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RESEARCH ARTICLE

Prevalence, factors associated, and negative outcomes of "probable PTSD" among HIV infected children and adolescents: CHAKA study 2014–2017

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The aim of this study was to determine the prevalence of "probable post-traumatic stress disorder (PTSD)," factors associated with probable PTSD, and its relationship with clinical and behavioral problems among children and adolescents with HIV/AIDS (CA-HIV). A random sample of 1,339 CA-HIV (aged 5–18 years, living with HIV) whose caregivers completed an extensive battery of measures. The caregivers evaluated psychiatric symptom severity using a standardized DSM-5-referenced psychiatric rating scale, the Child and Adolescent Symptom Inventory-5. The prevalence of "probable PTSD" was estimated with 95% confidence intervals (95% CI). Logistic and ordinal regression models were fitted to determine factors associated with probable PTSD, including study site, sex of the child, age of the child, caregiver religion, caregiver psychological distress, any anxiety and any attention-deficit/hyperactivity disorder (ADHD). Logistic and ordinal regression models were fitted to determine factors associated with probable PTSD and to evaluate the relationship between probable PTSD and clinical and behavioral outcomes. The overall prevalence of "probable PTSD" was 19.6%. CA-HIV with "probable PTSD" were more likely to have had their sexual debut (aOR = 2.78; 95% CI 1.12–6.55; $P = 0.02$). "Probable PTSD" was marginally associated with poor adherence to HIV medication (aOR = 0.13, 95% CI 0.02–0.97; $P = 0.05$). The study identified a high prevalence of "probable PTSD" among CA-HIV, with significant associations with caregiver psychological distress, anxiety, and ADHD. These findings underscore the need for targeted mental health interventions tailored to the unique needs of CA-HIV in Uganda. Furthermore, integrating mental health services into routine HIV care could address the significant burden of PTSD and its comorbidities in this vulnerable population in Uganda.

Keywords: Probable PTSD, Children/adolescents, HIV, Prevalence, Factors associated

Background

Post-traumatic stress disorder (PTSD) is a serious mental health condition characterized by intrusive thoughts, avoidance behaviors, negative alterations in mood, and heightened arousal following traumatic exposure [1]. It is particularly common among people living with HIV (PLHIV), who often experience multiple and repeated stressors such as stigma, illness-related trauma, and

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bereavement [2–4]. PTSD prevalence among PLHIV has been reported to be as high as 30% globally [5].

There is considerable heterogeneity in PTSD prevalence estimates across studies and settings, particularly among children and adolescents living with HIV (CA-HIV). For example, a Kenyan study reported a prevalence of only 1.3% among CA-HIV using the MINI-Kid diagnostic tool [6], whereas other studies using broader screening measures such as the Child and Adolescent Symptom Inventory-5 (CASI-5) report higher estimates [7]. This variability can be attributed to methodological differences (e.g., measurement tools used—*see further discussion of this issue in the Discussion section below*), sample characteristics (e.g., age, illness stage), and contextual influences such as trauma exposure, health-care access, and stigma [8, 9]. These differences underscore the need for region-specific data to inform targeted mental health interventions.

Among CA-HIV, known factors associated with PTSD include female sex, exposure to physical or sexual abuse, caregiver distress, and psychiatric comorbidities such as anxiety or attention-deficit/hyperactivity disorder (ADHD) [10–12]. Socioeconomic deprivation—characterized by poverty, food insecurity, and unstable housing—has also been shown to exacerbate PTSD risk by amplifying environmental stress and reducing access to support systems [13, 14]. Additionally, emerging evidence points to gene–environment interactions, such as FKBP5 polymorphisms that moderate the effects of childhood trauma via the hypothalamic-pituitary-adrenal (HPA) axis [15, 16]. These findings support a multifactorial model of PTSD vulnerability in CA-HIV.

