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Published in final edited form as:

J Trauma Stress. 2021 October ; 34(5): 955–966. doi:10.1002/jts.22716.

A Pilot Trial of Universal School-Based Mental Health Screening in El Salvador: Traumatic Stress in an Underresourced School Environment

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Abstract

Salvadoran youth have an elevated risk of trauma exposure and related mental health problems. However, investigations of childhood trauma exposure and mental health sequelae in El Salvador are limited. The present study aimed to (a) explore the prevalence of exposure to potentially traumatic events and symptoms of posttraumatic stress, anxiety, and depression and (b) evaluate the associations between specific trauma types and emotional functioning among Salvadoran youth. A total of 1,296 youth aged 8–21 years from seven public schools completed self-report measures of trauma exposure, posttraumatic stress symptoms (PTSS), anxiety, and depression. Participants reported high levels of trauma exposure, endorsing an average of 3.62 ($SD = 2.32$) trauma types. In total, 34.5% of participants reported clinically elevated PTSS; fewer youths reported elevated depressive (8.7%) and anxiety symptoms (8.6%). Although boys reported exposure to more trauma types than girls, $d = 0.22$, girls were more likely to endorse elevated PTSS, $V = .11$; anxiety, $V = .06$; and depression, $V = .10$. Adolescents reported exposure to more trauma types than younger children, $d = 0.23$, and were more likely to endorse elevated PTSS, $V = .07$; anxiety, $V = .13$; and depression, $V = .16$. Undergoing a frightening medical procedure, $OR = 2.30$; female sex, $OR = 1.92$; witnessing domestic violence, $OR = 1.70$; and experiencing war between gangs, $OR = 1.61$, were strong predictors of elevated PTSS. This broad, school-based screening was a critical step toward better understanding the rate of trauma exposure and trauma-related symptoms among Salvadoran youth.

El Salvador, a Central American country that borders Honduras and Guatemala, has faced significant challenges in the last 30 years. Since the end of the civil war in 1992, El Salvador has been filled with political and economic instability. The nation has one of the highest rates of homicide worldwide (United Nations on Drugs and Crime, 2019; World Population Review, 2020) and struggles with pervasive gang activity that has resulted in citizens experiencing threats, extortion, and forced migration (Human Rights Watch, 2020; World Bank Group, 2020). In addition, many Salvadorans live in poverty: In 2018, an estimated 26% of the population lived below the national poverty line (World Bank Group, 2020). That same year, an estimated 20% of Salvadorans lived abroad, mostly as a result of displacement, gang violence, and high rates of poverty (Central Intelligence Agency, 2020).

A recent national report published by the El Salvador Ministry of Economy (El Salvador Ministerio de Economía, 2019) found that children and adolescents have been disproportionately impacted by these violent and unstable conditions. For example, four in 10 youth (36.8%) do not live with their parents due to caregiver abandonment, death, or migration, and approximately one in four youth between 15 and 24 years of age (26.3%) do not work or go to school. This fact is particularly troublesome as these youth are at an increased risk of being recruited for or forced to join gangs. More than half (i.e., 57%) of Salvadoran youth have been exposed to at least one traumatic event, with many reporting having experienced up to four traumatic events (Johnco et al., 2020). These circumstances suggest that youth residing in El Salvador face disproportionate levels of adversity compared to youth in other parts of the world, significantly increasing their risk for mental health disorders. Among the 269 parents of Salvadoran youth surveyed by Johnco and colleagues (2020), 11%–19% reported that their child was experiencing clinically elevated symptoms of posttraumatic stress, with higher levels of trauma exposure associated with more severe posttraumatic stress disorder (PTSD) and impairment. Aside from this recent work, however, studies few studies have examined the prevalence rates of trauma exposure and subsequent mental health symptoms among children in El Salvador. As a result, there is a need for increased mental health screening to prevent the disenfranchisement of this high-risk population and identify youth in need of treatment.

Unfortunately, a 2013 study found that 69.5% of Latin American youth with mental health disorders do not receive treatment (Kohn, 2013). Importantly, this statistic is thought to be a marked underestimate of the true treatment gap given the notable omission of low-income Latin American countries in the study. In El Salvador, limited mental health legislation, expenditures, facilities, and providers suggest Salvadoran youth face overwhelming barriers to treatment (World Health Organization, 2011). In addition, the underidentification of individuals in need of services is a major obstacle to the provision of care for youth in low- and middle-income countries (LMICs; Patel et al., 2013). Understanding the prevalence of childhood trauma exposure and mental health symptoms in El Salvador may help facilitate the availability of trauma-focused services by providing evidence of the need for such services.

Universal school-based screening, also known as school-wide mental health screening, is a promising means of better understanding the prevalence rates of mental health symptoms among youth. The identification of the prevalence of mental health problems

can assist schools in prioritizing and directing resources to the prevention or intervention efforts that are most needed (Dowdy et al., 2010). Unfortunately, schools often have few resources to obtain systematic and evidence-based data on the mental health needs of their students. Partnerships with community collaborators, such as academic institutions, can help strengthen universal school screening efforts by providing school staff with guidance on empirically established methods and best practices.

The current paper provides an overview of a pilot universal school screening project conducted in seven public schools in El Salvador. This pilot screening program focused on assessing trauma exposure and posttraumatic stress symptoms (PTSS), as well as symptoms of anxiety and depression, which are frequently comorbid disorders related to posttraumatic stress (Galatzer-Levy et al., 2013). The aims of this pilot project were to (a) explore the prevalence of exposure to potentially traumatic events and the resulting PTSS and anxiety and depressive symptoms and (b) evaluate the association between exposure to specific trauma types and emotional functioning among Salvadoran youth. We hypothesized that there would be high rates of exposure to traumatic events among Salvadoran youth and that exposure to multiple trauma types would be associated with higher levels of PTSS, anxiety, and depression. We did not put forth any a priori hypotheses about how exposure to specific trauma types would relate to symptoms.

