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Multiple Traumas, Postelection Violence, and Posttraumatic Stress Among Impoverished Kenyan Youth

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Abstract

Research on posttraumatic stress disorder (PTSD) among youth has focused on specific subgroups from developed countries. Most of the world's youth and war-like violence, however, is concentrated in developing countries, yet there is limited mental health data within affected countries. This study focused on a random community-based sample of 552 impoverished youth ages 6–18 within an informal settlement in Nairobi, Kenya, which experienced war-like violence for a month following the contested presidential election of 2007. Six months after the violence ended, 99 (18%) had PTSD according to the UCLA PTSD Reaction Index (Steinberg, Brymer, Decker, & Pynoos, 2004), and an additional 18 (3%) were found to have partial PTSD due to high overall scores. Kenyan psychologists conducted diagnostic interviews and found the positive predictive value of the assessment tool to be 72% in this sample; the confirmed prevalence was 12%. Similar to other studies worldwide, Criterion C (avoidance) was the limiting factor for diagnosing PTSD according to the *DSM-IV-TR*, and parent–child agreement was at best fair. The number of traumatic experiences was strongly associated with PTSD outcomes. Differences due to age or sex were not found. The findings indicate the need for universal mental health services for trauma-exposed youth and their families in the impoverished informal settlements of Nairobi, Kenya.

Posttraumatic stress disorder (PTSD) among school-age youth can result from witnessing or experiencing war, disasters, sexual abuse, torture, motor vehicle accidents, and other traumatic events. Studies of traumatized school-age youth have documented a wide prevalence range for PTSD using the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000) criteria ranging between 3–52% (Scheeringa, Zeanah, & Cohen, 2010). Notably, these estimates come from developed countries, and there is little information on rates of PTSD in developing countries, such as those in sub-Saharan Africa, where many youth suffer traumatic events. This study focused on war-like violence in sub-Saharan Africa, and youth witnessing or experiencing this violence and suffering from PTSD who often remain undiagnosed and untreated. Studies suggest that PTSD among youth does not remit spontaneously (Pine & Cohen, 2002) and symptoms do not reduce quickly over time (McFarlane, 1987; Meiser-

Stedman, Smith, Glucksman, Yule, & Dalgleish, 2008; Scheeringa, Zeanah, Myers, & Putnam, 2005; Shaw, Applegate, & Schorr, 1996). Childhood and adolescent PTSD, if left untreated, can lead to chronic mental disorders and other adverse mental health outcomes in adulthood (Sack, Clarke, & Seeley, 1995). There is no reason to presume that this is not also the case in developing countries.

Although it is well known that most traumatized youth do not develop PTSD, experiencing multiple traumatic events has been shown to be associated with PTSD (Breslau, Wilcox, Storr, Lucia, & Anthony, 2004; Felitti et al., 1998; Thabet, Abed, & Vostanis, 2004). In addition to assessing the number of traumatic events, knowing the relationship between demographic variables and PTSD among youth in a developing country context may help focus the limited mental health resources on those most affected. Epidemiologic studies have consistently reported that girls are significantly more likely than are boys to develop PTSD (Breslau, Davis, Andreski, & Peterson, 1991; Furr, Comer, Edmunds, & Kendall, 2010; Garrison et al., 1995; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Neugebauer et al., 2009). Although age differences in the specific symptoms experienced have been documented (Pfefferbaum, 1997), there remains a debate of whether age is a risk or a protective factor (Keppel-Benson & Ollendick, 1993; Yule et al., 2000), as highlighted by mixed results in the literature and insufficient data to draw conclusions (Galea, Nandi, & Vlahov, 2005). One of the objectives of this study of youth within a developing country context was to test the hypothesis that girls and youth with a higher number of reported traumatic experiences will be more likely to have PTSD. We also investigated relationships between PTSD and age across the full range of school-age youth as well as within children and adolescents separately.

