RESEARCH

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Life After Trauma: A Survey of Level 1 Trauma Centers Regarding Posttraumatic Stress Disorder and Acute Stress Disorder

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ABSTRACT

Patients admitted to Level 1 trauma centers in the United States are rarely assessed for or educated about the potentially devastating effects of acute stress disorder (ASD) or posttraumatic stress disorder (PTSD). This descriptive research was conducted to describe current levels of assessment and education of ASD and PTSD in Level 1 trauma centers in the United States. The aims of this article are to (1) determine the extent to which Level 1 trauma centers in the United States assess and educate patients and providers about ASD and PTSD and (2) identify clinical staff who administer assessments and provide educational resources. A web-based survey was distributed to the trauma program managers and trauma medical directors of 209 adult and 70 pediatric Level 1 trauma centers in the United States. For PTSD, 26 (25.00%) adult and 17 (36.17%) pediatric centers had an *assessment protocol* for use with trauma patients. For ASD, 13 (12.50%) adult and 13 (27.66%) pediatric centers utilized an *assessment protocol* for use with trauma patients. For PTSD, 12 (12.37%) adult and 8 (20.00%) pediatric centers offered *educational protocols* for use with trauma patients. Seven (7.22%) adult and 7 (17.50%) pediatric centers maintain *educational protocols* for ASD in trauma patients. Fewer centers had assessment or educational protocols targeting formal and informal caregivers. This study was limited to Level 1 trauma centers in the United States. Results indicate that trauma patients are rarely assessed for or educated about the potential effects of PTSD or ASD. Formal and informal caregivers are also assessed and educated at low rates. Assessment, education, and incidence of PTSD and ASD should be included as universally measured health outcomes across trauma centers.

Key Words

Acute stress disorder, Assessment protocols, Educational protocols, Level 1 trauma centers, Posttraumatic stress disorder, Trauma

BACKGROUND/SIGNIFICANCE

Annually, more than 37 million adult and pediatric patients are admitted to hospitals following physical injury. Trauma recovery involves both physical and mental health aspects of care. For trauma survivors, the stressors associated with the event can lead to the development of acute stress disorder (ASD) or posttraumatic stress disorder (PTSD) (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Sparks, 2018). Sparks (2018) described PTSD as a cluster of symptoms that persist for at least 1 month after a traumatic event; symptoms may include the re-experience of traumatic events, nightmares, flashbacks, avoidance of people or places, depression, trouble concentration, irritability, and hypervigilance. Similarly, ASD is diagnosed when stress symptoms persist less than 1 month posttrauma and affect normal functioning (Rzucidlo & Campbell, 2009). Among adult trauma patients, 10%–20% develop PTSD (O'Donnell, Pattison, & Atkin, 2004) and 7%–28% develop ASD (Bryant, Freidman, Spiegel, Ursano, & Strain, 2011). In pediatric trauma patients, 9.6%–69% develop PTSD (Schreier, Ladakakos, Morabito, Champman, & Knudson, 2005) and 14.2%–27.7% develop ASD (Schreier et al., 2005). The estimates of PTSD and ASD incidence are large because there is no systematic recording or registry of these diagnoses maintained.

In addition to an increased risk for trauma patients, proximate or "secondhand" exposure to trauma places formal and informal trauma caregivers at risk for these disorders. Formal trauma caregivers include health care practitioners such as responding physicians and nurses. Among formal caregivers, rates of PTSD in adult intensive care unit (ICU) nurses and pediatric ICU nurses reach 24% and 17%, respectively (Mealer, Shelton, Berg, Rothbaum, &

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Moss, 2017). Meanwhile, as many as 22% of surgical residents and 40% of attending trauma physicians experience PTSD symptoms (Luftman et al., 2017). Informal caregivers include family members, spouses, and proxies; up to 80% of informal caregivers to adult trauma patients may experience PTSD (van Beusekom, Bakhashi-Raiez, de Keizer, Dongelmans, & van der Schaaf, 2016). Rates for PTSD among parents of injured children range from 8% to 23.9% (Kassam-Adams, Fleisher, & Winston, 2009), and ASD rates may reach as high as 12% (Shalev, Liberzon, & Marmar, 2017). The rates of ASD in adult and pediatric trauma nurses, physician residents, attending physicians, or informal adult caregivers are not consistently documented.

PURPOSE

The purpose of this study was to measure the availability of assessment and educational programs for PTSD and ASD at Level 1 trauma centers in the United States. An electronic survey was sent to 279 trauma units (209 adult and 70 pediatric). In addition, this study identified the protocols employed at these centers, health care professionals involved and levels of training provided to physicians and nurses regarding these disorders.

The study has important implications for policy makers, the U.S. military, and trauma professionals. For policy makers, systematically measuring health outcomes (i.e., PTSD and ASD) is an important public health tool. Left untreated, these disorders may lead to other significant public health problems including substance abuse and suicide. The U.S. military relies heavily on trauma centers as both training facilities and postevent support for soldiers and veterans. Assessing the current capabilities of those centers is important for pursuing their mission. Trauma professionals can use the findings to identify and model best practices in their centers (Pracht, Langland-Organ, & Ryan, 2018).