Method

Participants

Participants were 1,296 students from seven urban public schools in the Salvadoran municipalities of Colón, Santa Tecla, and San Salvador. Schools were chosen by the Ministry of Education in El Salvador based on previous data that showed significant levels of exposure to violence and high mental health needs among students in these municipalities (El Salvador Ministerio de Educación, 2018). The universal school screening program aimed to evaluate students in grades 3–12. In addition to two mental health screening measures (see Measures), students were asked to provide descriptive information about their grade, gender, and age. Out of the 3,353 students eligible to participate (i.e., the overall school population), a total of 1,296 students (38.7%) completed the screening measures. Most data for this study (92.0%) came from students in Grades 1–9 (i.e., basic primary school), whereas 7.9% of the screening data were from respondents in Grades 10–12 (i.e., secondary school). Students who participated in the screening were between 8 and 21 years of age ($M = 12.73$ years, $SD = 2.67$). Students up to age 21 were included in the study to comply with cultural norms in El Salvador, where individuals up to age 21 are considered to be youth and may attend high school; only 25 individuals in the sample were 19–21 years old. Approximately 55% ($n = 716$) of students identified as female, and 100% were Hispanic and spoke Spanish as their primary language.

Procedure

The current study was funded by the United States Agency for International Development (USAID) and was part of a larger project aimed at improving trauma-focused services for children in El Salvador (Orengo-Aguayo et al., 2020). Five of the seven schools that

participated in the screening were involved in the larger project, wherein psychologists from a local community mental health organization (CMHO) provided school-based, trauma-focused services to students referred for treatment. This preexisting relationship with the schools strengthened partnerships with school administrators, which facilitated the implementation of the school-wide screenings. All study procedures were approved as exempt by the Medical University of South Carolina Institutional Review Board and received approval from the research ethics committee of an institution in El Salvador (Universidad Francisco Gavidia).

Implementation Team—The research team collaborated with a CMHO to hire an implementation team for the school screening procedure. The implementation team consisted of six individuals: one coordinator, two psychologists, and three psychology students in their 4th and 5th years of training. In El Salvador, training for psychologists comprises a 5-year bachelor's degree program. The implementation team was responsible for (a) providing an overview of the project to participating schools, (b) obtaining caregiver informed consent and child assent, (c) administering the measures at the schools, and (d) collecting and entering data. To ensure fidelity to the administration of instruments, the implementation team underwent orientation and participated in four training sessions with the second and fourth authors, who developed protocols for obtaining consent, administering the screening measures, and entering data. All training sessions were conducted via a videoconferencing platform (i.e., Skype). The research team elicited feedback from members of the implementation team during the training sessions given their knowledge about the school system in El Salvador. Thus, the research team took an iterative approach to obtaining feedback and making adjustments to protocols, which maximized cultural and linguistic sensitivity to the local Salvadoran context.

Informed Consent And Administration of Measures—Caregivers of youth were approached by the implementation team at each school's scheduled parent-teacher conferences or other parent meetings. Across the seven schools, 38.7% of caregivers provided consent for their child to participate in the study; individual school recruitment rates ranged from 24.3% to 56.5% of the total student population at each school. Data were collected over the course of four weeks from June 2019 through July 2019. The implementation team visited classrooms with rosters of students for whom there was parental consent. For eligible students, youth verbal assent was obtained in the classroom. Youth completed the paper-and-pencil screening measures in a group format, with desk partitions to ensure privacy. Children with low literacy levels were given individualized assistance by a member of the implementation team who read the questions aloud to the student. A small pilot test was completed to assess question understanding among the target population and pilot test the administration procedures. At the end of the study, results tailored to each school were presented to the administrators and staff. Additionally, an overall report was presented to the El Salvador Ministry of Education with recommendations for next steps based upon the study results.

Data Entry—Once data entry was complete, two members of the research team checked 10% of the data for errors (i.e., 129 cases, every 10th row of data). A significant number

of errors were found. Therefore, the data from select whole classrooms were reviewed, resulting in a check of 21.7% of the data (i.e., 281 cases). Given the high rate of errors in the database, the research team ultimately determined that a complete review of all data was necessary. Accordingly, members of the research team used scanned versions of completed paper measures to verify the accuracy of each item for every case, which resulted in a fully verified and accurate data set.

Selection and Adaptation of Measures—The Child PTSD Symptom Scale for the *Diagnostic and Statistical Manual of Mental Disorders* (fifth ed.; *DSM-5*)–Self-Report (CPSS-5-SR; Foa et al., 2018) and the Revised Child Anxiety and Depression Scale–Short Version (RCADS-SV; Ebesutani et al., 2012) were chosen based on their psychometric properties and numerous validation studies as well as their previous use in universal school screenings. Regarding their use in Spanish-speaking populations, the psychometric properties of the original CPSS (i.e., based on criteria in the *DSM-IV*) have been evaluated in samples of youth in Chile (Bustos et al., 2009; Rincón et al., 2014) and Spain (Serrano-Ibáñez et al., 2018) as well as among youth of Latin American origin in the United States (Gudiño & Rindlaub, 2014; Kataoka et al., 2003; Meyer et al., 2015), including recent immigrants (Venta & Mercado, 2019) and unaccompanied minors (Hasson et al., 2020). When the present study was conducted, the CPSS for *DSM-5* had not yet been validated for use with Spanish-speaking children. The RCADS-SV has been validated for youth in Spain (Sandin et al., 2010) and El Salvador (Young et al., 2020). An existing CPSS-5-SR Spanish language instrument was obtained from the instrument’s authors. An existing Spanish-language version of the RCADS-SV was available from the UCLA Child FIRST website (<https://www.childfirst.ucla.edu/resources/>), which also provided a scoring program based on U.S. norms. For scoring purposes, United States grade levels for El Salvador could be estimated by subtracting 6 from the age of the respondent.

