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Resilience and Associated Factors Among War-Displaced Adolescents Living with Host Families in Butembo, Democratic Republic of the Congo: A Cross- Sectional Study

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Abstract

Background

War-related displacement can disrupt adolescents' family relationships, education, safety, and access to mental-health care. The role of host-family and community resources in resilience among internally displaced adolescents in Butembo, Democratic Republic of the Congo (DRC), remains insufficiently documented.

Objective

To describe resilience and mental-health symptoms and identify factors associated with resilience among war-displaced adolescents living with host families in Butembo.

Methods

We conducted a cross-sectional descriptive and analytical study from 16 to 27 September 2026. Adolescents aged 12–17 years who had been internally displaced and had lived with a host family for at least six months were recruited through snowball sampling. Data were collected using a structured questionnaire, the Child and Youth Resilience Measure-28 (CYRM-28), the Child PTSD Symptom Scale (CPSS), and the Patient Health Questionnaire-8 (PHQ-8). Descriptive analyses and multiple linear regression were conducted. Ethics approval was obtained from the Catholic University of Graben ethics committee (CERM-UCG No. CERM-26-318).

Results

Of 297 participants, 57.2% were girls. The mean traumatic-event count was 7.76 (SD 3.15). Among participants with available data, 66.5% screened positive for probable post-traumatic stress symptoms (169/254), and 45.1% had moderate-to-severe depressive symptoms (124/275). Using the sample median CYRM-28 score of 74 as an exploratory threshold, 50.2% were classified as having lower resilience (144/287). In the adjusted linear model (n = 272; R^2=0.609; adjusted R^2=0.585), family support (β = 1.04, 95% CI 0.72–1.37) and community support (β = 1.17, 95% CI 0.83–1.51) were positively associated with resilience. Direct exposure to violence was also positively associated with resilience (β = 4.96, 95% CI 1.08–8.85), an unexpected finding requiring cautious interpretation.

Conclusion

High levels of probable post-traumatic stress and depressive symptoms coexisted with substantial variation in resilience. Family and community support were associated with higher resilience, but the

cross-sectional design, non-probability sampling, and potential overlap between measures limit causal interpretation. Community-based support and accessible mental-health services warrant evaluation in this population.

Introduction

Armed conflict threatens children's and adolescents' health, development, education, and social relationships. Young people affected by conflict may experience bereavement, family separation, physical violence, destruction of homes, interrupted schooling, and prolonged uncertainty. Such exposures can increase the risk of post-traumatic stress symptoms and depression, while also disrupting the social resources that support adaptation [1–5].

Resilience is commonly understood as a dynamic process through which individuals draw on personal, relational, and contextual resources to maintain or regain functioning in the face of adversity. It should not be interpreted as invulnerability or as evidence that exposure to violence is harmless. Research among conflict-affected youth in the Democratic Republic of the Congo (DRC) has highlighted the importance of potentially traumatic events, coping resources, caregiver relationships, and social context [3, 5]. Measures such as the Child and Youth Resilience Measure (CYRM) assess resources that may support adaptation, rather than diagnosing a mental-health condition [6, 7].

The eastern DRC continues to experience recurrent insecurity and large-scale internal displacement. Many displaced families live within host communities rather than in formal camps. Host-family arrangements may provide practical assistance, belonging, and continuity, but may also be affected by overcrowding, poverty, strained household resources, and limited access to education and health services [8–12]. Adolescents may face particular challenges as they negotiate developmental transitions while coping with displacement and trauma.

In Butembo, North Kivu, adolescents displaced by conflict are hosted in extended-family and non-relative households. Despite the importance of these arrangements, local evidence on resilience, mental-health symptoms, and the resources associated with resilience remains limited. Understanding these associations could help local services develop responses that combine mental-health care with family- and community-level support.

This study therefore aimed to describe the sociodemographic and displacement characteristics of war-displaced adolescents living with host families in Butembo, assess resilience and mental-health symptoms, and identify factors associated with CYRM-28 resilience scores. Because the study was cross-sectional, associations are interpreted as non-causal.

Methods

Study design and setting

We conducted a cross-sectional descriptive and analytical study in Butembo, North Kivu Province, in the DRC. Data collection took place from 16 to 27 September 2026.

