Screening, Diagnosis, and Treatment of Post-Traumatic Stress Disorder

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ABSTRACT Post-traumatic stress disorder (PTSD) is a prevalent problem among military personnel and veterans. Identification of effective screening tools, diagnostic technologies, and treatments for PTSD is essential to ensure that all individuals in need of treatment are offered interventions with proven efficacy. Well-validated methods for screening and diagnosing PTSD are now available, and effective pharmacological and psychological treatments can be offered. Despite these advances, many military personnel and veterans do not receive evidence-based care. We review the literature on screening, diagnosis, and treatment of PTSD in military populations, and discuss the challenges to implementing the best evidence-based practices in clinical settings.

INTRODUCTION

Post-traumatic stress disorder (PTSD) is a topic of particular relevance for military personnel and veterans. Evidence-based screening, diagnosis, and treatment methods are essential to ensure that individuals with PTSD are identified and offered effective treatment options. In this article, we describe the evidence supporting screening tools, diagnostic technologies, and treatments for PTSD. We then discuss the barriers to accessing evidence-based assessment and treatment and describe important targets of future research. This article is not an exhaustive review of all available assessment or treatment options, but rather an overview of the methods with the best evidence base for military and veteran populations.

SCREENING

Screening for PTSD can serve multiple purposes. The first is to identify individuals at high risk for developing PTSD, but who have not yet manifested its symptoms (risk assessment). Individuals who are identified as high risk for the future development of PTSD would be eligible for prevention efforts. Risk factors for the development of PTSD following a traumatic event include pretrauma (e.g., prior trauma history and childhood conduct problems), peritrauma (e.g., perceived threat, heightened arousal, and dissociation) and post-trauma factors (e.g., hardiness and social support[1–3]). Recently, researchers have developed screening measures, known collectively as statistical prediction instruments (SPIs), that quantify these risk and resilience factors for the purpose of identifying individuals who may be vulnerable to PTSD following trauma exposure before symptoms actually develop. In a recent example of such an approach, O'Donnell et al[4] developed and validated a screening instrument that prospectively identifies, during hospitalization, civilian adults at high risk for developing PTSD and/or major depression. Results showed that the screening instrument had a sensitivity of 0.82 and a specificity of 0.84 when predicting PTSD and a sensitivity of 0.72 and a specificity of 0.75 in predicting Major Depression. Marx et al[5] tested a similar screening instrument for combat-related PTSD among Vietnam veterans using previously collected cross-sectional data. Drawing on the findings of King et al,[2] Marx et al[5] focused on those risk-resilience factors that were found to have the strongest relations with combat-related PTSD status. The resulting instrument, the PTSD SPI, displayed excellent sensitivity (0.90) and good specificity (0.80). These results suggest that it is feasible to develop instruments that could identify veterans and service members who might be prone to develop PTSD following trauma exposure. However, before this instrument or others like it are used for this purpose, it is necessary to conduct additional research using a longitudinal research design with a heterogeneous sample of active duty military personnel and/or veterans. Once such instruments have been validated with new data collected in subsequent studies, they will be of tremendous value to local and national level screening programs conducted by the Departments of Defense (DoD) and Veterans Affairs (VA) in the identification of at-risk individuals for outreach, thorough evaluation, and early intervention efforts.

In addition to risk assessment, screening provides an opportunity for early detection or identification of acute PTSD cases and individuals who are experiencing some PTSD symptoms but do not meet full criteria. Screening also affords the possibility of discovering previously unidentified cases of more chronic and severe PTSD. Such individuals would be candidates for currently available evidence-based interventions. Historically, the field has relied upon a variety of PTSD screening tools. Many of the early screening instruments, such as the PTSD—Keane scale of the Minnesota Multiphasic Personality Inventory-2,[6] the Impact of Events Scale,[7] and the Mississippi Scale for Combat-related PTSD[8] contained items that did not necessarily correspond to PTSD diagnostic criteria. Today, the most widely used screening tools have items that directly correspond to PTSD diagnostic criteria in the fourth edition of the Diagnostic and Statistical Manual of Mental

