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The primary care PTSD screen (PC-PTSD): development and operating characteristics

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ABSTRACT

Posttraumatic stress disorder (PTSD) is a frequently unrecognized anxiety disorder in primary care settings. This study reports on the development and operating characteristics of a brief 4-item screen for PTSD in primary care (PC-PTSD). 188 VA primary care patients completed the PC-PTSD, the PTSD Symptom Checklist (PCL) and the Clinician Administered Scale for PTSD (CAPS). The prevalence of PTSD was 24.5%. Signal detection analyses showed that with this base rate, the PC-PTSD had an optimally efficient cutoff score of 3 for both male and female patients. A cutoff score of 2 is recommended when sensitivity rather than efficiency is optimized. The PC-PTSD outperformed the PCL in terms of overall quality, sensitivity, specificity, efficiency, and quality of efficiency. The PC-PTSD appears to be a psychometrically sound screen for PTSD with comparable operating characteristics to other screens for mental disorders.

Introduction

Psychiatric disorders are prevalent among primary care patients[1]. Associations with increased medical costs[2] and excess medical utilization[3] have led to significant efforts to identify patients with psychiatric conditions in primary care. Comprehensive screens for mental disorders have been developed that detect disorders common to primary care such as major depression, panic disorder, and alcohol abuse.[4,5] Such screening efforts have led to increasingly cost-effective treatments for these disorders and improved quality of care.[6-8] Efforts to identify mental disorders in primary care have not yet led to effective screening methods for posttraumatic stress disorder (PTSD). PTSD is a serious and chronic psychiatric disorder that follows overwhelmingly stressful events, such as combat exposure, sexual assault, or natural disasters. Approximately 12 to 39% of patients in primary care settings meet diagnostic criteria for PTSD.[9,10] The prevalence in primary care is similar to those of depressive disorders and higher than those found for other anxiety disorders.[1] Given the high prevalence and lack of attention to identification, it is no surprise that PTSD is the most frequently under-recognized and untreated anxiety disorder in primary care.[11] The development of a primary care screen for PTSD is imperative to providing effective services to this population.[12]

Screening is warranted when a condition is prevalent; the condition significantly impacts quality of life; acceptable treatments exist; detection significantly reduces morbidity or mortality; and sensitive and specific diagnostic tests exist.[13]. Following these guidelines, it is clear that screening for PTSD is an important issue. In addition to being a relatively common psychiatric disorder, the majority of PTSD patients contact the health care system in primary care, rather than

specialty mental health services.[9] PTSD is associated with significant deficits in physical health functioning and quality of life that exceed those of other mental disorders including panic disorder, generalized anxiety disorder, and major depressive disorder.[14] PTSD is associated with increased morbidity, medical utilization and costs.[10, 15-17] Though only a minority of patients with PTSD receive services,[18] a number of efficacious behavioral and pharmacological treatments exist.[19-21] Treatment guidelines are also established with empirically based recommendations tailored for primary care, as well as for the determination of when more specialized psychiatric services are needed.[22]

It is recommended that screens for psychiatric conditions be very brief (*i.e.*, 2–4 items) self-report measures that are easy to read, understand, and complete.[23] Screen items should be embedded within a larger battery of important patient information and easily scored for positive or negative status. Efficient screens must strike the appropriate balance between sensitivity (the ability to detect positive cases) and specificity (the ability to rule out negative cases). Sensitivity is emphasized when detection is of greater interest, *e.g.* when base rates are low or the condition is extremely deleterious, and specificity is emphasized when false-positives are a concern, *e.g.* when the base-rate is high or treatment is extremely costly.[23,24] Perhaps the two most well established and comprehensive tools for detecting mental disorders in primary care are the Symptom-Driven Diagnostic System for Primary Care (SDDS-PC)[4] and the Primary Care Evaluation of Mental Disorders (PRIME-MD).[5] Both utilize a patient questionnaire that includes one to four screening items designed to detect mental disorders commonly seen in primary care such as major depression, panic disorder, and alcohol abuse. When compared to structured diagnostic interviews, the operating characteristics of these screens are good to excellent for some disorders (*e.g.*, alcohol abuse and dependence) and problematic for other disorders (*e.g.*, obsessive-compulsive disorder). There is also quite a bit of variability between the two screens. For example, the sensitivity and specificity for detecting depression using the SDDS-PC was 0.90 and 0.77, respectively, and 0.69 and 0.82 using the PRIME-MD. Neither the SDDS-PC nor the PRIME-MD includes items designed to detect PTSD.

