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Social Ecology of Child Soldiers: Child, Family, and Community Determinants of Mental Health, Psychosocial Wellbeing, and Reintegration in Nepal

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Abstract

This study employs social ecology to evaluate psychosocial wellbeing in a cross-sectional sample of 142 former child soldiers in Nepal. Outcome measures included the Depression Self Rating Scale (DSRS), Child Posttraumatic Stress Scale (CPSS), and locally developed measures of function impairment and reintegration. At the child level, traumatic exposures, especially torture, predicted poor outcomes, while education improved outcomes. At the family level, conflict-related death of a relative, physical abuse in the household, and loss of wealth during the conflict predicted poor outcomes. At the community level, living in high caste Hindu communities predicted fewer reintegration supports. Ultimately, social ecology is well-suited to identify intervention foci across ecological levels, based on community differences in vulnerability and protective factors.

Keywords

Child soldiers; posttraumatic stress disorder (PTSD); war; social ecology; Nepal

Introduction

Increasingly, there is attention to the social ecology of child soldiers and other children affected by armed conflict (Boothby et al., 2006; Cummings et al., 2009). The Psychosocial

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Working Group (2003) includes social ecology as a core domain of psychosocial wellbeing. Betancourt (2005) employs social ecology to frame the experience of displacement and implementation of emergency education programs for Chechen adolescents. Tol and colleagues (2009a) invoke social ecology to describe resilience promotion among war-affected children and communities. The goal of this paper is to apply social ecology to identify determinants of mental health and psychosocial wellbeing among child soldiers in Nepal.

Nested interacting spheres of social relationships that determine individual behavior and wellbeing are the fundamental components of analysis in social ecology (Bronfenbrenner, 1979). The most basic tier is the *individual* or *ontogenetic level* (see Figure 1). It reflects children's different histories, personalities, and psychobiological states in interaction with the social and physical environment shaping behavior and health (Cicchetti et al., 2000). The *microsystem* is the domain of immediate experience for the individual influenced by the amount of agency and/or resources an mobilized from immediate social contacts. Belsky (1980) considers this level the family environment. The *exosystem* comprises the "formal and informal social structures that make up the immediate environment in which children and families function," such as neighborhoods, social support groups, and employers (Cicchetti et al., 2000:697). For the child, the school and community are crucial social groups for healthy development. The *macrosystem* represents the institutions that shape and constrain social processes that drive patterned experience. This includes enforced public policy, economic environment, manufacturing, and corporate institutions that dictate employment availability or create niches of poverty (Cicchetti et al., 2000).

The mental health and psychosocial wellbeing of child soldiers varies not only because of their diverse experiences as soldiers and differential exposure to trauma, but also because of different social relationships and socio-ecological positioning both before and after conflicts (Betancourt et al., 2008a; Boothby et al., 2006; Kohrt et al., 2010b; Wessells, 2006; Wessells, 2009). Families and communities vary widely in their responses to child soldiers on their return home (Akello et al., 2006; Betancourt et al., 2008b; Williamson, 2006). Some families and communities welcome the children's return whereas others stigmatize and discriminate against former child soldiers (Betancourt et al., 2010). By revealing the patterns of socio-ecological niches occupied by child soldiers, researchers can better identify the main determinants of wellbeing. Then, in turn, interventionists can design effective programs that benefit not only former child soldiers but also their families and communities as well.

Social Ecology of Child Soldiers

Research and intervention programs with child soldiers and more broadly with children affected by conflict has revealed a number of factors operating across socioecological levels. Figure 2 graphically presents the existing epidemiological studies with variables categorized by their socioecological level (Bayer et al., 2007; Betancourt, in press; Blattman, 2006; Derluyn et al., 2004; Kanagaratnam et al., 2005; Kohrt et al., 2008; Somasundaram, 2002). For the purpose of this study, we simply refer to these as child, family, and community levels because these terms are used more commonly in the field setting.

Child level factors—The majority of research has focused on child level factors, such as exposure to traumatic events. Studies commonly include gender, education, age, livelihood, and descriptors of soldier experience, such as duration of association and time since return home.

Family level factors—Most studies examined the impact of the death of family member and one study examined the manner in which a parent died (Derluyn et al., 2004). While some studies examined socioeconomic status (SES) such as education and employment at the level of the child, other studies evaluated family SES (Blattman, 2006; Kohrt et al., 2008). One study included parent's education level and family displacement (Blattman, 2006).

Community level factors—Few researchers have assessed community level factors. Blattman's (2006) study in Uganda was the most comprehensive with regard to community and regional level factors. Blattman examined geographic and ethnic regions. To our knowledge, no epidemiological studies have explicitly included macrosystem variables in their analyses. This may be due to the challenge of defining macrosystem variables and collecting information, which is already difficult in non-conflict settings and harder still in post-conflict settings.

While researchers and interventionists working with child soldiers have advocated for use of the social ecological framework (Boothby et al., 2006) and epidemiological studies have included data from various ecological levels as described above, there has been a lack of analytical models employing this framework. This raises questions about whether and how the theoretical social ecological framework can be used to improve our understanding of child soldier mental health and psychosocial wellbeing.

The goal of this study, therefore, is to evaluate child soldier mental health and psychosocial wellbeing in Nepal with a social ecology framework using hierarchical linear models for analysis. The study examines how each socioecological level (child, family, and community) contributes to the variance in a model of mental health, psychosocial wellbeing, and reintegration using both standardized and locally-developed measures.

Setting: The People's War in Nepal

Nepal is a landlocked country north of India and south of the Tibetan autonomous region of China, with a population of almost 28 million. In 1996, the Communist Party of Nepal [CPN (M)] presented demands to the government of Nepal to address economic and social injustices, abolish the monarchy, and establish a constituent assembly. When the government refused to address these demands, the CPN (M) began an agrarian revolution. Government security forces and Maoists killed over 14,000 people during the People's War, which lasted 11 years; with the majority of deaths at the hands of the Royal Nepal Army and the government's police force (INSEC, 2008). The war ended in November of 2006, when the CPN (M) signed a peace treaty with the government. During 2008 elections, the CPN (M) won a two-thirds majority but later abandoned their top government positions.

