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Advances and Controversies in Military Posttraumatic Stress Disorder Screening

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Abstract As the longest war in American history draws to a close, an unprecedented number of service members and veterans are seeking care for health challenges related to transitioning home and to civilian life. Congressionally mandated screening for mental health concerns in the Department of Defense (DoD), as well as screening efforts Veterans Affairs (VA) facilities, has been established with the goal of decreasing stigma and ensuring service members and veterans with depression and posttraumatic stress disorder (PTSD) receive needed treatment. Both the DoD and VA have also developed integrated behavioral health in primary-care based initiatives, which emphasize PTSD screening, treatment, and care coordination. This article discusses the rationale for population-level deployment-related mental health screening, recent changes to screening frequency, commonly used screening instruments such as the primary care PTSD screen (PC-PTSD), PTSD checklist (PCL), and Davidson Trauma Scale (DTS); as well as the strengths/limitations of each, and recommended cut-off scores based on expected PTSD prevalence.

Keywords PTSD · Posttraumatic stress disorder · Screening · Epidemiology · Force screening · US military · Readiness · Deployment · Combat · Prevalence · Positive predictive value · Negative predictive value · Sensitivity · Specificity · DoD · VA · NDAA · CAPS · SPRINT · DTS · PCL · PTSD Checklist · Davidson Trauma Scale

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Introduction

The Global War on Terrorism has involved a high level of combat operations for a protracted period, with direct or indirect exposure to war-zone traumatic events for most service members who deploy. The transition home from a war zone can be challenging and involve complex interactions of health, interpersonal, and occupational functioning [1]. PTSD is one of the most common disorders stemming from the wars in Iraq and Afghanistan [2•]. The delay in onset or recognition of symptoms, chronicity, stigma, and avoidance inherent to the condition often contributes to delays in seeking care [1, 3••, 4]. Service members routinely underreport health concerns at the time of returning from deployment, and then begin to seek care only after several months have passed [1, 4, 5••, 6]. Large numbers do not seek care at all or never follow-up with referrals after screening positive [1, 3••, 4, 5••, 6]. Returning veterans can feel as if they are "stuck" between war and civilian life. In describing the challenges associated with reintegration, service members use phrases such as, "I wish I was still over there fighting; things were simpler over there," "life here [in the US] isn't as exciting," "I feel like the things I do here [in the US] don't matter," "I feel angry or numb… I can't connect with anyone," or "no one understands what I've been through; people that haven't gone [deployed] annoy me." Many of these are normal reactions after a 7-15 month combat deployment; however, service members sometimes have difficulty determining when these reactions

become maladaptive in the home environment. In addition to ensuring expedient access to care, screening is meant to encourage symptomatic individuals to seek treatment. A general trend among long-term PTSD trajectory and medication studies is that individuals with greater chronicity of symptoms demonstrate lower responses to treatment than those treated early following the index trauma [7–15, 16•, 17–20].

On a larger scale, untreated combat-related PTSD represents a significant public health, military resource, and force readiness challenge. Individuals who deployed to combat zones utilize more medical and mental health services than those deployed to other operations [6]. Primary care visits for these service members are characterized by generalized symptoms such as fatigue, pain, insomnia, and hypertension indicative of physiological processes of bodies chronically primed to respond to threat [6, 21]. PTSD appears to take a toll on the body over time; this increased physical health co-morbidity and health care utilization results in significant lost productivity for service members and an increased strain on already overburdened primary care providers.

Mood and substance use disorders are also highly comorbid with PTSD. When combined with the excessive autonomic activation of PTSD, combat service has been associated with an increased incidence of risky behaviors, assault, and intimate-partner violence [22]. Epidemiologic studies estimate current or 1-year prevalence of PTSD to be 3.5-5 % for the general population over 12 months, 6 % overall for military personnel returning from deployment, 13 % for infantry personnel returning from deployment, and upward of 30 % for those seeking behavioral health care [2•, 12, 23, 24]. Applying a prevalence of 6-13 % to the 2.5 million who have deployed in support of operations in Iraq and Afghanistan quickly illustrates the challenge facing the DoD and VA in ensuring adequate and expedient access to PTSD treatment. Screening validity and motivation to seek care in returning service members is further challenged by stigma and lack of confidence in military behavioral health services [3••, 5••]. Screening strategies outlined in the next section represent lessons learned from successes and failures in screening during OEF and OIF.

