

# Echoes of the past: prevalence and correlates of PTSD among formerly abducted youths in northern Uganda: findings from the WAYS study

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## ABSTRACT

**Background** Post-traumatic stress disorder (PTSD) has considerable and persistent effects on survivors of war, particularly in postconflict areas. Yet, evidence on what keeps survivors on the path of PTSD remains scarce.

**Aims** The current study aimed to assess the prevalence and correlates of PTSD symptoms among the war-affected population in northern Uganda.

**Methods** Data from 476 war-affected youths (aged 20–27 years) who had participated in a longitudinal cohort study were analysed to describe the enduring associations of background and postwar environmental risk factors with PTSD symptoms. The Impact of Event Scale-Revised was used to evaluate symptoms of PTSD. Descriptive statistics were used to compute background and postwar environmental correlates. Binary logistic regression analyses were fitted to assess the magnitude of the effects of the correlates on PTSD symptoms.

**Results** Background and postwar environmental factors (eg, sexual abuse and injury in captivity) were significantly associated with PTSD symptoms. Postwar environmental factors associated with PTSD symptoms included postwar hardships, stigma/discrimination, chronic illness, community relations, family acceptance and general functioning, among others. The odds ratios (ORs) for postwar hardships were 2.41 (95% confidence interval (CI): 1.63 to 3.56) and 2.90 (95% CI: 2.03 to 4.14) for high and severe PTSD, respectively. For stigma/discrimination, compared with higher scores, the ORs were 3.38 (95% CI: 2.22 to 5.17) and 4.12 (95% CI: 2.69 to 6.30) for high and severe PTSD symptoms, respectively.

**Conclusions** Background and postwar environmental stressors exacerbate the severity of PTSD symptoms in survivors of war and should form the basis for interventions to alleviate the toxic effects of war on survivors.

## INTRODUCTION

In the aftermath of political and violent conflicts in sub-Saharan Africa, post-traumatic stress disorder (PTSD) is a common and widely recognised mental health problem<sup>1 2</sup> that has even transformed the local discourse of suffering into a psychological one of 'trauma'.<sup>3</sup> The Diagnostic and Statistical

### WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The prevalence of post-traumatic stress disorder (PTSD) in the war-affected population is widely recognised.

### WHAT THIS STUDY ADDS

⇒ Background characteristics (eg, sexual abuse in captivity, duration in captivity and injuries while in captivity) and postwar environmental factors (eg, postwar hardships, stigma/discrimination, community relations, family acceptance and functioning) may be possible clinical factors that sustain survivors of violent conflicts on the path of PTSD.

### HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Prevention and intervention programmes for survivors may benefit from incorporating background and postwar environmental factors to reduce PTSD symptoms.  
 ⇒ Tailored psychoeducation and self-help programmes may have the potential to reduce PTSD symptoms in survivors of violent conflicts.  
 ⇒ Interpersonal and narrative exposure therapies may help survivors come out of or live positively with PTSD symptoms.

Manual of Mental Disorders, 5th Edition (DSM-5) criteria for PTSD include direct or indirect exposures to a traumatic event, followed by symptoms in four categories: intrusion, avoidance, negative changes in thoughts and mood, and changes in arousal and reactivity.<sup>4</sup> These symptoms often impact the lives of survivors and last for a month or longer.<sup>4</sup> After decades of violent conflicts in northern Uganda, many studies have recognised PTSD as a major postwar public health problem.<sup>1 2</sup> Despite this recognition, studies that shed light on the factors that sustain survivors of war on the path of PTSD are scarce. Yet, knowledge of these factors may inform interventions to alleviate the



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noxious effects of PTSD, ease functional impairment, improve psychosocial outcomes and quality of life for survivors, and help define pathways of PTSD experience in survivors of war.

Although PTSD rates vary significantly in many African countries, it is generally recognised that the rates are generally high. For example, in the ethnic clashes in Kenya following a disputed election in 2007, the PTSD prevalence rate among internally displaced Kenyans was 80.2% among heads of households.<sup>5</sup> Among South Sudanese refugees in the west Nile region of Uganda, 31.6% of the male and 40.1% of the female refugees met the criteria for PTSD diagnosis. Among survivors of the 1994 genocide in Rwanda, 24.8% met the symptom criteria for PTSD diagnosis 10 years after the war.<sup>6</sup>

In northern Uganda, a protracted guerrilla decimated the region for two decades (1986–2006) of war.<sup>7</sup> The civilian population was caught between the Lord's Resistance Army (LRA) on one side and the government troops on the other. As often with modern guerrilla war, the communities comprised the battlefields, and the victims were mainly unarmed civilians. Besides, it is estimated that 30 000 children were abducted and forced to participate in the war as fighters, human shields, porters and sex slaves.<sup>8</sup> For example, a previous study found that about 40% of abductees participated in killing, injuring or mutilating civilians.<sup>1</sup> Furthermore, about 30% of the formerly abducted children were girls who were used as childminders for LRA commanders, and others were forcefully married to LRA commanders and soldiers.<sup>9 10</sup> Many of the girls returned from captivity with children born out of sexual servitude to face stigma and discrimination in the communities.<sup>11 12</sup> Other abductees were tortured and/or witnessed horrendous violence and injuries or cared for those with severe injuries while in captivity.<sup>9 13</sup> Survivors of the violent conflict are now living in the same communities as their former tormentors and children born in captivity.<sup>14</sup> Many survivors also live in abject poverty with numerous other environmental stressors such as stigma/discrimination, personal vendetta while living together with former tormentors<sup>8 10 14</sup> and a postwar environment fraught with numerous risk factors for PTSD.