During the war, the CPN (M)'s People's Liberation Army (PLA) and the Royal Nepal Army conscripted children as soldiers, sentries, spies, cooks, and porters (Human Rights Watch, 2007; United Nations, 2006). Local groups estimate that at the conclusion of the war approximately 9,000 members—one-third of the PLA—comprised fourteen to eighteen year olds with 40 percent being girls (Human Rights Watch, 2007). Ten percent of the Royal Nepal Army during the conflict was below the age of eighteen (Singh 2004).

While the war affected child psychosocial wellbeing, it is important to consider the broader historical processes that affect child wellbeing. Poverty and discrimination, for example, are major influences on child wellbeing that predate the conflict and continue to exist since its resolution. Nepal's history represents a legacy of political, economic, and cultural processes that have marginalized large sectors of the population who then became the backbone of the Maoist revolution. Two dominant forces of marginalization are gender-based and caste-

based discrimination. Nepal's Gender-related Development Index (GDI) score, a measure of equality between women and men, is 0.545, on the low end globally, compared with 0.959 for Canada (UNDP, 2009). Nepal's population consists of more than 60 ethnic and caste groups. There is a long history of hegemonic dominance by the Hindu high castes (*Bahun* and *Chhetri*) of minority ethnic groups (*Janajati*, who are predominantly Buddhist and shamanist) and of those deemed low caste (*Dalit*).

Methods

Sample and Recruitment

The 2007 Paris Principles define “children associated with armed forces or armed groups” (CAAFAG) by the following criteria:

> Any person below 18 years of age who is or who has been recruited or used by an armed force or armed group in any capacity... It does not only refer to a child who is taking or has taken a direct part in hostilities. (UNICEF, 2007:7)

We employed this definition when identifying *child soldiers* for study participation. Additional selection criteria included participation in the armed group for at least 1 month and being under 18 years of age at the time of study enrollment. All participants also had to have a caregiver who could give their consent for the minor's participation in the research. In Nepal, full adult franchise occurs at the age of 18 years (Government of Nepal, 2006; His Majesty's Government, 2003). The institutional review board of Emory University approved the study protocol and consent process. The study design and implementation followed principles tailored to vulnerabilities of child soldier populations (Kohrt et al., 2010a). We employed expert purposive sampling, rather than a probability sample, to identify former child soldiers who have returned home because of difficulties in accessing this often hidden population; researches contacted 227 children, 169 met study criteria, and 142 participated in the study (Kohrt et al., 2008).

Caste/ethnicity was recorded with two triangulated methods. Children self-identified their caste/ethnicity. Field researchers also recorded the ethnicity of children based on the child's last name, which indicates caste and ethnicity in Nepal. These methods showed 100 percent agreement. Researchers then classified participants into 3 groups: *Bahun/Chhetri* (‘upper’ caste), *Dalit* (‘lower’ caste), and *Janajati* (ethnic minorities) according to census categories (HMG-CBS, 2003). The salience of these broader categories was also assessed ethnographically (Kohrt et al., 2009b).

Instruments

Based on our qualitative research (Kohrt et al., 2010b), we designed the epidemiological protocol for assessment of former child soldiers who had returned to their home communities. All instruments went through a translation procedure developed for transcultural research (Van Ommeren et al., 1999). We included standardized measures, *Depression Self Rating Scale* (DSRS) (Birleson, 1980, 2007) and *Child PTSD Symptom Scale* (CPSS) (Foa et al., 2001), locally validated for use in Nepal. We assessed lifetime traumatic events using the Kiddie-Schedule of Affective Disorders and Schizophrenia (K-SADS) PTSD traumatic event checklist (Kaufman et al., 1996).

Based on adapted methodology of Bolton and Tang (2002), a rating scale was developed to measure children's functioning in a contextually-valid manner: the *Child Function Impairment* (CFI) tool (Tol et al., under review). The final items comprised getting meals, working in the fields, cooking food, doing housework, playing sports and games/recreational

activities, spending time with others, studying in school, doing homework, helping neighbors.

Qualitative research was used to develop reintegration supports and difficulties measures. Reintegration supports included “helped take me home,” “welcomed me home,” “was proud of me,” “listened to me describe my experience,” “spent time/played with me,” and “allowed me to share my feelings.” Reintegration difficulties included “did not want me to come home,” “afraid of me,” “avoided me,” “teased me,” “threatened me,” “did not allow me to participate in religious festivals/activities,” and “did not allow me to go to school.” Reintegration supports does not include reintegration programming for former child soldiers in Nepal. Formal child soldier reintegration packages from I/NGOs were begun after study completion.

Test-retest reliability and inter-rater reliability of the instruments were established in two other studies among children in Nepal (Jordans et al., 2010). Instrument properties were sufficient to excellent: DSRS (Cronbach α=.80, Spearman-Brown coefficient for test-retest reliability r=.80); CPSS (α=.91, r=.85); and function impairment (α=.68, r=.70). Inter-rater reliability was excellent for all instruments (average ICC=.972; average Kappa=.891).

Additional child level variables included age, gender, education level, and marital status. Child soldier descriptor variables comprised age of recruitment (less than 14 years old vs. older than 14 years), duration of time as a child soldier (less than one year versus greater than one year), and time in the community since returning from the armed group (less than one year versus greater than one year). Some child soldiers reported that they were still associated with the armed group and were waiting to return to service. Therefore, we included a variable regarding whether or not the child regarded him/herself as “still associated.”

Family variables included type of family (joint versus nuclear family, with ‘joint’ referring to presence of family members beyond the nuclear unit), number of family members in the household, religion (Hindu vs. other religions), family caste (Dalit, Bahun/Chhetri, and Janajati), wealth (number of household items such as stove, radio, water, bicycle, etc.), change in wealth status as a result of the conflict (no change versus worsened economic status), and family decision maker (male decision maker versus female or joint decision maker). The two family-related trauma variables were “family member killed” and “physical abuse in the household.”