Existing measures for PTSD are largely inappropriate for use in primary care settings. There are several well-established diagnostic interviews for PTSD as well as numerous self-report symptom measures.[25] Many of the self-report inventories are based on the 17 PTSD symptoms covered in the DSMIV and utilize a Likert-style response format. Although these are sometimes referred to as "screens", the length and response format are not well-suited for a fast paced primary care setting. Even shorter measures (*i.e.*, fewer than 10 items) are often too time consuming because they require an interview to determine the nature of the traumatic event(s) and/or focus on life-time rather than current PTSD.[26] Furthermore, most of the very brief measures have been validated on survivors of a particular trauma[27] or a psychiatric population[28-30] rather than the general population or a sample of primary care patients. Those studies that have examined the prevalence of PTSD in primary care or ambulatory care settings have utilized the PTSD symptom checklist (PCL), [31,32] a measure that contains both a trauma probe section and the degree to which patients have been bothered by the 17 DSM-IV symptoms.[10,33] Finally, the few measures that would meet criteria for a primary care screen do not have information on psychometric properties or response operating characteristics.[9]

The present study evaluates a brief, four-item self-report screen for PTSD in primary care. Operating characteristics are derived in comparison to a gold-standard structured interview for PTSD. The overall performance of the PC-PTSD is compared to total scores on the PCL. Lastly, the accuracy of chart diagnosis for PTSD is compared to the accuracy of diagnoses when using the PC-PTSD.

Method

PC-PTSD Development

The PC-PTSD was designed to detect the PTSD diagnosis in busy primary care clinics, where physician time and resources are limited. Detection focuses on capturing meaningful, empirically derived symptom clusters. Factor analyses demonstrate four underlying factors that are specific to the PTSD construct and do not appear to be confounded by general psychological distress: re-experiencing, numbing, avoidance, and hyperarousal.[34-36] Consequently, the 4-item screen reflects these four factors. Because 90% or more of the general population will experience a traumatic even in their lifetime, assessment of trauma exposure was excluded from the screen items for its lack of specificity to the PTSD diagnosis.[37] A final consideration in the development of the PC-PTSD was reading level. Many of the existing measures for PTSD utilize language that requires at least a high-school reading level. For example the PCL has a Flesch grade level of 13.2.[38] We purposefully designed our screen to be understandable for individuals at the eighth grade reading level: for example, we defined hypervigiliance as "constantly on guard". The Flesch-Kincaid grade level for the PC-PTSD is 7.7. The PC-PTSD screen is presented in Table 1.

Table 1. *Primary care PTSD screen (PC–PTSD)*

In your life, have you ever had any experience that was so frightening, horrible, or upsetting that, in the past month, you...

1. Have had nightmares about it or thought about it when you did not want to?
   YES NO
2. Tried hard not to think about it or went out of your way to avoid situations that reminded you of it?
   YES NO
3. Were constantly on guard, watchful, or easily startled?
   YES NO
4. Felt numb or detached from others, activities, or your surroundings?
   YES NO

Participants and procedures

A total of 188 men and women participated in the study. Demographic characteristics of the sample are described in Table 2. The majority of VA medical care patients in the present study were female. Caucasian, married, and had some college education. Nearly 43% of the sample was not employed. Among these patients, the most frequent reasons for unemployment were due to retirement (40.9%) and poor health or disability (33.3%). The mean (*SD*) age of the sample was 52.1 (SD=15.8) years.