Studies of youth PTSD in developing countries in sub-Saharan Africa, and particularly East Africa, are few. In Kenya specifically, youth mental problems following sudden traumatic events such as the U.S. embassy bombing (Ndeti et al., 2005; Pfefferbaum et al., 2003, 2006) are documented, but there is less known about larger population estimates of PTSD. One study of Kenyan high school students sampled from 16 schools across lower-, middle-, and upper-class neighborhoods of Nairobi, estimated a 50% prevalence of PTSD (Ndeti et al., 2007). Studies from neighboring East African countries also reported a very high prevalence of PTSD potentially due to their focus on highly traumatized samples such as child soldiers (Derluyn, Broekaert, Schuyten, & De Temmerman, 2004; Klasen, Oettingen, Daniels, & Adam, 2010), and child laborers (Fekadu, Alem, & Hagglof, 2006). One larger population-based sample of youth from all regions and socioeconomic classes following the 1994 Rwandan genocide reported over 50% of youth having probable PTSD (Neugebauer, et al., 2009). It is not known whether this high prevalence of PTSD is present among Kenyan youth experiencing war-like violence. Another objective was to help fill this gap in knowledge by estimating the prevalence of PTSD from a randomly selected, community-based, sample of youth from a slum (informal) settlement in Nairobi, Kenya 6 months after a period of war-like violence in the community.

Due to the disputed presidential election in Kenya in December 2007, many youth across Kenya witnessed or experienced sudden war-like violence within their community. In Nairobi, postelection violence was concentrated in some, but not all, of the informal settlements-home to the most impoverished Kenyans. The dispute divided the major ethnic tribal groups, who were neighbors within the settlements. The largest informal settlement in Nairobi experienced very high levels of violence because the main opponent was the Member of Parliament (MP) for the region of Nairobi that included this settlement. In addition, the incumbent President and this MP were from different ethnic tribal groups. There were widespread reports of violence within this settlement lasting for over a month including burning stores and homes, forced circumcision, rape, and murder (Kenya National

Commission on Human Rights, 2008). Although it is estimated that the informal settlements are home to 60% of Nairobi's population, the mental health service needs of this group remains unknown.

Method

Participants and Procedures

Participants in this study were randomly sampled from a demographic surveillance system database, maintained by the Centers for Disease Control and Prevention (CDC) Global Disease Detection unit, within 2 of the 10 villages in the largest informal settlement in Nairobi, Kenya. First, houses with at least one child (6–11 years old) and one adolescent (12–18 years old) were randomly selected. Next, one child and one adolescent were randomly selected from all youth in each selected house in an attempt to balance the financial constraints on this study with the desire to obtain a large enough random sample to be representative of youth from this informal settlement. Selection lists for each housing cluster included the house number, the full name, age, and sex of the randomly selected child and adolescent for identification purposes. The final number of households assessed was 294 (588 youth), yet it was later determined that 36 of the assessed youth were not on the original selection lists; therefore, only 552 youth were included in our final analyses to ensure the sample was randomly selected (Figure 1).

Ethical and scientific research approval was obtained through the Kenyatta National Hospital/University of Nairobi Institutional Review Board, the Ministry of Science and Technology, and the CDC in Kenya. Signed informed consent/assent was obtained from parents and youth. Participants were given contact information for the ethics board, and no adverse events were reported.

Six months after the end of the postelection violence in Kenya, during the school break in August 2008, interviewers trained by the Africa Mental Health Foundation conducted in-home assessments accompanied by a community guide. Each interviewer was given a unique selection list within a CDC housing cluster and instructed to only interview those youth on the lists, not siblings or neighbors. Once a family on the list was located, every attempt was made to assess the selected members of the household, such as rescheduling for a different day or time. Subjective reports from interviewers indicated the parental refusal rate to be low, but the actual rate was not reported due to the lack of documentation from interviewers as discussed further in the limitations section. The interviewer read each question aloud while the youth marked their self-report forms and the parent marked a separate form about their child without sharing answers. The assessments were completed in a single visit to the home in less than 1 hour, and a phone number was obtained during the visit for follow-up purposes.

