The Use of the National Stressful Events Survey Acute Stress Disorder Short Scale (NSESSS) to assess the Prevalence and Predictability of Acute Stress Disorder in Trauma Patients

Abstract:

Introduction: Acute Stress Disorder (ASD) causes symptoms like distractibility, irritability, and emotional detachment, lasting three days to one month after a traumatic event. In 2021, about 40 million emergency department (ED) visits were recorded for acute injuries, highlighting the need for stress quantification. The National Stressful Events Survey Acute Stress Disorder Short Scale (NSESSS) measures ASD severity in adults following extreme stress, with scores ≥14 indicating severe symptoms. Few studies have examined the NSESSS for trauma patients. We aim to assess the NSESSS's effectiveness in understanding trauma's impact on patient well-being, identifying patient improvement, and improving outcomes.

Methods: This observational single-center study was conducted at a community hospital. Participants were at least 18 years old, arrived at the ED for acute injuries between January 2021 and December 2023, and consented to an ASD evaluation. Social workers administered the NSESSS upon hospital arrival, followed by a psychiatric evaluation within 48 hours. Patients were then reassessed by a psychiatrist with the NSESSS and DSM-5 criteria within seven days, with phone follow-ups for those discharged earlier. Statistical analysis was performed using SPSS software.

Results: The study included 27 patients, 17 (63%) of whom were male, and 9 (27%) had pre-existing psychiatric comorbidities. The median age was 41 years (IQR 27-54), and the median NSESSS score was 6 (IQR 2-15). Among participants, 8 were true positives (NSESSS score ≥14 and met ASD DSM-5 criteria), 17 were true negatives (NSESSS score <14 and did not meet ASD DSM-5 criteria), and 2 were false negatives (NSESSS score <14 but met ASD DSM-5 criteria). There were no false positives.

Conclusion: The NSESSS demonstrated internal consistency and validity, emerging as a promising tool for assessing ASD severity and tracking treatment progress in trauma patients. Early recognition and intervention for ASD are crucial in mitigating long-term adverse outcomes, highlighting the need for further research to understand its impact on patient well-being.

Introduction:

Acute Stress Disorder (ASD) is a reaction to stress that is experienced three days to four weeks after a traumatic event. (1). The prevalence of these traumatic events are varied according to the Diagnostic and Statistical Manual of Mental Disorders (DSM)-5-TR. The prevalence of ASD in

trauma patients as shown by previous studies range from 7-28% [3]. A longitudinal study reported that 10% of about 1,129 patients who presented with traumatic injury had ASD [4]. Another study reported a prevalence rate of ASD at 10% among employee assault victims [5]. Research conducted in the United Kingdom, Australia, and United States identified acute stress disorder in less than 20% of cases following events that do not involve interpersonal assault, such as motor vehicle accidents and burns, whereas higher rates (19-50%), were found in following interpersonal event, such as assault, and rape (1). According to the (DSM)-5-TR criteria, ASD is characterized by symptom clusters of dissociation, negative mood, intrusion, avoidance, and arousal. The diagnosis of ASD is made clinically by the presence of nine or more of the following symptoms from any of the five categories of intrusion, negative mood, dissociation, avoidance, and arousal, beginning or worsening after the traumatic event according to DSM-5-TR. [1]. Though the clinical presentation of ASD varies from person to person, it usually involves an anxiety response related to reexperiencing the traumatic event or reactivity towards the traumatic event. (1). One study found that patients with acute stress disorder used defense mechanisms such as "undoing" and "devaluation" compared to their counterparts who were not diagnosed with acute stress disorder. Additionally, those who used the defense mechanism of "undoing" were also positivity associated with symptoms of depression and high levels of post-traumatic stress disorder symptoms. Therefore, it is important to detect ASD symptoms early to avoid future exacerbations related to the trauma. [2].

The American Psychiatric Association (APA) developed emerging measures for further research and clinical evaluation to monitor the treatment progress of patients. One of the measures that was developed include the National Stressful Events Survey Acute Stress Disorder Short Scale (NSESSS) tool. The aim of the APA is to see these tools as a potentially useful tool to enhance clinical decision-making for patients with ASD. The tool should be used to enhance clinical decision-making and used as an adjunct for making a clinical diagnosis. The tool is administered at the initial patient interview based on clinically significant symptoms and repeated later to monitor treatment progress upon receiving a diagnosis of acute stress disorder. (15).