Diagnostic tools, treatments, and therapeutic methods for PTSD and ASD are well-researched and reported Connor, Ford, Arnsten, & Greene, 2015; Hawkins & Radcliffe, 2006; Kassam-Adams & Marsac, 2016; Keeshin & Strawn, 2014; Kerig et al., 2016; Kline, Cooper, Rytwinski, & Feeny, 2018; Winston, Kassam-Adams, & Garcia-España, 2003). During the past 10 years, researchers have sought to understand the role of patient education in the prevention and trajectory of PTSD (Watts, Zayed, Llewellyn-Thomas, & Schnurr, 2016). In a 2016 survey of U.S. adults, Harik, Matteo, Hermann, and Hamblen (2017) found that only 62.3% of respondents could correctly identify PTSD symptoms. In addition, only 37.9% of respondents could identify the appropriate treatment options for the disorder. There are no comparable ASD studies among informal caregivers. These findings suggest that almost half of patients and caregivers do not have the ability to recognize PTSD symptoms, and only a minority understand where to find help for the patient or for themselves.

These disorders are costly to patients in both personal and financial aspects. Individuals suffering from PTSD and ASD struggle to maintain personal relationships, employment, and overall quality of life (Zatzick et al., 2008). Because of increased utilization of health care services, these disorders also raise costs for patients and the health care industry (Ferry et al, 2015; Hoffman, Hays, Shapiro, Wallace, & Ettner, 2017).

New evidence indicates that the use of a patient decision aid (PtDA), an educational tool that "describes a condition and its prognosis, explains that treatment options are available, and discusses each option, including its protocol, potential risks, and probable benefits" (Watts, Schnurr, Zayed, Young-Xu, & Llewellyn-Thomas, 2015, p. 150), may reduce PTSD symptoms and increase utilization of effective treatments. These encouraging findings suggest that the use of educational tools such as PtDAs at trauma centers across the United States could reduce the cases of PTSD and/or its severity in patients with the disorder.

Currently, Level 1 trauma centers treat the highest number and most acute trauma patients. Because of their high volume of annual trauma-related admissions, these institutions have an unparalleled opportunity to address PTSD and/or ASD with patients through education and/or assessment. The provision of these services, however, has never been assessed.

In 1976, the American College of Surgeons (ACS) outlined the standards for the classification of trauma centers in *Resources for the Optimal Care of the Injured Patient* (ACS, 2014). In this document, organizational leaders established a hierarchy of hospitals, designating them as Levels 1–5, with Level 1 trauma centers offering the most acute care services. Although the ACS suggests that Level 1 trauma centers offer educational programs and/or assessment for PTSD to trauma patients, the organization's criteria do not require these services (Love & Zatzick, 2014). The exclusion of this requirement may leave trauma patients unaware of their risk of developing PTSD and/or ASD, the signs and symptoms of the disorder, and the treatment options available.

RESEARCH QUESTIONS/HYPOTHESES

Despite the opportunity for Level 1 trauma centers to address these disorders among trauma patients, as well as evidence that suggests that providing educational materials influences PTSD development and progression, there have been no previous studies that have evaluated the presence of educational programs and assessment for PTSD or ASD at these institutions. The aims of this article are to (1) determine the extent to which Level 1 trauma centers in the United States assess and educate patients and providers about ASD and PTSD and (2) identify the clinical staff who administer assessments and provide educational resources.

METHODS

In spring 2017, a web-based survey was distributed to the trauma program managers and trauma medical directors of 209 adult and 70 pediatric Level 1 trauma centers in the United States. These institutions were identified using the ACS website, which lists trauma centers that are verified by the organization (ACS, 2017), and respective state public health websites, which may have included institutions that were verified only via state guidelines. This list was then compared with the Level 1 trauma centers identified in the National Trauma Databank (ACS, 2016). Institutional representatives were contacted by phone to obtain e-mail addresses for the trauma program manager and the trauma medical director at each hospital. Individuals at each institution were asked to complete the survey within 4 weeks of survey receipt.

The survey addressed the following items:

- Populations assessed or educated for PTSD and ASD;
- Timing of assessment or education programs;
- Health care professionals involved;
- Specific tools utilized; and
- Education offered to resident physicians and nurses.

Hospital characteristics collected in the survey instrument included the following:

- Date of facility establishment;
- Number of hospital beds;
- Annual number of trauma admissions;
- Region in which the hospital resides;
- Residency/fellowship programs offered; and
- Certification status by the ACS, state guidelines, or both.

The survey was administered through Qualtrics, an online survey platform. To ensure adequate representation of Level 1 trauma centers, respondents were not required to answer all survey questions. Therefore, response rates differed between questions. We calculated frequencies for all responses, and calculations were based on the number of respondents (*N*) associated with each question. This study was reviewed by the institutional review board (IRB) at the University of Alabama at Birmingham and declared exempt (IRB Protocol # E170110003).

