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The intergenerational impact of war: longitudinal relationships between caregiver and child mental health in postconflict Sierra Leone

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Background: Trauma from witnessing events such as bombings and killings as well as direct victimization or participation in violence has been associated with psychosocial distress and poor mental health among war-exposed children and adolescents. This study examines the relationship between caregiver mental health and child internalizing (anxiety and depression) symptoms over a 4-year period in postconflict Sierra Leone. **Methods:** The sample included 118 adolescent Sierra Leonean youth (73% male; mean age = 16.5 years at Time 1) and their caregivers (40% male; mean age = 39.0 at Time 1). To measure depression and anxiety symptoms, the Hopkins Symptom Checklist–25 was used with adults and the Oxford Measure of Psychosocial Adjustment – previously validated for use with children and adolescents in the region – was used to assess youth. A multivariate hierarchical linear model (HLM) for studying change within dyads was implemented to study covariation in internalizing symptoms among caregivers and youth over time; these models also included covariates at the individual, family and community levels. The relationship of caregiver mental health to child's internalizing was tested in a latent variable extension of the HLM. **Results:** The latent variable extension estimated that a one standard deviation (SD) change in caregiver anxiety/depression was associated with a .43 SD change in youth internalizing ($p < .01$) over the 4-year period. Family acceptance was negatively related to youth internalizing ($p < .001$), while community stigma was positively associated ($p < .001$). **Conclusions:** The findings highlight an important interplay between caregiver and child mental health within the postconflict setting and the need for psychosocial interventions to extend beyond the individual to account for family dynamics. **Keywords:** War, depression, anxiety, intergenerational, dyadic analysis.

Introduction

Many factors shape the mental health of children and adolescents exposed to war. Trauma from witnessing events such as bombings and killings (Marshall, Schell, Elliott, Berthold, & Chun, 2005; Neugebauer et al., 2009; Panter-Brick, Eggerman, Gonzalez, & Safdar, 2009; Pham, Vinck, & Stover, 2009) as well as direct victimization or participation in violence (Annan, Blattman, Mazurana, & Carlson, 2011; Betancourt, Agnew-Blais, Gilman, Williams, & Ellis, 2010; Kohrt et al., 2008) have been associated with psychosocial distress and poor mental health. Exploration of the impact of such events on mental health often fails to recognize the link between individual-level exposures and the broader ecological context, including the impact of war on family and community functioning (Betancourt & Williams, 2008).

Effects of war on the family structure

The psychological sequelae of war exposures for children and their caregivers have tremendous implications for interpersonal relationships. Families are often displaced from their homes and separated from one another, and emotional stress may impair the ability of adults to provide care and nurturance for young children (Barber, 1999; Betancourt, 2015; Cassidy, Zoccolillo, & Hughes, 1996; Gewirtz, Forgatch, & Wieling, 2008; Karen & Joy, 2003; Lai, Hadi, & Llabre, 2014). In a study of mothers affected by war in northern Uganda, Morris and colleagues observed that depressed mothers showed impaired monitoring and nurturance of young children (Morris et al., 2012). In a study of Afghan families, Panter-Brick and colleagues observed that caregiver mental health was associated with eight dimensional measures of child mental health, including post-traumatic stress, depression, psychiatric difficulties, and prosocial strength (Panter-Brick, Grimon, & Eggerman, 2014). To assess the role that family context plays in shaping children's mental health in the postconflict setting, it is essential that researchers not only understand the war exposure histories and mental health of children and adolescents, but also the mental health of the adult caregivers.

