (18%)	242 (11%)	1,998 (89%)
Not married	2,852 (23%)	294 (10%)	2,558 (90%)
Unknown	294 (2%)	38 (13%)	256 (87%)
Military branch			
Air Force	1,343 (11%)	151 (11%)	1,192 (89%)
Army	7,223 (58%)	788 (11%)	6,435 (89%)
Marine	1,943 (16%)	222 (11%)	1,721 (89%)
Navy	1,690 (14%)	194 (11%)	1,496 (89%)
Other branch or component	264 (2%)	23 (9%)	241 (91%)
Service-connected disability benefit			
No	4,736 (38%)	589 (12%)	4,147 (88%)
Service connected, 0%	604 (5%)	58 (10%)	546 (90%)
Service connected, >0-60%	4,093 (33%)	453 (11%)	3,640 (89%)
Service connected, >60%	3,030 (24%)	278 (9%)	2,752 (91%)
Patient clinical characteristics			
PC-PTSD total score			
3	3,844 (31%)	382 (10%)	3,462 (90%)
4	8,619 (69%)	996 (12%)	7,623 (88%)
Depressive disorders			
Yes	1,701 (14%)	204 (12%)	1,497 (88%)
No	10,762 (86%)	1,174 (11%)	9,588 (89%)
Anxiety disorders			
Yes	1,001 (8.0%)	117 (12%)	884 (88%)

No	11,462 (92%)	1,261 (11%)	10,201 (89%)
Bipolar disorder			
Yes	50 (<1%)	-[e]	-[e]
No	12,495 (99%)	-[e]	-[e]
Psychotic Disorders			
Yes	6 (<0.1%)	-[e]	-[e]
No	12,539 (99%)	-[e]	-[e]
Substance use disorders			
Yes	996 (8%)	97 (10%)	899 (90%)
No	11,549 (92%)	1,290 (11%)	10,259 (89%)
Prior traumatic brain injury diagnosis			
Yes	1,526 (12%)	190 (12%)	1,336 (88%)
No	10,937 (88%)	1,188 (11%)	9,749 (89%)
Prior high risk for suicide			
Yes	104 (1%)	19 (18%)	85 (82%)
No	12,359 (99%)	1,359 (11%)	11,000 (89%)
Structural and process measures			
Clinical Evaluation Location			
General mental health clinic	6,057 (48%)	646 (11%)	5,411 (89%)
PC-MHI clinic	6,193 (49%)	669 (11%)	5,524 (89%)
Specialty PTSD clinic	295 (2%)	72 (24%)	223 (76%)
Timing of Confirmatory PTSD Diagnosis			
0-7 days	4,388 (35%)	468 (11%)	3,920 (89%)
8-28 days	3,119 (25%)	404 (13%)	2,715 (87%)
29-84 days	3,174 (25%)	336 (11%)	2,838 (89%)
85-365 days	1,864 (15%)	179 (10%)	1,685 (90%)

Notes: [a]Column percentage; [b]Row percentage; [c]Patients with multiple races recorded in their health record were categorized as multi-racial; [d]Patients who did not have a race recorded in their electronic health record were categorized as missing; [e]Cells of n less than 10 were suppressed to preserve data
privacy. EBP = evidence-based psychotherapy; PC-PTSD = Primary Care-Posttraumatic Stress Disorder screen for DSM-IV; PC-MHI = primary care-mental health integration; PTSD = posttraumatic stress disorder.

Overall, 11% (n = 1,387) of patients diagnosed with PTSD initiated EBP within the first 365 days after being diagnosed with PTSD. On average, patients initiated EBP 339 (95% CI: 337, 340) days after being diagnosed with PTSD. Five percent (n = 640) of patients

diagnosed with PTSD initiated EBP within the first 90 days after being diagnosed. Eight percent (n = 1,010) of patients diagnosed with PTSD initiated EBP within the first 180 days after being diagnosed. Adjusted cumulative incidence curves stratified by patient sociodemographic, clinical characteristics, and structural and process measures are presented in Figure 1.