Participants and eligibility

Eligible participants were internally displaced adolescents aged 12–17 years who had lived with a host family for at least six months. Adolescents living in institutions, formal displacement camps, or with their biological parents were excluded. Participation required guardian permission and adolescent assent. The final sample included 297 adolescents.

Sample size and recruitment

The study team planned to recruit at least 250 participants, using a pragmatic rule based on the number of candidate predictors and allowing for incomplete data. Because no comprehensive sampling frame was available, participants were recruited through snowball sampling facilitated by community contacts. Recruitment reportedly began through multiple entry points in different neighbourhoods, each participant could refer no more than three eligible adolescents, and where multiple eligible adolescents were identified in one household, selection was made by drawing lots. This non-probability method may have overrepresented adolescents connected to the initial referral networks; therefore, the sample should not be considered statistically representative of all displaced adolescents in Butembo.

Measures

Resilience was measured using the 28-item Child and Youth Resilience Measure (CYRM-28), with items scored on a five-point Likert scale and a total score ranging from 28 to 140. Higher scores indicate greater reported access to resilience-related resources. The study also collected sociodemographic and displacement characteristics, perceived economic circumstances, household size, perceived safety, exposure to potentially traumatic events, family support, community support, access to health care, and school attendance.

Post-traumatic stress symptoms were assessed using the 17-item Child PTSD Symptom Scale (CPSS), with a reported total range of 0–51. A score greater than 12 was used in the source analysis to classify probable post-traumatic stress symptoms. Depressive symptoms were assessed using the eight-item Patient Health Questionnaire (PHQ-8), with total scores from 0 to 24; moderate-to-severe symptoms were defined as a score of 10 or greater. These are screening classifications, not clinical diagnoses.

The structured questionnaire was administered face-to-face by trained local interviewers, using French-language materials with oral administration in Kiswahili as needed. Data were entered on Android devices using KoboCollect, with daily uploading when internet access was available. Interviews lasted approximately 30 minutes. The manuscript materials describe interviewer training and linguistic

harmonisation; however, formal translation procedures and local psychometric testing were not documented in sufficient detail and should be clarified.

Statistical analysis

Analyses were conducted in R version 4.4.1. Categorical variables were summarised using counts and percentages; continuous variables were summarised using means and standard deviations or medians and interquartile ranges, as appropriate. Normality was assessed using the Shapiro–Wilk test. Chi-square or Fisher's exact tests were used for categorical comparisons, and the Mann–Whitney test was used for non-normally distributed continuous variables. Multiple linear regression was used to examine factors associated with the CYRM-28 total score. Statistical significance was set at $p < 0.05$. Candidate variables were selected using an a priori strategy, with variables reportedly excluded when missingness exceeded 5% or the variance inflation factor exceeded 5.

The source analysis also classified global resilience as lower or higher using the observed sample median of 74. Because this threshold is sample-derived rather than an established clinical or diagnostic cut-off, the classification is presented as exploratory. The continuous CYRM-28 score is the more informative outcome for regression and interpretation.

Results

Participant characteristics

A total of 297 adolescents were included. Girls accounted for 57.2% (170/297), and 51.5% were aged 12–14 years. Approximately 43.1% were not currently attending school. Half lived with members of their extended family (50.2%), while 19.9% lived with non-relative host families; the living arrangement of the remaining 30.0% was not specified in the database. Nearly half rated their household's economic situation as poor or very poor (46.8%). More than half had been displaced for one to two years (57.2%). The most frequently reported places of origin were Beni (41.8%), Lubero (32.3%), and Butembo (19.2%). Family separation was reported by 74.1%, and 58.9% reported witnessing severe violence. Only 36.7% reported feeling safe often or always (Table 1).

Table 1
Sociodemographic, displacement, and host-household characteristics (N = 297)

Characteristic	**n (%) (N = 297)**
Age	
12–14 years	153 (51.5)
15–17 years	144 (48.5)
Sex	
Girls	170 (57.2)
Boys	127 (42.8)
Education level	
Primary/lower secondary	218 (73.4)
Upper secondary	46 (15.5)
No schooling/not currently enrolled category	33 (11.1)
Currently attending school	
Yes	169 (56.9)
No	128 (43.1)
Host household	
Extended family	149 (50.2)
Non-relative family	59 (19.9)
Other/not specified	89 (30.0)
Duration in host family	
6–11 months	71 (23.9)
1–2 years	166 (55.9)
≥ 3 years	60 (20.2)
Host household size	
1–4 people	42 (14.1)
5–7 people	134 (45.1)
≥ 8 people	121 (40.7)

