Acute Stress, Depression, and Anxiety Symptoms Among English and Spanish Speaking Children with Recent Trauma Exposure

Beth A. Barber · Krista L. Kohl · Nancy Kassam-Adams · Jeffrey I. Gold

Abstract A growing literature suggests the clinical importance of acute stress disorder symptoms in youth following potentially traumatic events. A multisite sample of English and Spanish speaking children and adolescents ($N = 479$) between the ages of 8–17, along with their caregivers completed interviews and self-report questionnaires between 2 days and 1 month following the event. The results indicate that children with greater total acute stress symptoms reported greater depressive ($r = .41$, $p < .01$) and anxiety symptoms ($r = .53$, $p < .01$). Examining specific acute stress subscales, reexperiencing was correlated with anxiety ($r = .47$, $p < .01$) and arousal was correlated with depression ($r = .50$, $p < .01$) and anxiety ($r = .55$, $p < .01$). Age was inversely associated with total acute stress symptoms ($r = -.24$, $p < .01$), reexperiencing ($r = -.17$, $p < .01$), avoidance ($r = -.27$, $p < .01$), and arousal ($r = -.19$, $p < .01$) and gender was related to total anxiety symptoms (Spearman's $\rho = .17$, $p < .01$). The current study supports the importance of screening acute stress symptoms and other mental health outcomes following a potentially traumatic event in children and adolescents. Early screening may enable clinicians to identify and acutely intervene to support children's psychological and physical recovery.

Keywords Children · Acute stress · Depression · Anxiety · Trauma

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Introduction

More than two thirds of children will experience one or more traumatic events by the age of 16 (Copeland, Keeler, Angold, & Costello, 2007). Children exposed to a trauma experience almost twice as many psychiatric disorders throughout their lifetimes as those not exposed to trauma (Copeland et al., 2007). Recent investigations have focused more specifically on the immediate psychological effects of traumatic events on children. The incidence of acute stress disorder (ASD) symptoms following single incident trauma (i.e., motor vehicle accidents [MVA], assaults, burns) varies between 8 and 31 % (Bryant, Mayou, Wiggs, Ehlers, & Stores, 2004; Bryant, Salmon, Sinclair, & Davidson, 2007; Kassam-Adams & Winston, 2004; Meiser-Stedman, Yule, Smith, Glucksman, & Dalgleish, 2005; Saxe et al., 2005; Winston, Baxt, Kassam-Adams, Elliott, & Kallan, 2005; Winston et al., 2002). The literature has suggested that many of the acute stress symptoms present immediately after a traumatic experience (i.e. MVA) are temporary with the majority of children adapting and progressing through life (Bryant et al., 2004; Cox, Kenardy,

& Hendrikz, 2008). Yet some children endure long-term negative psychological consequences in response to these acute traumas (Bryant et al., 2007; Cox et al., 2008; Kassam-Adams & Winston, 2004; Meiser-Stedman et al., 2005; Pailler, Kassam-Adams, Datner, & Fein, 2007; Stowman, Kearney, & Daphtary, 2011).

Research demonstrates a significant positive correlation between ASD, depression, and anxiety symptoms in adults following single traumatic events (Bryant & Panasetis, 2001; Wang, Tsay, & Bond, 2005; Warda & Bryant, 1998), however, these associations have not been studied extensively in children. Internalizing symptoms, specifically anxiety and depression, have been found to be highly comorbid with stress symptoms in youth following an acute potentially traumatic event (Kahana, Feeny, Youngstrom, & Drotar, 2006; Stallard, Salter, & Velleman, 2004). When examining specific subscales of ASD, physiological arousal immediately after trauma exposure has been found to be a sensitive predictor of later stress symptoms, depression, and emotional numbing (Kassam-Adams & Winston, 2004; Nugent, Christopher, & Delahanty, 2006). In comparison, findings have been mixed regarding the predictive value of dissociation for future stress levels (Bryant et al., 2004; Kassam-Adams & Winston, 2004; Meiser-Stedman et al., 2005, 2007).