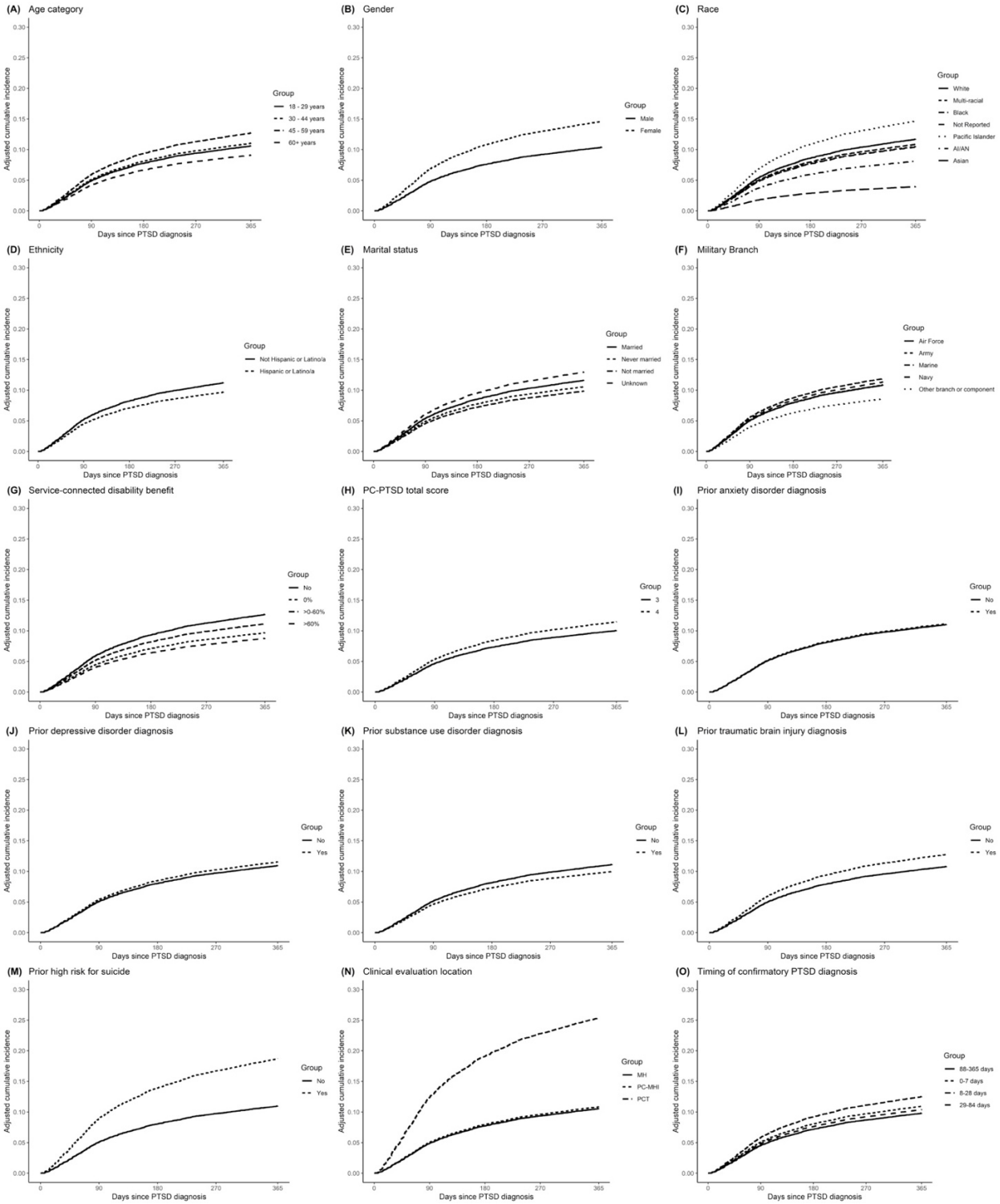


Figure 1. Adjusted cumulative incidence of EBP initiation by patient sociodemographic and clinical characteristics and structural and process measures during the first 365 days after posttraumatic stress disorder diagnosis among patients identified in primary care.

Footnote: PTSD = Posttraumatic stress disorder. MH = general mental health clinic; PC-MHI = Primary care-mental health integration clinic; PCT = specialty PTSD specialty.

Adjusted RMSTs and differences in RMSTs are presented in Table 2. Patient sociodemographic characteristics were associated with both earlier and later EBP initiation. Patients between 45 and 59 years old initiated EBP approximately five days earlier (95% CI: -8.53, -1.69) and patients 60 years and older initiated EBP approximately four days later (95% CI: 0.20, 7.02) relative to patients between 18 and 29 years old. Female patients initiated EBP approximately ten days earlier (95% CI: -13.47, -7.05), relative to male patients. Patients identifying as Asian and American Indian or Alaska Native initiated EBP approximately nineteen (95% CI: 14.39, 22.68) and approximately nine (95% CI: 3.36, 13.78) days later, respectively, and patients identifying as Pacific Islander initiated EBP approximately seven days earlier (95% CI: -12.92, -1.57) relative to white patients. Patients identifying as Hispanic or Latino/a initiated EBP approximately four days earlier (95% CI: 0.38, 6.94) to patients who do not identify as Hispanic or Latino/a. Patients who were not married initiated EBP approximately four days later (95% CI: 1.26, 7.18), relative to patients who were married. Patients who severed in an other branch or component initiated EBP approximately five days later (95% CI: 0.48, 10.20), relatively to patients who severed in the Air Force. Patients with 0%, >0-60%, and >60% VHA service-connected disability benefit initiated EBP approximately seven (95% CI: 3.16, 11.27), approximately four (95% CI: 0.57, 6.75), and approximately nine (95% CI: 6.31, 12.53) days later, respectively, relative to patients with no VHA service-connected disability benefit.