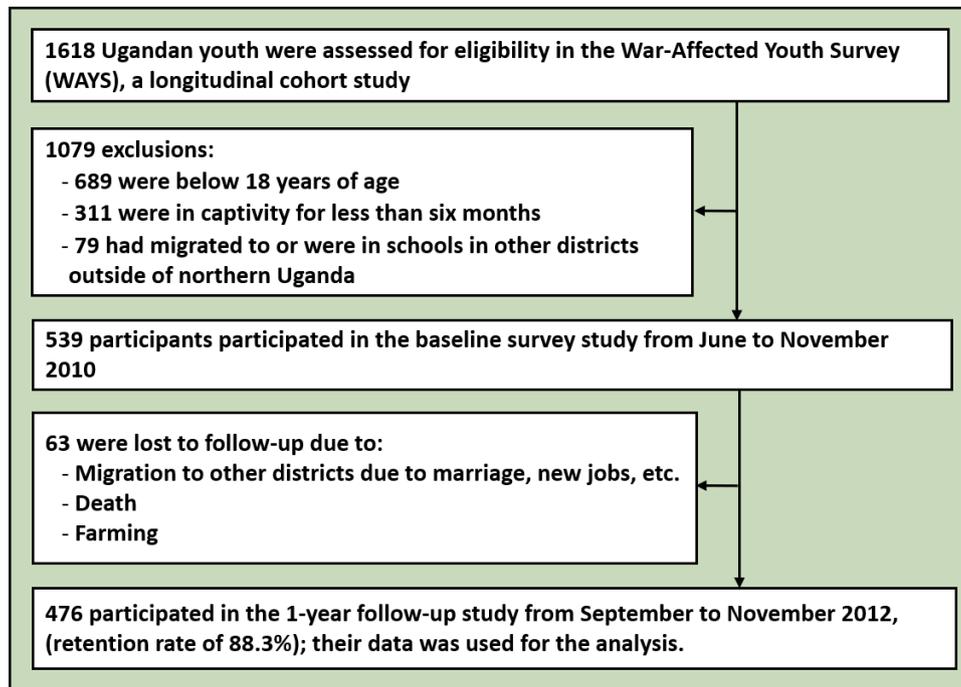
Systematic reviews on the prevalence of PTSD in sub-Saharan Africa, including Uganda, have reported varying results. In northern Uganda, one study reported a PTSD prevalence rate as high as 90%; others reported rates of 37%<sup>15</sup> while another reported 30%.<sup>2</sup> These disparities in findings may be a result of different instruments used to assess PTSD (eg, the Impact of Event Scale-Revised (IES-R) and post-traumatic checklist (PCL)), study designs, sample size and whether the data were collected during or after the violent conflicts.<sup>1 2</sup> For example, data collected during the war tended to report a higher prevalence of PTSD.<sup>10</sup> Another study following the war in the Balkans found varying degrees of mental health problems in different subpopulations in the aftermath of the war.<sup>13</sup> For example, old age, female sex, traumatic experiences and unemployment were associated with increased mood

and anxiety disorders while being male and being without a spouse were linked to substance use disorders.<sup>13</sup> Alternatively, postwar difficulties, such as poor adjustment in the aftermath of war, unemployment, guilt, shame, discrimination, feelings of disempowerment, poor community participation (broken citizenship), a distorted construction of their moral agency and experiencing numerous other stressors,<sup>16 17</sup> may all contribute to the continued PTSD symptomatology or may be consequences of PTSD. Moreover, previous studies have associated feelings of guilt and low social support (eg, family acceptance and community relations) with an increased risk of developing PTSD symptoms in postdisaster settings.<sup>18</sup> All these factors may contribute to increased PTSD symptomatology in survivors of war.

Furthermore, previous studies on the incidents of PTSD in war-affected populations in low-resource settings were faced with numerous limitations. First, most of the studies were conducted during the war, leading to possible contamination.<sup>10 18</sup> Second, most of the studies had small sample sizes. Lastly, the samples were sometimes not directly involved in the war, while others were directly involved. All these limitations may be possible explanations for the varying results of studies on PTSD and its risk factors in northern Uganda. Studying the risk factors and correlates of PTSD symptoms in survivors directly involved in the war is important for many reasons. First, many of the survivors live with numerous war scars: injuries sustained while in captivity, a history of rape and chronic illnesses.<sup>9</sup> Second, PTSD has been associated with reduced quality of life and compromised growth, and is linked to other mental health problems (depression, anxiety, etc) and physical health problems such as angina, arrhythmia, hypertension and sleep disorders.<sup>19</sup> Consequently, survivors' optimal functioning is limited and postwar recovery is impeded. To develop interventions to improve functioning, quality of life and physical health, studying the prevalence, background and postwar environmental correlates of PTSD symptomatology in war survivors is important.