Measures

Assessment of PTSD the University of California at Los Angeles (UCLA) PTSD Reaction Index (Steinberg, Brymer, Decker, & Pynoos, 2004) was used to assess youth PTSD self-reported by the child and adolescent and the parent's report about the child as well. This assessment was designed to follow the *DSM-IV-TR* criteria of experiencing a traumatic event (Criterion A) and reporting symptoms related to reexperiencing/intrusive thoughts (Criterion B), avoidance (Criterion C), and hyperarousal (Criterion D). It was reported to have excellent internal consistency and strong convergent validity (Balaban et al., 2005; Steinberg et al., 2004) and had been used with youth from sub-Saharan Africa (Ellis, Lhewa, Charney, & Cabral, 2006; Ellis et al., 2010; Ellis, MacDonald, Lincoln, & Cabral, 2008; Huemer et al., 2011). Ellis and colleagues (2006) reported that the UCLA PTSD Reaction

Index was a reliable and valid screening tool for PTSD symptoms among adolescent refugees from Somalia (a neighboring country of Kenya). In our sample, the coefficient α s for children and adolescents on Criterion B were .74 and .73, Criterion C were .67 and .68, and Criterion D were .67 and .66, respectively.

The assessment was adapted by replacing the traumatic event about being in a hurricane (not a relevant experience for this population) with “During the post-election violence, experiencing anything scary or violent.” The assessment was translated into Kiswahili, back translated into English, and discrepancies were corrected by consensus. A *DSM-IV-TR* diagnosis of PTSD was based on meeting Criteria A–D as outlined by the UCLA PTSD Reaction Index manual. Symptoms for criteria B–D were considered present if the youth indicated that they had the problem either 3 = *much of the time* or 4 = *most of the time* during the past month. Our decision to exclude 2 = *some of the time* was agreed upon through discussions with mental health clinicians at the Africa Mental Health Foundation treating traumatized youth and resulted in a more conservative estimate of the *DSM-IV-TR* prevalence of PTSD.

In an attempt to ensure we did not miss the children who were suffering greatly yet did not meet *DSM-IV-TR* criteria, we created an expanded group with serious PTSD symptoms by combining those that met *DSM-IV-TR* criteria with youth with partial PTSD who met Criterion A and scored above a total score of 38 on Criteria B–D. This expanded group came voluntarily to a local school within walking distance of their homes to meet individually with a Kenyan with a master’s degree in clinical or counseling psychology. None of the youth who came rejected the clinical interview. These psychologists were trained in the identification of PTSD among youth using a structured interview from the portion of the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995) that explored Criteria A, B, C, and D of a *DSM-IV-TR* diagnosis and were supervised by clinicians at the Africa Mental Health Foundation. This method of confirmation gave the proportion of youth with PTSD out of those screening positive (positive predictive value).

Statistical Analyses

We explored the PTSD score and the *DSM-IV-TR* symptom criteria (A–D) separately and together. We calculated different PTSD prevalence estimates based on the *DSM-IV-TR* criteria alone, our expanded group including *DSM-IV-TR* and partial PTSD, and after confirmation by a Kenyan psychologist. We used linear mixed models for our continuous PTSD score outcome and generalized linear mixed models for the four separate binary *DSM-IV-TR* criteria and our binary outcomes. We explored their associations with number of traumatic events, sex, and age modeling the correlated error terms that resulted from our nonindependent observations of siblings. Because there were no siblings within the separated child and adolescent datasets, we used multiple linear and logistic regressions to explore the same relationships for children and adolescents separately. Finally, we measured the agreement between the parent’s report for the child and the child’s self-reported PTSD score (Pearson’s correlation) and categories (Cohen’s κ interrater agreement statistic) interpreted according to convention (Landis & Koch, 1977). There were no missing data for number of traumatic events, sex, or age. The 1–3% missing data on any individual symptom for Criteria B–D were replaced with zeros (not having the symptom). Stata SE 9.1 (StataCorp, 2005) statistical software was used for all analyses, and p values $<.05$ were considered significant.