PTSD in CA-HIV is associated with multiple adverse clinical and behavioral outcomes. It can impair antiretroviral therapy (ART) adherence, reduce clinic attendance, and lead to early sexual debut and school dropout [17–19]. Emotional numbing, avoidance, and hyperarousal may hinder communication with caregivers or health-care providers, while stigma-related stress can worsen depressive symptoms and social isolation [17, 20]. PTSD also impacts HIV progression by dysregulating immune responses through chronic HPA axis activation [21].

Uganda represents a particularly important context for examining PTSD among CA-HIV due to its high HIV prevalence, history of civil conflict, and limited access to mental health services [22–25]. The combination of chronic poverty, caregiver loss due to human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS), exposure to community violence, and stigma creates a unique risk environment [25, 26]. Cultural interpretations of mental health and trauma may further influence both symptom expression and care-seeking behaviors [26]. However, few studies have rigorously examined PTSD and its correlates among CA-HIV in Uganda.

To address these gaps, this study aimed to (a) estimate the prevalence of probable PTSD among CA-HIV in Kampala and Masaka districts of Uganda; (b) identify factors associated with probable PTSD; and (c) evaluate the relationship between PTSD and negative clinical and behavioral outcomes. By doing so, we aim to generate evidence to support the integration of mental health services into HIV care in sub-Saharan Africa.

Methods

Participants and setting

This study was conducted at 5 children and adolescent HIV clinics in Uganda: 3 in rural Masaka district (The AIDS Support Organization, Kitovu Mobile AIDS Organization, and Uganda Cares Clinic) and 2 in urban Kampala (Joint Clinical Research Centre and Nsambya Homecare Department). The study recruited 1,339 child/adolescent–caregiver dyads, with each site contributing approximately 268 participants.

Eligibility criteria included:

1. CA-HIV aged 5–17 years, subdivided into children (5–11 years) and adolescents (12–17 years).
2. Caregivers aged $\geq$18 years who could speak English or Luganda (the local language spoken in the study areas).
3. Both child and caregiver were expected to remain in the study area for the following 12 months.

Exclusion criteria included:

1. Concurrent enrollment in another study (applicable to the Joint Clinical Research Centre).
2. Need for immediate medical attention.
3. Inability to understand study instruments due to cognitive or physical limitations.

Eligible study participants provided informed consent (caregiver) and assent (CA-HIV) after explanation of the study objectives and procedures. Study participants who met the eligibility criteria were subsequently enrolled from each study site in a consecutive manner until the necessary sample size was achieved. Two percent of qualified individuals were excluded due to factors such as their involvement in an ongoing study, the inability to reach the caregiver for consent acquisition, or the caregiver's refusal to grant consent.

Sampling procedure

A stratified random sampling technique was used to ensure proportional representation across the 5 clinics. Eligible participants were enrolled consecutively until the required sample size per site was achieved. Two percent of eligible individuals were excluded due to logistical challenges or refusal to provide consent.

Sample size calculation

The sample size was calculated using Cochran's formula for cross-sectional studies:

$$n = \frac{Z^2 \cdot P \cdot (1 - P)}{d^2}$$

where:

- Z: Standard normal deviate for a 95% confidence level (CI) (1.96).
- P: Estimated PTSD prevalence of 20% based on prior studies.
- d: Margin of error (0.05).

$$n = \frac{(1.96)^2 \cdot 0.20 \cdot (1-0.20)}{0.05^2} \times \frac{1}{(1-0.10)} = 1,339$$

Adjusting for a 10% nonresponse rate, the final sample size was 1,339 participants.

Measures

All data were obtained from caregivers who served as the sole informants for both child and family-level variables. This included all symptom measures and clinical/behavioral outcomes, based on structured interviews administered by trained research assistants. Children and adolescents did not complete direct assessments due to ethical concerns, cognitive limitations, and the need to maintain consistent data quality across wide age ranges (5–17 years).