Pailler et al. (2007) examined whether assessments of symptoms of depression and acute stress during an emergency department admission were associated with future risk behaviors, re-injury, and PTSD in 394 adolescents who had experienced a violent event. They found that depression symptoms and acute stress symptoms immediately following an injury were independently associated with the report of long-term posttraumatic symptoms. Ellis, Nixon, & Williamson (2009) examined the correlation between social support and negative appraisals with acute stress symptoms and depression in 97 children and adolescents presenting to the emergency department following a single-incident trauma. They found that trauma symptoms and depression symptoms were moderately positively correlated with each other. Children and adolescents who had stronger beliefs that they were going to be killed during the traumatic incident reported higher levels of both trauma symptoms and depression within 1 month of the trauma.

Most recently, Stowman et al. (2011) examined potential mediators (i.e., anxiety, depression, negative affect, hospital fear, and parent anxiety/depression) of ASD and PTSD in 50 youth and their parents presenting to the pediatric intensive care unit. Youth anxiety, negative affect, and hospital fear mediated immediate symptoms of ASD and later symptoms of PTSD. These initial studies highlight the co-occurrence of ASD symptoms and other mental health symptoms along with their potential long-term psychological impact in children and adolescents in a medical setting after a potentially traumatic event.

The purpose of the current study is to examine the relations between acute stress symptoms and anxiety and depression symptoms in English and Spanish speaking children/adolescents (8–17 years) following an acute, single-incident potentially traumatic event. We hypothesized that greater acute stress symptoms would be associated with increased anxiety and depressive symptomatology. We also hypothesized that symptoms of anxiety and depression would be correlated with the specific acute stress symptom subscale of arousal.

Method

Participants

Participants were recruited as part of a larger study investigating acute stress reactions in children. Children and adolescents ages 8–17 were recruited through word of mouth (i.e., flyer/phone call) and referrals from health care professionals/community partners from health care (ICU, Trauma Services) and community-based social service settings (i.e., schools, community centers, religious institutions) in three US cities: Philadelphia ($n = 210$), Los Angeles ($n = 237$), and Miami ($n = 32$). Of the 479 children enrolled in the study, 57 % of the participants' parents completed high school and 34 % were from households with income over $30,000. The study was conducted in accordance with a protocol approved by the IRB at each participating institution.

Inclusion criteria limited enrollment to children who had experienced within the past month an acute, potentially traumatic event (excluding abuse related events) and were more than 1 day post-event in order to potentially meet ASD diagnostic criteria. The children had to speak English or Spanish well enough to complete the measures and participate in the interview in addition to having family access to a telephone. Children were excluded from enrollment if their medical status, such as moderate to severe head injury (Glasgow Coma Scale ≤12), or cognitive functioning precluded participation in an interview. Additionally, we excluded abuse-related events because the acute impact of a single incident within repeated experiences of relational trauma is not appropriately assessed with an acute traumatic stress measure. The primary reasons for refusal include a lack of interest and/or time. With regard to the index event, 21 % experienced a medical event (e.g., abdominal pain, appendicitis and high fever), 71 % suffered an unintentional injury (e.g., sports related broken bones/fractures, dog bites, MVAs and burns), and 8 % were the victims or witnesses of

violence. For more information about this study see Kassam-Adams et al., 2013.

