Psychiatry Research 240 (2016) 157–162

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Accuracy of screening for posttraumatic stress disorder in specialty mental health clinics in the U.S. Veterans Affairs Healthcare System

Jack Tsai [a,b,*], Robert H. Pietrzak [b,c], Rani A. Hoff [b,c,d], Ilan Harpaz-Rotem [b,c,d]

[a] United States Department of Veterans Affairs, New England Mental Illness Research, Education, and Clinical Center, West Haven, CT, USA
[b] Department of Psychiatry, Yale University School of Medicine, New Haven, CT, USA
[c] United States Department of Veterans Affairs National Center for Posttraumatic Stress Disorder, West Haven, CT, USA
[d] Veterans Affairs Northeast Program Evaluation Center, West Haven, CT, USA

ARTICLE INFO

Article history:
Received 18 April 2015
Received in revised form
12 October 2015
Accepted 15 April 2016
Available online 21 April 2016

Keywords:
Trauma
Posttraumatic stress disorder
Epidemiology
Assessment/diagnosis
Health services

ABSTRACT

This study 1) describes the prevalence of positive PTSD screens among male, female, and OEF/OIF/OND veterans using various PTSD Checklist-Military version (PCL-M) criteria; 2) evaluates the sensitivity and specificity of various PCL-M criteria; and 3) identifies optimal screening criteria in predicting clinician-documented PTSD diagnoses. VA electronic medical records data from 327,093 veterans during 2008–2012 were analyzed. Receiver operating characteristic curve analyses compared PCL-M scores against clinician-documented PTSD diagnoses. Results showed that different PCL-M scoring criteria resulted in 62.0–84.5% of veterans screening positive for PTSD compared to 40.1% with a clinician-documented PTSD diagnosis. Sensitivity of the PCL-M ranged from 73.7 to 93.5% and specificity ranged from 21.6 to 45.8% for all veterans. The optimal PCL-M cut score according to Youden's index was ≥ 45 for male veterans, ≥ 35 for female veterans, and ≥ 38 for OEF/OIF/OND veterans. Self-report measures like the PCL-M may be a useful screening tool for identifying probable PTSD in VA specialty clinics, but they should be calibrated for different veteran subgroups and followed by structured clinical interviews.

Published by Elsevier Ireland Ltd.

1. Introduction

Screening and identifying posttraumatic stress disorder (PTSD) among veterans has been a priority of the U.S. Department of Veterans Affairs (VA) for over a decade (Dobie et al., 2002; Seal et al., 2008; Calhoun et al., 2010). Veterans are at higher risk for developing PTSD than adults in the general population given their greater exposure to various military-related trauma, particularly during wartime (King et al., 1999; Seal et al., 2009). There has been growing concern about the high rates of combat exposure and mental health problems among veterans who have served in Operations Enduring Freedom/Iraqi Freedom/New Dawn (OEF/OIF/OND) (Hoge et al., 2004, 2006; Seal et al., 2009). As a result, mandatory screening for PTSD among OEF/OIF/OND veterans was implemented in 2005 using the Primary Care PTSD screen (PC-PTSD; Prins et al., 2003). Use of the PTSD Checklist- Military version (PCL-M; Weathers et al., 1991b) for monitoring PTSD symptoms was implemented in 2009 as a VA national clinical reminder and has been used to assess veterans in VA specialty Anxiety/PTSD clinics. The PCL has also been used in research studies of VA patients for many years.

The PCL-M (Weathers et al., 1991a) is a 17-item self-report instrument developed to assess the presence and severity of military-related PTSD symptoms based on diagnostic criteria for PTSD in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; American Psychiatric Association, 2000). Respondents indicate the extent to which they have been bothered by symptoms, such as "repeated, disturbing memories, thoughts, or images of a stressful military experience from the past" in the past month on a 5-point Likert scale from 1 ("Not at all") to 5 ("Extremely"). The military version of the PCL specifies that respondents rate their PTSD symptoms in response to a "stressful military experience."