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Disorders (DSM-IV). One such scale is the Post-traumatic Diagnostic Scale (PDS). The PDS has well-documented reliability and validity, but has generally been tested with civilian rather than military or veteran samples.[9] The PTSD Checklist (PCL) has been used extensively with military, veteran and civilian samples and has excellent reliability and validity.[10,11] Recent research has validated the PCL with soldiers returning from combat; these data provide evidence for the utility of this screening measure in Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) soldiers.[12] The PCL presents 17 items corresponding to the core diagnostic symptoms of PTSD. Respondents rate how much each symptom bothers them on a 5-point scale from 1 ("not at all") to 5 ("extremely"), and the sum of the items provides an index of PTSD symptom severity. Population-specific cutoffs are recommended, with cutoffs for returning soldiers and OEF/OIF veterans generally lower than those for veterans of the Vietnam war (e.g., 30 to 34 for OEF/OIF veterans[12]; compared with 50 for Vietnam veterans[13]). Bliese et al[12] developed a shortened version of the PCL, the 4-item Primary Care PTSD Screen (PC-PTSD), for use in primary care settings or other settings in which more extensive screening is not feasible. In a validation study assessing returning soldiers in a primary care setting, the PC-PTSD compared favorably with the PCL.[12] Both older and newer screening tools have potential utility, with newer measures more appropriate for screening of DSM-IV-TR criteria and older measures more suited to assessment of key content areas, making these older instruments valuable as the diagnostic criteria for PTSD change across iterations of the DSM. A limitation of all of the previously described screening tools is that they solely depend upon the individual's self-report of symptom status. Self-report measures require patients to have sufficient insight into the extent and impact of their symptoms and to provide accurate information to clinicians and researchers. A number of factors can influence self-report, including the desire to appear more or less symptomatic than one is in reality. With the exception of the Minnesota Multiphasic Personality Inventory-2, the measures described previously do not assess the individual's response bias. For these reasons, among others, there has been great interest in identifying biomarkers that could be used to identify individuals at-risk for the development of PTSD in the wake of trauma exposure. Such tools or procedures would take advantage of information about the genetic,[14,15] neuroanatomical and neurocognitive,[16,17] and psychophysiological[18,19] correlates and precursors of PTSD already gleaned from prior research. Research with military and veteran samples is needed to determine the feasibility and utility of using biomarkers for PTSD screening purposes.

DIAGNOSIS

Multimethod assessment is the preferred means of establishing psychiatric diagnoses such as PTSD. Because any individual assessment method has limitations, converging evidence from different methods of assessment offers the highest degree of confidence when making a diagnosis. An ideal assessment of PTSD would include self-report measures of symptom severity, such as the questionnaires described above, an interviewer-administered semistructured clinical interview, and measurement of biological indices. A comprehensive assessment should include evaluation of possible comorbid diagnoses and careful consideration of differential diagnosis, and should include measures of psychosocial functioning and response bias as well as symptom severity. A comprehensive discussion of a multimethod assessment for PTSD is beyond the scope of this article. See Weathers et al[20] for a thorough review.

Semistructured Diagnostic Interviews

Semistructured diagnostic interviews are the gold standard for diagnosing psychiatric disorders including PTSD. Interviewer-administered measures are preferable to self-report measures because interviewers can clarify items and ask follow-up questions as necessary. Factors such as misinterpretation of questions, attempts to exaggerate or minimize symptoms, or random responding to questions may be more likely to influence self-report questionnaires than interviews.[21] Semistructured interviews are preferable to unstructured clinical interviews because they provide more accurate diagnoses.[22]

The Clinician-Administered PTSD Scale[23] (CAPS) is one of the most widely used semistructured clinical interviews for the assessment of PTSD. A trained interviewer reads questions corresponding to each of the DSM-IV PTSD symptoms and asks follow-up questions using specific behavioral markers to rate the frequency and intensity of each symptom on separate 5-point scales (0–4). Typically, symptoms that receive a frequency score of "1" or higher and an intensity score of "2" or higher are counted as present, and a diagnosis of PTSD is given if at least one re-experiencing, three avoidance, and two hyperarousal symptoms are present (also see Weathers et al[21] for a detailed comparison of different scoring rules). The sum of the frequency and intensity scores for all symptoms also gives a measure of symptom severity. The CAPS has well-established reliability and validity and has been tested extensively in veterans.[21]

Other semistructured clinical interviews include the PTSD Symptom Scale—Interview Version[9] (PSS-I) and the Structured Clinical Interview for DSM-IV[24] (SCID). The PSS-I includes 17 questions corresponding to the DSM-IV PTSD symptoms, and trained interviewers rate the severity of each symptom from 0 (not at all) to 3 (five or more times a week/very much). Unlike the CAPS, interviewers do not rate frequency and intensity separately and only one question assesses each symptom. In a validation study using a civilian sample, the PSS-I compared favorably to the CAPS.[25] The PSS-I has the potential advantage of being faster to administer than the CAPS; however, the PSS-I has not been well-tested in military samples. If a more comprehensive diagnostic tool is necessary, the SCID is another useful alternative. The

SCID assesses anxiety disorders including PTSD, as well as mood, substance use, and eating disorders, offering a broader diagnostic picture of Axis I pathology. In the PTSD module of the SCID, the interviewer asks questions corresponding to each of the DSM-IV PTSD symptoms and rates each symptom as absent, subthreshold, or threshold. Symptoms rated as "threshold" are considered present. However, the SCID does not offer an index of PTSD symptom severity (it is in general considered a dichotomous rating scale) and therefore is less sensitive to changes in symptoms over time. Moreover, the use of a dichotomous scale of symptom expression may not map onto symptom presentation in patient care settings thus limiting the viability of the SCID for certain types of programs and projects.