Three community level variables were included because of their hypothesized impact on psychosocial wellbeing suggested by our qualitative analyses. District census records and reports from human rights organizations about the conflict were the sources of district level data with ten districts included in the total sample. We included “total conflict mortality” by district because we hypothesized that a higher number of deaths in the district would result in higher levels of psychosocial problems, even if the casualties were not direct family members. Throughout the country, conflict deaths per district ranged from 30 in Humla district to 904 in Rukum district with a mean of 182 deaths per district (INSEC, 2008). We coded district conflict mortality into two groups to reflect levels below and above the country mean: less than 200 conflict deaths versus greater than 200 conflict deaths.

Within Nepal, researchers have connected greater female literacy rates with improved outcomes ranging from child health to delayed initiation of reproduction (Levine et al., 2001; Shrestha, 2002). Literacy was also associated with better mental health among internally displaced persons (Thapa & Hauff, 2005). At the district level, literacy rates are associated with lower levels of forced child labor (Thapa et al., 1996). We hypothesized that higher female literacy rates in a district would lead to less discrimination against women and

overall improved psychosocial wellbeing. The female literacy rate in 2000 was 35% (HMG-CBS, 2003). We employed a median split for the districts in the sample choosing 45% as a cut-off to categorize the upper and lower literacy groups.

Lastly, the caste-system in Nepal is associated with mental health. Dalit (low caste) persons showing 2.5 times greater depression and 4 times greater anxiety compared with Bahun/Chhetri (high caste) persons (Kohrt et al., 2009b). Despite increasing legislation to prohibit caste-based discrimination, there is widespread evidence of continued discrimination by upper castes against Dalits (INSEC, 1993). Greater numbers of high caste people in a community also may contribute to systematic suppression of women (Bennett, 1983) and poorer mental health for women of all castes (Kohrt & Worthman, 2009). Based on our qualitative data, stigmatization of child soldiers appeared to be more severe and prevalent in communities with a larger percentages of high caste people (Kohrt et al., 2010b). Therefore, we hypothesized that in those districts with larger proportion of high caste population we would see poorer psychosocial wellbeing and reintegration of former child soldiers. Bahun/Chhetris comprise 30% of the population in Nepal (HMG-CBS, 2003). We chose 40% district population comprised of high-caste persons as the cutoff for the data analysis employing a median split to create equal numbers of children in each group.

Analysis

We conducted regression models to determine the association of child, family, and community variables with the psychosocial and reintegration outcomes. Based on recruitment from different villages, there was one-level of non-nested clustering of data because in some villages multiple children participated in the study. We used Miglioretti and Heagerty's (2007) generalized estimating equation (GEE)-based strategy to obtain empirical standard error estimates for non-nested clustering structures. We conducted separate regressions using GEE for depression, PTSD, function impairment, and reintegration supports and difficulties. The models included all child, family, and community variables. In order to determine the contribution of the various socioecological levels, we also conducted separate models for child, child+family, and child+family+community. P-values less than 0.05 were considered statistically significant for all analyses. Statistical analyses were performed with SPSS v.16.0 (2006).

Findings

Table 1 presents demographics for the child, family, and community variables. The sample comprised 75 girls (52.8%) and all children had experienced at least one type of traumatic event with beatings being the most common (73.2%). Age range was 11.0 to 17.9 years. Age at recruitment into armed group ranged from 5.5 years to 16.8 years. Total time associated with armed group ranged from 1 to 57 months. Time since return to the community ranged from 1 to 62 months. Number of family members ranged from 1 to 13 members. Wealth measured as number of household goods and facilities ranged from 0 to 6 items. Twenty-two children (15.5%) reported they were still associated with an armed group at the time of the study.

Of the family level variables, 46 children (32.4%) lived in joint (extended) families. The majority of families practiced Hindu religion (90.1%), and the three caste groups composed equal portions of the total sample. One quarter of the children lived in a household where women were the decision makers or participated in decision making. At the community level, 93 children (65.5%) lived in districts where the total conflict mortality was greater than the national average. The median split for the two other variables was approximately 45% for female literacy rates and 40% for Bahun/Chhetri high caste proportion of the population.

There were significant correlations among psychosocial outcomes (See Table 2). The GEE multivariate regression models for depression, PTSD, and function impairment showed significant associations with child, family, and community variables (See Table 3). In the depression model, risk factors included female gender, exposure to bombing, and not being associated with an armed group currently. At the family level, Hindu religion, and physical abuse were risk factors, while being in a Janajati household was a protective factor. At the community level, total conflict mortality was a risk factor. For PTSD, exposure to torture was the strongest child risk factor, while being still associated with the armed group was protective. Among the family variables, joint family and Hindu religion were risk factors, while Janajati ethnicity was protective. Total conflict mortality at the community level predicted PTSD. For function impairment, the main risk factors were being female, exposure to bombing, Dalit family caste, and deteriorating family economic status post-conflict. Level of conflict mortality in the district was associated with increased function impairment.

Reintegration *support* was predicted by being older, having greater education, being abducted, living in a nuclear family in which there were a greater number of family members (as opposed to joint-extended families), living in districts with fewer high caste persons, and not exposed to tortured (See Table 4). Joint family arrangement and high conflict mortality predicted greater reintegration *difficulties*.

To evaluate the contribution of different socioecological levels to psychosocial wellbeing, we examined the variance explained with the addition of each level (See Table 5). Child-level variables, such as age, gender, exposures to bombing and torture, explained approximately 30 percent of the variance for depression, PTSD, and function impairment. Child-level variables, however, only explained 16 percent of the reintegration supports experienced and 18 percent of the reintegration difficulties. Including family level variables explained an additional 13 to 15 percent of the variance for all outcomes except reintegration. For reintegration, family level variables explained 26 percent of supports, but only 8 percent of difficulties.

Lastly, community level variables added less than ten percent additional variance explanatory power for depression, PTSD, function impairment, and reintegration difficulties. Total conflict mortality was significant in these instances. For reintegration supports, community level variables, specifically high caste population percentage, and female literacy, added 14 percent additional explanatory power. Total variance explained was above 50 percent for all outcomes except reintegration difficulties, which was 31 percent.