In Western settings, studies have identified biological and environmental underpinnings of covariation in caregiver and child mental health (Earls & Carlson, 2001; Jones, 2008; Overstreet, Dempsey, Graham, & Moely, 1999; Sullivan, Neale, & Kendler, 2000). Only a limited body of research has outlined

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the ways in which wartime stressors affect caregiver mental health and its link to child mental health (Dybdahl, 2001; Farhood, 1999; Locke, Southwick, McCloskey, & Fernandez-Esquer, 1996; Nomura & Chemtob, 2009; Panter-Brick et al., 2014). Feldman and Vengrober (2011) found that PTSD among Israeli children living near the Gaza strip was associated with maternal depression, anxiety and post-traumatic stress symptoms. A similar pattern was found between paternal post-traumatic stress symptoms and child developmental, behavioral and emotional problems in postconflict Bosnia and Herzegovina (Klaric et al., 2008). Comparable findings have been reported in Central America (Locke et al., 1996) and South Asia (Wickrama & Kaspar, 2007).

Most studies in postconflict settings have been cross-sectional, and thus can identify correlations between child and adult mental health, but cannot determine whether such associations are maintained over time or whether change in the mental health of caregivers relates to change in the mental health of youth (Betancourt, 2011a). One exception, a recent study by Panter-Brick et al. (2014), reported on two waves of caregiver and child mental health data collected in Afghanistan and Pakistan. They showed that changes in caregiver self-reported mental health were related to child-reported post-traumatic stress, and had a predictive impact equivalent to lifetime exposure to one to two traumatic events. They also found that changes in parent self-reported mental health were related to parent-reported child total difficulties and interference in domains of social life on the Strengths and Difficulties Questionnaire (Goodman & Goodman, 2009).

Less is known about the impact of caregiver mental health on older adolescents, because most research in the field has been conducted with younger children (Avan, Richter, Ramchandani, Norris, & Stein, 2010; Parsons, Young, Cooper, & Stein, 2011), with less attention paid to older youth (Pearson et al., 2013), who are in a developmental period characterized by increasing independence, rapid cognitive development, and a stronger influence of peers and community.

Many studies have focused on a narrow range of risk factors related to mental health of youth in the postconflict context, for example, the cumulative effect of war exposures, without regard to postconflict factors. The inclusion of contextual information is necessary to situate analyses within socio-ecological context in which war-affected youth live on a daily basis (Betancourt, 2011b; Tol, Jordans, Kohrt, Betancourt, & Komproe, 2013).

In contrast, in a longitudinal study in Sierra Leone, internalizing problems were related not only to longer time spent with armed groups and young age of involvement but also to postconflict hardships (Betancourt, Brennan, Rubin-Smith, Fitzmaurice, & Gilman, 2010). In the same sample, losing a caregiver and multiple daily hardships were associated with being in the subgroup of individuals who experienced a worsening of internalizing symptoms over time. Family abuse and neglect postconflict and social disorder in the community were associated with membership in the subgroup who maintained elevated levels of internalizing problems (Betancourt, Gilman, Brennan, Zahn, & VanderWeele, Under Review; Betancourt, McBain, Newnham, & Brennan, 2013).

The present study

This study, set in postconflict Sierra Leone, examines the relationship between caregiver and youth depression and anxiety symptoms over a 4-year period. Using a prospective design, we assessed trauma experience, postconflict adversity and psychological symptoms in a cohort of male and female war-affected youth and their caregivers in 2004 and 2008. In addition to evaluating participants' mental health profiles, we measured factors anticipated to shape mental health at the individual, family and community levels.

We hypothesized that after controlling for other variables, changes in caregiver depression and anxiety symptoms at baseline and follow-up would be predictive of youth's symptoms over this same period.

Methods

Participants

This study is situated within a prospective longitudinal study of war-affected youth in postconflict Sierra Leone. Participants were recruited from six districts located throughout Sierra Leone: Bo, Kenema, Kono, Bombali, Moyamba, and Pujehun. At T1 (2002), youth between the ages of 10 and 17, who were formerly associated with armed groups and who had contact information available through registries of our collaborating non-governmental agency partner, were approached and invited to participate. A second cohort of community youth who had not received reintegration services were also invited to participate. At T2 (2004), an additional cohort of self-reintegrated former child soldiers was recruited, and the entire sample was extended to include caregiver interviews. At T3 (2008), we were able to recontact 85% of youth interviewed in 2004. Demographic characteristics of the sample are displayed in Table 1.