Several patient clinical characteristics were associated with earlier EBP initiation. Patients who reported a total score of 4 on the PC-PTSD initiated EBP approximately three days earlier (95% CI: -6.25, -0.62) relative to patients who reported a total score of

3. Patients with a prior TBI diagnosis initiated EBP approximately five days earlier (95% CI: -8.12, -1.45), relative to patients without a prior TBI diagnosis. Patients with a prior high risk for suicide indicator initiated EBP approximately eighteen days earlier (95% CI: -24.12, -11.13) relative to patients without a prior high risk for suicide indicator.

There was evidence that health system factors were also associated with timing of EBP initiation. Patients who received a clinical evaluation in a Specialty PTSD clinic initiated EBP approximately thirty-six days earlier (95% CI: -41.38, -30.38), relative to patients who received a clinical evaluation in a PC-MHI clinic. Patients who received a confirmatory PTSD diagnosis 8-28 days after screening initiated approximately seven days earlier (95% CI: -10.06, -3.00), relative to patients who received a confirmatory PTSD diagnosis 85-365 days after screening.

Table 2. Associations between patient sociodemographic and clinical characteristics, and structural and process measures, and average days to EBP initiation during the first 365 days after posttraumatic stress disorder diagnosis among patients identified in primary care.

Measure	Adjusted RMST	Adjusted RMST Difference (95% CI)
Patient sociodemographics		
Age category[a]		
18 – 29 years	339.84	Reference
30 – 44 years	338.80	-1.04 (-4.29, 2.20)
45 – 59 years	334.73	**-5.11 (-8.53, -1.69)**
60+ years	343.45	**3.61 (0.20, 7.02)**
Sex[b]		
Male	340.36	Reference
Female	330.10	**-10.26 (-13.47, -7.05)**
Race[c]		
American Indian/Alaska Native	345.76	**8.57 (3.36, 13.78)**
Asian	355.72	**18.53 (14.39, 22.68)**
Black	339.20	2.01 (-1.19, 5.21)
Multi-racial[c]	340.07	2.88 (-0.15, 5.92)
Not Reported[d]	340.24	3.05 (-0.73, 6.82)
Pacific Islander	329.94	**-7.25 (-12.92, -1.57)**
White	337.19	Reference
Ethnicity[d]		
Hispanic or Latino/a	342.02	**3.66 (0.38, 6.94)**
Not Hispanic or Latino/a	338.36	Reference
Marital status[e]		
Married	337.39	Reference
Never married	339.91	2.51 (-0.69, 5.72)
Not married	341.61	**4.22 (1.26, 7.18)**
Missing	334.15	-3.25 (-7.89, 1.39)
Military branch[f]		
Air Force	339.31	Reference
Army	339.17	-0.13 (-3.48, 3.22)
Marine	336.72	-2.59 (-6.43, 1.26)
Navy	338.07	-1.24 (-5.03, 2.55)
Other branch or component	344.64	**5.34 (0.48, 10.2)**

VHA Service-connected disability benefit[g]		
No	334.85	Reference
Service connected, 0%	342.07	**7.22 (3.16, 11.27)**
Service connected, >0-60%	338.51	**3.66 (0.57, 6.75)**
Service connected, >60%	344.28	**9.42 (6.31, 12.53)**
Patient clinical characteristics		
PC-PTSD total score[f]		
3	341.18	Reference
4	337.74	**-3.44 (-6.25, -0.62)**
Prior anxiety disorder diagnosis[g]		
Yes	338.47	-0.35 (-3.77, 3.07)
No	338.82	Reference
Prior depressive disorder diagnosis[g]		
Yes	337.53	-1.46 (-4.67, 1.75)
No	338.99	Reference
Prior substance use disorder diagnosis[g]		
Yes	341.32	2.74 (-0.66, 6.14)
No	338.57	Reference
Prior traumatic brain injury diagnosis[h]		
Yes	334.57	**-4.79 (-8.12, -1.45)**
No	339.35	Reference
Prior high risk for suicide[i]		
Yes	321.30	**-17.63 (-24.12, -11.13)**
No	338.93	Reference
Structural and process measures		
Clinical evaluation location[j]		
PC-MHI clinic	339.26	Reference
General mental health clinic	339.96	0.70 (-2.08, 3.48)
Specialty PTSD clinic	303.38	**-35.88 (-41.38, -30.38)**
Timing of confirmatory PTSD diagnosis[k]		
0-7 days	339.01	-2.75 (-6.12, 0.62)
8-28 days	335.22	**-6.53 (-10.06, -3.00)**
29-84 days	340.33	-1.42 (-4.89, 2.04)
85-365 days	341.75	Reference