Current Screening Initiatives in the U.S. Military

PTSD screening frequency in DoD is mandated by Congress and executed according to military policy. Mandated screening began with the National Defense Authorization Act (NDAA) 1998, which required pre and post-deployment screening without specifying timing or instruments to be used [25]. The services decided to screen 120 days before deployment and again as service members returned home. However, screening immediately at the time of returning home was later found to be highly inaccurate due to delayed manifestation of symptoms as well as the practical consideration that service members believed that reporting would delay their return home [4, 5••, 6]. This prompted Congress to reevaluate PTSD screening; with NDAA 2005, they added screening at 90-180 days post deployment and specified that no service member could leave the armed forces without being screened [26]. Given concerns that too many individuals with PTSD were being missed with that screening schedule, additional screenings were added. In its annual military funding bill, National Defense Authorization Act (NDAA) for fiscal year 2012, lawmakers increased the frequency of required screening to the current schedule of 120 days before deployment, upon return from deployment, 90-180 days after deployment, 180-365 days after deployment, and 18-30 months after deployment [27]. Physical and psychiatric challenges associated with repeated combat deployments led to the creation of minimum deployment standards for mental health. These required at least 90 days of treatment stabilization before deployment and specified medications which precluded deployment regardless of duration of treatment (e.g., lithium) [28••]. Additional screening is also conducted on entry into the VA health care system and prior to chapter separation.

Service members and veterans are now also routinely screened for depression and PTSD during primary care appointments, and there are several programs that provide mental health services directly in primary care, either through embedded psychologists or through programs involving initial medication management by primary care providers [29, 30]. These efforts are in line with 2012 Institute of Medicine guidelines recommending screening once or more each year for active military and veterans [31]. These programs were created to give service members additional opportunities to seek help, reduce reporting discomfort, ensure coordination of care, and provide some treatment of depression and PTSD in primary care where stigma is believed to be less. In this model, behavioral health providers serve as consultants to primary care, while also providing direct care to those with more severe or treatment-refractory symptoms [29, 30]. Those receiving treatment through these programs are screened periodically to gauge progress [29, 30]. Coordination of care and communication between providers is often facilitated through a case manager [30]. A quasi-experimental study demonstrated that care-coordination between pre-deployment garrison and deployed environments could enhance various mental health clinical outcomes during deployment [28••].

For behavioral health providers working in specialty care clinics, the military developed the Behavioral Health Data Portal (BHDP), a software program that facilitated longitudinal screening and tracking of treatment progress in behavioral health clinics. In BHDP, patients complete screening questionnaires at each visit, which are immediately scored, allowing providers to trend progress during each visit. This

program is being rolled out Army-wide and has also been selected for use in other services.

Screening Instruments

Deployment screening conducted before and after deployment consists of a combination of self-administered questions and a face-to-face evaluation by a mental health provider trained to administer these screenings [4, 5••, 6]. Questions cover deployment location, general health, physical symptoms, mental health symptoms, and trauma exposure [4, 6]. The mental health section consists of questions related to PTSD, depression, suicidal ideation, aggression, and interest in receiving mental health care [4, 6]. Questions regarding depression and PTSD are drawn from instruments commonly used in primary care, including the Patient Health Questionnaire 2 (PHQ-2) for depression and the Primary Care PTSD screen (PC-PTSD). Following completion of the screening instrument, the service member is immediately interviewed by a credentialed physician, nurse practitioner, or physician assistant to determine if they require referral [4, 6]. Mental health personnel are often co-located with these providers both to provide emergency care if the service member endorses suicidal or homicidal ideation and to assist high risk individuals with obtaining immediate follow up if needed [4, 6, 28••].