### The present study

In this study, we used data from the War-Affected Youth Survey study (the WAYS study), a longitudinal cohort study of the trajectory of mental health problems in war-affected youths in northern Uganda that started in 2010. A detailed cohort profile is described in a different publication.<sup>20</sup> The current study used data from both T1 (collected from June to November 2010) and T2 (collected from September to November 2012). The present study aimed (1) to assess the prevalence of PTSD symptoms among the war-affected population in northern Uganda, and (2) to evaluate the background of survivors (eg, duration in captivity, gender, marital status, history of sexual abuse, injury while in captivity, postwar chronic illness) and postwar environmental correlates of PTSD symptoms such as postwar hardships, stigma/discrimination, community relations, family acceptance,



**Figure 1** Flowchart of study enrolment.

general functioning and prosocial behaviours in formerly abducted youths in northern Uganda.

## METHOD

### Participants and design

A detailed cohort profile has been published elsewhere.<sup>20</sup> The sample in this study consisted of formerly abducted youths drawn from the districts of northern Uganda. UNICEF, a United Nations agency responsible for providing humanitarian and developmental aid to children, had compiled a list of the youths. The UNICEF list was used to draw study participants from various districts of northern Uganda who met the study's participation criteria using a cluster sampling strategy. The inclusion criteria included (a) a history of abduction, (b) having lived in rebel captivity for at least 6 months, and (c) an age range between 18 and 25 years. Ultimately, 539 youths met the criteria and participated in the baseline study. In the follow-up study from September to November 2012, 476 of the 539 participants at baseline took part in the study, representing 88.3%<sup>20</sup> (see the flowchart, [figure 1](#)).

### Data collection

Participants were briefed and informed about the purpose of the study before data collection. Data were collected by university graduates extensively trained in research methods and well versed in both English and the indigenous language of the participants (Luo). Participants were interviewed or filled in the questionnaires in their village homes or nearby community centres for 30–45 minutes. At all data collection sites, a clinical psychiatric officer was present to manage or make referrals regarding any mental health emergency that would

arise. Written informed consent was obtained from all participants before data collection, following approved ethical guidelines. After data collection, all the participants were debriefed and informed of the availability of free psychological support should they need help.

### Measures

Originally in the English language, the instruments used to collect data were translated into Luo, the native language of the participants, by experts from the Department of English at Gulu University who were fluent in both languages. The Luo version of the instruments was subsequently back-translated into the English language to limit the possible loss of meaning. Subsequently, the Luo version of the instruments was assessed by comparing the pairs of original and back-translated items.<sup>20</sup> Next, the instruments were pilot tested and modified for cultural relevance and sensitivity.<sup>20</sup>

### Assessment of PTSD symptoms

PTSD symptoms were assessed using the 22-item IES-R.<sup>21 22</sup> This instrument is rated on a Likert-type scale ranging from 0 (not at all) to 4 (extremely) concerning the participants' traumatic experiences over the past week. The IES-R comprises three subscales: intrusion (7 items), avoidance (8 items), hyperarousal (7 items), and the total IES-R (22 items). A score of 33 or more out of a possible total score of 88 on the IES-R is indicative of the presence of probable PTSD.<sup>21 22</sup> In addition, a cut-off score of 35 out of a possible 88 was used as a sensitivity analysis and to check for a possible dose–response in previous studies of survivors of natural disasters<sup>23</sup> and intensive care units.<sup>24</sup> In this study, results for cut-offs of 33 and 35 total scores for the IES-R were made to guarantee the best possible

comparison with previous studies.<sup>25 26</sup> The internal consistencies of IES-R assessed with Cronbach's alpha values ranged from 0.87 to 0.92 in past studies.<sup>21 27</sup> The Cronbach's alpha values in this study ranged from 0.81 to 0.89.

### Correlates of PTSD

The several correlates of PTSD assessed included background correlates (eg, duration in captivity, gender, marital status, injury while in captivity and living with chronic illness) and other variables such as postwar hardships, stigma/discrimination, daily functioning, community relations and prosocial behaviours.

### Postwar hardships

This study used the 26-item UNICEF Bosnia Herzegovina (B&H) postwar screening questionnaire that measures difficulties experienced in the past 6 months.<sup>28</sup> This scale included items on housing and economic difficulties (eg, 'During the past 6 months, did you lack money for necessities like soap, salt, or sugar?'). Other traumas of the postwar hardships that were assessed in this instrument included elements of community violence such as physical assaults, muggings and robberies with or without a weapon (eg, knife and gun), death of family members or relatives as a result of accidents, suicide, community violence and land evictions, among others. Higher scores were indicative of greater postwar hardships. Each question was binary coded for presence (1) versus absence (0) (range 0–26). The internal consistency measured by the Kuder-Richardson coefficient of reliability (KR20) for the present study is  $\alpha=0.83$ .