Notes:
[a]Multivariable regression model included sex, race, ethnicity
[b]Multivariable regression model included age group, race, ethnicity

[c]Multivariable regression model included age group, sex, ethnicity
[d]Multivariable regression model included age group, sex, race
[e]Multivariable regression model included age group, sex, race, ethnicity
[f]Multivariable regression model included age group, sex, race, ethnicity, marital status
[g]Multivariable regression model included age group, sex, race, ethnicity, marital status, military branch, prior traumatic brain injury diagnosis
[f]Multivariable regression model included age group, sex, race, ethnicity, marital status, military branch, prior comorbid diagnoses of depression, anxiety, substance use disorder, and traumatic brain injury
[g]Multivariable regression model included age group, sex, race, ethnicity, marital status, military branch, prior traumatic brain injury diagnosis
[h]Multivariable regression model included age group, sex, race, ethnicity, military branch,
[i]Multivariable regression model included age group, sex, race, ethnicity, marital status, prior comorbid diagnoses of depression, anxiety, substance use disorder, and traumatic brain injury
[j]Multivariable regression model included age group, sex, race, ethnicity, marital status, military branch, VHA service-connected disability benefit, prior comorbid diagnoses of depression, anxiety, substance use disorder, and traumatic brain injury, PC-PTSD total score
[k]Multivariable regression model included age group, sex, race, ethnicity, marital status, military branch, VHA service-connected disability benefit, prior comorbid diagnoses of depression, anxiety, substance use disorder, and traumatic brain injury, PC-PTSD total score, and clinical evaluation location
Bold = p-value < 0.05; RMST = restricted mean survival time, RMST is interpreted as the average number of days for patients to initiate EBP; CI = confidence interval; VHA = Veterans health administration; PC-PTSD = Primary care PTSD screen; PC-MHI = Primary care-mental health integration; PTSD = PTSD Posttraumatic stress disorder.

Discussion

The purpose of this study was to identify patient factors and health system factors associated with the number of days between receipt of a new PTSD diagnosis and EBP initiation among patients who screened positive in primary care and then received a confirmatory diagnosis of PTSD. Overall, 1,387 (11%) patients who screened positive for PTSD in primary care and were diagnosed with PTSD initiated EBP during the first 365 days after their PTSD diagnosis. On average, patients initiated EBP 339 days after being diagnosed with PTSD. Five percent of patients diagnosed with PTSD initiated EBP within the first 90 days after being diagnosed. Previous evaluations of EBP utilization found approximately 15% of patients with an existing PTSD diagnosis initiate EBP. This suggests that approximately two thirds of patients who initiate EBP do so during the first year and approximately one third initiate within the first 90 days after a new PTSD diagnosis. We measured the difference in the average number of days to initiate EBP (i.e., difference in RMST) between levels of patient sociodemographics, clinical characteristics, and health system factors. We identified several patient factors, including sex, race, service-connected disability, and suicide risk indicator, and two health system factors associated with the number of days between receipt of a new PTSD diagnosis and EBP initiation. This is the first study to our knowledge to examine the number of days between receipt of a new PTSD diagnosis and EBP initiation among patients who screened positive in primary care, providing a foundation for further research exploring etiologies for delays in connecting patients with appropriate therapy.

Several patient characteristics were associated with the number of days between receipt of a new PTSD diagnosis and EBP initiation. Female patients initiated EBP

approximately ten days earlier on average relative to male patients. Previous evaluations of EBP initiation have found female patients were more likely to initiate EBP and initiate EBP earlier relative to male patients.[63,91] Patients identifying as Asian and American Indian or Alaska Native initiated EBP approximately nineteen and nine days later on average, respectively, and patients identifying as Pacific Islander initiated EBP approximately seven days earlier on average relative to white patients. In certain communities, cultural beliefs may influence treatment seeking behaviors. Previous evaluations of EBP utilization have not identified significant differences in EBP initiation between Asian, American Indian or Alaska Native, or Pacific Islander racial identities relative to white patients.[55,63] Our results suggest the timing of EBP initiation within the first year after PTSD diagnosis may be different between these groups. Patients with any VHA service-connected disability benefit initiated EBP later, on average, relative to patients without a VHA service-connected disability benefit. Previous evaluations have found patients with VHA service-connected disability benefit are less likely to engage in EBP.[62,91] It is possible that providers are less likely to offer EBP to patients with VHA service-connected disability benefit or that patients' perceptions of their benefit influence treatment seeking decisions.[126–128] Further research is needed to understanding the relationship between VHA service-connected disability benefits and EBP engagement.

