

Efficiency of a four-item posttraumatic stress disorder screen in trauma patients

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AAST Continuing Medical Education Article

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BACKGROUND:	One of the most common barriers identified by physicians who fail to screen for posttraumatic stress disorder (PTSD) in trauma patients is time constraint. We hypothesized the four-question Primary Care–PTSD screen (PC-PTSD) was an acceptable alternative to the commonly used 17-question Posttraumatic Stress Disorder Checklist–Civilian Version (PCL-C).
METHODS:	Consecutive trauma patients admitted to a Level I trauma center were given the PCL-C at the time of hospitalization. The four questions of the PC-PTSD are contained within the PCL-C. A positive PC-PTSD screen result was an endorsement of least three of the four questions. An overall score of greater than 44 on the PCL-C indicated a positive screen result. Sensitivity and specificity comparisons were made between the PCL-C and the PC-PTSD.
RESULTS:	Data were collected from 1,347 patients hospitalized for injury. The PC-PTSD identified 17.22% of patients with PTSD risk, and the PCL-C identified 16.10% at risk. Before discharge, the PC-PTSD has reasonable sensitivity in capturing the population at risk PTSD symptoms.
CONCLUSION:	In trauma patients before hospital discharge, the PC-PTSD is comparable with the PCL-C. Although some sensitivity is lost, the PC-PTSD is a shorter screen, and the loss of sensitivity may be offset by an increased frequency of administration. (<i>J Trauma Acute Care Surg.</i> 2013;75: 722–727. Copyright © 2013 by Lippincott Williams & Wilkins)
LEVEL OF EVIDENCE:	Diagnostic test, level III.
KEY WORDS:	Posttraumatic stress disorder; PTSD; screening; PC-PTSD; PCL-C.

It is well-known that traumatic events often lead to significant physical injury. However, traumatic injury can also cause considerable mental health impairments that endure long after the inciting incident. In particular, more than one fifth of trauma patients in the United States carry a diagnosis of posttraumatic stress disorder (PTSD) 1 year later.¹ PTSD develops after a traumatic occurrence involving actual or perceived death or serious injury to self or others. By definition, the response must involve fear, helplessness, or horror, and the person must develop three characteristic types of symptoms. These symptom clusters and diagnostic criteria include at least one (of five) reexperiencing symptom, at least three (of seven) avoidance symptoms, and at least two (of five) hyperarousal symptoms. For the PTSD diagnosis, these symptoms must be present for more than 30 days and cause clinically significant impairment and distress in the patient's life.^{2,3}

Current data support the following four trajectories of PTSD symptoms after acute injury: acute, chronic, delayed, or asymptomatic. Acute PTSD symptoms are manifested by extremely high anxiety and distress immediately after the event. These patients, however, will recover with time. Those with chronic distress exhibit a constant high level of symptoms indefinitely; whereas the asymptomatic group never goes on to develop characteristic symptoms of PTSD. Patients who initially do not experience any signs of PTSD but later develop severe symptoms may be experiencing delayed-onset PTSD.⁴

Early recognition is essential so that proper intervention can be implemented to prevent chronic PTSD and its debilitating effects. Several screening questionnaires exist to promptly recognize patients at high risk of developing PTSD. Based on previous findings, two screening tests have proven to have superior diagnostic efficiency in a primary care setting. These include the civilian version of the Posttraumatic Stress Disorder Checklist (PCL-C) and the Primary Care PTSD Screen (PC-PTSD, Table 1).⁵ The PCL-C is the most commonly used screening tool used in the acute traumatic injury population and is a 17-item questionnaire scored on a 5-point Likert scale (Fig. 1).⁶ The 17 items correspond directly to the 17 symptoms identified in the *Diagnostic and Statistical Manual of Mental Disorders Fourth Edition*, which constitute the PTSD diagnosis. It takes approximately 5 minutes to

10 minutes to administer and is used to assess the three major PTSD symptom clusters. A positive screen result is defined as a PCL-C score of greater than 44. Blanchard et al.⁷ reported that using this cutoff in motor vehicle crash survivors results in a sensitivity of 95% and a specificity of 86%.^{5,8}