The majority of military PTSD screening is done with the PC-PTSD. The PC-PTSD contains four questions related to the major PTSD symptom clusters of re-experiencing, avoidance, hyper-vigilance, and emotional numbing [32]. Following a positive screen with the PC-PTSD, the PTSD Checklist (PCL) is often administered. Three very similar versions of the PCL, based on DSM-IV criteria, have been used, the military version (PCL-M), the civilian version (PCL-C), and the specific stressor version (PCL-S). A new PCL version, based on DSM-5 (PCL-5) is now in the process of validation. The PCL consists of 17 questions related to DSM-IV criteria for PTSD as well as a Likert scale to assess symptoms severity, ranging from 1 (not at all) to 5 (extremely) [32]. Specific score cut-offs vary depending on the purpose of the test and population being tested.

The PC-PTSD and the PCL have been validated in civilian populations, US soldiers, and veterans in the VA system seen in primary and behavioral health care [23, 32–35]. The PCL has also been widely used by military services from other countries. Alternate versions of the PCL have been validated for multiple civilian trauma types [36] and sub-populations such as geriatric primary care patients [37], Brazilian first responders [38], and Sri Lankan military [39]. Some evidence suggests that instruments such as the PC-PTSD and PCL may not be as accurate over time. In a 9-month study with serial administration of the PCL, Forbes et al. found significant variations in accuracy of the PCL to determine presence and severity of individual symptom at each time point. As symptoms improved and approached the threshold criteria, the PCL demonstrated reductions in diagnostic accuracy as well [34]. Forbes et al. concluded that the PCL underrated improvement in comparison to the clinician administered PTSD scale (CAPS). Although Monson et al. found that the PCL remains sensitive to symptom change over time [40], the potential for diminished accuracy is concerning as the PC-PTSD and PCL are built into BHDP and all of the primary care centered programs. Another presumptive weakness of the PC-PTSD and PCL is the overlap of PTSD symptoms with other mental health conditions. Studies of a similar instrument, the Davidson Trauma Scale (DTS), found a drop in sensitivity of 30-40 % when co-morbid depression or another anxiety disorder was present [24]. In populations with large prevalence of co-morbid disorders, the PCL-S appears more optimal due to being anchored to a single traumatic experience [41•], and the PCL-S has been widely used in prevalence studies in military populations [2•, 42, 43]. The new PCL-5 is also anchored in the same way as the PCL-S. That being said, even objective tests have difficulty differentiating between PTSD and co-morbid anxiety. A study by Bodkin et al. found that 78 % of non-traumatized respondents screened positive for PTSD on the structured clinical interview for DSM-IV (SCID) if they were asked to complete that section using "something they had been worrying about [44]."

Other PTSD screening instruments widely used outside of the US military include the DTS, PTSD Symptom Scale – Self Report (PSS-SR), and Harvard Trauma Questionnaire (HTQ). The DTS is similar to the PCL-M/PCL-C. They share a 17-item structure tied to DSM-IV criteria with a 5-point Likert severity scale, demonstrate similar sensitivities and specificities, have been validated for use in US military and veteran populations, and are presumably both equivalently non-specific in differentiating between co-morbid axis I disorders as the PCL [24, 45]. Like the PCL-S, the DTS is anchored to a singular trauma [24]. It is widely used in PTSD research, particularly medication research. The DTS was found to be sensitive to changes in SSRI trials by its creator, Dr. Jonathan Davidson, when he analyzed his own medication trials [46]. However, due to the similarities with the PCL, the DTS likely demonstrates comparable performance overall.

The PSS-SR is a third 17-item questionnaire closely tied to DSM criteria with a 3-point Likert scale accompanying each symptom [47]. It is not widely used in American or European studies and is not validated in US military or veterans based on our literature search.

The HTQ is a narrative based assessment tool applied to an open-ended conversation. In a recent study of Iraq refugees, it took roughly one hour to administer as well as

time spent translating recorded responses [48]. Given its length and difficulty in administration, it is not widely used in research or clinical practice and is not validated for use in US military or veterans.

What cut-off Scores are Recommended for US Military Screening?

Use of the PC-PTSD is fairly straight-forward as it has too few items and only two possible cutoff scores validated in the literature. It is generally agreed that a score of two or greater demonstrates sufficient sensitivity and specificity to be considered positive, though three or greater is sometimes used when greater specificity is sought [32, 33]. This is a general screening tool and there are high rates of false positives when this tool is used in a general population screening process [23].