However, little is known about the study of the prevalence and predictors of ASD using the NSESSS tool among trauma patients. The purpose of this research is to assess the prevalence of ASD and the predictability of the NSESSS tool in assessing the treatment progress of ASD in trauma patients.

Methodology:

This is a single center prospective study that was conducted at Tower Health Reading Hospital. Patients were prospectively studied from the time of presentation in the hospital. The study was conducted over a six-month period with psychiatrists who did the data collection and data analysis.

National Stressful Events Survey Acute Stress Disorder Short Scale (NSESSS) is a 7-item measure that assesses the severity of symptoms of ASD in individuals aged 18 or older following an extremely stressful event or experience. The measure was completed by an individual upon receiving a working diagnosis of acute stress disorder and thereafter, prior to follow-up visits with the clinician. Each item asks the individual receiving care to rate the severity of his ASD symptoms. Basic demographic data were collected from the electronic medical record including gender, race, educational level, insurance, and employment status.

Trauma victims were assessed for ASD using the DSM-5 diagnostic criteria. This is based on the presence of nine or more symptoms from any of the five categories of intrusion, negative mood, dissociation, avoidance, and arousal, beginning or worsening after the traumatic event occurred. The NSESSS tool was administered on initial assessment by clinical social workers. An initial psychiatric evaluation was performed by a consulting psychiatrist within 24 to 48 hours after the consult was requested. The NSESSS tool was readministered after the initial assessment provided the patient was still available. In case the patient has been discharged from the hospital before the post-initial assessment on day 7, patient was called on the phone up to no more than three times after which the patient's participation automatically ended if unreachable. Only the psychiatrist in the study did the follow-up call to study patients.

Each item on the NSESSS measure is rated on a 5-point scale (0=Not at all; 1=A little bit; 2=Moderately; 3=Quite a bit; and 4=Extremely). The total score can range from 0 to 28, with higher scores indicating greater severity of the ASD. (13). The clinician asked to review the score of each item on the measure during the clinical interview and indicate the raw scores on the 7 items will be submitted to obtain a total raw score. The average total score reduces the overall score to a 5-point scale, which allows the clinician to think of the severity of the individual's acute stress disorder in terms of none (0), mild (1), moderate (2), severe (3), or extreme (4). The average total score was calculated by dividing the raw total score by the number of items in the measure, that is 7. When 2 or more items were left unanswered, the total score on the measure were not calculated. This was so to encourage the individual receiving care to complete all the items on the measure. When one item was left unanswered, a prorated score was calculated. This was calculated by summing the scores of items that were answered to get a partial raw score. The partial score was then multiplied by the total number of items on the NSESSS and the value was divided by the number of items that were actually answered. The calculated number was rounded off to the nearest integer and that was the final score at that time. (15). For this study, treatment progress was defined as improvement or deterioration observed in patients right from patient recruitment to follow-up.

Results:

This study is a descriptive research study examining the relationship between acute stress disorder and the severity of symptoms. In this study, we had 8 true positives, meaning that the

participants had a diagnosis of acute stress disorder and had a score on the NSESSS greater than 14. We also had 17 true negatives, meaning that the participants did not have a diagnosis of acute stress disorder and did not have a score greater than 14 on the NSESSS. We had no false positives meaning that 100% of the participants that had a diagnosis of acute stress disorder also had a score of less than 14 on the NSESSS. We had 2 false negatives meaning that the two participants had a diagnosis of acute stress disorder even though they scored less than 14 on the NSESS. With this data, we found that the sensitivity is 80%, and the specificity was 100%. We also found that the positive predictive value came out to be 100%, and the negative predictive value of 89.47%.

For this study, statistical analysis was performed using the SPSS statistical software.