RESULTS

A total of 55 (78.6%) respondents from pediatric Level 1 trauma centers completed the survey; 122 (58.4%) respondents from adult Level 1 trauma centers completed the survey. Of those respondents, 42 (84%) pediatric and 84 (75%) adult Level 1 trauma centers reported receiving trauma center verification from the ACS (Table 1). Trauma program manager was the title of respondents who most often replied to the survey for both pediatric ($n = 27$; 49.09%) and adult ($n = 73$; 59.84%) Level 1 trauma centers.

Respondents reported minimal assessment services for trauma patients at their Level 1 trauma centers. For ASD, 13 (27.66%) pediatric and 13 (12.50%) adult trauma centers maintained an assessment protocol for use with trauma patients. For PTSD, 17 (36.17%) pediatric and 26 (25.00%) adult trauma centers maintained an assessment protocol for use with trauma patients (Table 2). Furthermore, 11 (23.40%) pediatric and nine (8.65%) adult Level 1 trauma centers assessed all patients for ASD regardless of symptom status. For PTSD, eight (17.02%) pediatric and 16 (15.38%) adult Level 1 trauma centers assessed all patients for the disorder regardless of symptom status. Assessment for ASD occurred most frequently during the hospital stay for both pediatric ($n = 10$; 21.28%) and adult ($n = 12$; 11.54%) populations. Assessment for PTSD in pediatric Level 1 trauma centers occurred most frequently either during the hospital stay ($n = 6$; 12.77%) or during the patient's follow-up visit in the trauma clinic ($n = 6$; 12.77%). Assessment for PTSD in adult Level 1 trauma centers occurred most frequently during the hospital stay ($n = 15$; 14.42%).

In pediatric centers, nurse practitioners ($n = 6$; 12.77%) and social workers ($n = 6$; 12.77%) most often assessed patients for ASD, whereas nurse practitioners ($n = 8$; 17.02%) provided assessment services more often for PTSD. In adult centers, social workers provided these services most often for both ASD ($n = 5$; 10.64%) and PTSD ($n = 12$; 11.54%).

Assessment tools most frequently employed by pediatric Level 1 trauma centers included the Acute Stress Disorder Checklist for Children for ASD ($n = 4$; 8.51%) and the Child PTSD Symptom Scale (CPSS) for PTSD assessment ($n = 4$; 8.51%). In adult Level 1 trauma centers, the assessment tools most frequently employed for ASD assessment included the Acute Stress Disorder Interview ($n = 4$; 3.85%) and the Acute Stress Disorder Scale ($n = 4$; 3.85%). The PTSD assessment tool most frequently used in adult trauma centers was the PTSD Checklist for DSM-5 (PCL-5) ($n = 4$; 3.85%).

Assessment services for informal caregivers (e.g., family members, spouses) were also limited (Table 3). Only five (12.50%) pediatric and two (2.15%) adult Level 1 trauma centers maintained an assessment protocol for ASD for use with informal caregivers. Six (15.00%) pediatric and five (5.38%) adult Level 1 trauma centers maintained an assessment protocol for PTSD for use with informal caregivers. Of those trauma centers that provide assessment services to informal caregivers, assessment most often occurred during the patient's hospital stay; bedside nurses and nurse practitioners were the formal caregivers