Participants were recruited from general medical and women's health clinics at the Department of Veterans Affairs Medical Center in Palo Alto and Menlo Park, CA. The investigation received approval from the Stanford University Panel on Medical Human Subjects. The study was completed in two phases: clinic-based recruitment and screening and a one-month follow-up (SD=27.8 days) for a second administration of the screen and diagnostic interviewing. Seventy-one percent of participants also completed a measure of health status, as part of a separate study.[17] In phase 1, trained graduate students and master's level clinicians in psychology administered the PC-PTSD to screen patients in clinic waiting rooms. The eligible pool of participants included all patients in the waiting rooms. Exclusion criteria for waiting room screening included gross cognitive impairment and speaking a primary language other than English. All screened patients were invited to participate in the second phase of the study. Exclusion criteria at this phase included invalid telephone number, or participation in another research project that precluded participation in the current study. Of the men and women who completed the first screen (N=335), 56% completed the second phase. During the second phase, participants completed the PC-PTSD and the PCL. Trained masters' and doctoral-level psychologists then interviewed the participants for PTSD using a structured interview. Participants were paid for their participation.

There were no differences on the PC-PTSD between participants and non-participants. Furthermore, comparisons between 88 participants and 56 non-participants showed no differences in age, presence of PTSD, mental health, or medical diagnosis at the time of the initial screening.[17]

Table 2. *Demographic characteristics of 188 VA primary care patients*

Characteristic	No.of patients[a]	(%)[a]
Gender		
Male	64	(34.0)
Female	124	(66.0)
Ethnicity		
Caucasian/White	127	(68.6)
African American/Black	33	(17.8)
Hispanic/Latino	8	(4.3)
Asian/Pacific American	9	(4.9)
Native American/Indian	2	(1.1)
Other	6	(3.2)
Education		
Grade 8	1	(0.5)
Some high school	5	(2.7)
High school graduate	32	(17.5)
Some college	89	(48.6)
College graduate	28	(15.3)
Some post graduate	9	(4.9)
Masters	17	(9.3)
Ph.D.	2	(1.1)
Income		
< $10,000	26	(19.8)
$10,000–$20,000	16	(12.2)
$20,001–$40,000	50	(38.2)
$40,001–$60,000	13	(9.9)
$60,001–$80,000	12	(9.2)
$80,001–$100,000	5	(3.8)
> $100,000	9	(6.9)
Relationship status		
Single	44	(23.7)
Married	62	(33.3)
Living with partner	16	(8.6)
Separated/divorced	47	(25.3)
Widowed	17	(9.1)
Employed		
Yes, part-time only	16	(9.8)
Yes, full-time only	46	(28.2)
Yes, full and part time	31	(19.0)
No	70	(42.9)
Branch of service		
Army	72	(38.9)
Navy	47	(25.4)
Marines	11	(5.9)
Air force	44	(23.8)
Reserves	1	(0.5)
Relative of veteran	2	(1.1)
Other	8	(4.3)

[a]Total number of patients may not reach 188 for each demographic characteristic due to the presence of missing data.

Measures

PTSD

PTSD diagnoses were assessed using the Clinician-Administered PTSD Scale (CAPS).[39] This is a structured clinical interview that assesses PTSD as defined by the Diagnostic and Statistical Manual of Mental Disorders-IV.[40] The CAPS has excellent reliability and validity.[41] We examined inter-rater reliability using both in-person and audio-taped reliability ratings (N = 108). Inter-rater reliability for the presence or absence of a current CAPS PTSD diagnosis was excellent, kappa = 0.85.