Interviews were conducted with youth participants in 2002, 2004, and 2008. Data for all participants were collected through in-home interviews conducted by Sierra Leonean research assistants trained and monitored by the study principal investigator and research staff. All youth provided verbal assent, and verbal consent was also provided by youth's caregiver. Social workers travelled with the research team to respond to risk of harm situations (e.g., suicidality) and make referrals to local service programs as appropriate. Ethical approval was given by the Institutional Review Boards of the Boston University Medical School/Boston Medical Center and the Harvard School of Public Health.

The current sample includes all youth and caregivers for whom data were jointly available in 2004 and 2008 and to those youth for whom the same caregiver was interviewed at both time points (n = 118 dyads) in order to reliably estimate change in caregiver mental health over time.

Table 1 Characteristics of the sample ($N = 118$)[a]

Characteristic	Youth	Caregivers
Demographics		
Female	31 (26%)	71 (60%)
Age in 2004	16.5 (2.5)	39.0 (11.4)
Religion		
Muslim	68 (58%)	69 (60%)
Christian	51 (43%)	46 (40%)
Proficient literacy	38 (37%)	N/A
War Exposures		
Associated with armed groups	118 (100%)	11 (10%)
Age began with armed groups	11.3 (3.1)	N/A
Duration with armed groups (in years)	2.7 (2.1)	N/A
Witnessed armed conflict	105 (89%)	43 (37%)
Killed/injured others	37 (31%)	0 (0%)
Victim of rape	20 (17%)	11 (13%)
Mental health outcome[b]		
Mean depression and anxiety, 2004	34.5 (6.6)	53.0 (13.4)
Mean depression and anxiety, 2008	33.9 (5.9)	46.8 (11.9)
Relationship of Caregiver to Youth (%)		
Mother	43 (36.4)	
Father	25 (21.2)	
Sister or Brother	10 (8.5)	
Aunt or Uncle	19 (16.1)	
Other Relative	21 (17.8)	

Mean (SD) reported for continuous measures; N (%) reported for discrete measures. N/A implies that the question was not asked.
[a]Additional information on the full sample ($N = 529$) can be found in earlier publications (Betancourt et al., 2010).
[b]Mental health outcome measured using the Oxford Measure of Psychosocial Adjustment for youth and Hopkins Symptoms Checklist-25 for adults.

Measures

Internalizing symptoms. Youth were assessed using the Oxford Measure of Psychosocial Adjustment (OMPA), a locally derived instrument developed and validated for use among former child soldiers in northern Uganda and Sierra Leone (MacMullin & Loughry, 2004). Items were measured on a 4-point ordinal scale from 'never' to 'always.' The measure demonstrated strong internal consistency (Cronbach's $\alpha = .81$). Caregivers were assessed using an adapted version of the 25-item Hopkins Symptom Checklist (HSCL), which is measured on a four-point ordinal scale from 'not at all' to 'extremely' and exhibited excellent internal consistency in this sample (Cronbach's $\alpha = .92$) (Hesbacher, Rickels, Morris, Newman, & Rosenfeld, 1980). The scale was forward- and back-translated from English to Sierra Leonean Krio and underwent pilot testing (Hunt et al., 1991) in order to ensure comprehension and relevance of individual items. Regional variation in mental health was considered as a potential confounder, but, there was no association between region and anxiety/depression symptoms in caregivers or children; therefore, region was not included in statistical models.

War exposures. Exposure to severe forms of war violence was evaluated using the Child War Trauma Questionnaire (Macksoud & Aber, 1996). Two forms of toxic exposure (Shonkoff et al., 2012) have previously demonstrated particularly potent effects on the mental health of war-affected Sierra Leonean youth (Betancourt, Brennan, et al., 2010) and were included in analyses: being a victim of rape, and perpetration of violence such as injuring or killing another person.