TABLE 1 Hospital Characteristics

Pediatric Level 1 Trauma Centers		Adult Level 1 Trauma Centers	
Academic Title of Respondent (*N* = 55)	***f* (%)**	**Academic Title of Respondent (*N* = 122)**	***f* (%)**
Chief/director of pediatric trauma surgery	5 (9.09)	Chief/director of acute care surgery	8 (6.56)
Pediatric trauma medical director/chief	18 (32.73)	Trauma medical director/chief	33 (27.05)
Trauma program coordinator	5 (9.09)	Trauma program coordinator	8 (6.56)
Trauma program manager	27 (49.09)	Trauma program manager	73 (59.84)
Verifying Body (*N* = 50)	***f* (%)**	**Verifying Body (*N* = 112)**	***f* (%)**
American College of Surgeons	20 (40.00)	American College of Surgeons	43 (38.39)
American College of Surgeons and state guidelines	22 (44.00)	American College of Surgeons and state guidelines	41 (36.61)
State guidelines	8 (16.00)	State guidelines	28 (25.00)
Number of Beds (*N* = 50)	***f* (%)**	**Number of Beds (*N* = 111)**	***f* (%)**
1–99	3 (6.00)	1–99	0 (0.00)
100–399	29 (58.00)	100–399	17 (15.32)
400+	18 (36.00)	400+	94 (84.68)
Number of Admissions (*N* = 46)	***f* (%)**	**Number of Admissions (*N* = 109)**	***f* (%)**
1–499	11 (23.91)	1–499	0 (0.00)
500–999	14 (30.43)	500–999	1 (0.92)
1,000–1,499	9 (19.57)	1,000–1,499	12 (11.01)
1,500–1,999	9 (19.57)	1,500–1,999	22 (20.18)
2,000–2,499	1 (2.17)	2,000–2,499	22 (20.18)
3,000+	2 (4.35)	3,000+	17 (15.60)
Region (*N* = 48)	***f* (%)**	**Region (*N* = 110)**	***f* (%)**
Division 1: New England	4 (8.33)	Division 1: New England	5 (4.55)
Division 2: Mid-Atlantic	7 (14.58)	Division 2: Mid-Atlantic	20 (18.18)
Division 3: East North Central	10 (20.83)	Division 3: East North Central	21 (19.09)
Division 4: West North Central	4 (8.33)	Division 4: West North Central	10 (9.09)
Division 5: South Atlantic	6 (12.50)	Division 5: South Atlantic	16 (14.55)
Division 6: East South Central	5 (10.42)	Division 6: East South Central	11 (10.00)
Division 7: West South Central	8 (16.67)	Division 7: West South Central	14 (12.73)
Division 8: Mountain	3 (6.25)	Division 8: Mountain	4 (3.64)
Division 9: Pacific	1 (2.08)	Division 9: Pacific	9 (8.18)
Residency Programs Available (*N* = 48)	***f* (%)**	**Residency Programs Available (*N* = 112)**	***f* (%)**
Yes	47 (97.92)	Yes	111 (99.11)
No	1 (2.08)	No	1 (0.89)

who most frequently implemented these services. Multiple tools were used for ASD and PTSD assessments across responding trauma centers (see Table 3).

Level 1 trauma centers offered minimal educational services regarding ASD and PTSD to trauma patients and informal caregivers (Table 4). For ASD, seven (17.50%) pediatric and seven (7.22%) adult Level 1 trauma centers maintained educational protocols concerning ASD in trauma patients. For informal caregivers, only four (10.53%) pediatric and four (4.35%) adult Level 1 trauma centers maintained ASD educational protocols. For PTSD, eight (20.00%) pediatric and 12 (12.37%) adult Level 1 trauma

TABLE 2 Assessment Services Provided to Trauma Patients

	Pediatric (*N* = 47)		Adults (*N* = 104)	
	ASD, *f (%)*	PTSD *f (%)*	ASD *f (%)*	PTSD *f (%)*
Assessment protocol present	13 (27.66)	17 (36.17)	13 (12.50)	26 (25.00)
Population assessed				
Assess only patients who exhibit symptoms	1 (2.13)	7 (14.89)	6 (5.77)	6 (5.77)
Assess patients whether or not they exhibit symptoms	11 (23.40)	8 (17.02)	9 (8.65)	16 (15.38)
Time of assessment				
During the patient's discharge from the hospital	1 (2.13)	1 (2.13)	0 (0.00)	2 (1.92)
During the patient's hospital stay	10 (21.28)	6 (12.77)	12 (11.54)	15 (14.42)
During the patient's follow-up visits in the trauma clinic	0 (0.00)	6 (12.77)	0 (0.00)	3 (2.88)
During admission and during follow-up visits in the trauma clinic	N/A	N/A	0 (0.00)	1 (0.96)
Health care professionals involved				
Bedside nurse	2 (4.26)	4 (8.51)	3 (2.88)	4 (3.85)
Nurse practitioner	6 (12.77)	8 (17.02)	2 (1.92)	5 (4.81)
Case manager	0 (0.00)	1 (2.13)	4 (3.85)	4 (3.85)
Social worker	6 (12.77)	5 (10.64)	5 (4.81)	12 (11.54)
Pediatric surgery attending physician	2 (4.26)	3 (6.38)	N/A	N/A
Pediatrics resident	0 (0.00)	1 (2.13)	N/A	N/A
Psychiatry attending physician	0 (0.00)	2 (4.26)	0 (0.00)	1 (0.96)
Psychiatry resident	0 (0.00)	2 (4.26)	1 (0.96)	2 (1.92)
Psychologist	1 (2.13)	0 (0.00)	2 (1.92)	4 (3.85)
Counseling team	1 (2.13)	1 (2.13)	0 (0.00)	0 (0.00)
Trauma/surgical critical care attending physician	N/A	N/A	3 (2.88)	3 (2.88)
General surgery resident	N/A	N/A	1 (0.96)	1 (0.96)
Trauma/surgical critical care fellow	N/A	N/A	1 (0.96)	1 (0.96)
Trauma nurse coordinator	N/A	N/A	0 (0.00)	1 (0.96)
Other	N/A	N/A	0 (0.00)	2 (1.92)
Assessment tool employed				
Acute Stress Disorder Checklist for Children	4 (8.51)	N/A	N/A	N/A
Child Stress Disorder Checklist (CSDC)	3 (6.38)	1 (2.13)	N/A	N/A
Child PTSD Symptom Scale (CPSS)	N/A	4 (8.51)	N/A	N/A
Child Trauma Screening Questionnaire	N/A	2 (4.26)	N/A	N/A
Child Report of Posttraumatic Symptoms/Parent Report of Posttraumatic Symptoms (CROPS/PROPS)	N/A	1 (2.13)	N/A	N/A
PTSD Symptom Scale	N/A	1 (2.13)	N/A	N/A
Clinician Administered PTSD Scale for Children and Adolescents	N/A	1 (2.13)	N/A	N/A
UCLA Child/Adolescent PTSD Reaction Index for DSM-5 (PTSD-RI)	N/A	1 (2.13)	N/A	N/A
Screening Tool for Early Predictors of Posttraumatic Stress Disorder (STEPP)	3 (6.38)	3 (6.38)	N/A	N/A