### Sexual violence

Sexual violence was assessed with a single item from the UNICEF B&H Post-war Screening Survey.<sup>17 28</sup> Participants were asked whether they were sexually abused during abduction or in rebel captivity. The response was binary coded as '1' for occurrence and '0' for the absence of sexual abuse.<sup>17 28</sup>

### Stigma/discrimination

The 9-item Everyday Discrimination Scale, developed by Williams and colleagues, was used in this study.<sup>29</sup> The scale consists of statements that participants were asked to agree or disagree with. The main question in the questionnaire is 'In your day-to-day life, how often do any of the following statements apply to you because of your abduction and/or for having been in rebel captivity?' Participants answered questions on statements such as 'people act as if they think you are not smart', 'people act as if they are afraid of you', 'you are called names or insulted', etc. The response format was based on a 6-point Likert-type scale with 0=never; 1=less than once a year; 2=a few times a year; 3=a few times a month; 4=at least once a week; and 5=almost every day. Higher scores indicated a greater perception of stigma. The internal consistency of the scale computed using Cronbach's alpha reliability was 0.87.

### Community relations

This variable was conceptualised as perceived approval or recognition from community members and was measured by a 6-item community relations questionnaire. This instrument is based on previous qualitative studies on war-affected youths in Uganda by Betancourt and colleagues.<sup>30</sup> Items in the instrument consisted of statements such as 'since the war, people in this community have been good to you' and 'since the war, you feel you have been welcomed back into the community where you live'. All these statements relate to the experiences of being a former abductee. The items were scored on a 3-point Likert-type scale with response options of 0='not true', 1='sometimes true' and 2='very true'. The lower the score, the poorer the participant's relationship with the community and vice versa. The internal consistency, as measured by Cronbach's alpha for this instrument in the current study, was  $\alpha=0.87$ .

### General functioning

Based on previous qualitative research of a war-affected group of young adults, this variable is characterised as difficulties in performing daily tasks and activities developed by Betancourt and colleagues.<sup>30</sup> This instrument has 13 items scored on a 4-point Likert-type scale ranging from 1=not difficult to 4=very difficult. Items included in the instrument described the degree of difficulties in performing activities such as fetching water or firewood, participation in social functions such as traditional dances, community gatherings such as funerals or marriage ceremonies, domestic hygiene, etc. The total score for the scale ranges from 1 to 52. The higher the scores, the poorer the general functioning and vice versa. The internal consistency computed using Cronbach's alpha reliability for this scale was 0.84 for this study.

### Family acceptance

This instrument comprises six items that measure the perception of formerly abducted children regarding acceptance, understanding and respect from their family members developed by Betancourt and colleagues.<sup>30</sup> The items were rated on a Likert-type scale with three response options of 0='not true', 1='sometimes true' or 2='very true'. Examples of the items on the scale included 'since the war ended, do you feel you are welcome in the family with whom you live?', 'since you returned from rebel captivity, do you have the same opportunities and responsibilities as other members in the family/household?', 'since you returned from rebel captivity, do your caregivers treat you as well as the other members in the household?', etc. The internal consistency, as measured by Cronbach's alpha, demonstrated strong internal reliability for the current study,  $\alpha=0.93$ .

### Prosocial behaviours

This variable was assessed using the prosocial behaviours subscale of the Strengths and Difficulties Questionnaire (SDQ) developed by Goodman.<sup>31</sup> This 5-item subscale

includes statements such as 'I am helpful if someone is hurt, upset or feeling ill' and 'I usually share with others'. The participants' responses were rated on 3-point Likert-type options ranging from 0 (not true) to 2 (certainly true). The internal consistency of the SDQ computed using Cronbach's alpha reliability is well recognised and acceptable at  $\alpha=0.81$  for the current study.

### Chronic illnesses

Chronic illnesses were measured using a single question that inquired whether the respondents had ever had a chronic illness(es) before or after the captivity.