For the present study, existing Spanish versions of the CPSS-5-SR and RCADS-SV were reviewed by members of the research team: nine individuals in the mental health field with master’s- or doctoral-level training who were fluent in Spanish and of American, Cuban, Puerto Rican, Mexican, Dominican, Salvadoran, or Colombian origin. Reviewers provided feedback on grammar, the use of accents, and alternative phrasing to increase language comprehension for children and adolescents. These edits were combined into a first draft of the tailored measures. To further ensure the appropriate translation of measures and adaptation to the Salvadoran context, two monolingual Spanish-speaking psychologists from the CMHO in El Salvador reviewed the measures and tailored them to employ common Salvadoran words and phrasing; for example, the term “tornado” was removed from the CPSS-5 traumatic event list because tornados do not occur in the country, and the word “gangs,” or *maras*, was included in reference to being around a war.

Measures

Trauma History and PTSS—The CPSS-5-SR is a 27-item adaptation of the original Child PTSD Symptom Scale (CPSS; Foa et al., 2001) that corresponds to PTSD criteria outlined in the *DSM-5*. The CPSS-5-SR is used to measure the frequency and severity of PTSS and related functional impairment in children 8–18 years old. Respondents are

first presented with a list of 14 types of potentially traumatic events that they may have experienced in their lifetime, with an additional option to write in an unlisted traumatic experience. Respondents are then asked to rate the frequency at which that they have experienced PTSS in the last month, scoring items on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*6 or more times a week/almost always*). Finally, respondents indicate whether they have experienced impairment in seven areas of their life (e.g., school, religion, family relationships), scoring responses “yes” or “no.” The CPSS-5-SR has demonstrated strong psychometric properties, including good internal consistency (Cronbach’s $\alpha = .92$) and test–retest reliability (Pearson’s $r = 0.80$), convergent and divergent validity, and diagnostic sensitivity (0.93) and specificity (0.82) when evaluated using a clinical cutoff score of 31 (Foa et al., 2018). Although there are no published studies in which the CPSS-5-SR was used in school-based settings, a psychometric study of the original English version of the CPSS demonstrated high internal consistency (Cronbach’s $\alpha = .93$) and feasibility of use in a school-based environment (Stewart et al., 2017). In the present sample, internal consistency for the overall total posttraumatic stress scale (i.e., the 20 symptom frequency items) was good, Cronbach’s $\alpha = .91$.

Anxiety and Depression—The RCADS-SV is a 25-item version of the original 47-item RCADS intended to assess anxiety and depressive symptoms in youth in third through 12th grade; the short version provides total scores for symptoms of broad anxiety (15 items) and depression (10 items). Items are rated on a 4-point Likert-type scale ranging from 0 (*never*) to 3 (*always*). The measure has demonstrated a stable two-factor structure with adequate reliability for the Depression and Anxiety subscales across school-based (Cronbach’s α s = .80–.86) and clinical (Cronbach’s α s = .79–.91) samples, respectively (Ebesutani et al., 2012). Additionally, scores were shown to be convergent with domain-specific diagnoses in a group of clinically referred individuals (Ebesutani et al., 2012). A recently published psychometric study of the Spanish-language version of the instrument, conducted with the same sample as the current study, demonstrated a two-factor structure and reliability similar to what was reported in the original instrument development study, Cronbach’s $\alpha = .84$ for the Anxiety subscale; Cronbach’s $\alpha = .82$ for the Depression subscale (Young et al., 2020).

Data Analysis

A review of the completed measures suggested that some children may have had difficulty understanding the measures as they were written, as evidenced by occasional errors in response selection (e.g., circling more than one response for items assessing symptom frequency). For cases in which respondents selected more than one answer, the lower of the two responses was used for scoring to avoid an overestimation of symptom frequency. Data were analyzed using IBM SPSS Statistics for Macintosh (Version 26.0). Descriptive statistics were utilized to analyze demographic data (e.g., age, sex, grade level); the frequency of exposure to specific types of traumatic events; the average number of traumatic event types experienced; average scores on measures of PTSS, anxiety, and depression; and the frequency with which youth endorsed levels of PTSS, anxiety, or depression that fell above established clinical cutoff scores. Furthermore, the results were analyzed by sex and age within the overall sample. For age analyses, the sample was divided into children (ages 8–12 years) and adolescents (ages 13–21 years), and comparisons were made between these

two groups. Independent-samples *t* tests were utilized to compare (a) male participants with female participants and (b) children with adolescents regarding the number of traumatic event types endorsed. Chi-square tests were utilized to compare male youth, female youth, children, and adolescents on the frequency of exposure to specific trauma types and clinical elevation on measures of PTSS and anxiety and depressive symptoms. Pearson correlations were utilized to examine the association between the number of endorsed traumatic event types and average scores on measures of PTSS and anxiety and depressive symptoms. Point-biserial correlations were utilized to examine the association between exposure to specific trauma types and clinical elevation on measures of PTSD, anxiety, and depressive symptoms. Finally, binary logistic regression analyses were utilized to examine sex, age, and exposure to each trauma type as predictors of clinical elevation on measures of PTSD, anxiety, and depressive symptoms. Assumptions regarding multicollinearity, singularity, and linearity of the logit were met. Cohen's *d*, Cramér's *V*, Pearson's *r*, and odds ratios (*ORs*) were used as measures of effect size. For Cramér's *V*, values between 0.1 and 0.3 represent a small effect, values between 0.3 and 0.5 represent a moderate effect, and values greater than 0.5 represent a large effect (Cohen, 1988). For Pearson's *r*, values of approximately 0.1, .03, and .05 represent small, moderate, and large effects, respectively (Cohen, 1988). For odds ratios, values of approximately 1.5, 2.7, and 4.7 represent small, moderate, and large effects, respectively (Chen et al., 2010).

