Long-term psychiatric consequences of exposure to trauma in Cambodia: A regional household survey.

Cantor-Graae, Elizabeth; Chak, Thida; Sunbaunat, Ka; Jarl, Johan; Larsson, Charlotte A

Published in:
Social Science and Medicine

DOI:
10.1016/j.socscimed.2014.10.049

2014

Long-term Psychiatric Consequences of Exposure to Trauma in Cambodia: A Regional Household Survey

Elizabeth Cantor-Graae[a] PhD, Thida Chak[b] MD, Ka Sunbaunat[b] MD, Johan Jarl[c] PhD, Charlotte A. Larsson[a] PhD

[a] Division of Social Medicine and Global Health, Department of Clinical Sciences in Malmö, Lund University, Sweden, elizabeth.cantor-graae@med.lu.se, charlotte_a.larsson @med.lu.se.

[b] Department of Psychiatry, Faculty of Medicine, University of Health Sciences, Phnom Penh, Cambodia, thida.chak@yahoo.com, kasunbaunat@yahoo.com.

[c] Health Economics Unit, Department of Clinical Sciences in Malmö, Lund University, Sweden, johan.jarl@med.lu.se.

Corresponding author:

Elizabeth Cantor-Graae

Division of Social Medicine and Global Health

Department of Clinical Sciences in Malmö

Lund University

CRC, Jan Waldenströmsgata 35

Malmö, Sweden S-205 02

Email: elizabeth.cantor-graae@med.lu.se

Telephone: 46 + 40 + 391397

Acknowledgements

This study was financed by the Swedish Research Council and the Swedish International Development Cooperation Agency (Sida), grant number SWE-2010-010.

Abstract

The long-term psychiatric consequences of exposure to war and/or mass conflict continue to be of great concern and particularly in Cambodia. The current cross-sectional study examined the relationship between history of trauma and current psychiatric and functional morbidity in 3200 randomly selected adults aged 18-60 in Cambodia. Structured interviews were conducted from November 2011 until May 2012 in two predominantly rural regions purposively selected for differing duration of exposure to the Khmer Rouge occupation. Information was also collected regarding ongoing daily stressors and intimate partner violence. Despite high prevalence rates of conflict/war-related trauma, current rates of psychiatric disorders (depression, post-traumatic stress disorder) were relatively low, suggesting that the effects of trauma and extreme hardship in civilian populations may be modified by contextual factors and/or the passage of time. Poor to fair physical health was, however, reported by nearly 60% of the sample. Daily stressors were more important for current morbidity levels than history of trauma, especially in the region with shorter Khmer Rouge occupation. The results suggest that a focus exclusively on past trauma may overlook the contribution of adverse daily life circumstances towards current levels of well-being in civilian populations affected by war and/or mass conflict.

Key words:

trauma, war, conflict, psychiatric disorder, Cambodia, stress, SF-36, partner violence

Introduction

The long-term psychiatric consequences of war and conflict on civilian populations continue to be an issue of great concern (Murthy & Lakshminarayana, 2006), and particularly in Cambodia. Cambodia is still emerging from the hardships incurred during the Khmer Rouge era (1975-1979), when an estimated 2 million persons perished. Although 35 years have elapsed since the fall of the Khmer Rouge regime, reactions to trauma are complex and may have broad reaching implications (Kroll, 2003). Persistent levels of trauma-related poor mental health and functional impairment in Cambodia could represent considerable obstacles for economic growth and developmental sustainability.

Studies concerning the impact of trauma in Cambodia have found varying rates of post-traumatic stress disorder (PTSD) (Dubois et al., 2004; Sonis et al., 2009; Mollica et al., 2014), with higher impairment levels especially among older persons. Nevertheless, response to war and conflict-related trauma need not necessarily involve PTSD. Moreover, trauma responses may abate or evolve over time, with other types of symptoms taking greater precedence (Kroll, 2003). Further, a focus on conflict-related trauma may not capture all sources of psychological distress in post-conflict settings, and trauma occurring in civilian life may also be relevant. More importantly, a growing body of research suggests that daily stressors such as lack of food, socioeconomic insecurity, and intimate partner violence (IPV) may account for a sizeable proportion of the psychiatric morbidity found in conflict/war-exposed populations (Miller & Rasmussen, 2010). Daily stressors have been found to be particularly salient for psychological distress in post-disaster and post-conflict settings such as Sri Lanka and Chad (Fernando, Miller, & Berger, 2010; Rasmussen et al., 2010). A study in Afghanistan found that high levels of daily stressors