(continues)

TABLE 2 Assessment Services Provided to Trauma Patients (*Continued*)

	Pediatric (*N* = 47)		Adults (*N* = 104)	
	ASD, *f (%)*	PTSD *f (%)*	ASD *f (%)*	PTSD *f (%)*
Institution-specific screening tool for ASD	1 (2.13)	N/A	N/A	N/A
Institution-specific screening tool for PTSD	N/A	1 (2.13)	N/A	N/A
No specific screening tool applied	N/A	1 (2.13)	N/A	N/A
Acute Stress Disorder Interview	N/A	N/A	4 (3.85)	N/A
Acute Stress Disorder Scale	N/A	N/A	4 (3.85)	N/A
Stanford Acute Stress Reaction Questionnaire (SASRQ)	N/A	N/A	1 (0.96)	N/A
Modified Stanford	N/A	N/A	1 (0.96)	N/A
PCL-5	N/A	N/A	1 (0.96)	4 (3.85)
Institution-specific protocol	N/A	N/A	1 (0.96)	1 (0.96)
Diagnostic Interview Schedule (DIS)	N/A	N/A	N/A	1 (0.96)
PTSD Module	N/A	N/A	N/A	1 (0.96)
Posttraumatic Diagnostic Scale (PDS)	N/A	N/A	N/A	1 (0.96)
PTSD Checklist–Civilian Version (PLC-C)	N/A	N/A	N/A	1 (0.96)
Davidson Trauma Scale (DTS)	N/A	N/A	N/A	1 (0.96)
PTSD Checklist (PCL)	N/A	N/A	N/A	2 (1.92)
Self-Rating Inventory for Posttraumatic Stress Disorder (SRS-PTSD)	N/A	N/A	N/A	1 (0.96)
SPAN (Startle, Physiological Arousal, Anger, and Numbness)	N/A	N/A	N/A	1 (0.96)
Structured Clinical Interview of DSM-5 Disorders (SCID)	N/A	N/A	N/A	1 (0.96)
Brief DSMPTSD-III-R and DSMPTSD-IV (BPTSD-6)	N/A	N/A	N/A	1 (0.96)
Trauma Screening Questionnaire (TSQ)	N/A	N/A	N/A	1 (0.96)
ITSS	N/A	N/A	N/A	1 (0.96)
Unsure	N/A	N/A	N/A	1 (0.96)

Note. ASD = acute stress disorder; N/A = not available; PTSD = posttraumatic stress disorder.

centers offered educational protocols for use with trauma patients. Even fewer trauma centers provided PTSD educational services for informal caregivers: two (5.36%) pediatric and nine (9.78%) adult Level 1 trauma centers.

All pediatric trauma center respondents with ASD educational protocols provide these educational services to trauma patients regardless of symptom status (n = 7; 17.50%). However, pediatric trauma centers with PTSD educational protocols in place provide these services most often to patients who exhibit symptoms of PTSD (n = 4; 10.00%). Of the adult Level 1 trauma centers that provide educational services for both ASD (n = 4; 4.12%) and PTSD (n = 6; 6.19%), these services are most often provided to patients regardless of symptom status.

Educational services for ASD and PTSD were even less frequently available for informal caregivers. Educational services for ASD were offered by four (10.53%) responding pediatric Level 1 trauma centers to informal caregivers regardless of symptom status. Two responding pediatric trauma centers provide PTSD educational services to informal caregivers, one providing these services only to informal caregivers who exhibit symptoms of PTSD and one providing these services whether or not symptoms are exhibited. Of the four adult Level 1 trauma centers that provide educational services for ASD to informal caregivers, three (3.26%) provide these services only to informal caregivers who exhibit symptoms. However, for PTSD educational services, adult trauma centers that have these protocols most often educate caregivers whether or not they exhibit symptoms (n = 5; 5.43%). The time during which informal caregivers are provided ASD and PTSD educational services is most often during the