The assessment battery comprised of standardized, locally translated (adapted) psychosocial instruments administered to caregivers and, where applicable, to adolescents themselves. These included:

1. *Child and Adolescent Symptom Inventory-5 (CASI-5)*: The CASI-5 is a DSM-5-referenced tool validated in Uganda, administered to caregivers to assess psychiatric symptoms, including PTSD, anxiety, and ADHD; its reliability ranges from 0.72 to 0.94 across subscales [27, 28]. The locally adapted DSM-5-based CASI-5 [27, 28] was used to assess for "probable PTSD."
2. *Self-Report Questionnaire-20 (SRQ-20)*: Developed by WHO, the SRQ-20 was completed by caregivers to assess psychological distress, with validated use in Uganda showing sensitivity and specificity above 80% [29].

Sexual debut was assessed via direct self-report by adolescents aged 12–17 years using a confidential interviewer-administered questionnaire. School performance and disciplinary problems were reported by caregivers using structured items that included number of school days missed in the last month and any reported disciplinary events. Medication adherence and clinic visits were reported by caregivers through structured questions. Verification with medical records was not conducted, which is acknowledged as a limitation. *All other variables used in the study, their description and outcomes, including how each was assessed and by whom are included in Table S1: Description of Data Collection Measures (Supplementary Material).*

The psychosocial assessment tools used for the first time in the Ugandan population were taken through a translation and local adaptation process that is described in a separate paper [28]. The study protocol was administered by trained psychiatric nurses and psychiatric clinical officers (fluent in English and Luganda) supervised by a psychiatrist (EK) and a clinical psychologist (RM). For purposes of this article, we elicited 2 items [E57 (Has experienced an extremely upsetting event and continues to be bothered by it) and E58 (Has distressing memories or dreams about an extremely upsetting event)] of the CASI-5 that we categorized as "probable post-traumatic stress disorder" (probable PTSD) which are part of the DSM-5 psychiatric diagnostic criteria. This is described in the Results section as "probable PTSD" based upon items E57 and E58 of the CASI-5 (defined as meeting DSM-5 symptom criteria only) or psychiatric disorders (defined as meeting both the symptom and impairment criteria of DSM-5).

Statistical analysis

Factors associated with "probable PTSD" were determined by fitting separate logistic regression models. A model-building approach recommended by Victora et al. [30] was employed, based on a conceptual framework derived from the stress vulnerability model [31] (see **Figure 1**). The following sequential steps were taken:

1. Sociodemographic Factors: The initial prediction model included study site, sex, and age as a priori confounders. Additional sociodemographic variables—education level, socioeconomic status (based on principal component analysis of consumer durables, as proposed by Vyas and Kumaranayake [32], tribe (Muganda vs. non-Muganda), and religion (Christian, Muslim, or "other")—were considered for inclusion. Variables not statistically significant at the liberal *P*-value threshold of 0.15 were excluded using a backward elimination approach, ensuring all potential confounders were retained [31].
2. Caregiver Factors: Caregiver variables, including age, education level, religion, employment, health, HIV status, and SRQ-20 scores [32] for psychological distress, were added to the sociodemographic model. Nonsignificant variables were removed using the same liberal *P*-value threshold.
3. Psychosocial Environment: Orphanhood status, caregiver–child relationship quality, living arrangement, and household food sufficiency were considered and included in the model if significant.
4. Child Illness Factors: Variables like prematurity, CD4 count [33], body mass index), WHO staging, ART status, and pain levels (measured by Wong-Baker Face Scale) were included. A backward elimination method was applied.
5. Psychiatric Comorbidities: Probable PTSD and other psychiatric comorbidities were included at this stage, with a stricter *P*-value threshold of 0.10 to retain only the most relevant variables.

Regression models were also fitted to examine associations between probable PTSD and clinical/behavioral outcomes. The stepwise selection process employed liberal *P*