In addition to the CAPS, participants completed the PTSD symptom checklist (PCL).[31,32] This is a 17-item self-report

inventory of distress associated with PTSD symptoms. The PCL has been used as a screen with both primary care patients[10,33] and specifically targeted traumatized populations.[32]

Data analysis

Signal Detection Analyses were conducted using the methods outlined by Kraemer.[42] Weighted kappa coefficients are calculated which represent the quality of efficiency (κ (0.5)), sensitivity (κ (1)), and specificity (κ (0)). Using these quality indices, optimally efficient (*i.e.*, it maximizes both the quality of sensitivity and the quality of specificity) cutoffs were identified.

Results

Prevalence of PTSD

A total of 46 patients (24.5%) received a diagnosis of PTSD based on the CAPS interview (24% of female patients and 25% of male patients). There were no significant gender differences in the prevalence of PTSD.

Descriptive analyses of the PC-PTSD

The mean PC-PTSD score at initial screening was 1.3 (SD=1.6) with individual scores ranging from 0 to 4. The mean PC-PTSD score at follow-up was 1.5 (SD=1.6). The two administrations yielded a Pearson's correlation coefficient of 0.83 ($P< .001$), indicating good test-re-test reliability. At both recruitment and at follow-up, individuals who met criteria for PTSD according to the CAPS endorsed more items on the PC-PTSD than did individuals who did not meet criteria. At recruitment, PTSD positive patients had a mean score of 3.2, (SD = 1.1) and PTSD negative patients had a mean score of 0.7, (SD = 1.2; $t(184)=12.45$, $P<.001$). At follow-up, PTSD positive patients had a mean score of 3.2 (SD=1.1), and PTSD negative patients had a mean score of 0.9 (SD=1.3, $t(186)=11.18, P<.001$).

Signal detection analyses

The Spearman rank point-biserial correlation between the CAPS diagnosis and the PC-PTSD administered at the time of the interview was 0.83 ($P<.001$). As shown in Table 3, the PC-PTSD scale had an optimally efficient cutoff score of 3 (κ(0.5)=0.61), with a sensitivity rate of 0.78, a specificity rate of 0.87, a positive predictive value of 0.65, and a negative predictive value of 0.92.

Comparison of the PC-PTSD and PCL

Table 4 compares the performance of the PC-PTSD, administered at the time of the interview, to the PCL, in identifying PTSD as diagnosed by the CAPS. An optimally efficient cutoff of 30 was identified for the PCL. Using the optimally efficient cutoff of 3, the PC-PTSD outperformed the PCL in terms of overall quality (0.83 to 0.18), sensitivity (0.78 to 0.46), specificity (0.87 to 0.79), efficiency (0.85 to 0.71), and quality of efficiency (0.61 to 0.24).

Comparison of female and male participants

Scores on the PC-PTSD were compared to CAPS PTSD for females and males. In the sample of 124 women, an optimally efficient cutoff of 3 was identified. This yielded a sensitivity of 0.70, specificity of .84, and efficiency of 0.81. The quality of efficiency was 0.51. For the sample of 64 men, an optimally efficient cutoff of 3 was identified, with a sensitivity of 0.94, specificity of 0.92, and efficiency of 0.92. The quality of efficiency was 0.80. Mean scores for females and males were 1.48 (SD=1.58) and 1.42 (SD=1.59), respectively.

Comparison of clinic diagnosis and CAPS diagnosis

In order to evaluate the degree to which primary care providers correctly identified the PTSD diagnosis, we examined the VA medical charts of 133 participants. When using the CAPS as the gold standard, 15% of these participants had been diagnosed with PTSD. Providers correctly identified 61% of patients with PTSD and missed 39%. When using the PC-PTSD, the diagnosis of PTSD was correctly identified in 78% of cases and missed in 22% of cases.

Table 3. *Diagnostic utility of the PC-PTSD scale at different cutoff scores*

Cutoff point	Sensitivity	Specificity	Efficiency	PPV[a]	NPV[b]	κ(0.5)[c]
1	0.98	0.59	0.69	0.44	0.99	0.40
2	0.91	0.72	0.77	0.51	0.96	0.49
3	0.78	0.87	0.85	0.65	0.92	0.61
4	0.54	0.93	0.84	0.71	0.86	0.52

Note: Diagnostic utility is based upon the VA primary care sample (N = 188, base rate = 24.5%).
[a]PPV = positive predictive value. [b]NPV = negative predictive value. [c]κ(.5) = kappa coefficient representing quality of efficiency.