Patients with a prior high risk for suicide indicator initiated EBP approximately eighteen days earlier on average relative to patients without prior high risk for suicide indicator. The electronic health record alerts providers when they are caring for a patient who is high risk for suicide. It is possible that providers prioritize these patients for follow-up mental health care and EBP. This finding is particularly encouraging given

suicide prevention is a VHA strategic priority and EBPs are associated with reduced suicidal ideation.[129,130]

In addition to understanding individual level disparities, increasing EBP engagement requires addressing modifiable health system factors. We identified two health system factors associated with the number of days between receipt of a new PTSD diagnosis and EBP initiation. First, patients who were diagnosed in a specialty PTSD clinic initiated EBP approximately thirty-six days earlier on average relative to those who were diagnosed in a PC-MHI clinic. We did not find differences in days to initiating EBP for patients who received a clinical evaluation in a PC-MHI clinic or general mental health clinic. In a prior qualitative study, VHA patients have described barriers to engaging in EBP related to continuity of care.[131,132] Patients who are diagnosed with PTSD in a setting where EBP is not offered are referred to a general mental health or specialty PTSD clinic for treatment. This process can result in up to three separate assessments for patients who screen positive for PTSD before they are assigned a therapist to begin EBP: a brief assessment of PTSD symptoms in primary care, a comprehensive diagnostic clinical assessment for PTSD, and a specialty PTSD clinic intake assessment. Patients have expressed frustration with retelling of their story to multiple providers.[133]

Second, patients who received a confirmatory PTSD diagnosis 8-28 days after a positive PTSD screen initiated EBP approximately seven days earlier, on average, relative to patients who received a confirmatory PTSD diagnosis 85-365 days after a positive PTSD screen. Qualitatively, patients have reported seeking PTSD treatment due to acute crisis.[134] However, patients also report multiple barriers to accessing care including wait

times and PTSD symptomology. [135,136] Disclosing PTSD symptomology in primary care may represent an acute need for care or readiness to engage in treatment. Taken together, these findings suggest patients who receive a diagnostic clinical evaluation quickly and in a setting prepared to deliver evidence-based treatment initiate EBP earlier. Leveraging health system factors associated with earlier EBP engagement can help reduce PTSD symptoms and improve the health of patients diagnosed with PTSD. Patients who screen positive for PTSD in primary care are likely motivated to engage in care and the health system should be prepared to capitalize this motivation by facilitating timely follow up clinical evaluation and connection to EBP.

Limitations

There are several limitations to the current study. First, this study was observational; we cannot infer causality based on the observed associations. Second, measuring EBP utilization using structured EHR templates is a proxy measure only of EBP delivery. Other effective psychotherapy protocols for PTSD such as Prolonged Exposure for Primary care, Written Exposure Therapy or Eye Movement Desensitization and Reprocessing Therapy are available in the VHA. At the time of our evaluation operational measures did not exist for these therapies and they could not be reliably identified using structured EHR data. Third, we measured the date of PTSD diagnosis and receipt of EBP using clinical notes, which is subject to variability in provider documentation practices. Fourth, the use of routinely collected EHR data subjects our results to misclassification and model misspecification biases. It is possible that the timing of provider documentation and unmeasured variables (e.g., distance to nearest VHA facility, comorbid medical health conditions, receipt of a referral for EBP, or

patients' treatment preference) could confound the observed associations with the number of days to EBP initiation. While these factors are not easily accessible from routinely collected EHR data, future studies could incorporate these unmeasured factors via survey or manual chart review. Fifth, a clinically meaningful difference in the average number of days to EBP initiation has not been established and thus statistically significant differences should be interpreted with caution. Establishing a clinically meaningful difference requires further research and should incorporate patient and provider perspectives.

Conclusion

Understanding the timing of EBP initiation during the first year after a PTSD diagnosis provides information to focus health system design efforts on modifiable factors that ensure patients with PTSD are receiving the best care possible in an efficient and effective manner. Patients who screen positive and are diagnosed with PTSD are likely more ready to engage in EBP. Patients who initiate EBP within the first year after being diagnosed experience greater symptom improvement relative to patients who delay EBP or do not initiate.[78,109] Systematic efforts to increase EBP engagement should focus on rapid access to clinical evaluation in settings prepared to deliver EBP. Future research should explore patients' readiness and motivation to engage in EBP at the point of screening as well as patient and provider perceptions of barriers to accessing these therapies following a positive PTSD screen in primary care.

Chapter 5 – Integrated Commentary

The purpose of this dissertation was to understand VHA patients' progression through the PTSD care pathway from a new positive PTSD screen to engagement in EBP. In the VHA, most new patients with PTSD are first identified in primary care via routine screening. Understanding the care patients receive after a positive PTSD screen can inform efforts to improve EBP engagement and potentially improve the health of patients diagnosed with PTSD. We evaluated patient characteristics and health system factors associated with patients' engagement in EBP following a new PTSD diagnosis.