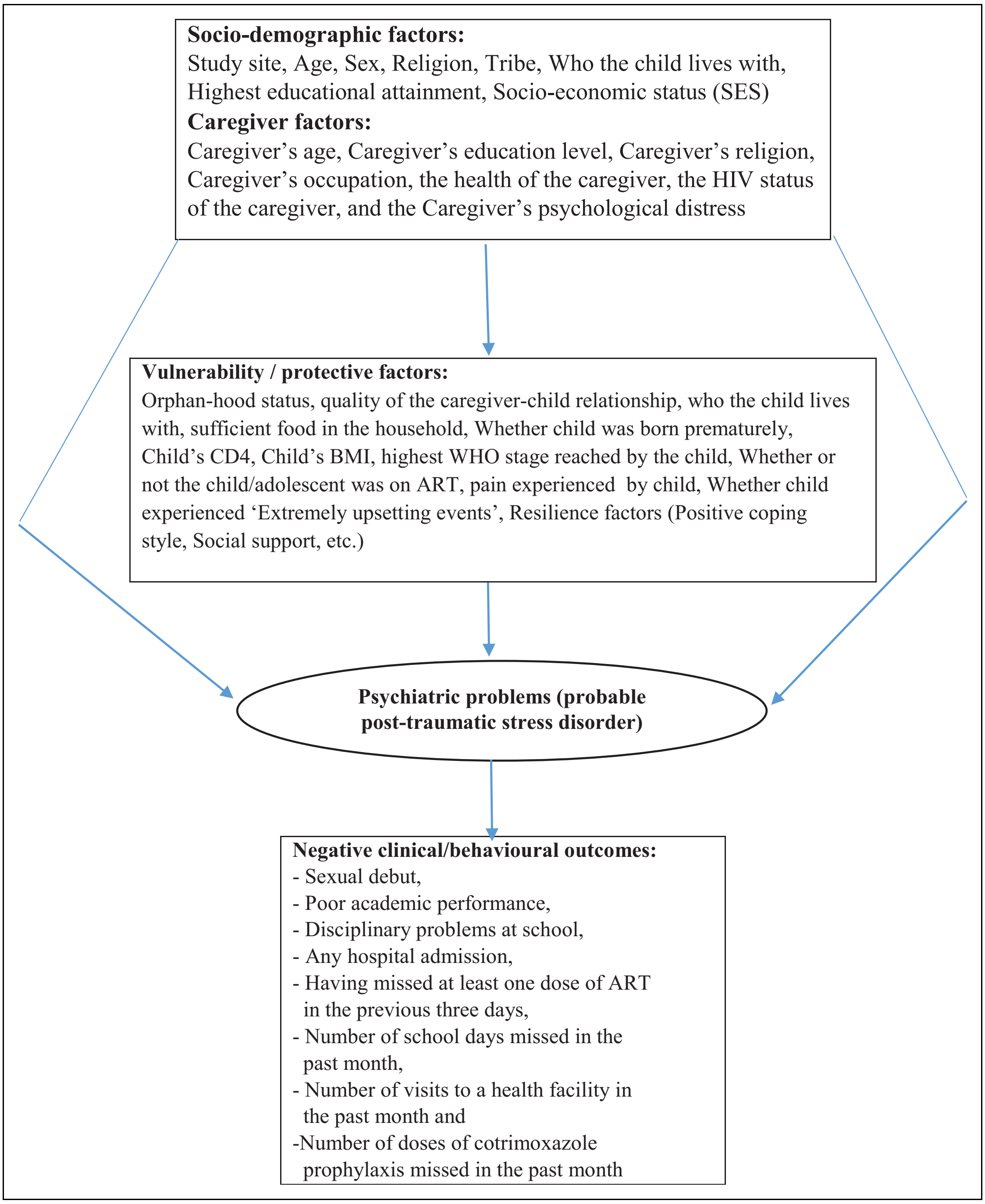

Figure 1. Conceptual framework based on the stress vulnerability model for psychiatric problems (probable post-traumatic stress disorder).

values (0.15 for confounders and 0.10 for comorbidities) to ensure that potential predictors were not prematurely excluded, following epidemiological modeling recommendations [34].

Logistic regression models were used to evaluate binary outcomes like sexual debut and ART adherence, while ordinal regression models were applied for ordered outcomes, such as the number of school days missed. All analyses were adjusted for study site, age, sex, and education. Data analysis was performed using Stata version 15.

Terminology clarification: In accordance with recommendations for cross-sectional analyses, we use the term "*factors associated with probable PTSD*" throughout this manuscript instead of "*risk factors*" to more accurately reflect the noncausal, associative nature of the findings.