TABLE 3 Assessment Services Provided to Informal Caregivers

	Pediatrics (*N* = 40)		Adults (*N* = 93)	
	ASD, *f* (%)	PTSD *f* (%)	ASD *f* (%)	PTSD, *f* (%)
Assessment protocol present	5 (12.50)	6 (15.00)	2 (2.15)	5 (5.38)
Population assessed				
Assess only informal caregivers who exhibit symptoms	3 (7.50)	2 (5.00)	1 (1.08)	2 (2.15)
Assess informal caregivers whether or not they exhibit symptoms	1 (2.50)	2 (5.00)	1 (1.08)	2 (2.15)
Time of assessment				
During the patient's discharge from the hospital	0 (0.00)	0 (0.00)	1 (1.08)	1 (1.08)
During the patient's hospital stay	3 (7.50)	2 (5.00)	1 (1.08)	3 (3.23)
During the patient's follow-up visits in the trauma clinic	1 (2.50)	2 (5.00)	0 (0.00)	0 (0.00)
Health care professionals involved				
Bedside nurse	2 (5.00)	1 (2.50)	1 (1.08)	2 (2.15)
Nurse practitioner	2 (5.00)	3 (7.50)	0 (0.00)	1 (1.08)
Case manager	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Social worker	1 (2.50)	1 (2.50)	0 (0.00)	0 (0.00)
Pediatric surgery attending physician	0 (0.00)	0 (0.00)	N/A	N/A
Pediatrics resident	0 (0.00)	0 (0.00)	N/A	N/A
Trauma/surgical critical care attending physician	N/A	N/A	1 (1.08)	0 (0.00)
General surgery resident	N/A	N/A	0 (0.00)	1 (1.08)
Trauma/surgical critical care fellow	N/A	N/A	1 (1.08)	1 (1.08)
Psychiatry attending physician	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.08)
Psychiatry resident	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.08)
Psychologist	0 (0.00)	0 (0.00)	1 (1.08)	1 (1.08)
Counseling team	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Trauma nurse coordinator	N/A	N/A	0 (0.00)	0 (0.00)
Other	N/A	N/A	0 (0.00)	0 (0.00)
Assessment tool employed				
Acute Stress Disorder Interview	1 (2.50)	N/A	2 (2.15)	N/A
Acute Stress Disorder Scale	1 (2.50)	N/A	1 (1.08)	N/A
PTSD Checklist (PCL)	N/A	N/A	N/A	2 (2.15)
PTSD Symptom Scale–Interview Version (PSS-I)	N/A	N/A	N/A	1 (1.08)
Screen for Posttraumatic Stress Symptoms (SPTSS)	N/A	N/A	N/A	1 (1.08)
Trauma Screening Questionnaire (TSQ)	N/A	N/A	N/A	1 (1.08)

Note. ASD = acute stress disorder; N/A = not available; PTSD = posttraumatic stress disorder.

patient's hospital stay. In the responding trauma centers, the bedside nurse, case manager, social worker, or psychologist is the health care professional most often involved in delivering the educational services to informal caregivers (see Table 4).

Few Level 1 trauma centers offered educational services to formal caregivers regarding ASD and PTSD (see Table 4). For ASD, only one (2.70%) pediatric and three (3.26%) adult Level 1 trauma centers provided educational protocols for residents/fellows. One (2.70%) pediatric and five (5.43%) responding adult trauma centers maintained ASD educational protocols for nurses.

For PTSD, four (10.81%) pediatric and seven (7.61%) adult Level 1 trauma centers offered educational