Of the 479 children enrolled, 225 completed study measures in Spanish and 254 in English. Within the Spanish sample, a subsample of 62 bilingual children completed the acute stress checklist in both language versions (in counter-balanced order across this group) to assess cross-language reliability. The bilingual children then completed the remainder of the questionnaires in the language of the measure administered first. All but one of the children who completed measures in Spanish sample, and 75 (30 %) of the children who completed measures in English were of Hispanic/Latino origin (as reported by parents).
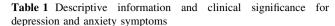
Measures

Child Acute Stress Symptoms

The Acute Stress Checklist for Children (ASC-Kids) is a brief, 29-item self-report measure of ASD reactions in children and adolescents developed by Kassam-Adams (2006). The ASC-Kids Symptom Scale is a continuous severity score. Internal consistency within symptom categories includes: dissociation ($\alpha = .64$), reexperiencing ($\alpha = .74$), avoidance ($\alpha = .73$), and arousal/anxiety ($\alpha = .73$) (Kassam-Adams, 2006). In a sample of 176 youth ages 8–17 who experienced a recent injury or intensive care unit admission, the ASC-Kids demonstrated strong test–retest reliability and internal consistency, as well as concurrent and predictive validity with other measures of traumatic stress (Kassam-Adams, 2006). A Spanish-language version of this measure, the *Cuestionario de Estrés Agudo – Niños (CEA-N)* (Kassam-Adams, Cardeña, Gold, & Muñoz, 2004) was also used in the current study. In the current study, this checklist showed excellent internal consistency in English ($\alpha = .83$) and Spanish ($\alpha = .84$) (Kassam-Adams et al., 2013).

Child Depression Symptoms

The Children's Depression Inventory (CDI) is a 27-item standardized self-report instrument of depressive symptoms over the past 2 weeks in English (Kovacs, 1992) and Spanish (Davanzo et al., 2004). The CDI uses a 3 point-scale (e.g., 0 [I am sad once in a while] to 2 [I am sad all the time]). Reponses to the items are added to yield a total score with the clinical cut-off being 19. Reliability and validity data have been established for the CDI (Davanzo et al., 2004; Kovacs, 1992). In the current study, the CDI showed excellent internal consistency in English ($\alpha = .84$) and Spanish ($\alpha = .86$).

Table 1 Descriptive information and clinical significance for depression and anxiety symptoms

Variables	Mean (SD)	Range	Clinically significant
CDI total score	8.19 (6.29)	1–27	19 and above
RCMAS total score	11.08 (6.59)	1–28	19 and above

CDI Children's Depression Inventory, *RCMAS* Revised Children's Manifest Anxiety Scale

Child Anxiety Symptoms

The Revised Children's Manifest Anxiety Scale (RCMAS) is a 37-item self-report instrument designed to measure the level and nature of anxiety in children and adolescents aged 6–19 years in English (Reynolds & Richmond, 1978) and Spanish (Richmond, Rodrigo, & De Rodrigo, 1988). Items (i.e., "Often I feel sick to my stomach." or "I am nervous.") are scored as "yes" or "no"; the Total Anxiety score (used in the current analyses) is comprised of 28 items. The guideline for the raw clinical cut-off is 19. The Total Anxiety score has demonstrated good internal and test–retest reliability (Reynolds & Richmond, 1978), and good criterion validity in ethnically diverse children and adolescents (Chemtob, Nakashima, & Carlson, 2002; Menne, 1994). In the current study, the RCMAS Total Anxiety scale showed excellent internal consistency in English ($\alpha = .88$) and Spanish ($\alpha = .86$).

Procedure

Following parental consent and child assent, participants completed the acute stress checklist measure in English (ASC-Kids) or Spanish (CEA-N), plus additional checklist measures of anxiety (RCMAS) and depression (CDI) symptoms. If a child needed reading assistance, research assistants read checklist items aloud and the child marked his or her responses.