Biomarkers

Although preferable to self-report measures, semistructured interviews still rely on patients to report their symptoms accurately. Ideally, biological indices of PTSD could be identified as assessment tools that are completely independent of patient report. Psychophysiological measures have been the subject of a great deal of research in recent years, and several physiological indices are reliably associated with PTSD.[18,26,27] Several different measures of physiological arousal and reactivity are widely viewed as potential markers, to include heart rate, skin conductance (sweat gland activity), blood pressure, and facial electromyography (a measure of muscle contractions in the face). Heart rate and skin conductance have emerged as particularly reliable markers of PTSD status.[26,27] Physiological differences distinguish between individuals with and without PTSD when participants are (a) at rest, (b) perceiving standardized trauma cues (e.g., Vietnam veterans viewing general images of Vietnam), or (c) perceiving idiographic trauma cues (e.g., hearing a script describing the individual participant's traumatic experience). Although these findings are encouraging, physiological measures are not perfectly accurate, with a large multisite study indicating that physiological indices correctly identified approximately 2/3 of PTSD cases,[27] and have limited specificity. Additionally, there has been little research replicating these physiological findings in OEF/OIF personnel and veterans. More recently, there has been increasing interest in identifying genetic, neuroanatomical, and neurocognitive biomarkers related to PTSD.[14–17,28] The possible utility of neuroimaging technology for identification of biomarkers is an area of particular enthusiasm.[29] However, this area of research is in its nascent stages.

TREATMENT

Several effective pharmacological and psychological treatments for PTSD are available, offering patients and therapists a choice of different treatment options. However, most treatments have not yet been tested in OEF/OIF veteran samples with PTSD.

Pharmacological Treatment

Selective serotonin reuptake inhibitors (SSRIs) and serotonin–norepinephrine reuptake inhibitors (SNRIs) are effective in the treatment of PTSD, with several large randomized controlled trials (RCTs) supporting their use in both civilian and veteran populations.[30] Treatment responders should be continued on maintenance doses of these medications following symptom reduction because relapse is likely following discontinuation of these medications.[31] Although atypical antipsychotics initially showed promise as adjunctive treatment to SSRIs for treatment-refractory patients,[32] a large multisite RCT found no benefit of risperidone for treatment-resistant military service-related PTSD.[33] As a result of these equivocal results and potentially harmful side effects, the most recent VA/DoD clinical practice guidelines for PTSD recommend against the use of risperidone and indicate that the benefit of other atypical antipsychotics is unknown.[30,34] The current practice guidelines also recommend against using benzodiazepines to treat PTSD because of their addictive potential, in terms of both tolerance and substance dependence.[34] Other pharmacological treatments are also available for PTSD; see Friedman[30] for a comprehensive review.

Psychotherapy

Evidence-based psychotherapies for PTSD include cognitive behavioral therapies and eye movement desensitization and reprocessing treatment (EMDR). Two forms of cognitive behavioral therapy, Cognitive Processing Therapy (CPT)[35] and Prolonged Exposure (PE),[36] have received consistent research support. The "national rollout" is currently disseminating these treatments throughout the Department of VA Healthcare System in order to improve access by training and certifying mental health clinicians in specified empirically supported treatments.[37]

CPT is a manualized 12-session cognitive behavioral treatment for PTSD originally developed for treatment of sexual assault victims.[35] CPT includes cognitive restructuring and exposure/emotional processing elements. Cognitive restructuring interventions are designed to teach patients how to challenge maladaptive thoughts ("stuck points") about the trauma. Specific interventions include asking patients to write an "impact statement" describing the meaning of the traumatic event, Socratic questioning by the therapist, written homework assignments, and a specific focus on beliefs about the self and other in five domains (safety, trust, power/control, esteem, and intimacy). The emotional processing component of CPT involves having the patient complete "written accounts" or detailed descriptions of the traumatic event designed to elicit the natural emotions experienced during the trauma. At least four RCTs have provided evidence supporting the efficacy of CPT in the treatment of PTSD.[38] In a RCT examining veterans with military-related PTSD, veterans receiving CPT improved significantly compared to a wait-list control group, and 40% of veterans receiving CPT no longer met criteria for PTSD at the end of treatment.[39] In addition to CPT, other forms of cognitive

therapy have been shown to be effective in the treatment of PTSD in civilian samples.[38]