Missing data analyses revealed that 7.6% of cases were missing one or more values on the CPSS-5-SR, 5.6% were missing one or more values on the RCADS-SV Anxiety subscale, and 3.9% were missing one or more values on the RCADS-SV Depression subscale. For cases that had two or fewer missing values on a given scale, mean replacement was used to substitute for missing values, allowing calculation of a total scale score. Cases that had more than two missing values on a given scale were excluded from analyses involving that scale ($n = 7$ for the CPSS-5-SR, $n = 12$ for the RCADS-SV Anxiety subscale, $n = 9$ for the RCADS-SV Depression subscale).

Results

Trauma Exposure and Mental Health Symptoms

Trauma exposure among youth was high, with participants endorsing exposure to an average of 3.62 traumatic event types ($SD = 2.32$, range: 0–14). Almost 94% of youth reported exposure to at least one type of traumatic event, whereas 81.3% reported exposure to two or more trauma types, 65.6% reported exposure to three or more trauma types, 47.0% reported exposure to four or more trauma types, and 31.1% reported exposure to five or more trauma types. Overall, the most commonly endorsed traumatic events included being injured in a serious accident (63.9%), witnessing community violence (47.4%), experiencing the violent or sudden death of a loved one (39.5%), undergoing a frightening medical procedure (39.4%), experiencing a natural disaster (37.5%), and witnessing domestic violence (35.4%; see Table 1 for complete information about trauma exposure).

Participants had an average score of 24.80 on the CPSS-5-SR ($SD = 17.15$), which indicates moderate symptom elevation. Of note, more than one third of the sample (34.5%) had CPSS-5-SR scores that fell above the recommended clinical cutoff of 31, suggesting

a probable diagnosis of PTSD. Participants had an average T score of 50.40 on the RCADS-SV Depression subscale ($SD = 13.34$), with 8.7% of the sample falling above the recommended clinical cutoff score of 70, suggesting clinically significant depression. Participants had an average T score of 51.85 on the RCADS-SV Anxiety subscale ($SD = 12.65$), with 8.6% of the sample falling above the recommended clinical cutoff of 70, suggesting clinically significant anxiety. Approximately 3.8% of participants had comorbid symptoms of posttraumatic stress, anxiety, and depression as indicated by elevations on the CPSS-5-SR and both the Anxiety and Depression subscales of the RCADS-SV. Furthermore, 3.9% of participants had comorbid anxiety and depressive symptoms, without clinical elevation of PTSS, as indicated by clinical elevation on both the Anxiety and Depression subscales of the RCADS-SV.

Sex Differences in Trauma Exposure and Symptomology

Boys endorsed exposure to more trauma types ($M = 3.90$, $SD = 2.36$) than girls ($M = 3.39$, $SD = 2.25$), $t(1,249) = 3.92$, $p < .001$, although this effect was small, $d = 0.22$. Sex differences regarding types of trauma exposure were also observed. For instance, boys reported significantly higher levels of exposure to serious accidents, natural disasters, witnessing physical assault, physical abuse, war between gangs, and experiencing physical assault than girls. In contrast, girls reported more exposure to sexual abuse than boys (see Table 1). A significantly higher proportion of girls fell above the clinical cutoff on measures of PTSD, $V = .11$; anxiety, $V = .06$; and depressive symptoms, $V = .10$, than boys. Further, the percentage of girls with comorbid PTSD, anxiety, and depressive symptoms was twice that of boys (see Table 2).

Age Differences in Trauma Exposure and PTSD, Anxiety, and Depressive Symptoms

Adolescents endorsed exposure to more trauma types ($M = 3.88$, $SD = 2.44$) than children ($M = 3.36$, $SD = 2.15$), $t(1,252) = 4.05$, $p < .001$, although this effect was small, $d = 0.23$. Age differences regarding types of trauma exposure were also observed. For instance, compared with children, adolescents reported significantly higher levels of exposure to robbery by force, threat, or arms; physical abuse by a stranger; witnessing domestic violence; witnessing community violence; sexual abuse; witnessing severe physical assault; and war between gangs (see Table 1). A significantly higher proportion of adolescents fell above the clinical cutoffs on measures of PTSD, $V = .07$; anxiety, $V = .13$; and depressive symptoms, $V = .16$, than children. Furthermore, the percentage of adolescents with comorbid PTSD, anxiety, and depressive symptoms was nearly 6 times higher than that of children (see Table 2).

Associations Between Trauma Exposure and Symptoms of PTSD, Depression, and Anxiety

As hypothesized, there was a moderately strong positive association between the number of endorsed traumatic event types and PTSS, $r = .43$, $p < .001$. There were also moderate positive associations between the number of endorsed traumatic event types and anxiety, $r = .39$, $p < .001$, and depressive symptoms, $r = .39$, $p < .001$. See Table 3 for correlations between symptom levels and trauma exposure.

A binary logistic regression revealed that being female; experiencing robbery by force, threat, or arms; experiencing physical abuse by a family member; witnessing domestic violence; witnessing community violence; experiencing sexual abuse; undergoing a frightening medical procedure; and experiencing war between gangs were all associated with significantly higher odds of being classified as having clinically elevated PTSD symptoms, $\chi^2(16, N= 1,246) = 222.05, p < .001$. Of these variables, undergoing a frightening medical procedure, being female, witnessing domestic violence, and experiencing war between gangs were the strongest predictors of PTSD symptom elevation (see Table 4).

In addition, a binary logistic regression revealed that older age, being female, witnessing community violence, experiencing sexual abuse, and undergoing a frightening medical procedure were all associated with significantly higher odds of being classified as having clinically elevated anxiety symptoms, $\chi^2(16, N= 1,238) = 101.36, p < .001$. Of these variables, undergoing a frightening medical procedure, experiencing sexual abuse, and older age were the strongest predictors of anxiety symptom elevation (see Table 5).