Results

Descriptive analyses were conducted to examine means, standard deviations, and ranges as presented in Tables 1 and 2. Relations between ASD symptom subscales and anxiety and depressive symptoms are presented in Table 3. We set the α more conservatively at $p < .01$ to help correct for multiple comparisons (Goodman, 2008). Participants mean age was 13.05 (SD = 2.60) and 294 (61 %) were boys. Age was significantly negatively associated with total acute stress symptoms ($r = -.24$, $p < .01$), reexperiencing ($r = -.17$, $p < .01$), avoidance ($r = -.27$, $p < .01$), and arousal ($r = -.19$, $p < .01$). Girls reported greater total anxiety

Table 2 Descriptive information for acute stress disorder total and subscales

Variables	Mean (SD)
ASD total score	13.63 (7.40)
Dissociation	3.83 (2.37)
Reexperiencing	3.18 (2.53)
Avoidance	3.42 (2.41)
Arousal	3.20 (2.53)
Impairment from symptoms	2.65 (1.32)

ASD acute stress disorder

Table 3 Pearson correlations between ASD total and symptom subscale scores and depression or anxiety scores

ASD symptom subscale	Depression	Anxiety
Dissociation	.14**	.22**
Reexperiencing	.36**	.47**
Avoidance	.21**	.33**
Arousal	.50**	.55**
Impairment from symptoms	.32**	.30**
ASD symptom total score	.41**	.53**

ASD acute stress disorder, *CDI* Depression assessed via the Children's Depression Inventory, *RCMAS* anxiety assessed via the Revised Children's Manifest Anxiety Scale

** $p < .01$

symptoms (Spearman's $\rho = .17$, $p < .01$). In regards to differences in types of events by age and gender, teens (ages 13–17) were slightly more likely to be victims/witnesses of violence compared to 8–12 year olds. Girls were more likely than boys to have a medical event and less likely to have unintentional injury. However, neither of these differences was large $\chi^2(2, N = 479) = 6.69$, $p < .01$.

Table 3 presents correlations between acute stress symptom severity (overall, and by symptom subscales) and depressive or anxiety symptom severity. Acute stress symptom severity was significantly positively associated with severity of depressive symptoms and with severity of anxiety symptoms. Additionally, several ASD subscales were significantly related to the overall severity (total score) of depressive or anxiety symptoms. Total depressive symptoms were significantly positively related to dissociation, reexperiencing, avoidance, and arousal, and to the severity of impairment from acute stress symptoms. Total anxiety symptoms were also significantly positively related to dissociation, reexperiencing, avoidance, arousal, and impairment.

Discussion

Children and adolescents with greater total acute stress symptoms experienced higher levels of co-occurring anxiety and depression symptoms after experiencing an acute potentially traumatic event. Previous literature has emphasized the long-term psychological effects that children and adolescents may experience as the result of a potentially traumatic event, especially when acute stress symptoms are immediately present (Bryant et al., 2007; Kassam-Adams & Winston, 2004; Meiser-Stedman et al., 2005; Pailler et al., 2007; Stowman et al., 2011). However, acute stress symptoms do not appear in isolation (i.e., Ellis et al., 2009; Pailler et al., 2007; Stowman et al., 2011) as the current study confirms, finding the presence of concurrent psychological symptoms (i.e., depression and anxiety) in children and adolescence immediately following a potentially traumatic event. These results are among the first to highlight the presence of significant acute posttraumatic mental health symptoms in a sample of both English and Spanish speaking children and adolescents recruited from health care and community-based social service settings.

This study underscores the importance of examining acute stress subscales in addition to examining total levels of acute stress symptoms (Dalgleish et al., 2008; Harvey & Bryant, 2002; Kassam-Adams & Winston, 2004; Winston et al., 2002, 2005). In agreement with previous literature and our hypothesis, the ASD subscale of arousal was most highly correlated with anxiety and depression symptoms. Reexperiencing was similarly correlated with anxiety. To a lesser degree, symptoms of avoidance and the degree of impairment from acute stress symptoms were moderately correlated with anxiety and depression symptoms. While one study (Kassam-Adams & Winston, 2004) found dissociation to be a strong predictor of future stress, the majority of studies have determined that dissociation has a low predictive value in children (Bryant et al., 2004; Meiser-Stedman et al., 2005, 2007). Our finding that dissociation was most weakly associated with concurrent anxiety and depression symptoms may reflect a difference between dissociative responses and other aspects of traumatic stress that are more closely related to anxiety and depression symptoms. This would help to explain what many past studies suggest is its weak or inconsistent role in the trajectory toward persistent traumatic stress symptoms in children.