Results

All of the 552 youth lived in the impoverished informal settlement, 52% were female with a mean age of 11 years (range 6–18 years), and 12% reported no lifetime traumatic events,

whereas 47% endorsed more than five traumatic events. In terms of the one event that “bothers [them] the most now,” children reported seeing a dead body (22%), followed by seeing someone beaten or shot (20%), being in a place where a war was going on (17%), general trauma during postelection violence (17%), and being in a fire or flood (8%). The remaining eight categories of traumatic events were endorsed by only 1% or 2% of the children including four children reporting sexual abuse. Adolescents’ reports of their most disturbing traumatic events were very similar and almost in the same order as those reported by children with two adolescents reporting sexual abuse as their worst trauma. Among the children and adolescents with *DSM-IV-TR* or partial PTSD (quantified in the following section), the three categories of traumatic events that were endorsed by over 20% of both children and adolescents were seeing someone beaten or shot, seeing a dead body, and being in a place where a war was going on; 79% of these youth reported this traumatic event occurred during the month of postelection violence.

The proportion of children and adolescents meeting *DSM-IV-TR* Criterion A was 87% and 84%, respectively. Criterion C had the lowest proportion of youth meeting the *DSM-IV-TR* threshold (Table 1). Interestingly, there were no statistically significant age or sex differences in meeting the *DSM-IV-TR* thresholds for any criterion in the mixed models or when children and adolescents were analyzed independently.

Prevalence of PTSD

Eighteen percent of 552 youth screened positive for PTSD based on *DSM-IV-TR* diagnostic criteria, and an additional 18 youth had scores above 38, indicating partial PTSD (Table 2). Out of the 117 youth with *DSM-IV-TR* or partial PTSD, 85 (73%) attended their meeting with a psychologist to validate a PTSD diagnosis (Figure 1). The psychologists diagnosed 61 out of these 85 youth with PTSD (positive predictive value = 72%). Assuming that all 32 no-shows had PTSD, the maximum prevalence of PTSD in our sample would be 17% (93/552), or assuming the opposite, the minimum would be 11% (61/552). Excluding the 32 no-shows from the denominator resulted in a 12% prevalence of PTSD (Table 2). There were no age or sex differences in mean PTSD scores, yet as the number of traumatic events increased by one, the mean PTSD score increased by 2.6 points ($p < .001$) with age and sex in the equation. Although Table 2 shows the percent prevalence of PTSD slightly higher among adolescents, our mixed model regression analyses showed no statistically significant effect of age group or sex on PTSD prevalence for any of our categories, with number of traumas in the model. As the number of traumatic events increased by one, however, the odds of *DSM-IV-TR* PTSD was 45% higher, *DSM-IV-TR* or partial PTSD was 57% higher, and clinician-confirmed PTSD was 48% higher, with age group and sex in the model (p values $< .001$). Similar results were found in our multiple regression analyses within children and adolescents separately.

Multiple Informant Comparisons

The correlation between the parent’s reported PTSD score for their child and the child’s self-reported PTSD score was .50. Parent–child agreement for a *DSM-IV-TR* diagnosis of PTSD was slight (Cohen’s $\kappa = .18$). Specifically, there were 12 pairs concordant for the presence of *DSM-IV-TR* PTSD and 209 concordant for the absence of *DSM-IV-TR* PTSD. Parent–child agreement was fair for our *DSM-IV-TR* or partial PTSD diagnosis (Cohen’s $\kappa = .29$). Specifically, there were 22 pairs concordant for presence and 195 concordant for absence.