Finally, a binary logistic regression revealed that older age; being female; experiencing robbery by force, threat, or arms; experiencing physical abuse by a stranger; witnessing domestic violence; experiencing sexual abuse; and undergoing a frightening medical procedure were all associated with significantly higher odds of being classified as having clinically elevated depressive symptoms, $\chi^2(16, N= 1,240) = 123.06, p < .001$. Of these variables, being female, older age, and undergoing a frightening medical procedure were the strongest predictors of depressive symptom elevation (see Table 6).

Comparison of School Involvement

The five schools that were involved in the larger project were compared to the two schools that were not involved, with no significant differences emerging for PTSS, $t(1,287) = -0.39, p = .697$; depressive symptoms, $t(1,281) = 1.90, p = .057$; or anxiety symptoms, $t(1,278) = 1.14, p = .254$. However, students from the five schools that were involved in the larger project endorsed experiencing a higher number of trauma types ($M = 3.76, SD = 2.35$) than students who attended the two schools that were not involved in the larger project ($M = 3.45, SD = 2.26$), $t(1,252) = 2.36, p = .018$.

Discussion

The present study documents the results of a pilot universal school-based screening program for trauma exposure and symptoms of posttraumatic stress, anxiety, and depression in a sample of youth in El Salvador. This work advances the science of universal screening practices in LMICs, where children are at high risk of exposure to potentially traumatic experiences that can lead to PTSS as well as emotional and behavioral problems. Our hypotheses that there would be high rates of trauma exposure, PTSS, anxiety, and depression among Salvadoran youth, and that exposure to multiple trauma types would be associated with higher levels of symptomatology were supported.

The present results indicate that trauma exposure among youth in El Salvador is quite high, with almost 94% of youth endorsing exposure to at least one potentially traumatic event and the overall sample reporting exposure to an average of more than three lifetime traumatic events. These rates exceed those observed in other studies of the prevalence of trauma exposure among youth in LMICs (Le et al., 2018), youth in Latin America (Johnco et al., 2020; Speizer et al., 2008), and Latinx youth living in the United States (Bridges et al., 2010; López et al., 2017). Similarly, the proportion of youth in the present sample with probable PTSD (i.e., 34.5%) is much higher than rates of PTSD observed in other community samples of youth in Latin America (e.g., 3.9%; Johnco et al., 2020) and Latinx youth in the United States (e.g., 9.5%; López et al., 2017), and is more than double the rate of PTSD observed among trauma-exposed youth worldwide (i.e., 15.9%; Alisic et al., 2014). These findings are not surprising given the high rate of trauma exposure reported in this sample and the context of El Salvador, which currently holds the highest homicide rate in the world (United Nations on Drugs and Crime, 2019; World Population Review, 2020) and has a long history of war, gang violence, and natural disasters. Although the prevalence of PTSS was much higher in the current sample than in other community samples of Latinx youth, the rates of anxiety and depression were similar to the rates observed in other studies (e.g., Bridges et al., 2010; López et al., 2017). This suggests some specificity of the effects of trauma exposure on mental health symptoms in the current sample.

Overall, boys endorsed more exposure to potentially traumatic events than girls. However, sex differences were found across trauma types, with boys reporting significantly higher levels of exposure to traumas involving physical abuse or assault, war between gangs, and serious accidents than girls, whereas girls reported higher levels of exposure to sexual abuse. This finding underscores the importance of studying sexual assault among women and girls in postconflict societies and continuing to develop robust identification, prevention, and treatment approaches. Consistent with prior literature, a larger proportion of girls had scores that placed them above the clinical cutoffs for PTSD, anxiety, and depression than boys (Alisic et al., 2014; Tolin & Foa, 2006). Researchers have postulated that culturally, it is more acceptable for women and girls to express their emotions and endorse mental health difficulties than men and boys, and relatedly, that males have a higher likelihood of engaging in externalizing rather than internalizing behaviors following trauma exposure (Tolin & Foa, 2006). The finding that adolescents in the present study reported exposure to a higher number of traumatic event types and were more likely to have elevated scores on measures of PTSD, anxiety, and depression than children is also consistent with previous studies that have suggested older children are more likely to have a history of trauma exposure (Copeland et al., 2007; Johnco et al., 2020). Finally, consistent with other studies (Copeland et al., 2007; Johnco et al., 2020), we found evidence of a cumulative impact of trauma such that youth with higher levels of exposure to potentially traumatic events endorsed more severe symptoms of posttraumatic stress, anxiety, and depression.

Results from binary logistic regression analyses revealed that, in the current sample, undergoing a frightening medical procedure, being female, witnessing domestic violence, and experiencing war between gangs were the strongest predictors of PTSD symptom elevation. Undergoing a frightening medical procedure was also a strong predictor of anxiety and depressive symptoms. During the initiation of our team's work in El Salvador, we

met with community partners to better understand the local context. Anecdotally, several community partners reported that access to medical care in El Salvador is limited and inadequate, particularly for low-income and at-risk communities. They also commented on the dangerous driving conditions and an alarming rate of motor vehicle crashes, often resulting in significant injuries. Given the apparent influence of this variable on mental health symptoms in youth, future studies should conduct a more in-depth analysis of what Salvadoran youth identify as a “frightening medical procedure” and what their experiences with local medical services have been. This information may help clarify why this particular trauma type was highly endorsed and significantly predictive of PTSD symptoms. Furthermore, this finding highlights the need for training of health care providers in trauma-informed health care provision practices, particularly in postconflict countries such as El Salvador.