Table of our results:

Table 1 : Result of the Statistical Analysis

	Dx acute stress disorder	**No dx of acute stress disorder**	
Score NSESS >14	8 (true positives)	0 (false positive)	**Positive Predictive value =** 100% TP/TP+FP
Score NSESS <14	2 (false negative)	17 (true negatives)	**Negative Predictive Value** = 89.47% TN/TN+FN
	Sensitivity= 80% TP/TP + FN	**Specificity=** 100% TN/TN+FP	

Discussion:

Acute stress disorder is the initial response to a traumatic event that lasts no less than three days and no more than a month in reaction to a traumatic event, compared to PTSD, which extends for more than four weeks and can develop months or years after the traumatic event. It is important to note that ASD can result in subsequent psychological distress leading to co-occurring psychiatric illnesses including depression, anxiety, and somatization among individuals who experienced the traumatic event. (7). Symptoms common to both diagnoses include distractibility, flashbacks, irritability, sleep malfunction, and feelings of detachment from oneself and emotions, which are all related to the traumatic event. (6). Although ASD and PTSD share similar symptomology, the onset and duration differentiate both diagnoses. (7).

ASD was outlined in the DSM-IV in 1994 as a new diagnosis to provide healthcare services to patients who were not covered by insurance and to initiate early interventions prior to the development of post-traumatic stress disorder (PTSD). (6). Unfortunately, there is limited data on the prevalence of ASD, compared to the commonly diagnosed condition post-traumatic stress disorder (PTSD). The reason being is that ASD is limited to the duration of symptoms, compared to PTSD, making ASD prevalence highly variable based and difficult to ascertain. It is important to note that about 20-90% of the general population is exposed to one or more stressful events in their life, but only 1.3 – 11.2% of acute stress disorder can develop into long term symptomatic disease. (6). Additional prior studies suggest acute stress disorder affects 21%-24% of adults with an increased prevalence in women. After receiving a diagnosis, an estimated 57% of males and 92% of females go on to develop PTSD within 6 months. (9). The exact reason why most people recover after a traumatic event is unclear. (6). There are several associated factors that can lead to the probable development of ASD including having a history of exposure to traumatic events in the past, history of psychiatric illness, poor or moderate social support, and exposure to moderate stress related to the traumatic event. It is interesting to note that people with a prior psychiatric history could be exposed to neuro-chemical imbalance and neuronal dysfunction compared to people with no psychiatric illness, leading to a probable acceleration of diagnosing acute stress disorder. (12). Still, the prognosis of acute stress disorder is positive. Most individuals will have resolution of their symptoms in less than a one month. People with the disorder can benefit from treatment. If people do develop PTSD, most individuals can recover within a few months to a year if they do not avoid treatments. (18).

When discussing acute stress disorder, it is important to understand the physiology of the human body when a person is experiencing a traumatic event. It is important to note that "stress" affects our internal biology. When a person is faced with stress, the hypothalamic-pituitary-axis is activated, and the "stress" hormone *cortisol* rises. When the endocrine system releases cortisol in response to stress, it is known to be an adaptive mechanism in order to respond to changing environments and face challenges, but, this adaptive mechanism can translate into a maladaptive process when the stress starts to affect the day-to-day life negatively, as in acute stress disorder. (8). The diagnosis of ASD is clinical, based on the patient's history and physical examination with no validated laboratory or radiographic tests for diagnosis. (6).