Discussion

Community and war-like violence occurs in even the most politically stable countries in sub-Saharan Africa, as was the case following the disputed Kenyan presidential election in December 2007. In addition to PTSD prevalence estimates, this research study is the first to document the pattern of posttraumatic stress symptom endorsement among a representative sample of impoverished school-age youth from the largest informal settlement in Nairobi. Exposure to multiple traumas was very common in our sample of impoverished Kenyan youth, and as anticipated, the majority did not develop PTSD. Six months after the violence ended, our estimated prevalence of PTSD ranged between 11–17% depending on the outcome for youths who did not receive clinical interviews. Our finding that PTSD score significantly increased as the number of traumatic events increased is in line with the literature, and the fact that nearly half reported more than five traumatic events was an indicator that many of these youth suffered repeatedly. Although we did not hypothesize finding a lack of age and sex differences, other studies found neither age differences (Green et al., 1991; Neugebauer et al., 2009; Schuster et al., 2001) nor sex differences (Catani, Jacob, Schauer, Kohila, & Neuner, 2008; Klasen et al., 2010; Lengua, Long, & Meltzoff, 2006). It is possible that we did not find sex differences due to our study's low reporting of sexual trauma, for girls are more often victims of sexual violence. We are uncertain about the low reporting of sexual trauma and it is a limitation of this study. In terms of age, we studied the full school-age range and still found no associations, yet a study with an even broader age range might be better suited to test the influence of developmental level on the presentation of PTSD (Pfefferbaum, 1997). It is likely that developmental differences are more evident between preschool and school-age youth (Green et al., 1991; Scheeringa et al., 2010), but perhaps just not as much within school-age youth themselves. A recent study reported that preschool children within the same informal settlement exhibited increased aggression and decreased prosocial behavior following the postelection violence (Kithakye, Morris, Terranova, & Myers, 2010). Our studies together document the effects of war-like violence on urban, impoverished, Kenyan youth and support the dire need for mental health services to be integrated into primary care within informal settlements in Nairobi.

This study had several limitations. Due to the transient and unorganized nature of informal settlements, it was not uncommon for house numbers to be out of order, painted over, or for families to have moved. This constraint on data collection was a limitation to our study design and was most evident in our interviewer's lack of documentation differentiating between a missing house number or a family that could not be located, the unavailability of a randomly sampled youth, or a parental refusal. Despite this limitation, subjective report from interviewers indicated that there were few parental refusals because these houses were being visited every 2 weeks for CDC disease surveillance; therefore, the occupants were comfortable with research studies. An additional positive influence on community entry may have been our use of CDC community guides who were known community members. Another constraint of this study was due to limited financial resources. This study was limited in its measure of reliability of the PTSD assessment beyond internal consistencies and limited in its measure of validity beyond positive predictive value because it was not possible to have the psychologists interview all youth to confirm the existence or lack of PTSD. Our use of a Western assessment of PTSD only within a developing country context (an etic approach) is another limitation, rather than also exploring the meanings of the constructs underlying these mental problems within the specific society (an emic approach). Future research would benefit from the addition of an emic approach to determine if there were any culturally specific descriptions of anxiety problems to better identify cases. Culturally based decisions that were made by our team of Kenyan mental health professionals include only counting a PTSD symptom scoring a 3 or 4, whereas the standard UCLA assessment includes a score of 2 and replacing the hurricane traumatic experience

with a postelection violence traumatic experience. These may be considered limitations, as they are deviations from the standard UCLA assessment. We attempted to address other potential cultural differences in both the understanding of assessment questions as well as the presentation of PTSD symptoms by adding two components to our study design: verification of the UCLA PTSD Reaction Index *DSM-IV-TR* or partial PTSD diagnosis by a Kenyan psychologist and using a second informant for the child assessment. The majority of youth identified by the assessment tool was confirmed to have PTSD by a Kenyan psychologist, indicating the assessment had an acceptable positive predictive value. Also, we found a sizeable parent–child discrepancy in reporting posttraumatic stress symptoms, and in fact, low parent–child agreement in diagnosing PTSD was reported by studies from more developed countries too (Dyb, Holen, Braenne, Indredavik, & Aarseth, 2003; Meiser-Stedman, Smith, Glucksman, Yule, & Dalgleish, 2007; Schreier, Ladakakos, Morabito, Chapman, & Knudson, 2005; Vogel & Vernberg, 1993). Despite the aforementioned limitations, other similarities between our results and those from more developed countries relate to the pattern of *DSM-IV-TR* criteria endorsement, which may have direct implications for the upcoming fifth edition of the *DSM*.