Alternatively, the PC-PTSD is a four-item test developed at a Veterans' Administration Medical Center and uses a presence/absence scoring format. It takes less than 1 minute to administer, and each of the four questions can also be found in the PCL-C (Fig. 1). There is one question specifically corresponding to each one of the reexperiencing, behavioral avoidance, emotional avoidance, and hyperarousal symptoms. An endorsement of any three of four questions is considered a positive screen result. The PC-PTSD is the first PTSD screening test to be developed with a primary care sample. It was found to be the single best screening test in the primary care setting because of its brevity and diagnostic efficiency. The PC-PTSD has 78% sensitivity and 87% specificity in veteran populations.⁵

Despite the known adverse events of PTSD on quality of life in trauma patients, many trauma programs do not routinely screen for PTSD after a traumatic injury. One of the most common barriers to PTSD screening identified by clinical practitioners is time constraint. Much of the current knowledge about PTSD and acute injury has come from studies using in-depth interviews with inpatients hospitalized after traumatic injury.⁴ However, administering in-depth PTSD interviewing or time-consuming screening questionnaires to every patient is not clinically feasible in most hospital settings.⁹ Thus, if we desire to identify high-risk trauma patients and eventually implement proper treatment, the use of a more efficient screening method in the acute care setting is essential.

By improving the efficiency of PTSD screening, trauma patients can be more readily assessed for the risk of developing PTSD without requiring lengthy interviews, expensive resources, or advanced training. Many institutions are adopting a two-step process for PTSD, which includes an initial screen followed by an in-depth diagnostic interview.⁴ Our research focuses on improving the efficiency of the initial PTSD screen. The overall goal of this study was to document the sensitivity and specificity of the four-question PC-PTSD and

TABLE 1. Summary of PTSD Screening Tools Evaluated

Acronym	Full Name	Descriptor
PCL-C	Posttraumatic Stress Disorder Checklist (Civilian Version)	Seventeen-item questionnaire; scored on a 5-point Likert scale using numeric value of 44 as positive screen result
PC-PTSD	Primary Care PTSD	Four-item questionnaire; yes/no scoring format with a positive screen result defined as endorsement of any three questions

Both the PCL-C and PC-PTSD are available for free upon request through the National Center for PTSD Web site.

the 17-question PCL-C in trauma patients at the time of initial injury. We hypothesized that the PC-PTSD would be an acceptable and more efficient alternative to the PCL-C as a

screening tool for PTSD after traumatic injury. It is important to remember that a positive screen result is not diagnostic of PTSD but rather indicative of a high-risk patient who requires further assessment.

PATIENTS AND METHODS

Procedure

The 17-question PCL-C screen was given to 2,165 consecutive trauma patients admitted to Froedtert Hospital, a Level I trauma center in the Midwest. The screen was administered during the patients' initial hospital stay within 2 days to 5 days of the trauma event, which varied mostly owing to patient's ability to communicate and availability of patient owing to surgical procedures. Demographic data were obtained from the

1. Repeated, disturbing memories, thoughts, or images of a stressful experience from the past?	1	2	3	4	5
*2. Repeated, disturbing dreams of a stressful experience from the past?	1	2	3	4	5
3. Suddenly acting or feeling as if a stressful experience were happening again (as if you were reliving it)?	1	2	3	4	5
4. Feeling very upset when something reminded you of a stressful experience from the past?	1	2	3	4	5
5. Having physical reactions (e.g., heart pounding, trouble breathing, sweating) when something reminded you of a stressful experience from the past?	1	2	3	4	5
6. Avoiding thinking about or talking about a stressful experience from the past or avoiding having feelings related to it?	1	2	3	4	5
*7. Avoiding activities or situations because they reminded you of a stressful experience from the past?	1	2	3	4	5
8. Trouble remembering important parts of a stressful experience from the past?	1	2	3	4	5
9. Loss of interest in activities that you used to enjoy?	1	2	3	4	5
10. Feeling distant or cut off from other people?	1	2	3	4	5
*11. Feeling emotionally numb or being unable to have loving feelings for those close to you?	1	2	3	4	5
12. Feeling as if your future will somehow be cut short?	1	2	3	4	5
13. Trouble falling or staying asleep?	1	2	3	4	5
14. Feeling irritable or having angry outbursts?	1	2	3	4	5
15. Having difficulty concentrating?	1	2	3	4	5
*16. Being "super-alert" or watchful or on guard?	1	2	3	4	5
17. Feeling jumpy or easily startled?	1	2	3	4	5

Weathers, Litz, Huska, & Keane National Center for PTSD - Behavioral Science Division

*Questions extracted from the PCL-C as part of the four question PC-PTSD

Figure 1. PCL-C for PTSD diagnosis based on the *Diagnostic and Statistical Manual of Mental Disorders Fourth Edition*. Weathers et al.⁶ National Center for PTSD—Behavioral Science Division.

