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Peritraumatic distress predicts depression in traumatically injured patients admitted to a Level I trauma center

Brian E. Bunnell^{a,*}, Tatiana M. Davidson^b, Margaret T. Anton^c, Bruce A. Crookes^d, and Kenneth J. Ruggiero^b

^aBiomedical Informatics Center, College of Medicine, Medical University of South Carolina, 135 Cannon St., Ste. 405, MSC 200, Charleston, SC 29425, United States

^bTechnology Applications Center for Healthful Lifestyles, College of Nursing, Medical University of South Carolina, 99 Jonathan Lucas St., MSC 160, Charleston, SC 29425, United States

^cDepartment of Psychiatry and Behavioral Sciences, College of Medicine, Medical University of South Carolina, 67 President St, Charleston, SC 29425, United States

^dDepartment of Surgery, College of Medicine, Medical University of South Carolina, 96 Jonathan Lucas St., Charleston, SC 29425, United States

To the Editor:

Between 20 and 40% of traumatically injured patients develop posttraumatic stress disorder (PTSD) and/or depression within a year post-injury [1]. The American College of Surgeons (ACS) Committee on Trauma strongly recommends that trauma centers routinely screen for PTSD and depression [2]. Resources that efficiently enhance capacity to identify good candidates for mental health follow-up are therefore a priority. The Peritraumatic Distress Inventory (PDI) [3] is a 13-item measure of acute emotional and physiological distress, a strong predictor of PTSD [4,5]. The relation between peritraumatic distress and development of depression is understudied. One prospective study with Japanese patients following a motor vehicle accident (MVA) found a relation between the PDI and depressive and anxiety symptoms one-month post-injury [6,7].

We used data from a prospective clinical sample of patients admitted to a Level I trauma center following traumatic injury to examine the predictive value of the PDI relative to depression severity and clinical status 30-days post-injury, and to establish optimal PDI cutoff scores predicting clinically elevated depression. Data were obtained from patients enrolled in the Trauma Resilience and Recovery Program (TRRP) [8] between August 2015 and July 2017. Patients were approached by TRRP staff who administered the PDI, provided psychoeducation about emotional recovery, and requested permission to contact them by telephone to conduct a 30-day mental health screen. Staff contacted patients approximately 30-days post-injury (Median days = 39) and administered a brief mental health screen,

*Corresponding author at: Biomedical Informatics Center, Department of Public Health Sciences, College of Medicine, Medical University of South Carolina, 135 Cannon Street, Ste.405, MSC 200, Charleston, SC 29425, United States. bunnellb@musc.edu.

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which included the Patient Health Questionnaire (PHQ-9), a 9-item self-report measure of depression severity [9]. Total scores ≥ 10 on the PHQ-9 indicate clinically elevated depression [10].

The sample included 269 patients who completed the 30-day screen. Sample characteristics are presented in Table 1. Results indicated that the PDI and PHQ-9 demonstrated adequate internal consistency (Cronbach's $\alpha = 0.83$ and 0.91 , respectively). The linear regression analysis predicting 30-day PHQ-9 scores from the PDI was significant ($\beta = 0.41$, $F[1, 267] = 54.44$, $p < 0.001$, $R^2 = 0.17$). Results of the logistic regression indicated that PDI scores predicted elevated clinical status on the PHQ-9 ($\beta = 0.08$ SE = 0.01 , Wald = 34.63 , $p < 0.001$, OR = 1.08 , 95% CI [$1.05, 1.11$], $R^2_{Nag} = 0.20$). Results of the ROC curve analysis predicting 30-day elevated clinical status was significant (AUC = 0.74 , SE = 0.03 , 95% CI [$0.67, 0.80$], $p < 0.001$). Examination of the coordinate points of the ROC curve suggested an optimal PDI cutoff score of 21 (sensitivity = 70%; specificity = 69%) predicting clinically elevated PHQ-9 scores. A score of 11 predicted elevations with 90% sensitivity (specificity = 34%), and a score of 34 predicted elevations with 90% specificity (sensitivity = 34%) (Fig. 1).

To our knowledge, this is the first prospective evaluation of the predictive value of the PDI relative to 30-day post-injury depression in patients admitted to a U.S. trauma center. The sample's diversity with respect to trauma-type (Table 1) extends prior findings with Japanese MVA survivors [6,7]. A cutoff score of 21 was found to accurately identify 70% of patients with, and 69% of patients without clinically elevated depression 30-days post-injury. Some providers may prefer to use a more conservative cutoff score of 11 to identify a higher proportion of patients who might require further screening and services. Some providers also may prefer to use brief depression screens to predict emotional recovery, although such screens tend to ask about symptoms in the past two weeks or month, a symptom timeframe that predates the injury and therefore may cloud interpretation. The PDI is a low-burden instrument that assesses acute distress specific to the immediate post-injury time frame and is predictive of both PTSD and depression 30-days post-injury. Research is needed to extend these findings using diagnostic interviews and other predictive factors (e.g., prior trauma). These data suggest that the PDI may add predictive value as trauma centers seek to identify strategies to meet the mental health needs of their patients, consistent with ACS guidelines.

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Fig. 1.
Receiver operating characteristic (ROC) curve for clinically elevated PHQ-9 scores.

Table 1

Sample characteristics.

Variable	M (SD)
Age	44.11 (18.75)
PDI total score	20.52 (11.84)
PHQ-9 total score	7.66 (7.45)
	<i>n</i> (%)
PHQ-9 elevation	
Clinically elevated	93 (34.57)
Non-clinically elevated	176 (65.43)
Sex	
Male	183 (68.0)
Female	86 (32.0)
Race	
Black	104 (38.7)
White	141 (52.6)
Asian	1 (0.4)
Other/Bi-Racial	22 (8.2)
Ethnicity	
Non-Hispanic	255 (94.8)
Hispanic	13 (4.8)
Unknown	1 (0.4)
Trauma type	
Motor vehicle collision	126 (46.8)
Motorcycle collision	33 (12.3)
Fall	51 (19.0)
Gunshot wound/stabbing	28 (10.4)
Pedestrian vs. auto	20 (7.4)
Assault/abuse	5 (1.9)
Medical injury	1 (0.4)
Other	5 (1.9)

Note. *N* = 269; PDI = peritraumatic distress inventory; PHQ-9 = patient health questionnaire.