TABLE 4 Educational Services Provided to Trauma Patients and Informal Caregivers

	Pediatric		Adults	
	ASD *f* (%)	PTSD *f* (%)	ASD *f* (%)	PTSD *f* (%)
Trauma Patients	***N* = 40**		***N* = 97**	
Educational protocol present	7 (17.50)	8 (20.00)	7 (7.22)	12 (12.37)
Population educated				
Educate only patients who exhibit symptoms	0 (0.00)	4 (10.00)	1 (1.03)	4 (4.12)
Educate patients whether or not they exhibit symptoms	7 (17.50)	3 (7.50)	4 (4.12)	6 (6.19)
Time of education				
During the patient's discharge from the hospital	4 (10.00)	2 (5.00)	2 (2.06)	3 (3.09)
During the patient's hospital stay	3 (7.50)	3 (7.50)	3 (3.09)	6 (6.19)
During the patient's follow-up visits in the trauma clinic	0 (0.00)	2 (5.00)	1 (1.03)	3 (3.09)
Health care professionals involved				
Bedside nurse	4 (10.00)	4 (10.00)	1 (1.03)	2 (2.06)
Nurse practitioner	2 (5.00)	6 (15.00)	0 (0.00)	2 (2.06)
Case manager	0 (0.00)	1 (2.50)	2 (2.06)	3 (3.09)
Social worker	3 (7.50)	5 (12.5)	0 (0.00)	3 (3.09)
Pediatric surgery attending physician	1 (2.50)	2 (5.00)	N/A	N/A
Pediatrics resident	0 (0.00)	1 (2.50)	N/A	N/A
Trauma/surgical critical care attending physician	N/A	N/A	0 (0.00)	1 (1.03)
General surgery resident	N/A	N/A	1 (1.03)	1 (1.03)
Trauma/surgical critical care fellow	N/A	N/A	1 (1.03)	0 (0.00)
Psychiatry attending physician	0 (0.00)	2 (5.00)	0 (0.00)	0 (0.00)
Psychiatry resident	0 (0.00)	1 (2.50)	0 (0.00)	0 (0.00)
Psychologist	0 (0.00)	0 (0.00)	2 (2.06)	4 (4.12)
Counseling team	0 (0.00)	0 (0.00)	1 (1.03)	1 (1.03)
Trauma nurse coordinator	N/A	N/A	0 (0.00)	0 (0.00)
Other	N/A	N/A	0 (0.00)	0 (0.00)
Informal Caregivers	***N* = 38**		***N* = 92**	
Educational protocol present	4 (10.53)	2 (5.26)	4 (4.35)	9 (9.78)
Population educated				
Educate only informal caregivers who exhibit symptoms	0 (0.00)	1 (2.63)	3 (3.26)	3 (3.26)
Educate informal caregivers whether or not they exhibit symptoms	4 (10.53)	1 (2.63)	1 (1.09)	5 (5.43)
Time of education				
During the patient's discharge from the hospital	1 (2.63)	0 (0.00)	1 (1.09)	3 (3.26)
During the patient's hospital stay	3 (7.89)	1 (2.63)	3 (3.26)	4 (4.35)
During the patient's follow-up visits in the trauma clinic	0 (0.00)	1 (2.63)	0 (0.00)	1 (1.09)
Health care professionals involved				
Bedside nurse	2 (5.26)	0 (0.00)	1 (1.09)	4 (4.35)
Nurse practitioner	1 (2.63)	1 (2.63)	0 (0.00)	1 (1.09)

(*continues*)

TABLE 4 Educational Services Provided to Trauma Patients and Informal Caregivers (*Continued*)

	Pediatric		Adults	
	ASD *f* (%)	PTSD *f* (%)	ASD *f* (%)	PTSD *f* (%)
Case manager	0 (0.00)	0 (0.00)	2 (2.17)	2 (2.17)
Social worker	1 (2.63)	1 (2.63)	1 (1.09)	4 (4.35)
Pediatric surgery attending physician	0 (0.00)	0 (0.00)	N/A	N/A
Pediatrics resident	0 (0.00)	0 (0.00)	N/A	N/A
Trauma/surgical critical care attending physician	N/A	N/A	1 (1.09)	1 (1.09)
General surgery resident	N/A	N/A	1 (1.09)	0 (0.00)
Trauma/surgical critical care fellow	N/A	N/A	0 (0.00)	1 (1.09)
Psychiatry attending physician	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Psychiatry resident	0 (0.00)	0 (0.00)	1 (1.09)	1 (1.09)
Psychologist	0 (0.00)	0 (0.00)	2 (2.17)	2 (2.17)
Counseling team	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Trauma nurse coordinator	N/A	N/A	0 (0.00)	1 (1.09)
Other	N/A	N/A	0 (0.00)	0 (0.00)

Note. ASD = acute stress disorder; N/A = not available; PTSD = posttraumatic stress disorder.

protocols for residents/fellows whereas three (8.11%) pediatric and 10 (10.87%) adult trauma centers maintained PTSD educational protocols for nurses. As demonstrated in Table 4, trauma centers with ASD and PTSD educational protocols for residents and fellows most often educate them to recognize symptoms. A few trauma centers educate residents and fellows only when they themselves begin to exhibit symptoms. For Level 1 trauma centers that provide ASD and PTSD educational services for the nursing staff, most educate nurses on how to recognize symptoms in themselves and others. Three trauma centers indicate that they only educate nurses once they personally begin exhibiting symptoms (see Table 4). Topics generally covered in education include signs and symptoms, assessment tools available, treatment options available, and appropriate consults to make if concerned for disorders in patients.

DISCUSSION

Trauma patients and their formal and informal caregivers are at risk to develop PTSD and/or ASD. Although the ACS recommends that all trauma centers provide education and assessment for these disorders to all trauma patients, only a small percentage of them do. Similarly, few Level 1 trauma centers offer services to informal caregivers. These findings suggest that many patients and their informal caregivers leave the hospital without an understanding of their risk for developing ASD immediately after the traumatic event, persistence of symptoms associated with PTSD more than 30 days after the traumatic event, and treatment options available to them.

Even fewer trauma centers educate formal caregivers about PTSD and/or ASD and the appropriate steps to take if they recognize these symptoms in their patients. Based on the results of this survey, bedside nurses, nurse practitioners, and social workers most frequently provide assessment and educational services within the hospital setting. Because these individuals spend the highest quantity of time with patients, they are the most likely to observe firsthand the signs and symptoms of PTSD or ASD in their patients, unlike physicians who may see patients after presentation. Thus, nurses' ability to recognize these disorders may be imperative to diagnosis. The lack of training for all formal caregivers may contribute to underdiagnoses of ASD and PTSD among patients. Despite repetitive vicarious exposure to trauma patients, these formal caregivers may also go undiagnosed, leading to burnout among physicians, nurses, and other members of the health care workforce (Bodenheimer & Sinsky, 2014).