Recently, literature on child and adolescent PTSD has focused on making recommendations for the fifth edition of the *DSM* (Pynoos et al., 2009; Scheeringa et al., 2010; Zeanah, 2010). In this global atmosphere, findings on the similarities and differences of mental health problems such as PTSD should be incorporated into the knowledge base. One of the contributions of these data is in our breakdown of the percentage of Kenyan youth meeting threshold for each *DSM-IV-TR* criterion. A consensus recently emerged and recommendations were made for *DSM-V* to incorporate a developmental perspective for the diagnosis of PTSD that focused on youth manifestations of symptomatology. One of the recommendations concerned Criterion C (arousal). Although the evidence clearly supported lowering Criterion C from needing three symptoms down to needing only two or one symptom for preschool children, the evidence was more limited for school-age children (Scheeringa et al., 2010). In our study of school-age Kenyan youth, we found that Criterion C was the least likely to be met for both children and adolescents, therefore acting as the threshold for the PTSD diagnosis among youth. In a recent review article, 7 out of 10 studies using *DSM-IV-TR* criteria also indicated the proportion meeting Criterion C to be lower than the proportions meeting Criterion B or D (Zeanah et al., 2010). Therefore, our finding that Criterion C acted as a threshold for making the PTSD diagnosis among Kenyan youth was consistent with the literature from other countries. Our proportion of Kenyan youth endorsing one and two Criterion C symptoms were comparable to proportions presented in other studies, thus providing additional evidence that the current *DSM-IV-TR* Criterion C may be too stringent for both children and adolescents within a developing country context as well.

These data are representative of Kenyan school-age youth in the largest informal settlement in Nairobi and provide much needed prevalence estimates on the mental health impact of the postelection violence. Many youth continued to suffer from PTSD symptoms 6 months after the postelection violence ended, and those who reported multiple traumatic events were more likely to have PTSD. Although the pattern of posttraumatic stress symptom presentation and parent–child disagreement seen in Kenya was similar to what has been reported from developed countries, our data showed no sex differences. Our lack of age differences suggested that developmental factors in the presentation of PTSD were not as evident within school-age youth. Overall, these results call for universal mental health care for traumatized, school-aged girls and boys within informal settlements in Nairobi, Kenya.

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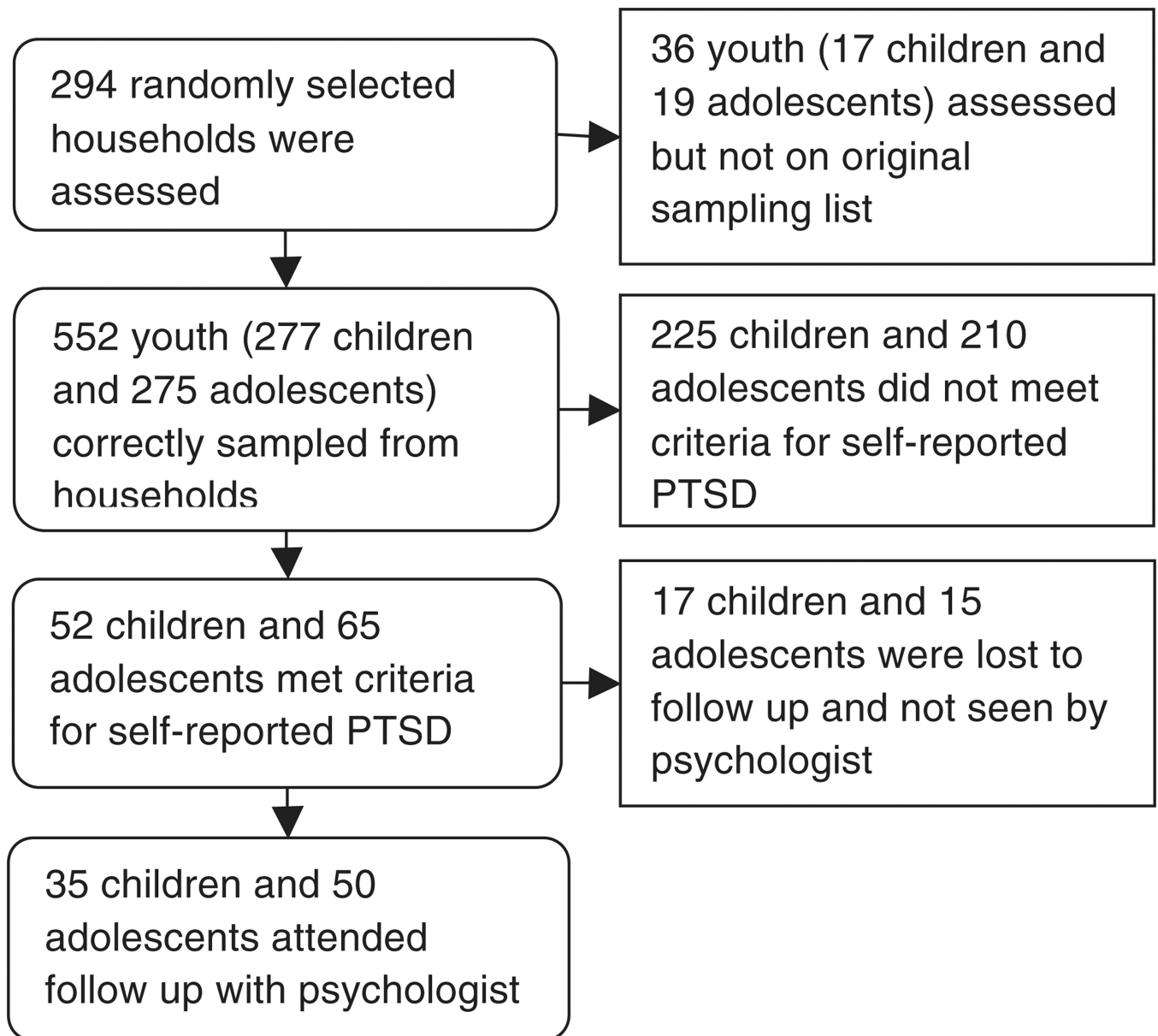