Ethical considerations

The study obtained ethical approvals from the Uganda Virus Research Institute's Research and Ethics Committee (Ref: GC/127/14/04/459), the Ethics Committee of the London School of Hygiene and Tropical Medicine, and the Uganda National Council of Science and Technology (Research Registration number: HS 1601). Participants found to have a psychiatric disorder were provided with

Table 1. Characteristics of study participants

Variable	Level	Total (n = 1,339) n (%)	Children (n = 855) n (%)	Adolescents (n = 484) n (%)
Study site	Urban	684 (51.1%)	419 (49.0%)	265 (54.7%)
	Rural	655 (48.9%)	436 (51.0%)	219 (45.2%)
Sex	Male	638 (47.7%)	412 (48.2%)	226 (46.8%)
	Female	699 (52.3%)	442 (51.8%)	257 (53.2%)
Religion	Christian	1,058 (79.0%)	672 (78.6%)	386 (79.7%)
	Muslim	273 (20.4%)	178 (20.8%)	95 (19.6%)
	Others/missing	8 (0.6%)	5 (0.6%)	3 (0.6%)
Tribe	Baganda	967 (72.3%)	625 (73.2%)	342 (70.8%)
	Non-Baganda	370 (27.7%)	229 (26.8%)	141 (29.2%)
Child lives with	Both parent	354 (26.4%)	255 (29.8%)	99 (20.4%)
	Single parent	512 (38.2%)	337 (39.4%)	175 (36.2%)
	Grandparents	258 (19.3%)	167 (19.5%)	91 (18.8%)
	Others/missing	215 (16.1%)	96 (11.2%)	119 (24.6%)
Orphan hood	Single-parent orphan	446 (34.5%)	247 (30.0%)	199 (42.2%)
	Double-parent orphan	127 (9.8%)	40 (4.9%)	87 (18.4%)
	Non-orphan	721 (55.7%)	535 (65.1%)	186 (39.4%)
Highest level of education attained	No formal	29 (2.2%)	12 (1.4%)	17 (3.5%)
	Preprimary	217 (16.2%)	214 (25.2%)	3 (0.6%)
	Primary	954 (71.5%)	624 (73.2%)	330 (68.3%)
	Secondary	132 (9.9%)	1 (0.1%)	131 (27.1%)
	Missing	3 (0.2%)	1 (0.1%)	2 (0.4%)
Socioeconomic index	Mean (Std)	4.4 (1.8)	4.2 (1.8)	4.8 (1.8)
Socioeconomic index (grouped)	0–2	194 (14.5%)	146 (17.1%)	48 (9.9%)
	3–4	480 (35.8%)	328 (38.4%)	152 (31.4%)
	5–6	480 (35.8%)	281 (32.9%)	199 (41.1%)
	7–9	185 (13.8%)	100 (11.7%)	85 (17.6%)
Baseline CD4 counts (cells/µL)	<500	265 (19.8%)	106 (12.4%)	159 (32.8%)
	≥500	1,060 (79.2%)	742 (86.8%)	318 (65.7%)
	Missing	14 (1.0%)	7 (0.8%)	1 (1.5%)
Child on ART at baseline?	Yes	1,277 (95.4%)	818 (95.7%)	459 (94.8%)
	No	62 (4.6%)	37 (4.3%)	25 (5.2%)

psychoeducation and referred to their local mental health departments.

Results

Characteristics of study participants

Of the 1,339 CA-HIV enrolled into this study, 64% were between 5 and 11 years and 36% were between 12 and 17 years (**Table 1**). The urban and rural study sites contributed 51% and 49% of participants, respectively. Males and females enrolled in the study were 48% and 52%, respectively. Seventy-nine percent (79%) of the respondents were Christians, 20% Muslims, while 1% reported other religions. More than three-quarters reported to have attained at least primary-level education. Regarding HIV illness parameters, 79% had CD4 counts equal to or greater than 500 cells/µL and most (95%) of the participants were on ART.