Discussion

The goal of this research was to determine the contribution of child, family, and community level factors related to psychosocial wellbeing and reintegration. The former child soldiers showed significant variation in their mental health and psychosocial wellbeing. While some displayed high levels of depression, PTSD, function impairment, and reintegration, others showed high functioning and minimal mental health complaints. This substantial variation in outcomes could be explained by differences across socioecological levels including *individual differences* in experience such as exposure to torture, *family-level differences* such as family caste and physical abuse in the household, and *community-level differences* including regional conflict mortality and caste/ethnic composition of the community.

As we would expect, trauma had an adverse effect on psychosocial wellbeing with torture being the strongest predictor of PTSD. We previously found that torture increased the risk of PTSD by seven times across all conflict-affected children, not only child soldiers (Kohrt et al., 2008). Torture showed the strongest inverse association with reintegration supports:

children exposed to torture reported the fewest number of perceived reintegration supports such as welcoming from the family, support in school, and inclusion by the community. This may result from symptoms of PTSD impairing children's interactions with others and their inability to galvanize or utilize support. In Nepal, exposure to traumatic events such torture may be interpreted as a sign of bad family *karma* which is a source of shame that leads to stigmatization both within the family and community, thus reducing reintegration supports (Kohrt & Hruschka, 2010). The prominent role of torture in predicting mental health among children is consistent with numerous studies conducted with adult torture survivors in the People's War in Nepal (Tol et al., 2007; Tol et al., 2009b).

Abduction showed a significant relationship with reintegration supports. Abducted children reported more support from families and the community upon return home compared to child soldiers who joined armed groups voluntarily. Families and community members may be more likely to welcome back children who they view as being reluctant participants. Abducted children also reflect the views acceptable to adults of children as passive participants in armed conflict (Boyden, 2003). This is in keeping with Nepali views of children as passive rather than active decision makers (Kohrt & Maharjan, 2010) especially for girls (Koenig & Kohrt, 2009; Kohrt & Koenig, 2009). In contrast, children who joined voluntarily may not be welcomed back or supported because the community holds them responsible for their actions as combatants.

The connection between current association with the armed group and psychosocial wellbeing at first glance appears counter-intuitive; if home and stability enhances wellbeing for children. This could have a number of underlying mediators. Children who had fled the armed group had the poorest outcomes possibly because their support system in the armed group transformed into a threat. Children reported being hunted down by the armed group to force them back into recruitment. Conversely, one girl former soldier explained that being with the armed group gave her the sense of being protected, “someone always had my back,” and that maintaining association provided an escape from potential domestic violence, sexual discrimination, or feelings of powerlessness (Koenig & Kohrt, 2009). Association with the armed group also was linked to supports and resources (Kohrt et al., 2010b).

Other significant child variables included age, education level, and gender. Older children had lower depression scores and greater support on reintegration. This may be because older children will have had better coping skills and ability to understand and psychologically accept their experiences. Their maturity may enable them to access and use reintegration supports more effectively than younger children. Education was important for reintegration support; it may operate through increased mobilization of support from others. .

Being female was linked with greater function impairment on their return home. This is likely to be due to the low status of girls in much of Nepali society. Some girls were attracted to joining the Maoists because of their views of bringing greater gender, as well as ethic and caste equality to Nepal (Kohrt et al., 2010b; Pettigrew & Shneiderman, 2004; Sharma & Prasain, 2004). Girls who belonged to high-caste Hindu culture would not have been allowed by their community to function as they did before joining the armed group because they will be seen to be impure after having lived away from home (Koenig & Kohrt, 2009).

At the family level, the type, size, and caste/ethnicity of family was examined with respect to psychosocial outcomes. Living in a joint (extended) rather than nuclear family was linked with greater depression, fewer reintegration supports, and greater reintegration difficulties. Families living jointly may be more traditional, uphold gender discrimination and thus view

the child's association with armed groups in a negative light; and thus be less welcoming when the child returns. The poorer outcomes linked with joint families may also result from a greater strain on resources and indicate greater poverty in those homes. Wealth in this study was assessed as total number of household goods and does not reflect resources per capita in the home. Further research is necessary to substantiate these ideas. Child soldiers in Hindu families had greater depression and PTSD; this will be examined in more detail below when community caste effects are discussed.

Female decision makers in the household did not predict differences in psychosocial outcomes. This could be because female decision making within the household was a result of separate and possibly contrasting processes. One interpretation is that a household with female decision makers is a more egalitarian household. Another possibility is that the woman is widowed or separated from male providers; female decision-making could be a marker of vulnerability in the households. Future research would benefit from exploring the reasons why females take part in household decisions to explain the psychosocial processes.

At the community/district level, all three variables were significant, although with different outcomes. Conflict mortality in the district was associated with increased negative outcomes: depression, PTSD, function impairment, and reintegration difficulties. Researchers have observed poorer child mental health in other settings with high exposure to community and political violence (Earls & Carlson, 2001; Kohrt et al., 2004; Luna, 2006; Sampson et al., 1997). Female literacy in the district did not predict differences in any of the measures we reported in these analyses.

Caste/ethnicity strongly predicted reintegration supports. We assume that caste negatively impacts supports because of restrictive gender and social practices. Prior to the war, we observed a high burden of mental health problems among women and people of low castes, which was mediated in part by discriminatory processes and deprivation of resources through structural violence (Kohrt, 2009; Kohrt et al., 2009b; Kohrt & Worthman, 2009): in an area with many high caste persons in rural Nepal, 50% of Dalits versus 28% of high castes persons were depressed, and similarly, 36% of women were anxious in comparison to 20% of men.

Our qualitative research with child soldiers revealed that caste relations played a major role in both who was recruited to join the Maoists and the child soldiers' experiences upon return to the community (Kohrt et al., 2010b). Lawoti (2003), examining mortality statistics of the People's War in Nepal, found that members of low castes and ethnic minorities bore the brunt of casualties. In communities with high levels of caste discrimination, children in low castes and girls were more vulnerable to conscription. Maoists advertised conscription as an escape from caste and gender discrimination. "In the Maoists, everyone is equal," explained one child soldier (Koenig & Kohrt, 2009).