Characteristic	n (%) (N = 297)
Perceived economic situation	
Good/very good	158 (53.2)
Poor/very poor	139 (46.8)
Time since displacement	
6–11 months	66 (22.2)
1–2 years	170 (57.2)
≥ 3 years	61 (20.5)
Place of origin	
Beni	124 (41.8)
Lubero	96 (32.3)
Butembo	57 (19.2)
Ituri	7 (2.4)
Other territories	13 (4.4)
Separated from family member	
Yes	220 (74.1)
No	77 (25.9)
Witnessed severe violence	
Yes	175 (58.9)
No	122 (41.1)
Feeling of safety	
Never/rarely	96 (32.3)
Sometimes	92 (31.0)
Often/always	109 (36.7)

Traumatic events, mental-health symptoms, and access to care

The mean traumatic-event count was 7.76 (SD 3.15), and the median was 8 (IQR 5–11). Exposure was classified as high for 62.3% of participants. Among the 254 adolescents with CPSS data, 169 (66.5%)

scored above the study's threshold for probable post-traumatic stress symptoms. Among adolescents with PHQ-8 data, 124 (45.1%) had moderate-to-severe depressive symptoms. Regarding access to care, 42.8% did not know where to obtain health care, and among those answering the relevant item, approximately half reported never or rarely receiving adult assistance to access care (Table 2).

Table 2
Traumatic-event exposure, mental-health symptoms, and access to care

Domain	Indicator/category	n (%) or summary
Traumatic events	Mean count (SD)	7.76 (3.15)
	Median (IQR)	8 (5–11)
Exposure level	Low	25 (8.4)
	Moderate	87 (29.3)
	High	185 (62.3)
CPSS	Mean (SD)	21.74 (15.04)
	Median (IQR)	19 (9–32)
Probable post-traumatic stress symptoms	CPSS > 12: yes	169/254 (66.5)
	CPSS ≤ 12	85/254 (33.5)
PHQ-8	Mean (SD)	9.41 (6.77)
	Median (IQR)	8 (4–14)
PHQ-8 category	Minimal	79/275 (28.7)
	Mild	72/275 (26.2)
	Moderate	61/275 (22.2)
	Moderately severe	34/275 (12.4)
	Severe	29/275 (10.5)
Knows where to obtain care	No	127/297 (42.8)
	Yes	170/297 (57.2)

Resilience

Global CYRM-28 scores were available for 287 participants. Using the sample median of 74 as an exploratory split, 144 (50.2%) were classified as having lower scores and 143 (49.8%) as having higher scores. Across the reported dimensions, 36.5% had low individual resilience, 34.2% low family resilience, and 36.4% low community resilience. When low and moderate categories were combined, 68.4% had low-to-moderate family resilience and 74.8% had low-to-moderate community resilience. These

descriptive categories should be interpreted cautiously because the cut-points and classification rules require clearer documentation (Table 3).

Table 3
CYRM-28 resilience classifications

Domain	Category	n (%)
Global resilience	Lower (≤ 74)	144/287 (50.2)
	Higher (> 74)	143/287 (49.8)
Individual dimension	Low	105/288 (36.5)
	Moderate	90/288 (31.2)
	High	93/288 (32.3)
Family dimension	Low	101/295 (34.2)
	Moderate	101/295 (34.2)
	High	93/295 (31.5)
Community dimension	Low	107/294 (36.4)
	Moderate	113/294 (38.4)
	High	74/294 (25.2)

Factors associated with resilience

The multiple linear regression model included 272 observations and was statistically significant (R^2=0.609; adjusted R^2=0.585; F = 24.895; $p < 0.0001$). Family support and community support were positively associated with the CYRM-28 score. Compared with the stated reference economic category, the categories labelled “comfortable/wealthy” and “very poor” had positive and negative coefficients, respectively. Direct exposure to violence was also positively associated with the score. Because the economic reference category is inconsistently labelled in the source tables, those coefficients require confirmation before publication (Table 4).