Of the Level 1 trauma centers that offered assessment services, there was no assessment protocol identified as universal among these centers. Although multiple assessment protocols are validated within adult and pediatric populations for PTSD and ASD, there have been no previous studies that have evaluated which tools have higher sensitivity and specificity within the ICU, emergency department, and/or other inpatient hospital settings. Future studies are needed to evaluate these tools and to guide development of universal protocols (Frank, Schroeter, & Shaw, 2017).

Likewise, few Level 1 trauma centers offer educational services to patients and informal caregivers and no formal educational protocols exist. Previous studies indicate

that patient education may positively impact the overall risk and symptom severity of PTSD (Karos, Niederstrasser, Abidi, Bernstein, & Bader, 2014). However, future studies are needed to evaluate the utility and efficacy of similar educational protocols for ASD. In addition, studies are needed to evaluate the efficacy of these tools within the pediatric and caregiver populations.

Given the volume of patients that Level 1 trauma centers admit and the potential negative effects of ASD and PTSD, we recommend that the use of assessments and educational resources be expanded for patient populations as suggested by the ACS. In addition, these tools and resources should be made available to both formal and informal caregivers. We further recommend that the ACS and other governing bodies revisit current policies regarding the optional use of educational programs and/or assessment for PTSD to trauma patients. We believe that stronger guidelines and policies would promote best practices in ASD and PTSD assessment and education in Level 1 trauma centers in the United States.

LIMITATIONS

Although this study illuminates a large gap in health care provision, there are research limitations. Because a comprehensive list of adult and pediatric Level 1 trauma centers in the United States does not exist, investigators had to first compile a list using the ACS website, data from the National Trauma Databank, and respective state public health websites. Despite steps taken to ensure Level 1 trauma center inclusion, it is possible that some trauma centers were inadvertently omitted from the study.

Furthermore, although most hospitals employ an individual with the title of trauma program manager and trauma medical director, not all institutions reported the presence of these roles at their respective institutions. Because of this, health care professionals may have been unintentionally omitted from survey participation. In addition, the length of the survey may have discouraged full completion. Utilization of evidence-based assessment and education tools, as well as a mandate from the ACS requiring all trauma centers to educate patients and caregivers about ASD and PTSD during hospitalization, has the potential to increase the percentage of institutions providing these services.

CONCLUSIONS

Patients admitted to Level 1 trauma centers in the United States receive extraordinary, and oftentimes lifesaving, treatment of physical injuries. However, the results of this research demonstrate that these same patients are rarely assessed for or educated about the potentially devastating effects of ASD or PTSD. Moreover, the formal and informal caregivers who tend to these patients, who may be equally susceptible to the proximate stresses of trauma, are assessed and educated at rates far lower than expected.

For Level 1 trauma centers that did assess and/or provided education about ASD and PTSD to patients and informal caregivers, the vast majority of these services were provided by nonphysicians. Our research findings indicate that assessments and education were most frequently delivered by nurses, nurse practitioners, and social workers. This finding, although unsurprising in the face of competing responsibilities and demands of physicians, may reflect an unconscious bias on behalf of the health care industry regarding roles and responsibilities. Although beyond the scope of this investigation, we believe this topic is worthy of further exploration.

Finally, despite the availability of validated assessment protocols and educational materials, we found no consistent use of diagnostic tools and PtDAs among respondents. The screening tools documented in this study varied in length, format, and method of administration. To our knowledge, there is no universally accepted criterion standard instrument for assessing ASD or PTSD, nor comparative studies regarding the efficacy of different types of protocols. We encourage future researchers and health care practitioners to consider standards and best practices for administering and monitoring assessments and accompanying educational tools.

The impact of mental health issues among trauma patients and formal and informal caregivers is one that the health care industry can no longer afford to ignore. If left unchecked, ASD and PTSD have the potential to overwhelm a system that was primarily designed to treat the *physical* symptoms of trauma. It is our sincere hope that this preliminary research will promote discussion and debate among health care providers at the local, state, and national levels.

KEY POINTS

- Although trauma centers provide high-quality care for the physical aftereffects of traumatic events, this study found that few adult and pediatric Level 1 trauma centers have PTSD or ASD assessment protocols in place for patients and formal and informal caregivers.
- Even fewer facilities have educational protocols for these disorders. Unidentified and untreated, these disorders can lead to other adverse outcomes, including substance abuse and suicide.
- If these problems continue to go unaddressed, they will affect the overall quality of life for patients and caregivers and ultimately raise costs across the health care industry.
- Trauma professionals are also susceptible to PTSD and ASD; to maintain a healthy and effective workforce, increasing the availability of assessment and education is desirable.

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