Figure 1. Flow chart depicting sample collection. PTSD = Posttraumatic stress disorder.

Table 1

Average UCLA PTSD Reaction Index Score and Proportion Meeting Various Criterion B, C, and D Symptom Thresholds

Group	n	M	SD	UCLA PTSD-RI				
				B: 1 symptom	C: 3 symptoms	C: 2 symptoms	C: 1 symptom	D: 2 symptoms
Total	552	22.8	15.5	66%	25%	43%	65%	52%
Children								
Total	277	22.9	15.2	65%	21%	39%	65%	52%
Males	136	23.1	14.8	65%	21%	42%	65%	52%
Females	141	22.8	15.7	65%	21%	37%	64%	53%
Adolescents								
Total	275	22.6	15.8	67%	28%	46%	64%	52%
Males	128	21.9	15.9	67%	28%	48%	68%	52%
Females	147	23.1	15.8	66%	27%	44%	61%	53%

Note. UCLA PTSD-RI = UCLA PTSD Reaction Index; PTSD = posttraumatic stress disorder.

Table 2
 Various Prevalences of PTSD as Measured by the UCLA PTSD Reaction Index

	<u>DSM-IV-TR</u>		<u>DSM-IV-TR or Partial</u>		<u>Clinician Confirmed PTSD^a</u>	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
All youth	99 (18)	453 (82)	117 (21)	435 (79)	61 (12)	459 (88)
Children	45 (16)	232 (84)	52 (19)	225 (81)	24 (9)	236 (91)
Males	22 (16)	114 (84)	24 (18)	112 (82)	13 (10)	118 (90)
Females	23 (16)	118 (84)	28 (20)	113 (80)	11 (9)	118 (91)
Adolescents	54 (20)	221 (80)	65 (24)	210 (76)	37 (14)	223 (86)
Males	24 (19)	104 (81)	27 (21)	101 (79)	17 (14)	106 (86)
Females	30 (20)	117 (80)	38 (26)	109 (74)	20 (15)	117 (85)

Note. *N* = 552. UCLA PTSD-RI = UCLA PTSD Reaction Index; PTSD = posttraumatic stress disorder. *DSM-IV-TR* = *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.)

^aSample size = 520 because 32 of 117 youth were lost to followup.