### Data analysis

The sociodemographic characteristics of the study participants were computed using descriptive statistics, and the results were tabulated. Before the analyses, a cut-off score of  $\leq 33$  on the 22-item IES-R scale was used to demarcate the presence or absence of PTSD. This cut-off was selected to identify a possible impaired group. Subsequently, as a caution against potential misclassification of the presence or absence of PTSD, sensitivity analyses were conducted with further analysis with a cut-off score of  $\leq 35$ . Regarding the correlates, we dichotomised background correlates (marital status, ie, married vs not married; a history of sexual abuse, ie, sexually abused vs not sexually abused; having a chronic illness vs having no chronic illness and, for the duration in captivity, those who were in captivity for less than the median period of 2 years vs those who remained in captivity for 2 years or longer). For postwar environmental correlates (duration in captivity, postwar hardships, stigma/discrimination, community relations, family acceptance, general functioning and prosocial behaviours), we chose the 85th percentile to demarcate the presence or absence of these psychosocial correlates, thereby increasing the study's public health relevance for identifying the group of formerly abducted youths who would need and benefit from interventions to reduce the toxic effects of the correlates. Consequently, PTSD was the dependent variable, while the correlates were independent variables. Because of the likelihood of high correlations between the PTSD correlates, it was quite probable that the assumption of multicollinearity may be violated. Consequently, multicollinearity was calculated as a variance inflation factor (VIF).<sup>32</sup> Often, a VIF figure of more than 10 demonstrates a serious violation of the multicollinearity assumption, while VIF values greater than 4.0 may be regarded as a cause for concern due to inflated standard errors (SEs).<sup>32</sup> Regarding the statistical analyses, we first used descriptive statistical procedures to compute the sociodemographic characteristics of the study population and tabulated the results. Second, to examine whether the correlates mentioned earlier were associated with experiencing PTSD, we performed a Pearson product-moment correlation analysis and tabulated the results. Third, we fitted binary logistic regression analyses to obtain odds ratios (ORs) and 95% confidence interval (CI) of PTSD for the low (IES-R score  $\leq 33$ ), high (IES-R

score  $>33$ ) and severe (IES-R score  $>35$ ) categories, relative to the low PTSD category. Recognised as a possible confounder, gender was adjusted for in all the analyses. All statistical analyses were conducted using IBM SPSS (V.27) with the significance level set at  $p<0.05$ .

### RESULTS

The sociodemographic characteristics of the study participants are presented in [table 1](#). The mean (SD) age of the participants was 25.3 (9.3) years during the second wave of data collection, and they lived in rebel captivity for about 3.1 (3.0) years (see [table 1](#)). There were 295 (62.0%) male participants, and 220 (46.2%) participants were married. The prevalence of probable PTSD was 37.6% and 21.6%, with a cut-off score of 33 and 35, respectively ([table 1](#)). The correlations between background and postwar environmental variables and PTSD were small to moderately significant, ranging from  $r=0.18$ ,  $p<0.01$ , to  $r=0.47$ ,  $p<0.001$  (see [table 1](#)).

The distribution of the correlates stratified by different levels of PTSD symptoms is presented in [figure 2](#). In general, a higher level of PTSD symptoms was gradually associated with lower family acceptance, more years of captivity, higher levels of stigma/discrimination, postwar hardships, prosocial behaviours and poorer community relations, while the reverse was true for higher levels of general functioning (see [figure 2](#)).

Binary logistic regression results with cut-off scores  $\leq 33$ ,  $>33$  and  $>35$  are presented in [table 2](#) for continuous variables dichotomised at the 85th percentile and in [table 3](#) for dichotomous variables (yes/no). In all the analyses, the odds of being classified as having probable PTSD were higher with longer duration in captivity, lower levels of family acceptance, community relations, prosocial behaviours, general functioning and experiencing higher levels of stigma/discrimination and postwar hardships for continuous variables (see [table 2](#)). Furthermore, participants with a history of sexual abuse, injury while in captivity and postwar chronic illness were more susceptible to PTSD (see [table 3](#)).

### DISCUSSION

#### Main findings

The result of this study is a valuable addition to the literature on the public health of populations in postwar settings where PTSD symptoms are a common mental health problem among survivors. By assessing the effects of various correlates on different levels of PTSD symptoms, the current study demonstrated significant effects of the extent to which background factors such as sexual abuse, duration in captivity and postwar environmental stressors (stigma, postwar difficulties, etc) shape the postwar trajectory of PTSD symptoms in survivors of violent conflicts. This study revealed that longer duration in captivity, sexual abuse, lower levels of family acceptance, community relations, prosocial behaviours, general functioning

**Table 1** Descriptive characteristics of variables in the study (n=476)

Variables	n	%	Mean	SD	Range	Correlation with PTSD†
Sex						-0.26***
Male	295	62.0	-	-	-	
Female	181	38.0	-	-	-	
Age						0.06
At T1	-	-	22.4	10.5	18–25	
At T2	-	-	25.3	9.3	20–27	
At abduction	-	-	14.1	4.2	0.7–19	
Duration in captivity	-	-	3.1	3.0	0.5–17	0.29***
Marital status						0.18**
Married	220	46.2	-	-	-	
Married to fellow abductees	87	18.3	-	-	-	
Separated/divorced	35	7.4	-	-	-	
Unmarried	74	15.5	-	-	-	
History of sexual abuse	168	35.3	-	-	-	0.44***
Injury while in captivity	193	40.5	-	-	-	0.37***
Postwar chronic illness	101	21.2	-	-	-	0.29***
IES-R subscales and total score						
IES-R total score	-	-	54.6	6.9	0–88	
Arousal	-	-	17.9	2.7	0–28	
Avoidance	-	-	19.1	3.1	0–32	
Intrusion	-	-	17.9	2.2	0–28	
Scores ≤33	297	62.3	-	-	-	
Scores >33	179	37.6	-	-	-	
Scores >35	103	21.6	-	-	-	
Psychosocial correlates						
Postwar hardships	-	-	12.5	4.9	0–24	0.47***
Stigma/discrimination	-	-	30.9	9.4	0–45	0.36***
Community relations	-	-	8.2	3.9	0–18	-0.24***
Family acceptance	-	-	4.9	1.6	0–12	-0.27***
General functioning	-	-	14.8	9.7	0–44	-0.26***
Prosocial behaviours	-	-	10.4	2.2	0–15	-0.28***

Pearson correlations with PTSD symptoms: \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ . PTSD indicated by Impact of Event scores:  $\leq 33$ =no PTSD;  $> 33$ =probable PTSD;  $> 35$ =likely PTSD.