attenuated the relationship between war-related violence and depression/PTSD (Miller et al., 2008). Exposure to IPV is a particularly severe stressor, associated with a range of mental disorders (Campbell, 2002). IPV may even increase in post-conflict settings, as shown in Gaza and Lebanon (Clark et al., 2010; Usta, Farver, & Zein, 2008). An approach focusing exclusively on past trauma (war or conflict-related) would thus underestimate the importance of other, ongoing sources of psychological distress that are potentially modifiable through targeted interventions. Increased knowledge concerning the multiplicity of factors contributing to poor mental health in conflict-exposed populations could lead to better treatment strategies. In resource-poor settings it may be crucial to prioritize community prevention rather than clinical treatment of symptoms that may abate with time (Miller & Rasmussen, 2010). Such an approach might be useful in Cambodia, where the consequences of trauma incurred during the Khmer Rouge period may be increasingly less relevant, especially in younger generations.

Nevertheless, the Khmer Rouge occupation was especially prolonged in some regions, particularly in the northwest. Efforts to improve community mental health may thus need to be informed by regionally specific evidence-based knowledge. Moreover, although poverty levels continue to decline in Cambodia, economic growth has been less rapid in rural areas, with large urban-rural differences (Hill & Menon, 2013; Engwall, Sjöberg, & Sjöholm, 2007). Apart from trauma, daily stressors such as financial worry and concerns about family welfare might also contribute substantially to poor mental health especially in rural areas where poverty is prevalent. The aim of the study was to examine the relative importance of past trauma (both conflict- and non-conflict-related) and current daily adversities for psychiatric status and functional ability in predominantly rural areas in two regions in Cambodia, i.e. the northwest and the southeast. These regions had considerable differences in the length of the duration of the Khmer Rouge occupation, and

consequently, the impact of especially war or conflict-related trauma might well correspondingly differ. We hypothesized that morbidity and impairment would be greater in the northwestern vs. the southeastern regions, due to longer duration of the Khmer Rouge occupation and shorter recovery time in the northwest, and that the relative contribution of past trauma (war or conflict-related events) versus current daily adversities for morbidity levels in these two regions would also differ accordingly.

Methods

Setting

Cambodia, population 13.4 million persons (Cambodian Inter-Censal Population Survey, 2008), is divided into 24 provinces that are further sub-divided into districts. The study took place in two regions purposively selected for differing durations of occupation by the Khmer Rouge: the northwest (NW) region, i.e. Battambang and Banteay Meanchey provinces (population 1,702,696) situated along the Thai border, and the southeast (SE) region; i.e. Prey Veng and Svay Rieng provinces (population 1,430,142) situated along the Vietnamese border. The SE provinces were among the first to be liberated by the invading Vietnamese military forces in 1979 and thus had a longer period within which recovery could take place, while the NW provinces were under Khmer Rouge control until 1998. Both regions are predominantly rural, with subsistence farming as the main occupation. In these four provinces, 28.1-32.2% of households are below poverty line, as compared to the national average of 34.9% (Engwall, Sjöberg, & Sjöwall, 2007).

Participants and sample design

A sample size of 3200 was predetermined in order to enable 80% power to detect 20% between-group differences, with a precision of ± 5% (95% confidence intervals) to allow for potential stratification by up to 4 variables. Individuals were eligible for inclusion if they were permanent residents of Cambodia aged 18-60 years, i.e. men and women of working age and thus conceivably economically productive. The study intentionally targets rural areas where financial worry and family welfare might be common concerns, in order to examine the relative importance of past trauma vs. current stressors. We purposely selected two-three rural districts per province, such that districts chosen would yield potentially adequate concentrations of poor households, based on census data and information from the provincial governor. A district is an administrative unit with well-defined boundaries and is further sub-divided into communes. Within districts, a multi-stage random probability design was then used to recruit participants. Thus, within each of ten districts, 2-5 communes were randomly selected out of all possible communes in that district, depending on district size. Next, within each commune, 4 villages (circa) were randomly selected for household sampling. Within each village a random direction from the village center was determined, after which every third household in that direction was approached, i.e. a "random walk" procedure. At each household a list was made of all eligible persons aged 18-60, from which a potential participant was randomly selected. One person per household was interviewed. If the person was unable to be interviewed at that time, follow-up visits were conducted. Persons who were intoxicated or displayed overt signs of cognitive deficit due to mental or severe physical illness were excluded. Sampling was conducted at different times of the day. In any given village solely men or solely women were sampled to ensure confidentiality and to enhance security, e.g. to reduce the risk that victims of partner abuse might be further abused. Sampling in the provinces

continued until the estimated predetermined sample size of 3200 persons was reached, proportionate to the populations in the respective provinces.