Study 1 provided an updated measurement of EBP initiation and receipt of a minimally adequate dose of therapy between 2017 and 2019. To identify drivers of EBP utilization we first quantified engagement in a national cohort of patients diagnosed with PTSD. Overall, 263,018 patients started PTSD treatment between 2017 and 2019 and 11.6% (n=30,462) initiated EBP within the first year after their PTSD diagnosis. Of those who initiated EBP, 32.9% (n=10,030) received a minimally adequate dose. These rates of EBP engagement served as the foundation to evaluate patient sociodemographic and clinical factors, and health system measures associated with EBP utilization. Next, we identified patient sociodemographic and clinical factors associated with initiating EBP and completing a minimally adequate dose of treatment within the first year after a PTSD diagnosis.

Several patient sociodemographic and clinical characteristics were associated with initiating EBP and receiving a minimally adequate dose of treatment. Older patients were less likely to initiate EBP, but more likely to complete a minimally adequate dose when they did initiate. Specifically, patients 60 years and older had 35% lower odds of

initiating EBP but had an 80% greater probability of receiving a minimally adequate dose of therapy compared to patients between 18 and 29 years old. We also found that patients with comorbid bipolar disorder or psychotic disorders had a 30% and 41% lower probability of initiating EBP treatment, respectively. However, these patients did not have a lower likelihood of receiving a minimally adequate dose of treatment once engaged in EBP. These findings highlight two specific drivers of treatment engagement that could guide prioritizing efforts to serve this population: (1) facilitate EBP engagement for older patients because older patients are more likely to follow through with completing a minimally adequate dose of treatment once engaged, and (2) offer EBP to patients with comorbid PTSD and serious mental illness because they are equally likely to follow through with completing a minimally adequate dose of treatment compared to patients with PTSD only. Study 1 quantified the magnitude of the problem of EBP engagement: most patients do not initiate EBP or receive a minimally adequate dose of treatment.

Study 2 built on the findings in study 1 by examining the mental health care patients received following a new positive PTSD screen in VHA primary care clinics. The purpose of study 2 was to understand the flow of patients from screening to EBP and identify health system factors that were associated with EBP engagement. Overall, 21,018 patients screened positive for PTSD in 2018; of these 76% were connected to a diagnostic clinical evaluation, and 86% of patients evaluated received a confirmatory PTSD diagnosis within one year of a positive screen. Despite these high rates of follow up care, only one in ten patients (n = 1,381) who screened positive and received a PTSD diagnosis engaged in EBP, suggesting the connection from screening to EBP could be better optimized.

We identified two health system factors associated with EBP engagement. The clinic location where the diagnostic clinical evaluation occurs, and the timing of the confirmatory PTSD diagnosis were each associated with increased likelihood of engaging in EBP. Patients who received an evaluation in a specialty PTSD clinic had greater odds of engaging in EBP, relative to those who received a clinical evaluation in a PC-MHI clinic. The probability of engaging in EBP was greatest among patients who received a confirmatory PTSD diagnosis 8-28 days after screening, suggesting that completing a clinical evaluation for PTSD within 28 days is an optimal window to maximize the likelihood of engaging in EBP. Most new patients are identified via routine PTSD screening in VHA primary care clinics and the timing and location where these patients receive a confirmatory PTSD diagnosis appears to be an important factor driving their ultimate initiation of EBP.

Study 2 built on the findings from Study 1 by identifying health system factors that may affect EBP engagement. Taken together, these two studies present patient sociodemographic and clinical characteristics, and health system factors that can be used to prioritize efforts to increase EBP engagement. Study 3 further builds on the findings from the two prior studies to examine the number of days from PTSD diagnosis to EBP initiation. No previous study has evaluated patient sociodemographic and clinical characteristics, and health system factors associated with the number of days from diagnosis to EBP initiation.

We identified two modifiable health system factors associated with the timing of EBP engagement during the first year after PTSD diagnosis. Patients who received a confirmatory PTSD diagnosis 8-28 days after a positive PTSD screen initiated EBP

approximately seven days earlier, on average, relative to patients who received a confirmatory PTSD diagnosis 85-365 days after a positive PTSD screen. Patients who were diagnosed in a specialty PTSD clinic initiated EBP approximately thirty-six days earlier, on average, relative to those who were diagnosed in a PC-MHI clinic. We did not find differences in the average number of days to initiating EBP for patients who received a clinical evaluation in a PC-MHI clinic or general mental health clinic. Additionally, several patient sociodemographic and clinical characteristics were associated with the timing of EBP initiation. Female patients, patients identifying as Pacific Islander, and patients with a prior high risk for suicide indicator initiated EBP earlier, relative to male patients, white patients, and patients without prior high risk for suicide indicator, respectively. Patients identifying as Asian initiated EBP later relative to white patients. Notable, we found other statistically significant differences between patient sociodemographic and clinical characteristics and the timing of EBP initiation, but the magnitude of these differences was small. A clinically meaningful difference in the average number of days to EBP initiation has not been established and thus statistically significant differences may not equate to *clinically* significant differences.