Exposure therapy is another evidence-based psychotherapy for PTSD. It was first tested in veterans and shown to possess efficacy for treatment of combat-related PTSD.[40,41] Since that time, a manualized form of exposure treatment, PE, has received a great deal of attention in the literature. PE includes two core components: in vivo and imaginal exposure. In vivo exposure involves creating a hierarchy of feared situations that the patient currently avoids because of trauma-related fears and repeated exposure to those situations outside of session. Imaginal exposure involves describing trauma memories during session and listening to a recording of the descriptions at home between sessions. PE also includes education about common reactions to trauma, breathing retraining, and discussion of thoughts and feelings elicited by the exposure assignments. A large body of research supports the efficacy of PE, with at least 13 RCTs published in the literature and a recent meta-analysis reporting large effects of PE relative to wait-list or psychological placebo comparison groups.[42] Similar to CPT, PE was first applied to the treatment of sexual assault victims, and much of the research supporting PE has been conducted in civilian samples. However, at least one RCT provided evidence for the efficacy of PE for female veterans,[43] and a case series examining 10 veterans, including eight men and five OEF/OIF veterans, showed significant reductions in PTSD and depressive symptoms after a course of PE.[44]

EMDR is another treatment for PTSD that possesses a modest evidence base for treating civilian forms of PTSD. EMDR includes assessment of the trauma memory and associated negative and positive cognitions, desensitization, and reprocessing, which involves holding the trauma memory in mind while making alternating eye movements, and installation of positive cognition, which involves holding positive cognitions in mind while making alternating eye movements. Meta-analyses have shown EMDR to be effective in treating the core symptoms of PTSD, but some studies suggest that EMDR is less efficacious in military samples.[45,46] Although eye movements were theorized to be an essential component of this treatment approach, more recent research has shown that eye movements or other alternating movements do not add to the benefit of EMDR, which is comparable to other exposure-based treatments.[45]

Comparative Efficacy and Extension to OEF/OIF Personnel

The pharmacological and psychological treatments described have been well-studied in a variety of different populations with different trauma types. Evidence-based psychotherapies are generally equally effective, with similar effect sizes seen for CPT, PE, and EMDR.[42] Notably, no RCT has ever compared the relative efficacy of medication versus psychotherapy, making it difficult to directly compare pharmacological and psychological treatment approaches. Moreover, further research is needed to determine the effectiveness of these treatments for OEF/OIF personnel. Treatment studies focused on returning veterans are ongoing, including RCTs of both CPT and PE as part of the large South Texas Research Organizational Network Guiding Studies on Trauma and Resilience (STRONG STAR) research consortium. Given the high rates of PTSD symptoms in returning veterans, determining the effectiveness of PTSD treatments for this group is vitally important.

Novel Treatment Approaches

Despite the emergence of evidence-based treatments for PTSD, research shows that up to 30% of patients may be unresponsive,[39] indicating the need for further research to refine existing treatments and develop new alternatives. Novel approaches to the treatment of PTSD currently under investigation include medications such as prazosin and propranolol, couples and family therapy, acceptance and commitment therapy, mindfulness-based interventions, imagery rehearsal therapy, narrative disclosure, and behavioral activation, among others.[47] Modifications to increase the effectiveness of existing therapies are also being examined, such as the use of virtual reality technology or the medication d-cycloserine to increase the effectiveness of exposure-based treatments.

BARRIERS TO CARE

Well-validated PTSD screening tools and diagnostic technologies have been developed, as well as effective pharmacological and psychological treatments. However, not all active duty personnel or veterans are receiving evidence-based practices.[48] In many clinical settings, there are significant barriers to implementing the best evidence-based practices for screening, diagnosing, and treating PTSD.