Although many youths demonstrate resilience in the aftermath of trauma exposure, some need professional services to help them overcome the emotional and behavioral difficulties that commonly follow traumatic experiences. Given the high percentage of youth in the current sample who reported trauma exposure and elevated PTSS, it is recommended that a tiered approach to intervention, such as the Mental Health and Psychosocial Support Intervention Pyramid (Inter-Agency Standing Committee Reference Group on Mental Health and Psychosocial Support, 2015) be implemented. For children with more severe symptoms, evidence-based trauma-focused interventions such as trauma-focused cognitive behavioral therapy (Cohen et al., 2017) could be implemented to reduce symptoms of PTSD and trauma-related anxiety and depression. In areas where access to mental health professionals is limited, universal mental health screenings can help identify areas of high need and enable resources to be deployed in a targeted way. Although school-based mental health screening is a useful approach to identifying youth in need of services, schools also merit consideration as a site for the delivery of mental health services given their potential to reduce access barriers that prohibit families from obtaining services in a traditional office-based clinic. On a macro level, governments and the broader international community should prioritize the mental health needs of youth living in postconflict settings by enacting policies and allocating funds that promote screening and referral for evidence-based mental health services. Future work should continue to examine the utility of school-based mental health screenings to inform the development of trauma-informed systems approaches and guide the deployment of mental health services to areas of high need.

The present findings must be considered in light of the study’s limitations. First, the results were entirely derived from self-report measures rather than clinical interviews, and the CPSS-5-SR has not been psychometrically validated within this population, although our team is currently working on these efforts. More rigorous methods are likely not feasible for this type of broad school-based screening effort, but future studies could utilize clinical interviews to assess trauma exposure and symptoms of PTSD, anxiety, and depression among youth in El Salvador in an attempt to replicate and validate the present findings. Additionally, future studies should utilize qualitative methods to obtain a more detailed understanding of how Salvadoran youth understand and define certain index traumas (e.g., frightening medical procedures) to determine if the measures used are tapping into the intended constructs within this new cultural and social context. Second, the present sample

only included youth from public schools located in the municipalities of Colón, Santa Tecla, and San Salvador, so it is unclear to what degree our findings are generalizable across El Salvador. Future studies should include youth from across the country, including both urban and rural locations, to gain a more nationally representative sample. An additional limitation was that only 38% of caregivers provided consent for their children to participate in the study. It is worth noting that in postconflict communities like those included in the present study, participation in a study by authorities could be viewed with suspicion or fear, which may have affected the participation rate. The higher rate of participation among elementary school students compared with high school students also bears noting. Although this limitation represents an unfortunate shortcoming of this study, it is also reflective of wider educational trends in El Salvador. Approximately 83% of all primary and secondary school students in El Salvador are enrolled in Grades 1–8, with only 17% enrolled in Grade 9 or higher (El Salvador Ministerio de Educación, 2018). The unequal distribution also points to the importance of early intervention, as older adolescents may be less likely to participate in organized studies, and their caregivers may be less able to encourage participation. In addition, given that four out of 10 children in El Salvador do not attend school, this could have affected the representativeness of the sample, particularly for older youth. We also faced several difficulties that stemmed from attempting to remotely facilitate data collection and data entry in this low-resource context. Although the members of the Salvadoran implementation team all had a background in psychology, they had no prior experience with school-based screening or administration of the measures used in the present study. In addition, data entry posed a particular challenge, as members of the implementation team made significant errors while transferring information from paper measures to electronic databases. We overcame these challenges by having researchers from our team review every item to ensure accurate data entry, which was not ideal. Future studies may consider the use of more rigorous training methods or the placement of a coordinator who is highly trained and able to guide and supervise in-country implementation.

Despite the noted limitations, the present study documents high levels of trauma exposure and a substantial need for trauma-focused mental health services among youth in El Salvador and supports the feasibility of conducting universal school-based screening in LMICs. We offer some lessons learned based on our experiences in the hopes of informing future school screening efforts in LMICs. First, careful attention should be paid to training local collaborators in school-based data collection methods. Considering the lack of experience with data collection methods and school-based screening measures in many LMICs, research teams must be mindful of the need to provide additional support and improve local capacity while maintaining a collaborative approach from afar. In addition, employing an iterative approach to implementation efforts is key to improving the quality and accuracy of the data collection and data entry activities, as it provides the opportunity to learn, improve, and adapt to the local context. For example, it would be helpful for a data collection protocol to incorporate weekly reports that highlight any difficulties with data collection or data entry, which could then be addressed with the team to improve future data collection. Finally, it is important to use measures that are appropriate for the language, culture, and reading level of the local context and target population. Although our project involved a systematic and comprehensive process to adapt existing Spanish measures for El

Salvador, some children enrolled in third and fourth grade still had difficulties completing the measures by themselves. We overcame this issue by having the local implementation team paraphrase or explain the questions to the children as needed. Local collaborators received explicit training regarding how to explain items while being as neutral as possible. In the future, it will be important to further test assessment measures with third- and fourth-grade students to ensure a level of understanding in this age range.

This type of broad school-based screening effort is a critical first step in gaining a better understanding of the base rate of trauma exposure and trauma-related symptoms for youth in El Salvador. The present results suggest high rates of exposure to potentially traumatic events, PTSS, and anxiety and depressive symptoms among Salvadoran youth. In particular, the PTSD symptom elevation rate of over 34% in the current sample is notable for the field of international traumatology, as it speaks to the psychological burden on youth who live in postconflict settings. Many studies on trauma prevalence have been conducted with predominantly White, North American, and European samples, which limits the field's understanding of the impact of trauma exposure in postconflict LMIC settings.

This study also documents the feasibility and potential utility of school-based screening efforts, which can be used to deploy resources and mental health services to high-need areas in a targeted way. Although the current study was limited to urban regions around the capital city of San Salvador, lessons learned from this pilot study could help inform a larger screening effort that includes a nationally representative sample of youth from across El Salvador. This was one of the first published studies to assess youth-reported PTSD, depression, and anxiety symptoms in a sample of Spanish-speaking, Central American youth; it represents an important first step in understanding the impact of trauma exposure for Salvadoran youth.

Acknowledgments

This work was supported by a United States Agency for International Development (AID-519-C-13-00002). The funding agency had no role in the study design, collection, analysis, or interpretation of the data, writing the manuscript, or the decision to submit this paper for publication.

The authors wish to thank Katherine Satizabal-Parra Teefey, program coordinator for this project, for her assistance. We would also like to thank our local partners (FUNPRES and Creative Associates International) and the Salvadoran schools, without whom this work would not have been possible. Together we can change the world.