In districts with a greater proportion of high caste people, children reported fewer reintegration supports, such as being welcomed home, being sent back to school, and playing with friends and neighbors. The lack of reintegration supports in high caste areas may stem from cultural factors linked with enforcement of caste mores that promote discrimination against low castes and women (Kisan, 2005). Additionally, a greater percentage of high caste people in a community may exert a form of social pressure on other high caste families to engage in discriminatory behaviors (Bennett, 1983). Factors related to caste require further investigation for the underlying process by which caste mediates psychosocial wellbeing. Models in the U.S. have shown that racial discrimination is a predictor of poor wellbeing but often through complex pathways (Ahmed et al., 2007; Williams, 1999; Williams & Williams-Morris, 2000).

The contribution of other ecological levels to modeling risk and protective factors for mental health and psychosocial wellbeing was another question posed in this study. Based on our analyses of variance explained at different levels, we found that child-level factors contributed to approximately 30 percent of variance, with the exception of reintegration supports and difficulties in which child-level factors only explained 16 and 18 percent respectively. Family-level factors explained about half as much variance as child level factors, i.e. approximately 15 percent. However, for reintegration supports, family level factors explained substantially greater variance at 26 percent of the total model. Lastly, including community-level factors explained less than ten percent variance except for reintegration supports (14 percent variance explained).

The trend of decreasing variance explained at levels more distant from the child are expected given the contribution of proximate (e.g. direct child experiences) versus distal factors (e.g. district-level variables that are filtered through community and family before impacting children directly) as has been found consistently across global mental health research (Corrigall et al., 2008). For example, total conflict mortality, although significant for negative psychosocial and functional outcomes, does not appear to contribute significant variance above and beyond individual and family trauma.

In contrast, the finding of significant variance contributed at the family and community level to reintegration supports is particularly noteworthy. The family and community factors contribute above and beyond individual factors. The significant factors at these levels were family structure, family caste, and community caste composition. Children in high caste communities received significantly less support.

Caste-based social identity and discrimination is a sensitive issue and thus likely to be challenging to overcome. Nevertheless, knowing the damaging effect this discrimination, and particular lack of support for girls, have on psychosocial wellbeing should be motivation to find ways to develop interventions particularly targeting community-level caste/ethnicity factors. There are a range of political organization and nongovernmental organizations dedicated to eradicating caste-based discrimination, many of which are founded and maintained by persons in Dalit castes (Kisan, 2005). Gaining advice as well as actively involving these organizations in psychosocial and other reintegration activities for child soldiers may be a useful way to address community level factors and ensure that interventions do not unintentionally reinforce existing forms of discrimination (Denov, 2007). The connection between gender and caste-based discrimination also demonstrates the need for collaborative efforts between women's rights organizations and anti-caste discrimination organizations. The peaceful promotion of these goals will hopefully decrease vulnerability to recruitment into armed groups.

Limitations

Using study designs more targeted towards multi-level analysis could improve this study and other studies of child soldiers employing social ecology, e.g. communities, rather than individuals, could be the unit of sampling to provide insight into social ecology, such as approaches advocated by others (De Jong, 2010; De Silva et al., 2007; DeVries, 1997). Collecting more detailed community and regional information would facilitate this. This study was limited to data at the district level. However, mortality, literacy, and ethnicity figures at the village development committee (VDC) level (equivalent to county-level in U.S. demographics) would be more precise.

Our analyses did not differentiate trauma survivors, such as those exposed to trauma or bomb blasts, with physical damage from those who did not become disabled. The prominent role of bombing in poor outcomes, especially function impairment, also raises important

questions about the possibility of traumatic brain injury as part of the mediating process. The function impairment instrument does not differentiate different causes of disability, and therefore we may be capturing a connection with physical disability. Research with veterans of the Afghanistan and Iraq conflicts has demonstrated the importance of traumatic brain injury (TBI) and its overlap with the PTSD phenotype (Harvey et al., 2003; Sammons & Batten, 2008). Mollica and colleagues (2002) also have reported the contribution of TBI among Cambodian refugees in poor mental health and functional outcomes.

Another limitation of the study was the exclusion of studying sexual violence. Future research should consider ways to examine sexual violence in a manner sensitive to cultural conditions. This is important because in other conflict settings sexual violence has been a prominent factor in determining psychosocial wellbeing of former combatants, especially girls (Betancourt, 2009). Recent research in Liberia also highlights the need to assess sexual violence among male combatants as well (Johnson et al., 2008).

Other analytic techniques have been employed in social ecology studies. Structural equation modeling, as opposed to multivariate regression, would allow for better examination of direct and indirect effects of different socioecological variables (Asah, 2008; Kohrt et al., 2004). In addition to addressing moderator effects, multiple mediator analyses could uncover the mechanisms by which caste composition influences individual wellbeing (Kohrt et al., 2009a). In order to employ these other approaches, however, larger sample sizes would be needed, especially given the significant heterogeneity in variables such as duration of association and time since reintegration.

Conclusion

The goal of this study was to use a social ecological framework to explore the mental health and psychosocial wellbeing of child soldiers during their reintegration into their community. We were able to identify factors at the child, family, and community level that contributed to differences in reintegration and psychosocial outcomes. At the child individual level, lack of education and exposure to trauma especially torture and bombing predicted poor outcomes. At the family micro-system level, living in joint families, low caste, and physical abuse in the household predicted poor outcomes. At the community exosystem level, living in a high caste Hindu community predicted a significant amount of total variance in lack of reintegration support. The social ecology-informed statistical analysis reinforces the theoretical calls for multi-tiered approaches to intervention.

This study also supports the need for using a combination of standardized mental health measures and locally-developed psychosocial and exposure measures, with particular attention to the inclusion of positive outcome measures rather than sole reliance on markers of pathology and impairment. To our knowledge, this is the first study with child soldiers demonstrating differences based on regional characteristics (district mortality and percentage of high-caste persons in the population). In Nepal, crucial areas to foster psychosocial wellbeing are addressing trauma sequelae at the child, family, and community level, focusing on resilience promotion through community psychosocial programs, education and income generation at the level of child, family, and community, and on addressing issues related to gender and caste relations at the community level. Ultimately, addressing these issues in a social ecology framework will improve the wellbeing of child soldiers and support psychosocial wellbeing throughout the community.