Interview procedure

A standardized structured interview was developed for the purpose of the study. Interviews were conducted from November 28, 2011 to May 4, 2012 by 8 trained psychiatric residents from the University of Health Sciences, Phnom Penh. Interviewers were gender-matched to the participants. Interviews were conducted orally in Khmer, with no one else in the household present. Each interview lasted 30-40 minutes. A supervisor in the field conducted quality control procedures, by monitoring team members and checking completed interviews.

Ethical permission

The study was approved by the Swedish Regional Board of Ethics, Lund University, Sweden and by the Cambodian National Ethical Committee for Health Research, Phnom Penh. Informed consent from all participants was obtained orally, due to high rates of illiteracy.

Measures assessed in the interview protocol

The current study utilizes information concerning the following areas: socio-demographic background, trauma exposure, psychiatric symptoms, self-rated health, daily life functioning, daily life stressors, and experience of intimate partner violence.

Socio-demographic background measures

Age was utilized as a continuous measure (regression analyses) and as a category measure (between-group comparisons), where age was dichotomized as “younger cohort” (18-39 years) vs.

"older cohort" (40-60 years). The older cohort represented persons who were at least 3 years old at the beginning of the Khmer Rouge occupation in 1975, and thus old enough to have experienced the entire period, i.e. 1975-1979. A similar age grouping was used by Sonis et al (2009). Marital status was dichotomized as married/cohabiting vs. single/widowed/divorced or separated. Educational level was dichotomized as "no schooling to 6 years of school" (primary school) vs. "7 years or more" (middle school or more).

Exposure to trauma

Trauma related to conflict/war was assessed using the Cambodian version of the Harvard Trauma Scale (HTS), Section I. (Mollica et al., 1998), originally developed for evaluation of Cambodian survivors of mass violence. A summary score (ever in life exposure) was obtained for each individual based on yes/no responses to 28 trauma items. In addition to the HTS, we assessed ever in life exposure to selected trauma items from the Composite International Diagnostic Interview (CIDI) (WHO, 2004), a priori chosen as representing civilian trauma or adverse life events not directly related to war/mass conflict, e.g. exposure to man-made and natural disasters, life-threatening illness, etc. Such events are also more relevant for persons born after 1979 (the younger cohort). Similarly to the HTS, a summary score was obtained for yes/no responses to 26 CIDI items. Persons were asked when the events occurred in relation to the Khmer Rouge period. CIDI events that had occurred during 1975-1979 were excluded to minimize potential war/mass conflict-related trauma. Based on a median-split of the frequency distribution of the summary scores, HTS trauma exposure was dichotomized as "high" (4 or more) vs. "low" (3 or less), and CIDI trauma was dichotomized as "high" (2 or above) vs. "low" (0-1).

Current psychiatric status, self-rated health, and functional capacity

Current psychiatric status was assessed using the Cambodian version of the Hopkins Symptom Check List (HSCL) (Mollica et al., 1987). The 25 items are scored as to how much the person was bothered by that item during the past 2 weeks, i.e. 1=not at all, 2=a little, 3=quite a bit, 4=extremely. A total mean score was derived for each person, based on the sum divided by the number of items answered. The measures used for analysis were total mean score (25 items), anxiety mean score (10 items) and depression mean score (15 items). Persons were categorized as having "high" vs. "low" total HSCL, depression, and anxiety scores based on a median-split of the respective mean scores' frequency distribution. Persons were further defined as having "symptomatic depression" or "symptomatic anxiety" if their HSCL mean scores on the respective sub-scale items were >1.75, i.e. the cut-off point suggested by Mollica et al. (1987) as indicating significant distress in Cambodian populations. In addition, we identified persons currently having an episode of "probable major depressive disorder" (PMDD), using an algorithm similar to that used by Bolton, Neugebauer, & Ndogoni (2002). Thus, persons with PMDD had HSCL symptoms (severity level 3 or 4) during the past 2 weeks meeting DSM-IV (American Psychiatric Association, 1994) criteria for major depressive disorder and scores on the SF-36 subscale #3 (see below) indicating functional impairment.

A brief screening scale for post-traumatic stress disorder (PTSD) was used to assess diagnostic status, consisting of 22 yes/no items from the CIDI diagnostic interview (WHO, 2004) corresponding to each of the DSM-IV (American Psychiatric Association, 1994) criteria for PTSD. The screening was administered directly following trauma assessment, albeit items were not anchored to any specific trauma. Persons whose affirmative responses indicated that they met the full DSM-IV criteria for an episode of at least one month's duration were categorized as "probable PTSD"; ever in life or during past year, respectively.