TABLE 2. Population Demographics and Descriptive Information

Variable	Mean (SD) n (%)
Age, y	41.2 (17.3)
Sex	
Male	956 (71.0)
Female	391 (29.0)
Mechanism of injury	
MVC	471 (35.0)
GSW	202 (15.0)
Fall	181 (13.4)
MCC	145 (10.8)
Stab wound	107 (7.9)
Pedestrian vs. auto	78 (5.8)
ATV crash	11 (0.8)
Assault and battery	25 (1.9)
Snow mobile crash	13 (1.0)
Suicide attempt	8 (0.6)
Bicycle	34 (2.5)
Other	71 (5.3)

ATV, all-terrain vehicle; GSW: gunshot wound; MCC, motorcycle crash; MVC, motor vehicle crash.

trauma registry. Patients who left any questions blank were excluded from the study.

Measures

PCL-C results were scored using the traditional method, which defines a positive screen result as an overall score greater than 44.⁷ The 17 items of the PCL-C are listed in Figure 1.²

Results of the PC-PTSD were extracted from the PCL-C answers because the four questions of the PC-PTSD are already contained within the PCL-C, since the PCL-C directly corresponds to the 17 symptoms of PTSD and the PC-PTSD uses four of the 17 symptoms of PTSD (identified in Fig. 1). A positive screen result was simply defined as an endorsement of any three of the four questions. Comparisons were made between the PCL-C and PC-PTSD. Sensitivity and specificity were then calculated for each comparison.

RESULTS

Population Descriptors

Of the initial 2,165 trauma patients, 1,347 (62.2%) filled out the survey completely during their stay. Males represented 71.0% of responders, with a mean (SD) age of 41.2 (17.3) years. Motor vehicle crash was the mechanism of injury for more than one third of the patients (35.0%). Gunshot wounds (15.0%) and falls (13.4%) were the next most common mechanisms of injury, followed by motorcycle crashes (10.8%), stab wounds (8.0%), pedestrian-automobile collisions (5.8%), bicycle crashes (5.3%), assault and battery (1.9%),

snow mobile (1.0%), all-terrain vehicle crashes (0.8%), and other (5.9%) (Table 2).

Measures

Population Prevalence

Overall, the PCL-C identified 16.1% as screening positive for risk for PTSD, and the PC-PTSD identified 17.2% (Fig. 2).

Sensitivity

The PC-PTSD had a sensitivity of 72.4% when compared with PCL-C score of greater than 44 (Table 3).

Specificity

The PC-PTSD had a specificity of 93.4% when compared with PCL-C (Table 3).

DISCUSSION

This is the first study that has focused specifically on comparing the sensitivity and specificity of the PCL-C and PC-PTSD to screen a trauma population for risk for PTSD. Our findings suggest that using the PC-PTSD identified a similar number of high-risk patients as the PCL-C. Furthermore, PC-PTSD retained a high specificity (93.4%) but had a slightly diminished sensitivity (72.4%) when compared with the PCL-C, which is the most commonly used PTSD screen in the civilian population. This loss of sensitivity may be acceptable because the PC-PTSD is a shorter screen. With time limitations being the major barrier to PTSD screening in the acute setting, a more concise screen will be used more often. Thus, the increased frequency of administration will offset the loss of sensitivity. It is also important that false-positive results are kept to a minimum because there is evidence that inappropriate psychological debriefing and treatment after a traumatic event may impede natural recovery and essentially be harmful.^{10–12}

When evaluating a trauma population for symptoms of PTSD during the initial hospital stay, the four items of the PC-PTSD are an acceptable alternative to the PCL-C. However, unlike the PCL-C, PC-PTSD is a binary screen and does not