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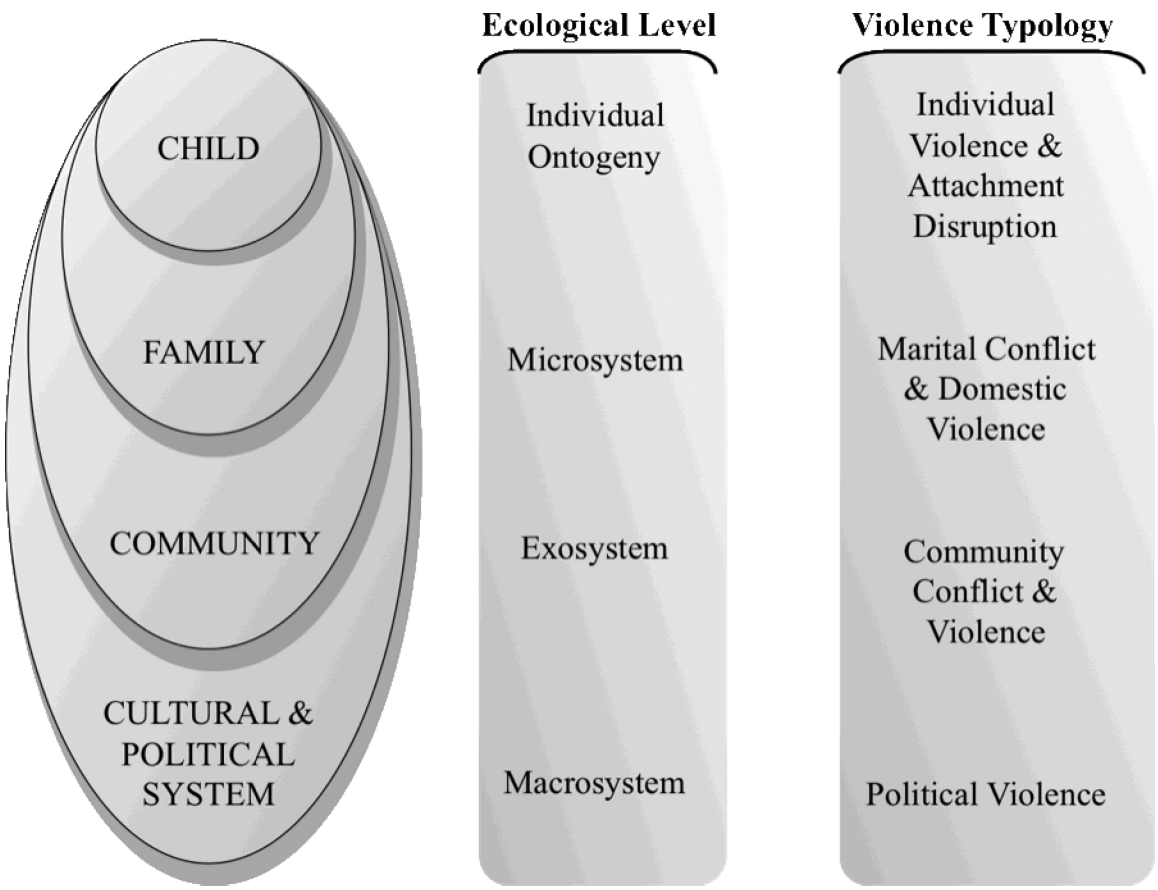

Figure 1.
Social ecology framework for exposure to violence. Adapted from Cummings et al. (2009).