Prevalence of probable PTSD

Two hundred and sixty-two participants (19.6%) met symptom count criteria for probable PTSD. A description of the study population by "probable PTSD" is given in **Table 2**.

Table 2. “Probable PTSD” by child category

Psychiatric Disorder	Total (*n* = 1,339) *n* (%) 95% CI	Children (*n* = 860) *n* (%) 95% CI	Adolescents (*n* = 484) *n* (%) 95% CI
Probable post-traumatic stress disorder	262 (19.6%)	68 (7.9%)	194 (40.1%)
	(17.8–21.2)	(6.7–8.9)	(38.9–42.1)

Table 3. Factors associated with probable PTSD: Results of fitting logistic regression models including comorbidities

Outcome	Parameter	PTSD UaORs; 95% CI; *P* value	PTSD aORs; 95% CI; *P* value
Site	Urban	1	1
	Rural	0.45 (0.30–0.60) $P = 0.032$	0.50 (0.34–0.65) $P = 0.001$
Sex of child	Male	1	1
	Female	1.60 (1.20–2.40) $P = 0.045$	1.51 (1.18–2.26) $P = 0.012$
Age of child	5–11 years	1	1
	12–17 years	2.70 (1.90–3.80) $P < 0.001$	2.51 (1.78–3.54) $P < 0.001$
Caregiver religion	Christian	1	1
	Muslim	1.20 (1.05–2.00)	1.14 (1.01–1.84)
	Other/missing	3.00 (1.20–7.00) $P = 0.041$	2.79 (1.14–6.59) $P = 0.039$
Caregiver SRQ-20 score	Per unit increase	1.15 (1.08–1.20) $P < 0.001$	1.12 (1.07–1.17) $P < 0.001$
Current CD4 count	Per 100 cell increase	–	–
Caregiver occupation	Farmer/fish	1	1
	Professional	1.20 (0.75–1.83)	1.14 (0.73–1.79)
	Other	1.13 (0.72–2.01) $P = 0.345$	1.16 (0.71–1.91) $P = 0.800$
Who does child live with	Both parents	1	1
	Mother	1.43 (0.87–1.99)	1.50 (0.91–2.46)
	Father	1.89 (0.91–3.89)	2.02 (0.98–4.18)
	Others	1.47 (0.89–2.22) $P = 0.342$	1.56 (0.97–2.51) $P = 0.451$
Body mass index	Underweight	1	1
	Normal weight	1.08 (0.81–1.43)	1.12 (0.70–1.77)
	Overweight/obese	1.91 (0.73–1.99)	1.82 (0.74–4.47) $P = 0.606$
Any anxiety	Yes	2.01 (1.44–3.49) $P < 0.001$	2.26 (1.53–3.26) $P < 0.001$
Any ADHD	Yes	2.49 (1.46–4.10) $P < 0.001$	2.52 (1.48–4.24) $P = 0.001$

Factors associated with probable PTSD

In the final model with psychiatric comorbidities (**Table 3**), “probable PTSD” was associated with the study site (aOR 0.50; 95% CI 0.34–0.65; $P = 0.001$), sex of the child (aOR 1.51; 95% CI 1.18–2.26; $P = 0.012$), age of the child/adolescent (aOR 2.51; 95% CI 1.78–3.54; $P < 0.001$) and caregiver distress indicated by the SRQ-20 score ($P < 0.001$). As the caregiver's distress (indicated by SRQ-20 score) increased, the odds of the CA-HIV having “probable PTSD” increased by 12%; in addition, “probable PTSD” was associated with any anxiety (aOR 2.26; 95% CI 1.53–3.26; $P < 0.001$) and any ADHD (aOR 2.52; 95% CI 1.48–4.24; $P < 0.001$) (**Table 3**).

Clinical outcomes

CA-HIV with “probable PTSD” were more likely to have had their sexual debut (aOR = 2.78; 95% CI 1.12–6.55; $P = 0.02$). Probable PTSD was marginally associated with poor adherence to HIV medication ($P = 0.05$) (**Table 4**). There was no evidence that “probable PTSD” was associated with poor academic performance, disciplinary problems at school, school days missed in the past month, visit to the health unit, and any hospital admission (see **Table 4**).