Understanding the timing of EBP initiation within the first year after a new PTSD diagnosis provides further opportunity to address EBP engagement. Patients who screen positive and are diagnosed with PTSD are likely motivated to engage in care. Study 3 provides information that could be used to capitalize on patients' motivation. The studies presented in this dissertation provide specific information that can be used to address patient level disparities and improve engagement in EBP through health system design. Efforts to support older patients and patients with mental health comorbidities in

initiating EBP should be prioritized, disparities in racial, ethnic, and gender identities should be addressed, and health system design should focus on rapid access to clinical evaluation in settings prepared to deliver EBP. The infrastructure to identify new patients in primary care and provide diagnostic clinical evaluation and EBP treatment for patients with PTSD exists in the VHA. Yet too few patients diagnosed with PTSD receive EBP and there is room to improve the care pathways for this population.

The implementation of a systematic population level PTSD screening program was based on USPSTF recommendations for depression and anxiety screening. The USPSTF recommends that 1) screening programs use a validated screening tool that can identify patients who would otherwise not be detected; 2) patients who screen positive should receive a follow-up clinical evaluation; and 3) patients with confirmed diagnoses should be provided or referred to evidence-based care. In their recommendation on anxiety and depression screening, the USPSTF states health systems must have the capacity to deliver treatment when there is a positive screen to achieve the benefit of screening.[60,61] Similar considerations apply to PTSD screening.

The VHA's PTSD screening program meets the first two recommendations: the PC-PTSD is a validated screening measure[102,137] and many new patients diagnosed with PTSD are identified via screening in primary care.[38] The findings from the studies presented in this dissertation provide evidence that the VHA's PTSD screening program has the infrastructure to achieve the third recommendation, but currently, only 11% of patients with PTSD who were identified via screening in primary care initiate EBP. We found that most patients who screened positive in primary care received a clinical evaluation and were diagnosed with PTSD. Patients who were diagnosed in a setting prepared to deliver

evidence-based treatment (i.e., specialty PTSD clinic) engaged in these treatments more often and more quickly. However, only 2% of patients were diagnosed with PTSD in a specialty PTSD clinic, and overall, most patients did not engage in EBPs despite wide dissemination of these treatments. These findings represent an opportunity to address the third USPSTF recommendation.

We used the Donabedian model of health care quality to evaluate health system factors along the PTSD care pathway associated with EBP engagement. The results from our analyses describe how the structure and process of a clinical evaluation following a positive PTSD screen produces the outcome of initiating EBP. Specifically, patients who received a diagnostic clinical evaluation within the first month (8-28 days) after screening and patients who were evaluated in a specialty PTSD clinic initiated EBP more often and more quickly. Understanding how the structural and process dimensions of the PTSD care pathway are associated with initiating EBP provides valuable information about the effectiveness of the PTSD care pathway. Patients' decisions to engage in PTSD treatment are complex. Prior evaluations have identified numerous patient-level drivers of EBP engagement, including age, race, ethnicity, and mental health comorbidities,[55,62–64] practical barriers (e.g., work and transportation),[65–68] and PTSD symptom specific barriers (e.g., difficulty being in public and avoidance of trauma memories).[65–69] It also important to consider how patient and system factors interact and influence patients' decisions to engage in care.

Research exploring patients' experiences of care following a PTSD diagnosis have identified lack of continuity of care and multiple intake assessments as barriers to EBP engagement.[66] Asking patients to repeat intakes and retell traumatic stories to

multiple providers is not a trauma-informed or patient centered approach to care. In the VHA, patients who engage with a specialty PTSD clinic after being diagnosed in a general mental health or integrated behavioral health (e.g., PC-MHI clinic) setting receive an additional clinical evaluation when they establish care.[110] The flow of patients from PTSD screening through multiple intake assessments before engaging in EBP has been hypothesized to decrease engagement in treatment.[111]

Direct referrals from primary care to specialty PTSD clinics have been proposed as a way to facilitate ease of access to EBPs and address this barrier.[77,111] However, this recommendation is challenging in the VHA's current treatment system for two reasons. First, specialty PTSD clinics are designed to provide discrete episodes of PTSD treatment target PTSD symptoms.[112] Second, specialty PTSD clinics may not be adequately staffed to accommodate the volume of diagnostic clinical evaluation referrals that are generated from primary care. Patients already experience long wait times for specialty PTSD clinic appointments and directing all positive PTSD screenings to specialty PTSD clinics would likely overwhelm these clinics and reduce access to EBPs.