Table 4. *Comparison of the diagnostic utility of the PC-PTSD and the PCL*

Scale	r_{pb} with diagnosis[a]	Cutoff[b]	Sensitivity	Specificity	Efficiency	κ(0.5)[c]
PTSD-PC	0.83**	3	0.78	0.87	0.85	0.61
PCL	0.18*	30	0.46	0.79	0.71	0.24

Diagnostic utility is based upon the VA primary care sample (N = 188, base rate = 24.5%).
[a]r_{pb} = Spearman rank point-biserial correlation representing overall quality; diagnosis = CAPS diagnosis. [b]Cutoff = optimally efficient cutoff score. [c]κ(0.5) = kappa coefficient representing quality of efficiency.
*$P < 0.05$. **$P < 0.001$.

Discussion

The results of this study suggest that PTSD is a frequent psychiatric disorder in VA primary care settings. Close to a quarter of VA primary care patients met full criteria for PTSD based on a structured diagnostic interview. This finding is consistent with other VA-based ambulatory studies on the prevalence of PTSD and higher than those reported in non-VA primary care settings.[9,10] This finding suggests that screening for PTSD, especially in VA primary care settings, is warranted.

The PC-PTSD appears to be a psychometrically sound screen for correctly identifying VA primary care patients with and without a PTSD diagnosis. In this population, the PC-PTSD had an optimally efficient cutoff score of 3 for both women and men. Using signal detection analysis, the PC-PTSD was found to be a better predictor of PTSD (as diagnosed by the CAPS) than the PCL total symptom score. Indeed, using a cutoff score of 3, the PC-PTSD outperformed the PCL in terms of overall quality, sensitivity, specificity, efficiency and quality of efficiency. Consistent with Walker *et al.*,[33] we found that the optimal cut-score for the PCL was significantly lower than previously published cutoff scores of 45 to 50. This may underscore the importance of validating screening instruments with different populations.

The PC-PTSD is distinguishable from other PTSD measures, including the PCL, in its readability, brevity, ease of completion and scoring, and omission of specific trauma probe questions. In addition to its reading level, the PC-PTSD is the shortest screen available and the only one that utilizes a simple binary (yes/no) response format. While some settings may warrant close examination of specific trauma experiences (*e.g.*, emergency room settings), primary care physicians have limited resources for opening "Pandora's box",[43] especially when the average number of traumatic experiences reported by patients exposed to any trauma is 4.8.[37] Furthermore, recent theoretical and empirical findings suggest that the deleterious relationship between trauma exposure and health appears to be mediated by the diagnosis of PTSD[13, 44-47] suggesting that screening efforts should be based on the diagnosis, not trauma exposure per se.

The sensitivity and specificity of the PC-PTSD are similar to those reported for the detection of depression in primary care (PRIME-MD and SDDPC) and its efficiency score or diagnostic accuracy (85%) is similar to other, longer, measures of PTSD.[23] As noted by Kraemer and others,[42] selecting a cutoff score based on the quality of efficiency (κ(0.5,0) balances sensitivity and specificity relative to the prevalence of the diagnosis in the sample. However, the weight assigned to the quality of sensitivity and specificity is tied to risks associated with false-negative and false-positive results. In the context of screening for PTSD in primary care, a persuasive argument can be made that sensitivity, rather than efficiency should be optimized. If a cut-off score of 2 rather than 3 is used, the sensitivity of the PC-PTSD increases from 0.78 to 0.91 with a concurrent decline in specificity from 0.87 to 0.72. The overall efficiency, however, is still acceptable (77%). Thus, we recommend that in primary care settings patients with a score of 2 or higher, should be further assessed.