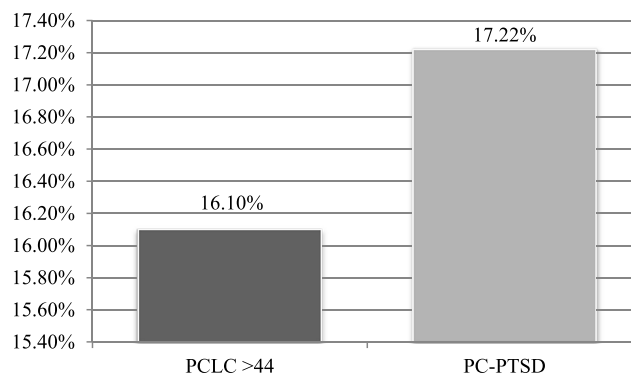


Figure 2. Percentage of patients with positive PTSD screen result. PCL-C > 44, PCL-C, scored with traditional method.

TABLE 3. Statistical Analysis for PC-PTSD Versus PCL-C

PC-PTSD	PCL-C		
	+	–	
+	157	75	232
–	60	1,055	1,115
	217	1,130	1,347
Sensitivity			72.35%
Specificity			93.36%
Positive predictive value			67.67%
Negative predictive value			94.62%

assess severity of PTSD. It only examines whether patients are beginning to show signs of the acute phase trajectory of PTSD. Thus, those identified as high risk by the PC-PTSD will need further evaluation by a psychologist either during their initial inpatient stay or as an outpatient. This is particularly important because there is strong evidence that early intervention can reduce the occurrence of the development of PTSD in traumatic injury survivors. Nevertheless, it is essential to note that these patients do not yet meet the time requirements for PTSD and should not be incorrectly labeled with the diagnosis. At our medical center, following all positive screen results, a formal psychological consultation is conducted, and intervention is initiated in the hospital, with continued outpatient treatment when necessary.

PTSD is seen in trauma survivors, especially those of low socioeconomic status, gunshot wounds, and assaultive injury. The rate of symptoms is much higher than the rest of the population.^{13,14} In addition, it has been shown that a diagnosis of PTSD is directly correlated with longer recovery times from acute injury and poorer quality of life after trauma.¹⁵ For these reasons, it is important to identify the most at-risk trauma patients to prevent complications and improve quality of life after trauma.

LIMITATIONS

Several limitations to this study exist. First, data for the PC-PTSD had to be extracted from the PCL-C because the PC-PTSD questions were not in a yes/no format and the additional questions could have skewed patient responses to the four PC-PTSD components. Furthermore, these screens were given during the initial hospitalization, which may have not been sufficient time for patients to develop symptoms of reexperiencing, hyperarousal, and avoidance. However, it is essential to remember that the questionnaires are not to be used for diagnostic purposes. The PC-PTSD and PCL-C are merely screening tools to assess risk of a patient developing PTSD in the future. Moreover, there is no preinjury data, so baseline comorbidities or patient substance abuse history does not exist. Comorbid conditions could have impacted patient response and affected our results. Injury Severity Score (ISS) was also not evaluated as a potential confounding factor, although past research suggests that the ISS is not significantly related to psychological outcome.

CONCLUSION

Early identification of patients at risk for the development of chronic PTSD is extremely important as untreated patients have worse outcomes, longer recovery periods, and diminished quality of life.¹⁵ The brief PC-PTSD screen seems to be an acceptable alternative to the PCL-C when used in trauma patients during their initial inpatient stay. By increasing the efficiency of PTSD screening, it is feasible for a larger number of health care professionals to screen trauma patients for PTSD during hospitalization. The cohort of patients with a positive screen result should then be referred for a complete psychological consultation and undergo detailed assessment by a trained professional. By identifying high-risk individuals early on, proper psychological interventions can be provided to impede the development of chronic PTSD and its devastating consequences.

AUTHORSHIP

T.D.-C. and K.B. provided the concept and design. J.H. performed the data collection. J.H., T.D.-C., and K.B. performed the data analysis and interpretation. J.H. drafted the manuscript. J.H., T.D.-C., and K.B. provided critical revision.

DISCLOSURE

The authors declare no conflicts of interest.

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