Table 4
Factors associated with CYRM-28 score in the adjusted linear regression model (N = 272)

Factor	Adjusted β	95% CI	p-value
Perceived economic situation: comfortable/wealthy	8.36	3.14 to 13.59	0.002
Perceived economic situation: very poor	−8.32	−15.52 to − 1.13	0.024
Direct exposure to violence	4.96	1.08 to 8.85	0.013
Family support score	1.04	0.72 to 1.37	< 0.001
Community support score	1.17	0.83 to 1.51	< 0.001

Model fit: R^2=0.609; adjusted R^2=0.585; F = 24.895; p < 0.0001.

Differences by sex

Probable post-traumatic stress symptoms were more frequent among girls than boys (74.3% versus 55.7%; p = 0.0033). Boys were more likely to be out of school at the time of the survey (52.0% versus 36.5%; p = 0.0002). The proportion reporting that they never felt safe was similar by sex (7.1% among girls and 7.9% among boys; p = 0.7857) (Table 5).

Table 5
Selected indicators by sex

Indicator	Girls n/N (%)	Boys n/N (%)	Total n/N (%)	p-value
Probable post-traumatic stress symptoms (CPSS > 12)	110/148 (74.3)	59/106 (55.7)	169/254 (66.5)	0.0033
Not currently attending school	62/170 (36.5)	66/127 (52.0)	128/297 (43.1)	0.0002
Never feels safe	12/170 (7.1)	10/127 (7.9)	22/297 (7.4)	0.7857
Note. Denominators vary according to available data.				

Correlations

The supplementary correlation matrix reported positive correlations between CYRM-28 scores and family support (r = 0.57) and community support (r = 0.60), and negative correlations between resilience and depressive symptoms (r = − 0.42). CYRM-28 scores were positively correlated with CPSS scores (r = 0.23). Family and community support were strongly correlated with each other (r = 0.62). Because several support items may conceptually overlap with the CYRM-28 resource domains, these correlations may partly reflect shared measurement content and should not be interpreted as independent causal effects (Supplementary Table S1**)**.

Discussion

In this cross-sectional study of 297 war-displaced adolescents living with host families in Butembo, probable post-traumatic stress symptoms and depressive symptoms were common, while resilience scores varied substantially. Family support and community support were positively associated with CYRM-28 scores in the adjusted model. Perceived economic circumstances were also associated with resilience. The positive association between reported direct exposure to violence and resilience was unexpected and should be interpreted cautiously.

Mental-health burden among displaced adolescents

Two-thirds of participants with available CPSS data screened positive for probable post-traumatic stress symptoms, and nearly half of those with PHQ-8 data had moderate-to-severe depressive symptoms. These findings indicate a substantial need for accessible, age-appropriate psychosocial support and referral pathways. They should not, however, be interpreted as diagnostic prevalence estimates: both instruments are screening measures, and the threshold used for the CPSS should be justified with reference to the exact version and language used. Missing data also mean that the denominators differ across outcomes.

The findings are consistent with research documenting substantial psychological distress among conflict-affected children and adolescents in the DRC and other humanitarian settings [3, 5, 13, 14]. Differences between studies may reflect the population sampled, timing and intensity of conflict exposure, instruments and thresholds, access to support, and sampling methods. Direct comparisons should therefore be made cautiously.

Family and community support

Family and community support scores were associated with higher resilience scores. Host families may provide emotional acceptance, daily care, protection, and support for schooling, while peers, teachers, faith leaders, and other community members may offer additional sources of belonging and practical help. In displacement settings where formal services are limited, these relationships may be especially important. Previous work with conflict-affected youth has also highlighted the relevance of caregiver relationships and coping resources [3, 5].

Nevertheless, the observed associations do not demonstrate that host-family placement causes greater resilience or that family-based support is superior to individual care. The CYRM-28 includes relational and contextual resources, while the study also measured family and community support using separate scales. This conceptual overlap may inflate correlations and regression coefficients. Future analyses should examine the item content and construct validity of the scales, assess multicollinearity, and, where possible, estimate the contribution of support measures after accounting for overlapping items or use outcomes less directly embedded in the exposure measures.

Economic circumstances

Perceived economic circumstances were associated with resilience in the adjusted model. Material hardship may restrict access to food, education, health care, and safe living conditions, while households with greater resources may have more capacity to provide stability. However, the economic categories and reference group are inconsistently reported in the current tables. The coefficients should not be interpreted definitively until the variable coding and reference category are checked against the original data and output.