Family acceptance. A locally derived measure of family acceptance was constructed for use in both 2004 and 2008. The content of these items was based on qualitative work done in consultation with the local research staff and comprised six questions on youths' perceived respect and support from family members (Betancourt et al., 2008). Response options were 'not true', 'sometimes true' and 'always true.' The scale showed strong internal consistency (Cronbach's $\alpha = .91$).

Daily hardships. A composite measure of household assets, drawn from standard items on the UNICEF Multiple Indicator Cluster Survey (UNICEF, 2007), was developed to index relative socioeconomic status (SES) of the household within the broader community. In 2008, an adaptation of the Post-War Adversities Index (Layne, Stuvland, Saltzman, Djapo, & Pynoos, 1999) was added to assess daily hardships under the domains of hunger, economic insecurity, and interpersonal adversities. The scale comprises thirty yes/no questions and demonstrated good internal consistency within the sample (Cronbach's $\alpha = .83$).

Community stigma. Youths' self-perceived stigma within the community was assessed using an adaptation of the Everyday Discrimination Scale (Williams, Yu, Jackson, & Anderson, 1997). This instrument prompts individuals about adverse community interactions such as differential treatment, threats or abuse due to discrimination. We assessed discrimination specific to being a former child soldier (Cronbach's $\alpha = .76$).

Statistical analyses

We modeled both youth and caregiver depression/anxiety over time as simultaneous outcomes. Because the mental health of the youth and caregiver are likely to be correlated, we adopted a dyadic modeling strategy (Barnett, Marshall, Raudenbush, & Brennan, 1993; Kenny, Kashy, & Cook, 2006) using the multivariate hierarchical linear model (HLM) for studying change within dyads (Raudenbush, Brennan, & Barnett, 1995). In contrast to that model, which used three time points and estimated a quadratic equation, with two time points we estimated a linear model to examine the relationship between risk and protective factors with two outcomes, in particular caregiver mental health and youths' internalizing symptoms. Our model incorporated a measurement model by making use of parallel outcome scales allowing estimation of latent outcomes as estimates of true scores that are free from measurement error (Barnett et al., 1993; Raudenbush et al., 1995). Goldberg and others (Goldberg & Sayer, 2006; Goldberg & Smith, 2008, 2011) have employed a similar approach to create a linear growth model with two time points, and Betancourt and colleagues have implemented a two-time-point growth model without the dyadic component in an analysis of PTSD (Betancourt, Newnham, McBain, & Brennan, 2013). In the present model, items were assigned to parallel scales by matching them on standard deviations and centering the items on zero and dividing the subscales by the number of items in each scale. In order to evaluate the relationship of change in caregiver depression and anxiety symptoms on youth internalizing, the latent variable regression (LVR) feature of the HLM 7.0 software (Raudenbush, Bryk, & Congdon, 2011) was employed (Ozer, Brennan, Barnett, & Sperling, 1998; Raudenbush & Sampson, 1999).

In our model, the slope accounts for any secular trend in mental health for either the youth or their caregivers – that is an overall tendency for youth to experience either improving or worsening mental health. The intercept may be predicted by time-invariant variables, such as demographic characteristics, which may also be used to predict the slope. Additionally, time-varying covariates were added to the model testing the association between predictors that change over time with changes in the mental health outcome. The relationship of caregiver

mental health with child mental health is net of all variables in the model predicting both youth and caregiver mental health, thereby reducing the risk that the relationship is due to confounding.

Missing data were addressed using 20 imputed data sets (Rubin, 1987). This approach considers the relationship of missing data to other observed characteristics in the data set, thereby reducing bias that occurs when using complete case analyses (listwise deletion) in addition to accounting for sampling variability across imputations by introducing an error term for each imputed value. The level of missingness on variables ranged from 0% to 2.5%.