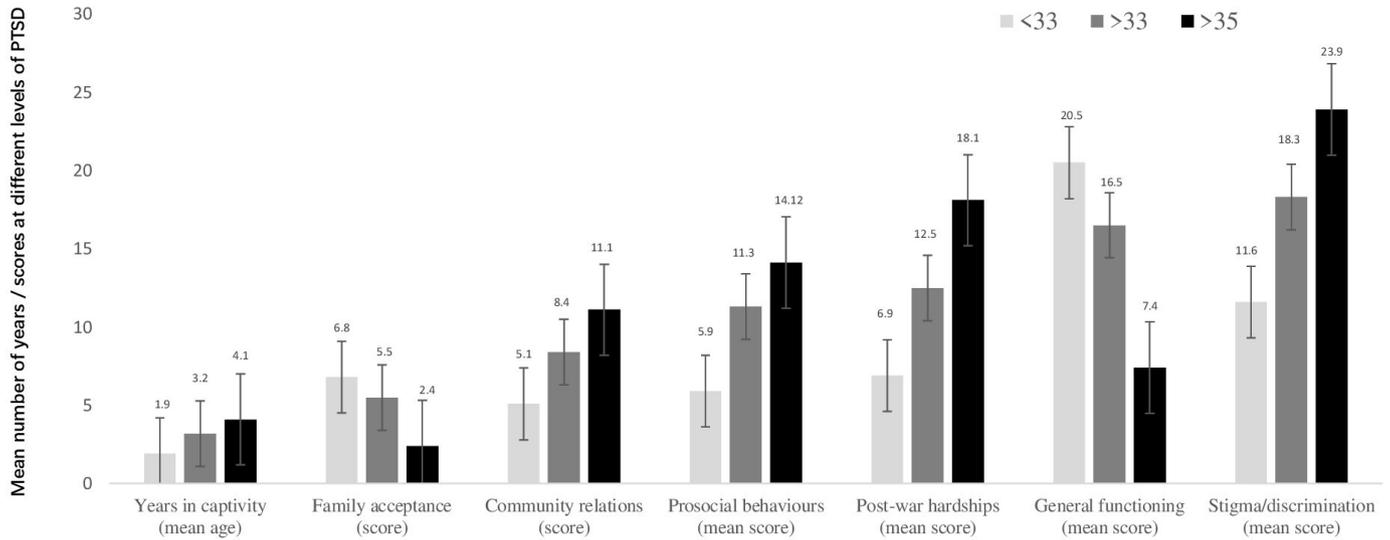
†PTSD symptoms indicated by IES-R total score.

IES-R, Impact of Event Scale-Revised; n, subpopulation; PTSD, post-traumatic stress disorder.

and experiencing higher levels of stigma/discrimination and postwar hardships were associated with increased odds of being classified as experiencing probable PTSD. Trauma history of violence (eg, injury and sexual abuse) has been recognised in previous studies as a risk factor for PTSD.<sup>28</sup> Nevertheless, it is also possible that stressors such as family rejection, postwar hardships and stigma, among others, may be a reflection of an individual's PTSD symptomatology rather than factors that contribute to it.

In previous studies with the same population of formerly abducted youths, the prevalence of probable PTSD was found to be 54% in the war-affected population immediately after cessation of violence,<sup>26</sup> while in the general population, the prevalence of PTSD symptoms ranged

from about 12% to 13%. Therefore, the prevalence of probable PTSD of 40% in the current study with survivors of the war is plausible, particularly since the prevalence of PTSD symptoms tends to decline with time. However, it is difficult to compare the results of the current study with previous studies due to differences in sample sizes, PTSD measures used, times during which the studies were conducted (ie, during or after the war), with whom the studies were conducted (perpetrators, victims or those indirectly affected by the war). Besides, perpetrators of violence are reported to suffer from PTSD symptoms just as much as victims.<sup>1 2</sup> Although our study used ORs as a measure of effect size instead of explained variance in the entire spread of scores, the results agree with past



Three levels of PTSD (represented by scores: scores ≤33, scores >33, and scores >35)

Key: PTSD= posttraumatic stress disorder indicated by Impact of Events scores.