Results from this large, multi-ethnic sample of children also provide a basis to examine potential differences in acute responses to trauma based on demographic factors, and to examine the intersection of sex and age, along with ethnicity in the future, as potential factors in these responses. Among participants, girls endorsed significantly higher levels of anxiety symptoms. Modest associations of age with total acute stress, reexperiencing, avoidance, and arousal (such that older children reported less severe symptoms) were observed.

An important note is that as a group, none of the mean scores for symptoms of anxiety or depression were at or above established clinical cut-off scores, which may reflect an ability to recover from such events. In contrast, these levels may also signify the important role medical staff plays in the examination of symptomatology. Without careful education and screening, individual children and adolescents presenting with subclinical symptoms to various health care centers may fail to obtain critical early intervention services. Left untreated, subclinical levels will either improve or progress to clinical levels over time, negatively impacting daily functioning. It becomes critical that medical professionals are able to identify early symptoms for appropriate referrals in addition to educating the families of these children about the potential long-term impact of such events. Given that the population was not clinically impaired at the time of the assessment, symptoms or concerns should ultimately be regularly monitored to ensure continued wellbeing. Follow up studies would be beneficial in order to examine chronic symptoms, preventative intervention targets, and outcomes.

In the future, examining co-morbid ASD and psychiatric symptomatology associated with specific types of acute, potentially traumatic events (e.g., violence, MVAs, acute medical events) may enhance our understanding of risks associated with specific types of injuries and increase our sensitivity to early identification and treatment of symptoms by injury type. As a follow up to Ellis's 2009 study, it may also be beneficial to examine children's appraisal of acute potentially traumatic events and concurrent psychiatric symptoms. In addition, examining group differences (e.g., acculturation) between English and Spanish speaking subsamples could inform future research on mental health outcomes in specific ethnic groups.

Given the wide age range of the current sample and that less than twelve percent of participants were under 10-years-old, additional research may be needed to examine the psychological effects of young children immediately following an acute, potentially traumatic event. Additionally, participants were geographically and ethnically diverse but were all recruited in urban settings that serve urban and suburban youth. We recognize that these findings may not generalize to more rural samples.

To ensure comparability with established norms, we utilized standard instructions for the RCMAS and CDI, which inquire about functioning over the past 2 weeks, however the acute event may have occurred less than 2 weeks ago for some participants. As a result, we are unable to say with certainty whether these symptoms were newly occurring, were exacerbated by the potentially traumatic event or were pre-existing. Additional limitations include item overlap (i.e., arousal symptoms of acute stress include non-trauma specific symptoms such as irritability),

and having a single source (child self-report) for all measures. Previous symptom levels and trauma histories were not obtained for all participants. Therefore, a relationship between pre-existing symptoms and acute stress cannot be established.

These findings have critical implications for the screening and treatment of children after exposure to acute, potentially traumatic events. Examination of such relations can help professionals in a medical setting recognize children with acute symptoms that require support and possible clinical attention (Bryant et al., 2004, 2007; Dalgleish et al., 2008; Kassam-Adams, Marsac, & Cirilli, 2010; Kassam-Adams & Winston, 2004; Meiser-Stedman et al., 2005; Pailler et al., 2007). From a clinical and medical perspective, the knowledge of these comorbid symptoms may aid in serving the immediate psychological and physical needs of children and adolescents following an acute, potentially traumatic event in multiple settings (i.e., medical and mental health centers). Early and accurate screening may allow healthcare professionals to acutely intervene to support children's psychological and physical recovery, while reducing the likelihood that acute mental health symptoms may become chronic.

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