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Open practices statement

The project reported in this article was not formally preregistered. Neither the data nor the materials have been made available on a permanent third-party archive; requests for the data or materials should be sent via email to the lead author at stewartr@musc.edu. Any requests for data must be approved through the IRB at Universidad Francisco Gavidia.

Table 1

Frequencies of Endorsed Traumatic Events

Traumatic event	Overall sample ^a (N = 1,296)			Male (n = 577)			Female (n = 716)			Children (n = 638)			Adolescents (n = 658)			χ^2
	n	%		n	%		n	%		n	%		n	%		
Serious accident	827	63.9		415	71.9		409	57.1		415	65.0		412	62.6		$\chi^2(1, N = 1,294) = 0.84$
Witnessing community violence	612	47.4		270	46.8		341	47.6		249	39.0		363	55.2		$\chi^2(1, N = 1,292) = 33.93^{***}$
Violent or sudden death of a loved one	511	39.5		214	37.1		295	41.2		249	39.0		262	39.8		$\chi^2(1, N = 1,292) = 2.33$
Frightening medical procedure	509	39.4		241	41.8		266	37.2		260	40.8		249	37.8		$\chi^2(1, N = 1,292) = 2.94$
Natural disaster	485	37.5		242	41.9		242	33.8		254	39.8		231	35.1		$\chi^2(1, N = 1,291) = 8.82^{**}$
Witnessing domestic violence	457	35.4		191	33.1		264	36.9		197	30.9		260	39.5		$\chi^2(1, N = 1,289) = 2.09$
Witnessing physical assault	324	25.0		161	27.9		160	22.3		138	21.6		186	28.3		$\chi^2(1, N = 1,291) = 5.16^*$
Physical abuse by a family member	322	24.9		171	29.6		149	20.8		152	23.8		170	25.8		$\chi^2(1, N = 1,289) = 13.43^{***}$
War/altercations between gangs	202	15.6		120	20.8		81	11.3		75	11.8		127	19.3		$\chi^2(1, N = 1,288) = 22.09^{***}$
Robbery by force, threat, or arms	132	10.2		67	11.6		65	9.1		38	6.0		94	14.3		$\chi^2(1, N = 1,293) = 2.24$
Physical abuse by a stranger	131	10.3		87	15.1		44	6.1		52	8.2		79	12.0		$\chi^2(1, N = 1,275) = 27.83^{***}$
Sexual abuse (inappropriate touching)	91	7.0		27	4.7		64	8.9		31	4.9		60	9.1		$\chi^2(1, N = 1,290) = 8.89^{**}$
Physical assault	59	4.6		36	6.2		22	3.1		23	3.6		36	5.5		$\chi^2(1, N = 1,290) = 7.59^{**}$
Rape (forced sexual relations)	31	2.4		11	1.9		20	2.8		12	1.9		19	2.9		$\chi^2(1, N = 1,293) = 1.07$

Note. For age analyses, the sample was divided into children (age range: 8–12 years) and adolescents (age range: 13–21 years).

^aThree students did not indicate their gender.

* $p < .05$.

** $p < .01$.

$p < .001$

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Table 2
Frequencies of Youth Falling Above the Clinical Cutoffs on Measures of Posttraumatic Stress Disorder (PTSD), Anxiety, and Depression

Variable	Overall sample (N = 1,296)		Male (n = 577)		Female (n = 716)		Children (n = 638)		Adolescents (n = 658)		χ^2
	n	%	n	%	n	%	n	%	n	%	
PTSD (CPSS-5) ^b	447	34.5	167	29.0	279	39.0	199	31.2	248	37.7	$\chi^2(1, N = 1,289) = 5.57^*$
Anxiety symptoms (RCADS-SV) ^c	112	8.6	39	6.8	73	10.2	31	4.9	81	12.3	$\chi^2(1, N = 1,286) = 14.59^{***}$ $\chi^2(1, N = 1,280) = 4.61^*$
Depressive symptoms (RCADS-SV)	113	8.7	33	5.7	80	11.2	26	4.1	87	13.2	$\chi^2(1, N = 1,283) = 11.75^{***}$ $\chi^2(1, N = 1,283) = 34.37^{***}$
Comorbid anxiety and depressive symptoms ^d	51	3.9	14	2.4	37	5.2	7	1.1	44	6.7	$\chi^2(1, N = 1,283) = 6.25^*$ $\chi^2(1, N = 1,283) = 26.95^{***}$
Comorbid PTSD, anxiety, and depressive symptoms ^d	49	3.8	13	2.3	36	5.0	7	1.1	42	6.4	$\chi^2(1, N = 1,291) = 6.74^{**}$ $\chi^2(1, N = 1,293) = 24.93^{***}$

Note. For age analyses, the sample was divided into children (age range: 8–12 years) and adolescents (age range: 13–21 years). CPSS-5 = Child PTSD Symptom Scale for DSM-5; RCADS-SV = Revised Child Anxiety and Depression Scale–Short Version.

^aThree students did not indicate their gender.

^bFor the CPSS-5, scores of 31 or higher are considered indicative of probable PTSD.

^cFor the RCADS-SV, T scores of 70 or higher are suggestive of clinically significant symptomatology.

^dComorbidity was determined by assessing whether participants fell above the clinical cutoff on more than one measure or subscale (i.e., above the clinical cutoff on the Anxiety and Depression subscales of the RCADS-SV or above the clinical cutoff on the CPSS-5 and both RCADS-SV subscales).