Self-rated health was assessed by the item "How would you generally describe your health?" derived from the widely used single item from the Medical Outcomes Study Short-Form 36 (SF-36) (Ware & Sherbourne, 1992) with the answer alternatives "excellent", "very good", "good", "fair", "poor" dichotomized as excellent/very good/good vs. fair/poor.

Current functional ability was assessed using: a) selected subscales from the SF-36 (Ware & Sherbourne, 1992), and b) an instrument developed specifically for the current study, i.e. the Cambodian Task Performance (CTP) scale. The SF-36 (8 sub-scales) has been widely used, including in Cambodia (Dubois et al., 2004), although normative population data for Cambodia are lacking. We used the following four SF-36 sub-scales: #1) limitations in physical activities due to health problems, #2) limitations in usual role activities due to physical health, #3) limitations in usual role activities due to emotional health, and #4) limitations in social activities due to physical/emotional problems. One item in #1 (difficulties in bathing or dressing oneself) was excluded, as it was included in the CTP scale (see below). A summary score based on raw scores for the four sub-scales was created for the purpose of data analysis, with scores inverted on three of the sub-scales such that higher scores indicated worse functionality.

The SF-36 subscales were complemented by the Cambodian Task Performance scale (CTP), an instrument assessing specific aspects of adult daily task performance in Cambodia. For scale development, we conducted focus group discussions (FGDs) to identify adult tasks perceived as relevant for daily functioning in rural Cambodia, in similarity to methods used by Bolton, Neugebauer, & Ndogoni (2002) in Rwanda and Uganda. Two FGDs were conducted per region (6 persons per group recruited from primary healthcare centers, gender-separate groups conducted by the corresponding gender-matched Cambodian co-author), after which participants were asked

individually to free list those tasks that they considered important. Based on the tasks listed, gender-specific items (7 for men, 10 for women) were constructed for protocol use. Items included daily tasks such as washing self, manual labor, earning money, caring for children or sick relatives, etc. Persons were asked to rank on a level of 1-4 how often they currently had difficulty performing the tasks, compared to a fully functional person of the same age and sex, where 1=never have difficulty, 2=sometimes difficulty, 3=often difficulty, 4=often cannot do. A mean score was created for each person, based on the summary score divided by the items answered. For both the SF-36 and the CTP, persons were categorized as having "high level of functional impairment" vs. "low level of functional impairment", based on the median-split of the respective scores' frequency distributions. For specific SF-36 subscales, impairment was defined as follows: subscales #1 and #2, summary scores above the median; subscale #3, "yes" to at least one item; and sub-scale #4 "quite a bit"/"extremely much" impairment.

Daily life adversities

Exposure to daily life adversities was assessed using an instrument consisting of twelve daily stressor items developed particularly for this setting. In addition to free listing adult tasks, FGD participants were asked to individually free list those daily stressors that they considered most relevant (see FGD methods above). The most frequent stressors listed formed the basis for the 12 items in the protocol. Persons were asked to rank on a scale of 1-4 (1=never, 2=occasionally, 3=often, 4=very often) how often they currently felt stressed in their daily lives by items such as food scarcity, financial worry, fear of landmine injury, etc. A mean score was derived based on the summary scores divided by items answered. Persons were categorized as having "high" vs. "low" current stress, based on the median-split of the mean score frequency distribution.

Exposure to intimate partner violence (IPV) was assessed separately from daily adversities and past trauma, using selected items from the Cambodia Demographic and Health Survey (CDHS) 2005 originating from the Conflict Tactics Scale (Strauss et al., 1996). Items were made gender neutral for the purpose of the current study. Exposure to IPV was assessed as: ever exposed by a current/previous partner to emotional violence, e.g. threats (3 items, IPV-E), and/or actual physical or sexual assault (9 items, IPV-P), respectively, without further specification of the exact timing/partner. Persons who responded affirmatively to at least one item for the respective IPV type were defined as "exposed" (vs. persons without that specific IPV exposure).

Development of the protocol and pretesting

The interview protocol was developed in English, translated into Khmer, and back-translated into English, using standard back-translation methodology (Maneesriwongul & Dixon, 2004). Items were discussed with Cambodian collaborators (TC, KS) to ensure proper translation and cultural relevance. The protocol was pre-tested on persons not included in the current sample.