Alternatively, we provide several recommendations to increase engagement in EBPs. First, revise clinic schedules to promote access to clinical evaluations within 28 days of a new positive screen and implement a process measure to monitor the number of days between a new positive PTSD screen and clinical evaluation. Patients who received a diagnostic clinical evaluation within the first month (8-28 days) after screening initiated EBP more often and more quickly. Second, implement brief protocols of evidence-based PTSD treatment such as Prolonged Exposure for Primary Care and Written Exposure Therapy in PC-MHI clinics. Approximately half (47%) of patients who screened positive

for PTSD received a clinical evaluation in a PC-MHI clinic. Implementing these therapies in PC-MHI clinics and adjusting appointment lengths to allow for adequate time to provide these therapies would increase access to EBPs in settings where confirmatory evaluations routinely occur. Third, prioritize use of shared decision making with patients who are diagnosed with PTSD using the PTSD Treatment Decision Aid [113]. Qualitative research has found that patients' knowledge of EBP and buy-in to the rationale for the exposure-based treatment modality contributes to their decision to engage in these therapies.[66,68] The VHA clinical practice guideline for PTSD recommends clinicians use a patient centered care and shared decision-making approach that explains treatment options, discusses benefits and expectations of a referral to a mental health specialist, and involves the patient in prioritizing treatment goals. To engage in this process and make informed decisions, patients require information about what is involved in CPT or PE, expected outcomes from engaging in treatment, and the location where care will be provided.

Mental health providers in PC-MHI clinics are well-positioned to engage patients who are diagnosed with PTSD in shared-decision making. However, mental health providers working in primary care clinics have reported time constraints to conduct shared decision making in-session.[138] At the point of screening, primary care clinicians have neither the time nor expertise to carry out shared decision-making about the subsequent diagnostic evaluation or treatment for PTSD, and integrated mental health providers may not have sufficient time or bandwidth to provide this information. The VHA could prioritize the use of shared decision making by revising clinic schedules for mental health providers in PC-MHI clinics and developing a structured note template to

facilitate documentation of patients' decisions. Structured note templates were used to promote CPT and PE use and enable fidelity monitoring during the VHA's initial implementation of these therapies [101]. A similar strategy could be used to support use of shared decision making.

Other interventions to increases access to EBPs have been tested. One clinical trial tested a telemedicine-based collaborative care model designed to improve engagement in EBP in VHA community-based outpatient clinics. Patients included in the trial had an existing PTSD diagnosis, were engaged in VHA mental health care, and were primarily living in rural areas. The intervention consisted of an off-site telemedicine PTSD care team to support in-clinic providers and improve access to and engagement in CPT. Patients who received the intervention were 18 times more likely to engage in CPT relative to patients who received usual care. Unfortunately, implementation of intervention into routine care has not yet been tenable.[139] A follow-up evaluation of why implementation failed revealed that approximately half of patients who were involved in the implementation trial never had any discussion of EBPs with their providers and many patients who were referred to EBP were not actually interested in the therapy.[69] Patients typically declined EBP because of the trauma focused component of these therapies. However, over half of the patients who had multiple conversations about EBP ultimately engaged in treatment. A shared decision-making approach could engage patients and facilitate discussions about EBP. The National Center for PTSD has published the PTSD Treatment Decision Aid.[140] In a randomized clinical trial, use of the PTSD Treatment Decision Aid with patients referred from primary care was associated with greater knowledge of PTSD and PTSD treatment options, and increased engagement in EBP.[141]

Adapting a telemedicine-based intervention that engages patients in a shared-decision making process earlier in the PTSD care pathway (i.e., after a positive PTSD screen) could support patients deciding whether and how to engage in EBPs. A two-part, single telehealth visit intervention could achieve this goal. First, a patient who screens positive in a telehealth primary care visit is connected directly via a warm telehealth handoff to a psychologist who would conduct the diagnostic clinical evaluation. Second, if the PTSD diagnosis is confirmed, the psychologist then conducts shared decision-making with the patient using the PTSD Decision Aid. Many primary care encounters are conducted via the VHA's telehealth technology, and the proportion of virtual appointments has increased following the COVID-19 pandemic.[142–144] After an appointment with a positive PTSD screen, the patient could be connected to a psychologist immediately (i.e., "warm handoff") via telehealth. Psychologists are well positioned to facilitate patients' desire to initiate EBP by providing education, orientation, and presenting treatment options through a shared decision-making process.

A pragmatic implementation trial with an embedded sequential mixed methods evaluation could be used to test a rapid specialty consultation intervention for patients who screen positive for PTSD in primary care. Prior to implementation, qualitative interviews and ethnographic observation with patients who screen positive and are diagnosed with PTSD and with providers involved in screening and diagnostic clinical evaluations can inform the design of the intervention. The intervention could be delivered by existing VHA clinical psychologists using the VHA's telehealth technology. Trial outcomes could be measured from routinely collected electronic health record data and supplemented by surveying patients' knowledge of EBPs. Following implementation,

qualitive interviews could assess for feasibility and acceptability of the intervention among patients, primary care providers, and EBP therapists. Much of the infrastructure to engage patients diagnosed with PTSD in EBP exists in the VHA. Further consideration and understanding of the PTSD care pathway design and patients' experiences of care along the pathway is necessary to increase EBP engagement.

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