Although the PCL-M and its variants (e.g., PCL-civilian version) are one of the most widely used screening instruments for PTSD (Richardson et al., 2006; Berger et al., 2007; Li et al., 2010), there is no established scoring approach or cut score for the PCL that is used in the VA. Investigating and establishing optimal scoring methods to detect PTSD is important in light of data suggesting that different scoring approaches and cut scores yield different estimates of probable PTSD (Keen et al., 2008; Terhakopian et al., 2008); and that different cut scores may apply in select subpopulations of trauma survivors (Keen et al., 2008; Terhakopian

* Correspondence to: 950 Campbell Ave., 151D, West Haven, CT 06516, USA.
E-mail address: Jack.Tsai@yale.edu (J. Tsai).

http://dx.doi.org/10.1016/j.psychres.2016.04.036
0165-1781/Published by Elsevier Ireland Ltd.

et al., 2008). Screening and evaluating the accuracy of screening for PTSD among veterans is important for secondary and tertiary prevention efforts, and necessary to ensure VA providers are successfully identifying and providing for veterans who need care.

Different scoring procedures have been used for the PCL to yield either a continuous measure of symptom severity or a dichotomous indicator of a positive screen. To obtain a continuous measure, responses on the PCL can be summed for a total score. To obtain a dichotomous measure, various cutoff scores are used or a symptom cluster approach can be used in which responses are matched to DSM-IV diagnostic criteria (e.g., moderate or greater endorsement of one Criterion B symptom, three Criterion C symptoms, and two Criterion D symptoms). A more recent version of the PCL based on the DSM-5 has been created called the PCL-5 (Weathers et al., 2013), however the PCL-M only differs from the PCL-5 on five items and 16 items remain unchanged.

Research on the PCL has proposed a variety of dichotomous scoring methods, including using cutoff scores ranging from 30 to 50 (Keen et al., 2008). Most notably, PCL scores of 35 or higher (Bliese et al., 2008), 44 or higher (Blanchard et al., 1996), or 50 or higher (Weathers et al., 1993; Hoge et al., 2004) have been used to identify probable PTSD. Others have used DSM-IV criteria to determine whether responses on the PCL indicate a positive screen for PTSD (Harpaz-Rotem et al., 2014; Tsai et al., 2015). And yet others have used even more stringent criteria, such as requiring both PCL scores to be 50 or higher *and* responses to correspond to DSM-IV criteria (Tsai et al., 2012). Given the various ways the PCL has been scored, further research is needed on how to best use this measure and other self-report measures to detect PTSD. Additionally, some research suggests that the accuracy of different cutoff categories are influenced by PTSD prevalence such that populations with low PTSD prevalence should use higher cutoff values (Terhakopian et al., 2008), suggesting cutoff scores should be calibrated for the population of interest.

In the current study, we analyzed data from a national clinical sample of veterans to 1) describe the prevalence of positive PTSD screens in VA specialty mental health clinics among different veteran subgroups (men, women, OEF/OIF/OND veterans) using different PCL-M scoring criteria; 2) examine the accuracy of the PCL-M in terms of sensitivity and specificity of the PCL-M; and 3) identify the optimal PCL scoring method among different veteran subgroups in diagnosing PTSD using clinician-documented PTSD diagnoses as the gold standard. The results may inform the extant literature that has relied on the PCL-M, continued PTSD screening efforts in the VA healthcare system, and future use of the PCL-5.

2. Methods

2.1. Data source

The PCL-M was administered to veterans in VA specialty Anxiety/PTSD clinics throughout the country by VA mental health providers and entered into the VA electronic medical record. Using VA electronic medical record databases that capture outpatient care and test results, we identified PCL-M scores that were completed between October 1, 2008 and September 31, 2011. We followed veterans for 365 days from the initial administration of the PCL to record all mental health diagnoses given within the observed period, including diagnoses of PTSD. These diagnoses were based on providers' clinical impression and judgment, and were not based on a structured diagnostic interview. However, PTSD diagnoses documented in VA electronic medical record databases have been found to accurately reflect PTSD diagnoses made by VA mental health providers (McCarron et al., 2014). We also obtained participants' sociodemographic information from the electronic medical record. The data were unduplicated to include only the first PCL-M on record, so that there are no repeated measurements for any individual veteran included in the current study. Only veterans who responded to the PCL-M were included and the final sample included 327,093 unique veterans.