All statistical tests were two-sided and conducted at $\alpha = .05$. Growth modeling was performed using HLM 7.0, multiply imputed data sets were created using STATA 11.0/SE's multiple imputation suite (command MI) (StataCorp., 2009), and descriptive analyses were conducted in PASW Statistics 18 (SPSS Inc., 2007).

Results

Sample characteristics

Descriptive characteristics of the sample are shown in Table 1: 73% of youth participants and 40% of primary caregivers interviewed were males. The most common caregiver interviewed was the mother (36.4%), followed by father (21.2%), other relative (17.8%), aunt or uncle (16.1%), and brother or sister (8.5%). Youth were, on average, 16.5-years old, caregivers were 39.0 years. All youth versus 11% of adults self-reported association with armed forces. Among youth, the average age that this association commenced was 11.3-years old and average duration was 2.7 years; 89% of youth and 37% of caregivers reported witnessing armed conflict, including armed attacks, shootings and bomb explosions.

Depression and anxiety trajectories

Results from the youths' internalizing outcomes from the HLM are reported in Table 2. Only the model predicting child mental health, net of the effect of caregiver mental health (LVR), is shown (the complete results of the HLM are included in Appendix S1, available online). The main explanatory variable of interest, caregiver mental health, positively covaried with youth internalizing levels, meaning that an improvement in symptoms among caregivers predicted improvements among youth over this time period ($\beta = .212$, $SE = 0.069$, $p < .01$), after accounting for all other covariates predicting both youth and caregiver mental health in the model. Community stigma positively covaried with youths' internalizing levels ($\beta = .054$, $SE = 0.010$, $p < .001$). An increase in family acceptance from baseline to follow-up was associated with a decrease in internalizing symptoms ($\beta = -.040$, $SE = 0.010$, $p < .001$).

Table 2 Relationship of caregiver mental health, war exposures, and postwar factors to youth depression and anxiety over time

	β-Intercept (*SE*)	β-Slope (*SE*)
Demographics		
Intercept	−.005 (0.036)	.083 (0.053)
Age	−.015 (0.008)*	−.007 (0.013)
Female	−.092 (0.057)	−.020 (0.098)
SES	.001 (0.012)	−.012 (0.017)
War Exposures		
Killed/injured others	.033 (0.050)	−.050 (0.083)
Victim of rape	.118 (0.075)	−.070 (0.118)
Postwar factors		
Daily hardship	.010 (0.008)	.016 (0.014)
Time-varying covariates		
Family acceptance	−.040 (0.010)***	
Child soldier stigma	.054 (0.010)***	
Caregiver HSCL-25 score	.212 (0.069)**	

*$p < .10$; **$p < .01$; ***$p < .001$. SE represents robust standard errors. HSCL stands for Hopkins Symptoms Checklist-25 items, which measures depression and anxiety symptoms.

Discussion

The current analysis demonstrated significant covariation in caregiver and child mental health over time. Over and above the effects of all other covariates in our models, including secular mental health trends over time, there is a robust relationship between change in the caregivers' mental health and that of the youth. Specifically, over a 4-year period following the end of Sierra Leone's civil war a one standard deviation change in caregiver depression and anxiety was associated with a 0.43 standard deviation change in internalizing among youth within their households.

Although substantial evidence links maternal and paternal depression to child mental health difficulties in Western settings (Hughes & Gullone, 2008; Weissman et al., 1987), few studies have investigated the impact of caregiver mental health on youth mental health in postconflict settings. As youth adjust to life following war and re-establish routines and relationships, caregiver mental health and stability significantly influence their psychological health (Betancourt & Khan, 2008). A growing body of evidence has highlighted the important role of caregiver mental health in the development and maintenance of child mental health (Avan et al., 2010; Panter-Brick et al., 2014; Pearson et al., 2013). In complement to Panter-Brick and colleagues' (2014) findings on the prospective covarying of caregiver mental health and child post-traumatic stress over a 1-year period, the current study demonstrates a similar relationship with depression and anxiety outcomes over 4 years. Despite literature suggesting that caregiver mental health has an impact on the mental health of the young persons in their care, our model cannot determine a causal direction. Thus, the youths' mental health may also have an impact on the caregivers in this sample. Although it would be difficult to estimate the degree