During training of the interviewers, inter-rater reliability tests were conducted to assess interviewers' performance on core sections of the interview, i.e. SF-36, HSCL. Intra-class correlation analysis for inter-rater reliability yielded satisfactory coefficients for these measures (Cronbach's alpha ranging from 0.945 to 0.998). Although the HSCL's specificity and sensitivity were previously validated in Cambodian refugees (Mollica et al., 1987), we re-assessed the sensitivity of the HSCL cut-off point (>1.75 mean score depression sub-scale) regarding clinically relevant "symptomatic depression" in Cambodia. HSCL scores were assessed in ten psychiatric patients attending an out-patient clinic in Phnom Penh, having a diagnosis of "major depressive disorder", and with symptoms present during the past two weeks. All ten patients had HSCL

scores for depression items ranging from 1.87 – 2.58, thus indicating satisfactory sensitivity of the cut-off point.

Statistical Analysis

Analyses were conducted using STATA version SE13.1 (Stata Corp, 2014). Communes and villages were the primary and secondary sampling units, respectively, stratified by region. Sampling weights were assigned to each observation and calculated as the total number of eligible communes divided by the actual number sampled, multiplied by the total number of eligible villages divided by the actual number sampled. All analyses were performed accounting for the complex survey design using the "svy" prefix in STATA. All frequencies are shown unweighted, whereas all other statistics, including prevalence, are shown adjusted for sampling design and weights. Between-group comparisons for category and numerical variables were analyzed using Pearson's chi square tests and Adjusted Wald tests, respectively. Associations between trauma exposure (HTS, CIDI) and outcome measures were analyzed using logistic regression reported as odds ratios (ORs) with 95% confidence intervals (CIs). The relationship between each outcome measure and trauma was examined first for HTS and CIDI trauma separately, in the total sample and by region, respectively, adjusted for age and sex. Next, logistic regression was used to examine the relationship between selected outcome measures and trauma exposure with HTS, CIDI entered simultaneously along with potential confounders, i.e. age, sex, marital status, educational level, current stress, and IPV exposure. Missing data were rare, i.e. maximally 0.5% of total sample, and cases with missing data were excluded list-wise from logistic regression analyses. Statistical significance was accepted at $p<0.01$ (two-sided) due to the number of analyses performed.

Results

The final sample consisted of 3200 persons (NW, n=1701, SE, n=1499), representing in total 30 communes and 113 villages. Median number of persons interviewed per village was 32 (range 8-40). Among the 3464 households selected for potential sampling, interviews could not be carried out at 264 households due to: no eligible person (85), entire household absent (71), eligible person refused (79), house unoccupied (22), other (7). No differences in refusal rate were shown between regions or provinces. Mean age among refusals was 36.8, with 45 men and 34 women refusing to participate.

Table 1 shows the study sample characteristics, including IPV prevalence. Persons in the NW (vs. SE) were significantly younger, and more often single, divorced/separated, or had a deceased spouse. Physical/sexual partner violence was significantly more prevalent in the NW.

Table 2 shows the mean number of traumatic events per HTS and CIDI in the sample and by region, age group, and gender. HTS trauma events were more frequently reported than CIDI events, both in the total sample and within each region. In the total sample, 51.1% (n=1679) reported three or more HTS trauma, and 59.1% (n=973) of the older cohort reported six or more HTS trauma. Mean numbers of CIDI trauma, but not HTS trauma, were significantly greater in the NW (vs. SE). In both regions, HTS trauma means were significantly greater in older vs. younger cohorts, and males vs. females. Similar results were obtained for CIDI trauma, albeit age cohort and gender differences were less marked.

The most frequent HTS trauma were: forced labor (39.7%), lack of food/water over prolonged time (38.7%), being in a combat situation (37.2%), shelling or grenade attacks (37.2%), lack of shelter (34.6%), and forced evacuation (32.6%). Among these, lack of food/water was more often

reported in the SE vs. NW, while being in a combat situation was more often reported in the NW vs. SE ($p<0.01$, $p<0.001$, respectively). The most frequent CIDI trauma were: natural disaster (21.8%), man-made disaster (20.9%), and witnessing someone being badly injured or killed (19.1%, NW more frequent vs. SE, $p<0.001$).