Table 4. Outcomes associated with probable PTSD

Outcome	Parameter	PTSD UaOR; 95% CI; *P* value	PTSD aOR; 95% CI; *P* value
Sexual debut[a]	Binary; Ever had sex	2.69 (1.10–5.75) $P = 0.031$	2.78 (1.12–6.55) $P = 0.020$
Poor academic performance	Binary; Yes (poor)	0.81 (0.36–3.27) $P = 0.510$	0.82 (0.30–2.27) $P = 0.710$
Disciplinary school problems	Binary; Yes (problems)	1.95 (0.89–5.54) $P = 0.159$	1.90 (0.79–4.54) $P = 0.150$
School days missed in past month	Ordinal; Missed more	0.97 (0.91–1.03) $P = 0.341$	0.97 (0.91–1.03) $P = 0.340$
Visit to the health unit	Binary; Yes	0.60 (0.31–1.16) $P = 0.132$	0.60 (0.31–1.16) $P = 0.131$
Any hospital admission	Binary; Yes	1.44 (0.53–3.93) $P = 0.470$	1.44 (0.53–3.93) $P = 0.471$
Missed Cotrimoxazole and prophylaxis[a]	Ordinal; Missed more doses	0.49 (0.35–0.98) $P = 0.048$	0.59 (0.35–0.98) $P = 0.048$
Missed any ART dose[a]	Binary; Yes (missed)	0.23 (0.12–0.99) $P = 0.050$	0.13 (0.02–0.97) $P = 0.051$

[a]Assessed only among adolescents.

Discussion

This study aimed to determine the prevalence of probable PTSD among CA-HIV in Uganda, identify factors associated with probable PTSD, and assess its impact on clinical and behavioral outcomes. Probable PTSD was found to be highly prevalent, with significant associations observed for specific sociodemographic, caregiver, and psychiatric factors. These findings contribute to the limited body of literature on PTSD among CA-HIV in sub-Saharan Africa, providing insights into factors associated with probable PTSD and potential intervention targets.

The prevalence of probable PTSD in this study (19.6%) aligns with previous findings that suggest elevated rates of PTSD among PLHIV compared to the general population [35, 36]. However, our results differ significantly from the 1.3% prevalence reported by Kamau et al. [6] in Kenya. This heterogeneity can be attributed to variations in study design, participant selection, and measurement tools. First, study design differences—including sampling methods and analytical models—may account for discrepancies in prevalence estimates. Second, participant selection criteria varied across studies; for instance, the Kenyan study involved only urban youth, while our study sampled both urban and rural participants, who may have differing levels of trauma exposure. Third, measurement tools differed: The Kenyan study employed the MINI-Kid, a structured diagnostic interview that follows DSM criteria comprehensively, whereas our study used the CASI-5, relying on 2 PTSD-related items based on caregiver report. While the MINI-Kid offers diagnostic precision, the CASI-5 has the advantage of practicality in low-resource settings, though it may under- or overestimate PTSD prevalence due to its limited item set. The high prevalence of "probable PTSD" established by this study is consistent with results from prior research which suggest that stress-related disorders (including PTSD) are elevated among PLHIV as compared to those living without HIV/AIDS [37, 38]. Symptoms of PTSD, such as avoidance of traumatic memory recall, recurrent flashbacks, and heightened arousal, have been linked to HIV-related medical challenges [39, 40], possibly explained by a decline in immune system effectiveness through reduced CD4 cell counts and heightened severity of physical HIV symptoms [41] coupled with inconsistent adherence to medication [5]. In this study, rural settings were associated with lower PTSD prevalence, possibly due to differences in exposure to violence or stressors common in urban areas [42–44]. Study site (living in a rural setting) was protective against probable PTSD, aligning with findings from previous studies which established that people living within urban environments experience particularly high levels of trauma [45, 46] compared to those in rural areas.