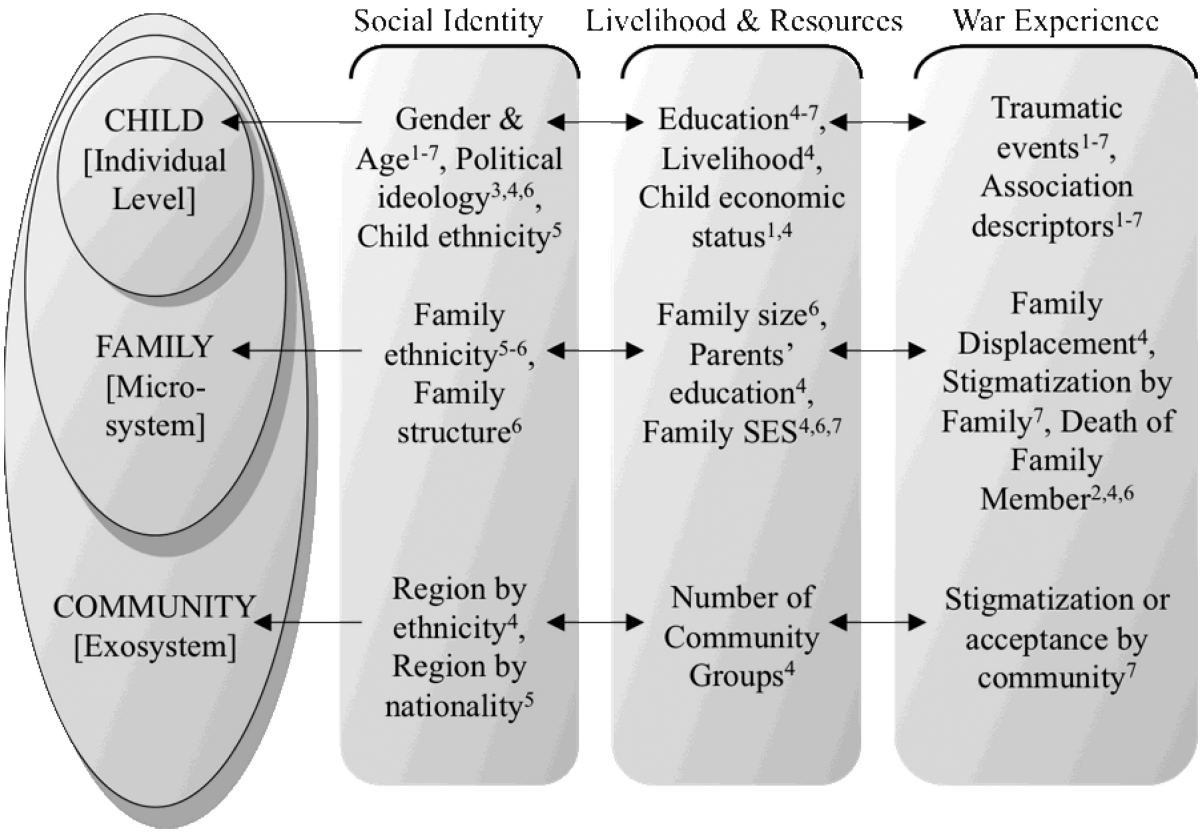

Figure 2.
Social ecology of child soldiers with variables examined in epidemiological studies: [1] Somasundaram 2002; [2] Derluyn et al. 2004; [3] Kanagaratnam et al. 2005; [4] Blattman 2005; [5] Bayer et al. 2007; [6] Kohrt et al. 2008; [7] Betancourt et al. 2010.

Table 1

Child Soldiers Demographics (N=142)

CHILD VARIABLES		**FAMILY VARIABLES**		**COMMUNITY VARIABLES**	
Continuous Variables	**Mean (SD)**	**Continuous Variables**	**Mean (SD)**	**Categorical Variables**	**No. (%)**
Age	15.75 (1.59)	Family Size	6.08 (2.19)	Conflict Mortality	
Categorical Variables	*No. (%)*	Wealth	1.92 (1.51)	< 100	49 (34.5)
Gender (Girls)	75 (52.8)	*Categorical Variables*	*No. (%)*	> 100	93 (65.5)
Education		Joint Family	46 (32.4)	Female Literacy	
None	8 (5.6)	Hindu Religion	128 (90.1)	< 45%	66 (46.5)
Primary	40 (28.2)	Caste		> 45%	76 (53.5)
Lower Secondary	44 (31.0)	Dalit	46 (32.0)	High Caste Proportion	
Secondary +	50 (35.2)	Bahun/Chhetri	45 (32.0)	< 40%	72 (50.7)
Married	20 (14.1)	Janajati	51 (36.0)	> 40%	70 (49.3)
Recruitment		Wealth Change			
< 14 years old	86 (60.6)	No change or improved	68 (47.9)		
> 14 years old	56 (39.4)	Got worse	74 (52.1)		
Time as soldier		Decision Maker			
< 1 year	88 (62.0)	Male member	108 (76.1)		
> 1 year	54 (38.0)	Female or jointly	34 (23.9)		
Time since returned		Family Member Killed	6 (4.2)		
< 1 year	62 (43.7)	Physical Abuse	7 (4.9)		
> 1 year	80 (56.3)				
Bombing	80 (56.3)				
Torture	41 (28.9)				
Abduction	73 (51.4)				
Beating	104 (73.2)				
Still Associated	22 (15.5)				

Transcult Psychiatry. Author manuscript; available in PMC 2013 November 19.

Table 2

Psychometric Properties and Pearson Correlations for Psychosocial Outcome Measures (N=142)

	Psychometric Properties					Correlations			
	Items	**Reliability**	**Mean**	**SD**	**Range**	**PTSD**	**Function Impairment**	**Reintegration Supports**	**Reintegration Difficulties**
Depression	18	0.80	14.25	5.71	3-27	0.70†	0.59†	−0.26§	0.41†
PTSD	17	0.91	20.86	10.07	1-43		0.61†	−0.17	0.54†
Function Impairment	10	0.68	7.14	6.15	0-29			−0.09	0.33†
Reintegration Supports	36	0.93	13.82	7.88	0-36				−0.26*
Reintegration Difficulties	54	0.87	4.57	4.21	0-20				

*p<.05

§p<.01

†p<.

Table 3

Multivariate Regression Models for Depression and PTSD (n=142)

	Depression (DSRS)		PTSD (CPSS)		Function Impairment (FI)	
	β (95% CI)	p-value	β (95% CI)	p-value	β (95% CI)	p-value
CHILD VARIABLES						
Age	−0.35 (−0.76—0.05)	.08	−0.29 (−1.42—0.85)	.62	−0.21 (−0.71−0.29)	.42
Female	2.61 (0.91—4.31)	.003	2.71 (−1.08—6.50)	.16	1.75 (0.05—3.44)	.04
Education (none=ref)						
Primary	−1.31 (−4.75—2.21)	.11	1.29 (−4.05—6.62)	.76	−0.72 (−4.67—3.23)	.31
Lower Secondary	−1.43 (−4.78—1.92)		0.21 (−4.61—5.02)		−1.89 (−5.91—2.13)	
Secondary +	−2.47 (−5.32—0.37)		−0.44(−5.11—4.23)		−2.23 (−6.06—1.61)	
Married	1.06 (−1.04—3.17)	.32	−0.82 (−4.06—2.42)	.62	0.29 (−1.49—2.07)	.75
Recruitment (>14yrs)	0.58 (−1.25—2.41)	.54	0.60 (−2.83—4.03)	.73	0.77 (−1.14—2.68)	.43
Time as soldier (>1yr.)	−0.17 (−1.89—1.55)	.85	−0.27 (−3.72—3.18)	.88	−0.06 (−2.49—2.37)	.96
Time since returned (>1yr.)	0.56 (−1.36—2.48)	.57	0.60 (−2.35—3.54)	.69	0.89 (−1.05—2.83)	.37
Beating	0.14 (−1.80—2.07)	.89	1.71 (−1.36—4.79)	.28	0.59 (−1.51—2.70)	.58
Bombing	1.93 (0.59—3.26)	.005	2.00 (−1.36—4.80)	.08	2.97 (1.38—4.56)	<.001
Abduction	−0.10 (−1.43—1.22)	.88	0.89 (−1.90—3.67)	.53	−0.32 (−1.97—1.33)	.70
Torture	1.02 (−0.71—1.22)	.25	5.18 (2.04—8.32)	.001	0.67 −1.37—2.70)	.52
Still Associated	−3.29 (−5.62—−0.96)	.006	−4.74 (−8.40—−1.08)	.01	−0.68 (−2.59—1.32)	.49
FAMILY VARIABLES						
Joint Family	1.35 (−0.50—3.19)	.15	3.20 (0.11—6.30)	.04	0.79 (−1.20—2.79)	.44
Family Size (#members)	−0.01 (−0.35—0.40)	.98	−0.21 (−0.87—0.45)	.53	0.9 (−0.43—0.60)	.74
Hindu Religion	2.34 (0.33—4.36)	.02	4.65 (0.25—9.06)	.04	−0.60 (−2.87—1.66)	.60
Caste (High Caste=ref.)						
Dalit	−0.51 (−2.05—1.03)	.02	−1.18 (−4.16—1.81)	.15	2.74 (0.91—4.56)	<.001
Janajati	−2.37 (−4.08—−0.66)		−3.59 (−7.21—0.03)		−0.69 (−2.97—1.59)	
Wealth	0.03 (−0.77—0.83)	.94	−0.26 (−1.43—0.91)	.66	−0.18 (−0.85—0.49)	.61
Wealth Worse After Conflict	0.89 (−0.59—2.37)	.24	−0.73 (−4.36—2.91)	.67	4.24 (1.32—5.14)	.001
Female Decision Maker	0.67 (−0.95—2.30)	.41	1.32 (−1.23—3.87)	.31	1.47 (−0.81—3.75)	.21
Family Member Killed	0.57 (−4.39—5.52)	.82	3.57 (−3.09—10.23)	.29	0.52 (−2.91—3.96)	.76
Physical Abuse	3.30 (1.21—5.39)	.002	0.41 (−3.22—4.05)	.83	1.61 (−1.38—4.62)	.29
COMMUNITY VARIABLES						
Mortality (>200)	1.82 (0.05—3.59)	.04	7.72 (3.75—11.69)	<.001	3.98 (1.95—6.02)	<.001
Female Literacy (>45%)	−0.49 (−1.92—0.94)	.50	−0.76 (−5.05—3.50)	.72	0.19 (−1.86—2.25)	.86
High Caste Proportion (>40%)	1.12 (−1.50—3.73)	.40	1.81 (−4.52—2.59)	.60	−1.45 (−3.55—0.67)	.18