Table 3 shows regional comparisons and total sample results concerning psychiatric symptoms, self-rated health, current stress and functional impairment. Persons in the NW (vs. SE) had significantly greater levels of symptoms (total HSCL, depression, anxiety), current stress, and functional impairment. In the total sample, prevalence of "symptomatic depression" and "symptomatic anxiety" was 7.3% (n= 330) and 13.1% (n=550), respectively, and both were significantly more prevalent in the NW vs. SE (13.9% vs. 4.9%; 22.6% vs. 9.5%, respectively, $p<0.001$, data not shown). Prevalence of co-morbidity for "symptomatic depression" and "symptomatic anxiety" in the total sample was 5.1% (n=231), and significantly greater in the NW vs. SE (9.7% vs. 3.5%, $p<0.001$). In total, 98 persons (2.2 %) met operational criteria for "probable major depressive disorder" (PMDD), according to the algorithm including functional impairment. Prevalence of PMDD was significantly greater in the NW vs. SE (4.3% vs. 1.4%), and women vs. men (3.4% vs. 1.0%) (all comparisons, $p<0.001$, data not shown). In total, 140 persons (2.6%) met criteria for "probable PTSD" of at least one month's duration, ever in life. Among these, 51 (1.1%) met criteria for "probable PTSD" during the past year. The prevalence of "probable PTSD" ever in life was significantly greater in the NW (6.9% vs. 0.9%, $p<0.001$), men vs. women (3.6% vs. 1.5%, $p<0.01$), and older vs. younger cohorts (3.9% vs. 1.1%, $p<0.001$) (all comparisons, data not shown).

Persons in the NW vs. SE had significantly higher stress scores (**Table 3**). The most frequently reported stressor in the total sample was financial worry (37.8%), followed by concerns for poor health (18.7%).

Persons in the NW vs. SE had significantly higher levels of functional impairment (SF-36, CTP) (**Table 3**). With regard to specific SF-36 sub-scales, 34.4% (n=1249) of the total sample reported limitations in physical activities due to health, 28.2% (n=1139) reported limitations in usual role activities due to physical health, 19.4% (n=870) reported limitations in usual role activities due to emotional health, and 3.7% (n=173) reported limitations in social life due to health/emotional problems (data not shown). Fair-to-poor self-rated health was reported by 56.8% of the total sample (**Table 3**).

Trauma exposure (high vs. low HTS, CIDI respectively) was examined in the total sample in relation to the following outcome measures: HSCL symptoms (total), self-rated health, current stress, functional impairment (SF-36, CTP), and IPV (emotional, physical), using logistic regression analyses adjusted for age, sex and the complex survey design (**Table 4).** IPV was here examined as a possible "outcome" of trauma exposure from sources other than IPV. CIDI trauma exposure was significantly related to all outcome measures. HTS exposure was significantly related to all outcome measures except for anxiety and IPV. CIDI trauma yielded generally greater ORs for most outcome measures, compared to HTS. Stratification of these analyses by region (**Table 5)** revealed both regional differences and similarities with regard to the association between trauma and poor outcome. Thus**,** ORs signifying poor outcome were consistently greater in the NW for HTS exposure, compared to the SE. Moreover, in the SE, HTS was not associated with any outcome, and in contrast to the NW, neither trauma measure was significantly related to

poor self-rated health. However, similar associations were found in both regions regarding the IPV and current stress measures, where solely CIDI trauma exposure was significant.

Finally, logistic regression analyses stratified by region were used to examine the relationship between trauma exposure (high vs. low HTS, CIDI, respectively) and selected outcome measures, i.e. total HSCL symptoms, poor self-rated health, and functional impairment (SF-36, CTP), adjusted for additional covariates (**Table 6**). Thus, HTS and CIDI were here entered into the same model together with age, sex, marital status, educational level, current stress, and IPV-P/IPV-E. Current stress and IPV-E/IPV-P were regarded here as potential daily life adversities that might confound or mediate the relationship between trauma and morbidity/disability. Odds ratios for the effect of HTS and CIDI are shown for all outcome measures, whereas for the other risk factors, only ORs for measures that reached significance in at least one region are shown.

In the fully adjusted models (Table 6), where HTS and CIDI are also adjusted for each other, a distinctive regional pattern emerged. In the NW, CIDI was significantly related to all outcome measures, whereas HTS was solely related to poor self-rated health and CTP impairment. In contrast, in the SE, neither HTS trauma nor CIDI trauma were significantly related to any outcome measure (**Table 6**). Moreover, although current stress was independently related to all measures of well-being in both regions, ORs for these relationships were greater in the SE. Also, IPV-P (but not IPV-E) was independently related to high HSCL levels solely in the NW and to poor self-rated health solely in the SE.

DISCUSSION

Exposure to trauma, whether conflict/war-related or related to civilian life, is prevalent in these rural regions in Cambodia, especially among males and persons over 39 years of age. Traumatic events were somewhat more frequent in the NW, i.e. the region with longer duration of conflict and political instability. Persons in the NW vs. the SE also had greater levels of psychiatric symptoms, current perceived stress, and greater impairment on daily functioning. In the fully adjusted models, trauma was also more strongly related to psychiatric symptoms, self-rated health and functional disability in the NW compared to the SE, suggesting that morbidity in this region is partly due to the persistent impact of such events, experienced either during the conflict years or civilian life. In contrast, in the SE, psychiatric morbidity and functional disability were more strongly related to current perceived stress than to trauma exposure, whether civilian or war-related, indicating the relatively greater importance of daily adversities for current well-being in that region. The current findings suggest that focusing exclusively on past trauma may underplay the importance of current adversities for poor mental health and functional impairment.