This study provides novel insights into the complex interplay of sociodemographic, caregiver, and psychiatric factors influencing PTSD among CA-HIV. The association between caregiver distress and probable PTSD underscores the importance of family-centered interventions. This research demonstrated that, in comparison to the 5–11-year age bracket, the 12–17-year age group exhibited an almost threefold likelihood of experiencing probable PTSD, likely attributed to an elevated degree of exposure and challenges associated with transitioning their medical care to adult care settings, disclosure of their HIV status, coupled with the increased burden and interplay of physical, emotional, and social stressors during this susceptible developmental phase [47, 48]. Additionally, our finding that rural settings are protective against PTSD offers a nuanced perspective on environmental influences. While previous studies have identified these factors associated with probable PTSD individually, this study integrates them into a comprehensive model, addressing a critical gap in understanding PTSD within this population.

Expanding comparisons beyond Kenya, PTSD prevalence among CA-HIV in South Africa mirrors our findings, reflecting shared socioeconomic and health-care challenges across these regions [49]. Additionally, the association between probable PTSD and anxiety in this study aligns with prior research, emphasizing the interconnected nature of psychiatric comorbidities in this population [6, 17, 50]. These comparisons underscore the need for tailored interventions that consider the unique sociocultural and systemic factors in sub-Saharan Africa.

Despite these contributions, several limitations warrant consideration. The reliance on only 2 CASI-5 items to define probable PTSD is a notable limitation, as it does not encompass the full DSM-5 diagnostic criteria. While the CASI-5 has demonstrated reliability and validity in similar populations [28], the findings should be interpreted cautiously as exploratory. Additionally, caregiver-reported data for some variables introduces the potential for reporting bias. Another significant limitation is the lack of adjustment for multiple testing, which increases the risk of Type I errors and necessitates cautious interpretation of the findings [34]. Lastly, the cross-sectional study design limits our ability to infer causal relationships, highlighting the need for longitudinal studies to explore these associations further.

The high prevalence of PTSD among CA-HIV calls for integrating mental health services into routine HIV care, as recommended by the WHO [51, 52]. Interventions should address the broad spectrum of psychopathology observed, including psychiatric comorbidities such as anxiety and ADHD. Family-centered approaches that mitigate caregiver distress may further reduce PTSD risk in CA-HIV. Future research should focus on developing context-specific mental health interventions and evaluating their effectiveness in improving outcomes for CA-HIV.

This study provides valuable insights into the prevalence and correlates of probable PTSD among CA-HIV in Uganda. While limitations, such as the reliance on caregiver reports and the use of 2 CASI-5 items, necessitate cautious interpretation, the findings underscore the urgent need for integrated mental health services. Future research should build on these exploratory findings to develop and evaluate interventions tailored to the unique needs of CA-HIV in sub-Saharan Africa. Similarly, future research should focus on developing and evaluating tailored intervention-based models that integrate mental health into HIV care services, considering unique contextual factors such as cultural practices, caregiver roles, and resource constraints in sub-Saharan Africa [53, 54].

Data accessibility statement

All data and materials in this manuscript, additional files, and figures attached are freely available with no restrictions.

Supplemental files

The supplemental files for this article can be found as follows:

Table S1. Data collection tools for the study.

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Competing interests

Professor Gadow is a shareholder in Checkmate Plus, publisher of the Child and Adolescent Symptom Inventory-5. The other authors declare that they have no competing interests.

Author contributions

RSM, WS, EK, GZR, PA, TTS, KDG, JL, and VP have made substantial contributions to conception, design, acquisition of data, drafting the manuscript, revising it critically and gave the final approval of this version to be published. WS did the analysis and interpretation of data. Each author participated sufficiently in this work and takes public responsibility for appropriate portions of the content.

Ethics approval and consent to participate

This study was conducted in Uganda under the authorization HS 1601 approved by the Science and Ethical Committee of the Uganda Virus Research Institute and the Uganda National Council of Science and Technology. Consent to participate in this study was obtained from caregivers and assent from children and adolescents.

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