Note: Generalized estimating equations used to control for village clusters.

Table 4

Multivariate Regression Models for Reintegration (n=142)

	Reintegration Supports		Reintegration Difficulties	
	β (95% CI)	p-value	β (95% CI)	p-value
CHILD VARIABLES				
Age	0.95 (0.47—1.43)	<.001	−.01 (−0.61—0.59)	.97
Female	−0.08 (−2.21—2.05)	.94	−0.42 (−2.21—1.38)	.65
Education (none=ref)				
Primary	−1.46 (0.69—3.98)	<.001	1.58 (−0.24—3.40)	.16
Lower Secondary	1.77 (−3.70—7.22)		1.36 (−0.82—3.53)	
Secondary +	−0.40 (−5.75—4.98)		0.61 (−2.11—3.32)	
Married	1.48 (−0.84—4.80)	.21	1.27 (−0.81—3.43)	.23
Recruitment (>14yrs)	−0.38 (−3.09—2.33)	.78	1.53 (−0.44—3.50)	.13
Time as soldier (>1yr.)	−0.57 (−3.10—1.96)	.66	−0.66 (−2.62—1.30)	.51
Time since returned (>1yr.)	1.16 (−0.30—2.63)	.12	1.09 (−0.36—2.54)	.14
Beating	−0.98 (−3.52—1.57)	.45	1.06 (−0.22—2.33)	.11
Bombing	0.62 (−1.70—2.95)	.60	1.19 (−0.57—2.94)	.19
Abduction	3.08 (1.24—4.93)	.001	−0.91 (−2.09—0.29)	.14
Torture	−3.22 (−5.81—−0.62)	.02	1.25 (−1.33—3.83)	.34
Still Associated	NA		0.85 (−0.65—2.34)	.27
FAMILY VARIABLES				
Joint Family	−5.45 (−8.69—−2.22)	.001	1.76 (0.40—3.12)	.01
Family Size (#members)	0.59 (0.13—1.05)	.01	−0.24 (−0.66—0.18)	.26
Hindu Religion	−3.11 (−7.11—0.90)	.13	1.17 (−0.21—2.55)	.09
Caste (High Caste=ref.)				
Dalit	−0.03 (−3.13—3.06)	.01	0.09 (−2.41—2.61)	.66
Janajati	−4.32 (−7.16—−1.49)		−0.79 (−2.86—1.28)	
Wealth	1.00 (−0.56—2.57)	.21	0.21 (−0.51—0.92)	.57
Wealth Worse After Conflict	1.65 (−1.11—4.41)	.24	1.04 (−0.59—2.66)	.21
Female Decision Maker	−1.47 (−4.14—1.20)	.28	0.57 (−0.83—1.97)	.43
Family Member Killed	1.24 (−1.70—4.17)	.41	0.47 (−2.02—2.97)	.71
Physical Abuse	2.86 (−1.28—7.03)	.18	−0.90 (−3.10—1.30)	.43
COMMUNITY VARIABLES				
Mortality (>200)	1.32 (−1.68—4.31)	.39	3.41 (1.53—5.29)	<.001
Female Literacy (>45%)	−0.89 (−3.75—1.97)	.54	−0.62 (−2.24—1.00)	.46
High Caste Proportion (>40%)	−10.08 (−13.44—−6.71)	<.001	−0.20 (−1.72—1.33)	.80

Note: Generalized estimating equations used to control for village clusters.

Table 5

Variance (R^2) explained by social ecology levels: child, family, and community (N=142)

	Depression	PTSD	Function Impairment	Reintegration Supports	Reintegration Difficulties
Child	0.37†	0.34†	0.29†	0.16*	0.18§
Family	0.14†	0.13§	0.15†	0.26†	0.08
Community	0.02	0.06§	0.05§	0.14†	0.06*
Total	0.53	0.52	0.50	0.57	0.31

Significance of R^2 change for child, family, community:

*p<.05

§p<.01

†p<.001