Proper application of the PCL is complicated by the fact that no single cut-off is adequate for all purposes [23]. For epidemiological studies of PTSD prevalence in most populations (where prevalence is expected to <15 %), higher specificity cutoffs (e.g., 48 or higher), are necessary to ensure that estimates are not grossly inflated; for screening in a clinical setting where every individual will be receiving a clinical evaluation, a lower cutoff (30-44) is preferred to reduce the number of false negatives [23]. This recommendation is contrary to guidelines from the National Center for PTSD which recommend that the highest PCL cutoff scores be reserved for settings where prevalence is highest (e.g., >40 % prevalence in a VA mental health clinic). However, Terhakopian et al. provides a nice illustration of why it is necessary to apply the highest cutoff scores in population research and why cutoff scores have to be calibrated depending on the expected prevalence and clinical setting. In a population of returning veterans with a PTSD prevalence of 15 %, for example, a PCL cut-off of 30, which has been validated for use in clinical settings and estimated to have a sensitivity of 0.85 and specificity of 0.73, produces a prevalence estimate of 36 % (and a corresponding percent of the population needing clinical evaluation). This is more than double the actual prevalence, due to high numbers of false positives and low predictive value [23], and can also potentially overwhelm mental health resources to conduct the clinical evaluations. If the cut-off is increased to 50, sensitivity decreases to 0.54 and specificity increases to 0.93 [23]. This results in nearly half of individuals with PTSD (46 %) being missed, but produces a prevalence estimate that is much more accurate (14 %). This demonstrates that the purpose of screening, clinical setting, and clinical resources must be taken into consideration in selecting an appropriate cutoff. Epidemiological studies of prevalence must utilize higher cutoffs, while screening in clinical settings must take into consideration an appropriate balance of identifying as high a number of individuals who have the disorder as possible while also not overwhelming clinic resources and the capacity to evaluate those who screen positive. One concern is that test performance may not be as reliable in the presence of co-morbid conditions, and PCL results should be interpreted with caution in individuals with depression or other anxiety disorders. In terms of other instruments, the DTS appears to have no clear advantage over the PCL, though DTS validation studies are difficult to interpret because of subgroup analyses that limit accurate comparisons with PCL studies [24].

The largest limitations of current screening programs stem from their reliance on self-report data, which is impacted by concerns of a lack of anonymity due to stigma and appears to diminish in accuracy over time and as individuals improve [24, 34]. Use of standardized interview-based assessments such as the Clinician Administered PTSD Scale (CAPS), the Short PTSD Rating Interview (SPRINT), or the PTSD Symptom Scale – Interview (PSS-I) is impractical due to the time and special training required to administer each. To address this, a current research focus is the identification of potential biomarkers for PTSD, particularly early in its clinical course when it is most responsive to treatment [49–51]. Though still in its infancy, several potential markers such as p11 in peripheral blood cells and glucocorticoid receptor numbers have demonstrated potential utility in differentiating PTSD from other psychiatric conditions in humans, but not to the degree that they can be relied on clinically [50, 51]. Cortisol and inflammatory markers are also being studied, though their role in PTSD is very complex and variable [52, 53]. Should a viable biomarker for PTSD be identified, it would likely change the military's screening policies dramatically.

Conclusion

Screening is conducted to ensure adequate medical resources are in place to facilitate expedient treatment of service members with PTSD. Due to variable symptom manifestation and reintegration into civilian life among returning warriors, screening needs to be conducted over time. To reduce stigma, enhance accurate symptom reporting, and promote connection to care, the military is enhancing treatment of depression and PTSD in primary care. PTSD screening instruments validated for use in US military and veteran populations include the PC-PTSD, PCL, and DTS. These assessments require calibration to the population of interest and purpose of the test, though they may have reduced reliability when there is significant co-morbid axis I conditions. Regardless of screening results, diagnosis of PTSD must rely on a clinical interview by a qualified provider. Further validation studies and new screening instruments are needed for both DSM-V and when diagnosing PTSD with co-morbid

axis I conditions or trending symptom changes over long periods of time. A major weakness of the current system is its reliance on self-report data. Although biomarker research offers the hope of transforming screening processes, this research has not advanced to the level that major changes are likely in the near future.

Compliance with Ethics Guidelines

Conflict of Interest Daniel J. Lee, Christopher H. Warner, and Charles W. Hoge declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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