Although gender differences did not emerge in terms of the optimal cutoff on the PC-PTSD, the screen appeared to perform better with male patients than with female patients. It is unclear why this finding emerged. It may be that gender differences in PTSD chronicity and comorbidity impact the course of PTSD symptoms and subsequent responses on the PC-PTSD.[48]

Because of the significant relationship between PTSD and health care utilization and morbidity, detection of PTSD in primary care is essential. It is our hope that the PC-PTSD will be adopted in primary care settings where time efficiency and identification of potentially traumatized patients is of utmost importance.

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CORRIGENDUM

We regret that there were two errors in the data analyses reported in our article, "The Primary Care PTSD screen (PC-PTSD): Development and Operating Characteristics".[1] Although the operating characteristics of the PC-PTSD were correctly reported in Table 3, the comparison of the PC-PTSD to the PCL (Table 4) should appear as follows:

Table 4. Comparison of the diagnostic utility of the PC-PTSD and the PCL

Scale	r_{pb} with diagnosis[a]	Cutoff[b]	Sensitivity	Specificity	Efficiency	κ(0.5)[c]
PC-PTSD	0.60*	3	0.77	0.85	0.85	0.58
PCL	0.76*	48	0.84	0.90	0.89	0.72

*P<0.001.
[a] r_{pb}=Spearman rank point-biserial correlation representing overall quality; diagnosis is based on CAPS. [b]Cutoff=optimally efficient cutoff score; [c]κ(0.5)=kappa coefficient representing quality of efficiency.

These revised analyses are based upon a sub-sample of 167 participants who completed both the PCL and the PC-PTSD. The base rate of PTSD in this sub-sample was 26%. Thus, the values of the PC-PTSD are slightly different than those reported in Table 3, which was based on the full sample (*N*=188 with a base rate of 24.5%). The major correction is in the performance of the PCL. A miscalculation was inadvertently missed in the computation of PCL total scores. With this correction, an optimally efficient cutoff of 48 was identified for the PCL. As shown in Table 4, the PCL outperformed the PC-PTSD in terms of overall quality, sensitivity, specificity, efficiency and quality of efficiency.

Despite its superior performance in predicting CAPS diagnosis, the PCL may be too long (17 items) for primary care settings. In addition, the PCL used in this study (PCL-S) required identification of a traumatic event (here, the worst Criteria A event as identified by the CAPS). As noted in the original article, many primary care physicians have limited resources for opening "Pandora's Box", especially when considering rates of trauma exposure in this population. Although another version of the PCL (PCL-C) uses a generic probe ("stressful experiences in the past"), less information is available on the psychometric properties and operating characteristics of this version of the PCL.[2] Reported cutoff scores on the PCL-C have tended to be lower (30 to 40) than those obtained from PCL's anchored to criteria A events (45 to 50).[3]

As noted above, the analyses for the PC-PTSD were correct and consequently, there are now new implications from these analyses with regard to the use of the PC-PTSD. The optimally efficient cut-off score for the PC-PTSD is still 3, with a corresponding sensitivity of 0.78 and a specificity of 0.78. The changes in validation characteristics apply to the PCL and are reported in the correction to Table 4 which compares the two measures. Our recommendation is to utilize the PC-PTSD as a first stage screen in primary care settings. Patients screening positive (3 or more) can then be assessed for the diagnosis using the CAPS and followed in treatment using the PCL-S.

The second correction applies to the comparison made between the PC-PTSD and the chart diagnoses when using the CAPS as the gold standard. A participant was missed in the original analysis (134 medical charts were reviewed not 133) and the percentage of cases accurately identified by the chart was accidentally reversed. The PC-PTSD correctly identified 81% (not 78%) of PTSD cases using a cut point of 3 or higher; the chart diagnosis correctly identified 39% of PTSD cases (not 61%). Thus, the PC-PTSD was considerably more accurate than the chart diagnoses in identifying true cases of PTSD.

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