The current study is the largest to date in Cambodia, and although limited to four provinces, finds relatively low rates of "probable major depressive disorder". Despite prevalent trauma, rates of PTSD were also relatively low, albeit marked regional differences were obtained, with up to 6.9% prevalence of lifetime PTSD in the NW. Functional impairment was more prevalent than specific psychiatric diagnoses or symptomatic conditions. In contrast, rates of PTSD ranging from 7.3% to 20.6% have been found in two other provinces (Dubois et al., 2004; Mollica et al., 2014) and 11.2% nation-wide (Sonis et al., 2009), thus indicating considerable differences from the current study. However, direct comparisons of PTSD rates are difficult due to sampling and

methodological differences. This was a survey of rural inhabitants of working age (18-60), and not of the general population. Thus, excluding persons over the age of 60, for example, might have attenuated PTSD results. Sonis et al. (2009) used a national probability sample, whereas Dubois et al. (2004) and Mollica et al. (2014) studied single provinces, i.e. Kampong Cham and Siem Reap, respectively, where contextual aspects such as urbanization, climate/geographical factors, sources of livelihood, etc. may differ. Also, all studies (including ours) assessed PTSD with symptom check-lists, whereas clinical diagnostic interviews would yield more accurate case ascertainment. With regard to physical functional impairment (SF-36 subscale #1), we found higher rates than Dubois et al. (2004), using the same sub-scale. Also, despite the slightly younger age distribution in our sample, nearly 60% of participants reported fair-to-poor self-rated health, in contrast to 36.2% in Dubois et al.'s (2004) study.

Nevertheless, rates of psychiatric disorder and trauma within and across conflict-exposed populations may vary widely, and it is unclear to what extent variations depend upon contextual factors related to the setting and/or methodological factors, including the validity of self-report (Rodin & van Ommeren, 2009). The greater prevalence of PTSD reported among males vs. females departs from the gender pattern generally seen (Breslau, 2009), but the results are based on small case numbers (n=51), and caution is warranted. It may be noted that about half of the current sample consisted of younger persons, i.e. without direct exposure to the Khmer Rouge period. In our study, younger persons reported significantly fewer traumatic events as expected, in contrast to Sonis et al. (2009) where no age cohort differences were found. Also, in these rural villages, poverty is prevalent, and the harsh conditions of daily life in isolated villages may positively select for persons better able to survive. Moreover, in rural regions such as these, psychological distress may preferentially be expressed in terms of physical symptoms (Stevens,

2001), which might partly explain the relatively high prevalence of poor self-rated health currently found. Alternatively, social support and religious beliefs may be stronger in these rural areas, thus possibly lessening the mental health consequences of trauma exposure (Johnson & Thompson, 2008). A recent study in Peru found that sense of belonging and interpersonal relationships had a protective influence on the occurrence of chronic PTSD in earthquake survivors (Flores, Carnero & Bayer, 2014). Finally, in Rwanda, PTSD symptoms dramatically improved already after 18 months post-genocide (Cohen et al., 2011), thus lending support to the relatively low current rates found here.

Daily adversities, as reflected in the measure "current perceived stress", were independently related to all outcome measures in both regions (**Table 6**), thus supporting the notion that these aspects are at least as important for general well-being as history of trauma in civilian populations exposed to mass violence. The relative importance of daily adversities may even vary considerably by region, as indicated here. It may be noted that in the final models, exposure to IPV-P (physical violence), albeit also potentially a stressful aspect of everyday life (Miller & Rasmussen, 2010), was in the NW solely related to psychiatric symptoms and in the SE solely related to poor self-rated health. Although IPV may have been under-reported, IPV prevalence rates agree with the most recent rates reported by the CDHS (2005). Nevertheless, IPV was assessed as current and previous exposure aggregated, and may not solely reflect the current situation. Also, it may well be that other aspects of daily life, such as financial worry, are more relevant for well-being in these rural settings. Stress due to financial worry was reported by 37.8% of the sample. Moreover, Cambodian society is still largely dominated by patriarchal values, and tolerance towards IPV is high even among women (Eng et al., 2010). Acceptance of patriarchal

values by women might influence the extent to which IPV is perceived as a problem, thus perhaps mitigating some of its negative impact.