Practical Barriers

Large-scale screening can be difficult to implement widely. Primary care centers have been targeted as a natural setting for screening[12]; however, primary care clinicians have limited time with patients and need to screen for a number of other medical and psychiatric issues in addition to PTSD. Diagnostic tools can also be difficult to disseminate to a broad range of clinical settings. Semistructured interviews require training to administer reliably and are more time-intensive than self-report measures. Assessment of psychophysiological indices of PTSD requires expensive equipment and training to administer and score accurately. Evidence-based psychotherapies also require extensive training, making them difficult to disseminate widely. The VA has initiated a "national rollout" providing training in CPT and PE to providers across the country to increase patient access to these two therapies. However, the actual implementation of such interventions across large institutions like VA and the DoD can be a substantial challenge.[49] Another related challenge to accessing these treatments is the significant time commitment that is required, which can be difficult for active duty

personnel, working veterans, and individuals living in rural locations who may have to travel long distances to meet with a therapist. Telehealth and internet-based interventions have been proposed to increase access to care in remote locations, and such treatments are currently under investigation.[50] Pharmacological treatments are thought to be easier to disseminate, but not all veterans are willing to take psychotropic medications, and pharmacological treatments for PTSD are only modestly effective. Additionally, many pharmacological interventions have undesirable side effects, such as impaired sexual functioning, making compliance difficult.

Comorbidity

Active duty service members and veterans typically present with a number of medical and psychiatric complaints all requiring attention. The existence of comorbid conditions can interfere with both diagnosis and treatment of PTSD. The presence of comorbid mental or physical health conditions can complicate diagnosis if PTSD symptoms are attributed to other causes. Treatment for PTSD may be delayed because of the presence of comorbidities. For example, in the case of comorbid PTSD and substance dependence, the current VA/DOD clinical practice guidelines recommend deferring PTSD treatment until medical detoxification is complete.[34] This concern is all the more pressing because patients often do not present with one DSM-IV disorder, but rather are likely to meet criteria for multiple mental health concerns. In one large nationally representative sample, more than 40% of individuals meeting criteria for one disorder had at least one comorbid disorder, and the likelihood of comorbidity increased with symptom severity.[51] Traumatic brain injury (TBI) and PTSD commonly co-occur in civilian, military, and veteran populations and can be difficult to distinguish because both can result from the same traumatic incident.[52,53] The two conditions also have several overlapping symptoms, including impaired concentration, decreased sleep, psychomotor agitation, and irritability, and there is currently no established method of differentiating the etiology of these common symptoms.[53] Depression and substance use are also commonly comorbid with PTSD and co-occur frequently with PTSD symptoms in OEF/OIF personnel and veterans.[54] When veterans present with multiple mental health concerns, a comprehensive evaluation and treatment plan is essential to ensure all relevant treatment targets are addressed.

Stigma

Another important barrier is the stigma associated with mental illness. Active duty personnel may be concerned that a PTSD diagnosis will interfere with their work or result in a medical discharge from the military, and veterans may be concerned about their ability to return to service in the future. Such service members may not seek treatment or may be motivated to conceal or minimize the severity of their symptoms to clinicians. Research with OEF/OIF samples indicates that concerns about stigmatization are prevalent. In one study of OEF/OIF service members and veterans, over half of respondents who screened positive for a mental health disorder expressed concerns about possible stigmatization associated with seeking mental health treatment (e.g., endorsed items such as "It would harm my career," "my unit leadership might treat me differently," or "I would be seen as weak"), highlighting the salience of this concern for returning veterans.[54] Factors associated with perceived stigma include negative beliefs about mental health treatment and lower levels of perceived unit support.[55] Unfortunately, perceptions of stigma are highest among service members who most need treatment, with those who screen positive for mental health disorders, including PTSD, reporting greater stigma.[55,56]

CONCLUSIONS AND FUTURE DIRECTIONS

Screening and diagnosis of PTSD have improved exponentially in recent years. Existing assessment methods are effective in identifying the severity of PTSD symptoms and discriminating PTSD from other psychiatric disorders. Although establishing a PTSD diagnosis is useful, this type of assessment offers little insight into a patient's social, occupational, physical, and cognitive functioning. Not only is the assessment of functional impairment critical from the standpoint of making a PTSD diagnosis, it is crucial for treatment planning and outcomes monitoring. Similar to PTSD, functional impairment can be assessed using clinical interviews, self-report instruments, and performance-based measures.

Effective treatments for PTSD are available and as a result clinicians, active duty military personnel, and veterans have the choice of several evidence-based pharmacological or psychological treatment options. Although several treatment options are available, not all treatments have a strong evidence base with military samples, and more research is needed with OEF/OIF samples in particular. Furthermore, little is known about which treatment is best for which patient. Identifying genetic factors or demographic or personality variables that discriminate effectiveness of different treatments for particular patient populations is an exciting area of future research.

In summary, several well-validated PTSD screening tools and diagnostic technologies now exist, and effective pharmacological and psychological treatments for PTSD are available. Despite these advances, many active duty personnel and veterans still do not receive these evidence-based assessment and treatment approaches. Future research should focus our efforts on dissemination or how to get these proven methods in the hands of clinicians and delivered effectively to the military personnel and veterans who need them.

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