**Figure 2** Mean number of years / scores of correlates at different levels of post-traumatic stress disorder (PTSD).

studies that demonstrated a moderate to high prevalence of PTSD symptomatology among the same war-affected population.<sup>1,2,15</sup> On the specific correlates of PTSD symptoms, it was not possible to compare the results of the current study with previous studies concurrently assessing similar groups of PTSD symptom correlates. No previous research attempted to study the effects of various background and environmental correlates that sustain survivors on the path of long-term PTSD symptomatology after a violent conflict. Comparison of the results of the current study is also hindered by the use of different measures of PTSD symptoms, such as the PCL or the IES-R. Moreover, the outcomes in the current study were indicated by cases (eg, cases of sexual abuse, injury while in captivity and postwar chronic illness) or 15% of those who scored highest on the postwar environmental correlates (scores ≥85th percentile). Comparison is further hampered by

the use of different statistical approaches, varying sample sizes and the type and severity of trauma events. Based on a meta-analysis of risk factors for PTSD in an adult sample, pretrauma correlates such as a history of psychiatric disorder, childhood abuse and family history of mental illness, among others, predicted continued PTSD similar to our study.<sup>33</sup> Other factors in the aftermath of the trauma, such as trauma severity, lack of social support and life stressors, contributed more to PTSD than the traumatic factors that occurred before.<sup>33</sup>

More than 6 years after the cessation of violence, PTSD symptoms still echo among many survivors of the war, particularly those who lived longer in rebel captivity, had lower levels of family acceptance on return from captivity, have had poor community relations and have functioned less optimally. Also, those experiencing stigma and postwar hardships have higher PTSD symptom levels. As

**Table 2** Logistic regression analyses: attributable risks of continuous psychosocial correlates on PTSD, adjusted for gender (n=476)

Variables	N (≥85th percentile)	PTSD (indicated by IES-R scores)		
		≤33 IES-R score, n=297 (Reference)	>33 IES-R score, n=179 OR (95% CI)	>35 IES-R score, n=93 OR (95% CI)
Duration in captivity	107	1	2.91 (1.87 to 4.59)	3.34 (2.11 to 5.23)
Postwar hardships	187	1	2.41 (1.63 to 3.56)	2.90 (2.03 to 4.14)
Stigma/discrimination	131	1	3.38 (2.22 to 5.17)	4.12 (2.69 to 6.30)
Community relations	108	1	2.94 (1.82 to 4.62)	3.26 (2.08 to 5.18)
Family acceptance	124	1	1.66 (1.16 to 2.38)	2.05 (1.34 to 3.16)
General functioning	146	1	2.82 (1.92 to 4.02)	3.88 (2.56 to 5.88)
Prosocial behaviours	112	1	1.70 (1.18 to 2.45)	2.28 (1.50 to 3.34)

Continuous measures are dichotomised at the 85th percentile. PTSD indicated by Impact of Event scores: ≤33=no PTSD; >33=probable PTSD; >35=likely PTSD. IES-R, Impact of Event Scale-Revised; N, total number; n, subpopulation; PTSD, post-traumatic stress disorder.

**Table 3** Logistic regression analyses: attributable risks of dichotomous psychosocial correlates on PTSD, adjusted for gender (n=476)

Variables	Cases (N)	PTSD (indicated by IES-R scores)		
		≤33 IES-R score, n=297 (Reference)	>33 IES-R score, n=179 OR (95% CI)	>35 IES-R score, n=93 OR (95% CI)
History of sexual abuse	168	1	2.26 (1.52 to 3.37)	2.89 (1.82 to 4.12)
Injury while in captivity	193	1	1.74 (1.24 to 2.44)	2.55 (1.73 to 3.78)
Postwar chronic illness	101	1	1.91 (1.25 to 2.94)	3.39 (2.24 to 5.14)

Categorical variables are dichotomised by the number of cases versus no cases. PTSD indicated by Impact of Event scores: ≤33=no PTSD; >33=probable PTSD; >35=likely PTSD. IES-R, Impact of Event Scale-Revised; N, total number; n, subpopulation; PTSD, post-traumatic stress disorder.

indicated in the results, survivors with scores equal to or greater than the 85th percentile on duration in captivity, postwar hardships, stigma/discrimination, community relations, family acceptance and prosocial behaviours or experienced sexual abuse and injury while in captivity and who are living with chronic illnesses compared with those with lower scores on postwar environmental stressors below the 85th percentile are more vulnerable to PTSD symptomatology. The results indicated the relationships between background and postwar environmental correlates (eg, sexual abuse, stigma, general functioning and postwar hardships) and PTSD symptoms were significantly stronger, possibly due to the part played by the postwar environmental contextual risks. Past research has demonstrated that interpersonal sensitivity, a known correlate of PTSD symptoms and environmental stressors such as stigma were mediators of the relationship between war experiences and later mental health problems.<sup>1 2 15</sup> Furthermore, postwar hardships,<sup>17</sup> the use of maladaptive coping strategies<sup>34</sup> and postwar stressors<sup>17</sup> have also been implicated in locking survivors on the continued path of probable PTSD. Consequently, the postwar environment and background characteristics, such as sexual abuse, long duration in captivity and chronic illness, are key determinants of the continued experience of PTSD symptoms.