Unexpected association between violence exposure and resilience

Direct exposure to violence was positively associated with resilience scores, and the supplementary correlation matrix also showed a small positive correlation between CYRM-28 and CPSS scores. These results are counterintuitive if higher CPSS scores represent more symptoms. Several explanations are possible, including coding or scoring errors, differences in who was available for recruitment, unmeasured confounding, variation in perceived access to resources, or shared measurement artefacts. The study design cannot distinguish among these explanations. The findings should not be presented as evidence that violence strengthens resilience or produces post-traumatic growth. The direction of coding, the raw distributions, the regression specification, and the correlation matrix should be verified before publication.

Gender and education

Girls had a higher proportion of probable post-traumatic stress symptoms, whereas boys were more often not attending school. These differences may reflect gendered patterns of exposure, responsibilities, safety, and educational disruption, but the study did not establish the mechanisms. Disaggregated and qualitative research could help clarify the needs of girls and boys and support the design of gender-responsive mental-health and education programmes.

Implications for practice

The findings support attention to the social environment in which displaced adolescents live. Potential responses include strengthening caregiver skills, providing host households with practical and material support, supporting safe peer and community activities, facilitating school re-entry, and ensuring confidential referral pathways for adolescents with significant distress. These approaches should complement, not replace, access to individual assessment and evidence-informed mental-health care. Their effectiveness and feasibility should be evaluated prospectively with adolescents and host communities.

Strengths and limitations

Strengths include a focus on adolescents living in host families, the inclusion of 297 participants, the use of structured measures of resilience and mental-health symptoms, and the collection of information on family, community, and service-access factors. Several limitations must be considered. First, the

cross-sectional design precludes causal inference and cannot establish temporal relationships between support and resilience. Second, snowball sampling may have produced selection bias and limits generalisability. Third, missing data reduced the analytic sample for several outcomes and the adjusted model. Fourth, the questionnaire was administered in French or Kiswahili, but formal translation, back-translation, and local psychometric validation procedures were not fully documented. Fifth, the median-derived resilience threshold is sample-specific and should not be treated as a validated classification. Sixth, conceptual overlap between the CYRM-28 and the separate support scales may partly account for observed associations. Finally, self-reported trauma and mental-health symptoms may be affected by recall, disclosure, and social-desirability biases.

Conclusion

Among war-displaced adolescents living with host families in Butembo, probable post-traumatic stress symptoms and depressive symptoms were common. Family support, community support, and perceived economic circumstances were associated with resilience scores, although overlap between measures and methodological limitations warrant caution. The positive association between direct violence exposure and resilience requires verification and should not be interpreted as a protective effect of violence. Community- and family-sensitive support, accessible mental-health services, and educational continuity are reasonable priorities for local programmes, but their effects should be assessed in longitudinal or intervention studies.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Ethics Committee of the Université Catholique du Graben (CERM-UCG No. CERM-26-318). All study procedures involving human participants were conducted in accordance with the relevant institutional and national ethical guidelines and regulations and the principles of the Declaration of Helsinki. Written informed consent was obtained from the participants' parents or legal guardians, and assent was obtained from the adolescents, as specified in the study protocol. Interviews were conducted in a setting intended to protect participants' privacy, and responses were coded for analysis. The study protocol provided for pausing or discontinuing interviews if participants experienced distress and for referral to a neuropsychiatry clinician at Matanda Secondary Referral Hospital for adolescents experiencing severe distress. The study team indicated that data would be stored securely for five years and subsequently destroyed. As recruitment involved participant referrals, referral names and contact details were to be stored separately from research responses and deleted once recruitment was complete.

This study was not a clinical trial.

Consent for publication

Not applicable. No individually identifiable participant information is reported in this manuscript.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors’ contributions

J.K.K. contributed to conceptualization, data curation, formal analysis, investigation, methodology, project administration, resources, software, supervision, validation, visualization, and writing of the original draft and review and editing of the manuscript. F.K.S., A.P.K., and H.K.S. contributed to conceptualization, resources, software, supervision, validation, visualization, and writing of the original draft and review and editing of the manuscript. R.M.M. contributed to conceptualization, data curation, formal analysis, investigation, methodology, project administration, resources, software, supervision, validation, visualization, and writing of the original draft and review and editing of the manuscript. L.P.S. contributed to conceptualization, methodology, project administration, resources, software, supervision, validation, visualization, and writing of the original draft and review and editing of the manuscript. All authors reviewed and approved the manuscript.

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Supplementary Files

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