2.2. Sample

Of the 327,093 veterans in the study, the majority was male (90.3%), White (58.6%), unmarried (51.8%), and lived in an urban area (65.0%) with a mean age of 44.2 (standard deviation [sd]= 15.5) and annual income of $25,321.6 (sd=49,924.4). A substantial proportion (40.1%) were OEF/OIF/OND veterans. Over half of the total sample (58.6%) did not receive any VA disability compensation within 12 months of their initial PCL-M assessment; and 4.0% were classified as unemployable and receiving 100% disability compensation from the VA.

2.3. Data analysis

First, descriptive statistics were used to describe mean PCL-M scores, the proportion of veterans who screened positive for PTSD using different scoring criteria on the PCL-M, and the proportion with clinician-documented PTSD diagnoses among the total sample and veteran subgroups. Differences between veteran subgroups were compared with effect size measures, such as Cohen's d and differences in percentages, rather than statistical significance testing given the large size of the samples. Second, frequency analyses were conducted to create 2×2 tables describing the number of true and false positives, and true and false negatives when comparing PTSD screening algorithms against clinician-documented PTSD diagnoses. These numbers were used to calculate sensitivity and specificity values. Cohen's kappa (Cohen, 1960) was also calculated to provide a measure of agreement between positive PTSD screens and clinician-documented PTSD diagnoses. Third, receiver operating characteristic (ROC) curve analyses were conducted to plot the true positive rate against the false positive rate at varying thresholds (Hanley and McNeil, 1982). The area under the curve was calculated using a non-parametric method of trapezoidal approximation (Metz, 1978); an area of 1 represents a perfect test and an area of.5 represents a test no better than chance. Finally, Youden's index (Youden, 1950) was used to identify PCL-M cutoff scores that had optimal sensitivity and specificity in identifying PTSD diagnoses. We tried to adhere to the Standards of Reporting of Diagnostic Accuracy (STARD; Bossuyt et al., 2003), except we were not able to provide specifics about the clinic setting, recruitment, training of VA clinicians, and time interval between assessments given the nature of the study. All statistical analyses were conducted using SPSS version 20.0.

2. Results

As shown in Table 1, the mean PCL-M score of the total sample was over 50% and 40.1% of veterans in the total sample had a VA clinician-documented diagnosis of PTSD in their medical chart. The distribution of PCL-M scores was normal overall, except for a large number of scores at the lowest possible score of 17 who did not report any PTSD symptoms. There were very small gender differences in PCL-M scores and clinician-documented PTSD diagnoses, with women having higher PCL-M total scores than men (Cohen's d=0.03), but lower rates of clinician-documented PTSD diagnoses (Δ3.45%). OEF/OIF/OND veterans had slightly higher mean PCL-M total scores than non-OEF/OIF/OND veterans (Cohen's d=0.10) and substantially higher rates of VA clinician-documented PTSD diagnoses (Δ17.42%).

Using varying screening criteria with the PCL-M, 62.0–84.5% of all veterans screened positive for PTSD. The percentage of veterans declined with higher PCL-M cutoffs (≥ 35, ≥ 44, and ≥ 50). Positive screens based on PCL-M responses matched to DSM-IV criteria resulted in identifying fewer veterans than the PCL-M ≥ 44 cut score, but more than the PCL-M ≥ 50 cut score. The most stringent screening criteria of using DSM-IV criteria and total scores ≥ 50 resulted in identifying the fewest number of veterans with PTSD, which was still higher than the percentage of veterans