to which this effect compares to the better documented influence of caregiver mental health on youth, some amount of reciprocal causality seems inevitable. For example, a child demonstrating signs of internalizing, such as gloomy mood and anxious behaviors, could provoke low mood or anxiety in a caregiver. Knowledge of the relationship between caregiver and youth mental health is critical when considering approaches to addressing mental health problems among war-affected youth. Interventions that exclusively target youth may fall short if they fail to address the developmental impact that caregivers have on younger household members. As a component of future studies, both focusing on treating youth only, and treating both youth and caregivers, regular monitoring of both youth and caregiver mental health over time using robust statistical models for longitudinal data analysis can help disentangle the extent to which each affects the other.

Alongside caregiver mental health, two other time-varying covariates, family acceptance and community stigma, also predicted internalizing outcomes in youth. For each one standard deviation increase in family acceptance, there is a predicted decrease of 0.040 on the three-point response scale. This finding augments earlier work which depicted the significant benefits of a supportive environment for psychological adjustment among former child soldiers (Betancourt, Newnham, et al., 2013). On the other hand, stigma arising from being a child soldier was negatively related to mental health. Stigma has demonstrated a consistent association with poor mental health outcomes (Tol et al., 2013).

While not a primary focus of this analysis, older age at time of interview was also related to lower overall levels of internalizing ($p = .05$). It is possible that older youth may have had access to a greater set of opportunities following the war or were more easily able to relocate their family members.

Study limitations

Several limitations must be noted. First, although the sample drew from six districts across Sierra Leone, the youth in this study may not be representative of the nation's youth more broadly. Second, the study relied upon youth and caregiver self-reports of mental health symptoms, which has potential for reporting bias. For example, some participants may over-report symptoms in the hope of receiving additional services, while others may under-report to avoid potential stigma. Community stigma and family acceptance are self-reported by the youth in the same surveys in which they reported their mental health using similar methods (self-report on Likert scales), so there is a threat of common methods bias; for example, a youth experiencing low mood might perceive rates of community stigma as higher and family acceptance as lower. Third, the study highlights an association between caregiver and youth mental health over time, but does not tell us about the causal direction of the relationship or whether some unobserved variable influences both.

Conclusion

In one of the first studies to examine the prospective relationship between caregiver and child mental health in a war-affected setting, we find that levels of caregiver mental health are robustly associated with child mental health. Furthermore, other potentially malleable environmental variables such as family acceptance and community stigma are related to the internalizing trajectories of youth. Interventions aimed at supporting the psychological wellbeing of war-affected young persons should consider the social ecology, and broaden service options to include attention to caregiver mental health along with the mental health of the war-affected youth. Future research could help identify the causal links between caregiver and youth mental health as well as explore the role played by various hardships in the process of improving mental health.

Supporting information

Additional Supporting Information may be found in the online version of this article:

Appendix S1 HLM output without Latent Variable Regression.

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Key points

- Although it is well established that caregiver mental health plays a role in child mental health in Western settings, there is a dearth of longitudinal studies in postconflict environments investigating this relationship following war exposure.
- A two-wave prospective study of mental health among former child soldiers and their caregivers was conducted in postconflict Sierra Leone.
- Over and above the effects of all other covariates, there is a robust relationship between change in the caregivers' mental health and that of the youth over a 4-year period.
- Changes in family acceptance and community stigma also predicted internalizing in youth.
- Future interventions should consider the role of caregiver mental health and family dynamics when assessing internalizing symptoms in youth.

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