It is important to discuss PTSD risk factors that are presumed to apply to ASD due to close resemblance. For example, female gender, trauma severity, avoidant coping, neuroticism, history of traumatic exposure prior to recent exposure, and history of a pre-trauma psychiatric disorder can all be examples of risk factors for ASD. (16). Additionally, risk factors can further be broken down into three categories known as: pre-trauma factors, peri-trauma factors, and post-trauma factors. Pre-trauma factors include: female gender, intellectual disability, lack of education, history of traumatic events, history of psychiatric disorders, personality disorder, and genetics. Peri-trauma factors can include assault, rape, physical injury, and trauma severity. Post-trauma factors can include: acute stress disorder, tachycardia, poor socioeconomic status, intensive care stay, physical pain severity, brain injury, disability, subsequent life stress, and dissociative symptoms. (6). To treat patients with ASD, the first line management is trauma-focused cognitive behavioral therapy (CBT). This therapy can reduce the risk of developing PTSD with emphasis on increasing knowledge on trauma psychology, identifying cognitive distortions, practicing exposure therapy, and symptom management skills. (6). It is important to recognize that exposure-based therapy leads to a greater reduction in symptoms of ASD. Exposure-based therapy should be used in early interventions for people who at risk for developing PTSD. Studies have shown that at least five therapy sessions consisting of prolonged exposure therapy and cognitive restructuring help prevent the development of PTSD in patients with AS, in the initial month following the traumatic event. (10). Additionally, there is no substantial evidence that pharmacotherapy is efficacious for treatment of ASD. Though, pharmacotherapies used for PTSD have been applied to ASD such as selective serotonin reuptake inhibitors (SSRI's) and second-generation antipsychotics. For example, SSRIs are the most studied medications for PTSD. Medications such as fluoxetine, sertraline, paroxetine, known as the SSRI'S and venlafaxine, known as the selective norepinephrine reuptake inhibitors (SNRI's), are known as first-line pharmacotherapies for treatment of PTSD. (6). These medications have shown the most benefit as monotherapy in treatment for PTSD symptoms. The side effect profile is generally well tolerated with the SSRI's and SNRI's. Additionally, augmentation strategies are common for treatment resistant symptomatology. For example, the alpha-adrenergic antagonist prazosin is used for the treatment of nightmares and hyper-arousal, though some studies have shown weak evidence for its use. Another medication used as an adjunct to SSRI/SNRI includes Mirtazapine which is used for improvement of sleep duration and reduction of sleep latency. (19). Additionally, second-generation antipsychotics can be used as monotherapy or augment SSRI's. These medications are not first line and are usually used if patients failed SSRI's and CBT. (6). Another study found that paroxetine and sertraline are the recommended drugs for psychomotor inhibition symptoms of ASD, while olanzapine, olanzapine orally disintegrating, and quetiapine fumarate were the recommended treatment for psychotic symptoms of ASD. (17). Unfortunately, exposure to trauma can have a negative and psychological impact that can lead to a deterioration of health and well-being. Early screening, immediate intervention, and ongoing monitoring for ASD will help reduce occurrences of PTSD,

and suicide. (12). It is important to note that ASD patients are twenty-four times more likely to die by a suicide attempt compared to individuals without ASD. Therefore, early identification and treatment may lead to less devasting symptoms and clinical presentations. (6).

As mentioned previously, an important measure to assess the severity of ASD symptoms is the National Stressful Events Survey Acute Stress Disorder Short Scale (NSESSS) tool, a validated seven-item questionnaire for ASD. (13). Respondents are asked to fill in the questionnaire in regard to the past seven days as the timeframe that the traumatic event occurred or become worse after the traumatic event. One study found that patients with pre-existing psychiatric disorder had reported high levels of traumatic symptoms in terms of the global score of the NSESSS. (14). This tool is effective to track changes in the severity of the individual's symptoms. If there are consistently higher scores on the scale, then additional interventions may be needed. The tool can be administered at regular intervals as clinically indicated, which is based on the treating physician's discretion. (15). Although the NSESS tool seemed to be beneficial as an adjunct for clinical decision making for acute stress disorder, it is important to discuss the limitations of this study. This study had a small sample size, therefore conducting the study with a larger sample size may be worthwhile. Additionally, studies with longer follow up period would be important in order to assess symptoms of ASD. The study we conducted was a descriptive study, with the focus of collecting data through surveys and interviews and is not meant to establish a causal relationship.

Conclusion:

Acute stress disorder can develop into chronic conditions such as PTSD, and lead to deterioration of the quality of life for patients. While our study had 8 true positives, meaning that the participants had a diagnosis of acute stress disorder and had a score on the NSESSS greater than 14, and our study had 17 true negatives, meaning that the participants did not have a diagnosis of acute stress disorder and did not have a score greater than 14 on the NSESSS, with 0 false positives and only 2 false negatives, it is important to discuss the limitations of our study. Our sample size was limited to n=27 participants, therefore, it is important to conduct the study with a larger sample size to infer results about the predictability of the NSESS tool in assessing the treatment progress of ASD in trauma patients. Therefore, using the NSESSS tool in everyday clinical practice as an adjunct diagnostic tool to confirm and support the clinical working diagnosis of ASD would help prevent the exacerbation of ASD symptoms and allow for early treatment of ASD. Additionally, our study was only conducted at one hospital system, it would be important to assess how results are compared broadly within multiple hospital networks. Further research studies, such as cohort prospective studies, that longitudinally follow patients with ASD for a certain amount of time, can give substantial answers and information about the impact of the diagnosis on patient's mental health. Additionally, clinicians need to be better informed about the use of prolonged exposure therapy to help patients with ASD for better outcomes. Future research studies can focus on different therapy modalities to study the impact on mortality and morbidity when a patient is diagnosed with acute stress disorder.

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