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3

Pearson and Point Biserial Correlations Between Symptomology and Trauma Exposure

Variable	1	2	3
1. CPSS-5			
2. RCADS Anxiety subscale	.63***		
3. RCADS Depression subscale	.66***	.71***	
4. Number of trauma types	.43***	.39***	.39***
5. Natural disaster	.06*	.07*	.05
6. Serious accident	.12***	.13***	.12***
7. Robbery	.17***	.15***	.19***
8. Physical abuse by family	.23***	.17***	.22***
9. Physical abuse by stranger	.16***	.15***	.17***
10. Witnessing domestic violence	.26***	.23***	.24***
11. Witnessing community violence	.23***	.22***	.21***
12. Sexual abuse	.21***	.21***	.19***
13. Rape	.15***	.12***	.10***
14. Traumatic loss	.20***	.16***	.13***
15. Physical assault	.16***	.12***	.12***
16. Witnessing physical assault	.21***	.15***	.16***
17. Frightening medical procedure	.27***	.23***	.24***
18. War between gangs	.14***	.11***	.14***

Note. Variables 5–18 are dichotomous, and correlations presented for these variables are point biserial. CPSS-5 = Child PTSD Symptom Scale for DSM-5; RCADS = Revised Child Anxiety and Depression Scale.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4
 Logistic Regression Predicting Clinically Elevated Posttraumatic Stress Disorder Symptoms

Predictor	B	SE	Wald statistic	OR	95% CI
Age	0.00	0.03	0.01	1.00	[0.95, 1.05]
Female sex	0.65	0.14	21.11	1.92***	[1.45, 2.53]
Natural disaster	0.07	0.14	0.25	1.07	[0.82, 1.40]
Serious accident	0.04	0.14	0.09	1.04	[0.79, 1.38]
Robbery by force, threat, or arms	0.45	0.22	4.08	1.57*	[1.01, 2.42]
Physical abuse by a family member	0.35	0.16	5.01	1.42*	[1.05, 1.94]
Physical abuse by stranger	0.32	0.22	2.06	1.37	[0.89, 2.12]
Witnessing domestic violence	0.53	0.14	13.79	1.70***	[1.29, 2.26]
Witnessing community violence	0.32	0.14	5.28	1.38*	[1.05, 1.82]
Sexual abuse	0.58	0.27	4.43	1.78*	[1.04, 3.04]
Rape	0.98	0.52	3.54	2.67	[0.96, 7.42]
Sudden or violent death of loved one	0.26	0.14	3.69	1.30	[1.00, 1.70]
Severe physical assault	0.51	0.33	2.39	1.67	[0.87, 3.21]
Witnessing severe physical assault	0.30	0.16	3.58	1.35	[0.99, 1.84]
Frightening medical procedure	0.83	0.14	38.00	2.30***	[1.77, 3.00]
War between gangs	0.48	0.18	6.64	1.61**	[1.12, 2.31]

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5

Logistic Regression Predicting Clinically Elevated Anxiety Symptoms

Predictor	B	SE	Wald statistic	OR	95% CI
Age	0.11	0.04	7.96	1.12 ^{**}	[1.04, 1.21]
Female sex	0.54	0.24	5.32	1.72 [*]	[1.09, 2.74]
Natural disaster	0.28	0.22	1.60	1.32	[0.86, 2.04]
Serious accident	0.21	0.25	0.69	1.23	[0.76, 2.01]
Robbery by force, threat, or arms	0.44	0.29	2.25	1.56	[0.87, 2.77]
Physical abuse by family member	0.13	0.24	0.27	1.14	[0.71, 1.83]
Physical abuse by stranger	0.46	0.30	2.24	1.58	[0.87, 2.86]
Witnessing domestic violence	0.32	0.23	1.90	1.38	[0.87, 2.17]
Witnessing community violence	0.52	0.24	4.63	1.69 [*]	[1.05, 2.71]
Sexual abuse	1.01	0.33	9.16	2.73 ^{**}	[1.43, 5.24]
Rape	0.30	0.53	0.31	1.34	[0.47, 3.82]
Sudden or violent death of loved one	0.38	0.22	2.91	1.46	[0.95, 2.26]
Severe physical assault	-0.40	0.44	0.86	0.67	[0.28, 1.57]
Witnessing severe physical assault	0.23	0.24	0.89	1.26	[0.78, 2.02]
Frightening medical procedure	0.79	0.22	12.38	2.20 ^{***}	[1.42, 3.41]
War between gangs	0.05	0.28	0.03	1.05	[0.61, 1.81]

* $p < .05$.** $p < .01$.*** $p < .001$.

Table 6

Logistic Regression Predicting Clinically Elevated Depressive Symptoms

Predictor	B	SE	Wald statistic	OR	95% CI
Age	0.17	0.04	16.72	1.18 ^{***}	[1.09, 1.28]
Female sex	1.12	0.26	18.95	3.05 ^{***}	[1.85, 5.04]
Natural disaster	0.09	0.23	0.15	1.09	[0.70, 1.71]
Serious accident	0.47	0.26	3.23	1.60	[0.96, 2.67]
Robbery by force, threat, or arms	0.71	0.28	6.24	2.03 [*]	[1.17, 3.54]
Physical abuse by family member	0.30	0.24	1.54	1.35	[0.84, 2.18]
Physical abuse by stranger	0.88	0.29	8.99	2.41 ^{**}	[1.36, 4.28]
Witnessing domestic violence	0.50	0.24	4.36	1.64 [*]	[1.03, 2.61]
Witnessing community violence	0.17	0.24	0.52	1.19	[0.74, 1.91]
Sexual abuse	0.83	0.34	6.00	2.30 [*]	[1.18, 4.48]
Rape	-0.66	0.59	1.23	0.52	[0.16, 1.66]
Sudden or violent death of loved one	-0.05	0.23	0.05	0.95	[0.61, 1.48]
Severe physical assault	-0.21	0.43	0.25	0.81	[0.35, 1.87]
Witnessing severe physical assault	0.25	0.25	1.01	1.28	[0.79, 2.09]
Frightening medical procedure	0.73	0.23	10.25	2.07 ^{**}	[1.33, 3.23]
War between gangs	0.49	0.27	3.44	1.64	[0.97, 2.75]

* $p < .05$.

** $p < .01$.

*** $p < .001$.