Numerous pathways through which background and postwar environmental factors may be associated with PTSD symptoms have been underscored, especially postwar environmental stressors.<sup>17</sup> These postwar stressors, such as family acceptance, postwar hardships and stigma, may erode all social support that is required for one to function optimally. Furthermore, considering the buffering hypothesis, family support and family homecoming have been recognised as protective factors among survivors of war and for the prevention of PTSD symptoms. It may be that postwar hardship, such as economic difficulties, stigma/discrimination and poor community relations, exposes war survivors to the probability of developing PTSD due to a confluence of factors, such as interpersonal sensitivity<sup>1 2</sup> and maladaptive coping strategies,<sup>34</sup> and makes war survivors drift down or just fail to come out of PTSD symptomatology as their past continuously echoes back to them. Yet, a combination

of adverse background and postwar environment may precipitate a domino effect that subsequently leads to a sustained path to probable PTSD in a cumulative process where both traumatic and post-traumatic events are associated with probable long-term PTSD. A recent study showed that PTSD was an underlying factor contributing to the vulnerability of the youths in northern Uganda and should be considered in designing and implementing social protection programmes in vulnerable communities of war survivors.<sup>35</sup>

### Strengths and limitations

Compared with previous studies, our study had a relatively large sample size of a hard-to-reach population carefully enumerated by UNICEF. Furthermore, our study was conducted more than 6 years after the war ended, with the results not contaminated by an ongoing war like other previous studies.<sup>10 18</sup> Lastly, our study used ORs as a measure of the magnitude of the effects of the correlates instead of explained variance in the spread of scores in the entire distribution. Using scores over the 85th percentile to denote the occurrence of the postwar environmental correlates made the clinical implications of our study of greater public health relevance as we focused on those who may require urgent help.

Nonetheless, before interpreting the results of our study, a few limitations need to be accounted for. First, it is probable that PTSD symptoms existed before the war and that other background factors may be associated with them. Similarly, other traumas of the postwar environment that were not assessed, such as domestic violence, may also limit the interpretation of our results. Nevertheless, the postwar hardships that were considered included elements of community violence such as physical assaults, muggings and robberies with or without a weapon (eg, knife and gun), death of family members or relatives as a result of accident, suicide, community violence, or land evictions, etc. Besides, the family function that was assessed may also include elements of domestic violence. Second, correlates of PTSD symptoms were measured retrospectively, making them susceptible to recall bias. Third, it is also possible that stressors such as family acceptance, postwar hardships and stigma, among others, may be a reflection of an individual's PTSD symptomatology

rather than factors that contribute to it. Fourth, IES-R was developed in 1996 based on the DSM-IV, which might represent a slightly out-of-date characterisation of PTSD compared with the current DSM-5 diagnostic criteria. Finally, other mediating and moderating factors not included in this study may be associated with the attributable risks of probable PTSD in this study.

### Implications

The results of the current study have implications for practice, research, policy and theory. Postwar environmental stressors such as postwar hardships, stigma and community relations, *inter alia*, are important factors to consider when treating survivors with PTSD symptomatology. Besides, survivors with a history of sexual abuse, chronic illness and injuries are more vulnerable to PTSD symptoms than those without such backgrounds. For example, trauma-focused cognitive-behavioural therapy conducted by non-clinical staff has been demonstrated to be effective in reducing PTSD symptomatology.<sup>36</sup> Other interventions for those locked on the path of PTSD may be realised through therapies such as interpersonal therapy or narrative exposure therapy (NET). The efficacy of interpersonal psychotherapy<sup>37</sup> and NET<sup>38</sup> has been established in a study with a similar population in northern Uganda. Furthermore, more studies are required to illuminate the causal mechanisms by which these environmental factors lead to probable PTSD. Policymakers should design interventions targeting survivors from vulnerable backgrounds and experiencing postwar stressors that effectively treat PTSD symptoms. Although the cumulative stress and buffering hypotheses can explain some aspects of probable PTSD vulnerability, the confluence of postwar environmental stressors and background characteristics is complex. No single theory can adequately explain susceptibility to PTSD symptoms in postwar settings.

### CONCLUSION

This study demonstrates that a higher level of PTSD symptoms was gradually associated with postwar environmental factors such as low family acceptance, higher levels of stigma/discrimination, postwar hardships and poor community relations, while the reverse was true for higher levels of prosocial behaviours and general functioning. Similarly, background characteristics such as sexual abuse, injuries while in captivity and chronic illness were associated with the increased magnitude of probable PTSD. Policies and interventions to reduce PTSD symptoms should consider postwar environmental factors and background factors as key determinants of probable PTSD. Trauma-focused cognitive-behavioural therapy, interpersonal therapy or NET, psychoeducation programmes such as mental health literacy and social intervention studies to reduce postwar environmental stressors and symptoms of PTSD are critical to reducing PTSD symptoms. Furthermore, programmes such as

self-help interventions are known to be cheap, effective and efficient in alleviating PTSD symptoms. Moreover, self-help interventions involve less staff time, can be implemented by para-health professionals and are more suitable in low-resource settings short of highly qualified healthcare professionals.

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