Methodological Considerations

The study has a number of limitations, and the results should be interpreted with caution. Firstly, sampling took place solely in rural districts. Thus, the sample is neither representative for the provinces included nor representative for Cambodia. Also, the study intentionally targeted persons potentially still in the active work force, to explore whether morbidity due to persistent trauma could have broader implications for economic productivity in these regions. Thus, older survivors of the Khmer Rouge regime (persons over 60) were excluded. The use of cross-sectional data precludes inferences about causality; e.g., current psychiatric morbidity or functional impairment may influence reporting of trauma, stress and other measures. Also, the use of face-to-face interviews may have influenced responses to sensitive questions, such as trauma and IPV. Trauma measures and reactions to trauma ("probable PTSD" ever in life, past year) were based on recall and thus potentially influenced by recall bias, especially for distal events. The summation of traumatic events does not take into consideration the severity or frequency of exposure. Also, duration of residence in the specific regions is unknown, and thus, the effect of in- and out-migration on trauma exposure cannot be determined. Moreover, although the results generally suggest a differential impact of region, residual confounding due to factors not measured in this study cannot be excluded. Thus, better levels of well-being among persons in the SE may be due to factors other than this region's shorter length of conflict exposure and longer recovery period. Another issue is whether civilian trauma can be considered as distinctly separate from conflict-related trauma, as some civilian trauma, e.g. man-made disaster, may occur as a result of mass

conflict. Nevertheless, the exclusion of CIDI trauma occurring during 1975-1979 reduces some of the potential overlap between civilian- and conflict-related trauma. Further, prevalence rates of psychiatric morbidity were based on symptom check-lists rather than diagnostic interviews, albeit data collection was conducted by psychiatric residents. Severity levels of PTSD symptoms were not assessed. Moreover, the psychometric properties of the daily stressor and Cambodian Task Performance scales developed specifically for this study are unknown. However, measures derived from FGDs conducted in the actual setting may be less likely to be subject to cross-cultural bias. Moreover, they were strongly related to trauma exposure and well-being, providing some support for face validity. The SF-36, although previously used in Cambodia (Dubois et al, 2004), has unknown validity in Cambodia, whereas both the HSCL and the HTS scales have previously been validated in Cambodian refugees (Mollica et al., 1992). The study's strengths are high participation rates, large sample size, low internal attrition and the detailed nature of the information collected, especially concerning trauma. To our knowledge, this is the first study in Cambodia to examine the impact of current stressors and IPV on mental health and functional capacity.

Conclusions

The impact of events from the Khmer Rouge period continues to make itself manifest in a northwestern region of Cambodia, in terms of reduced mental health and daily functional capacity, although a complex interplay of contributing factors, past as well as present, seems implicated. Thus, a focus exclusively on past trauma may overlook the role of current daily life circumstances for current morbidity levels. The regional differences observed regarding the relative impact of trauma may have important implications for public health efforts and policy makers involved with

strategic allocation of funds and resources. In both regions, however, targeted interventions aimed at improving daily life circumstances, including efforts to reduce poverty, would likely lead to better mental health. The high rates of poor self-reported health indicate the need also for systematic efforts to improve health care in these regions. The current findings suggest that a greater understanding of factors that promote recovery and/or resilience in conflict- exposed populations may be useful for those concerned with trauma and its long-term consequences.

References

American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*. Washington, D.C.: American Psychiatric Association.

Bolton, P., Neugebauer, R., & Ndogoni, L. (2002). Prevalence of depression in rural Rwanda based on symptom and functional criteria. *Journal of Nervous and Mental Disease, 190,* 631-637.

Breslau, N. (2009). The epidemiology of trauma, PTSD, and other posttrauma disorders. *Trauma, Violence, & Abuse, 10,* 198-210.

Cambodia Demographic and Health Survey (CDHS). (2005). Phnom Penh, Cambodia: National Institute of Statistics, National Institute of Public Health.

Cambodian Inter-Censal Population Survey. (2008). http:/www.nis.gov.kh/nis/census2008/census.pdf. Accessed February 11, 2014.

Campbell, J.C. (2002). Health consequences of intimate partner violence. *Lancet, 359,* 1331-1336.

Clark, C. J., Everson-Rose, S. A., Suglia, S. F., et al. (2010). Association between exposure to political violence and intimate-partner violence in the occupied Palestinian territory: a cross-sectional study. *Lancet, 375,* 310-316.

Cohen, M.H., Shi, Q., Fabri, M., et al. (2011). Improvement in posttraumatic stress disorder in postconflict Rwandan women. *Journal of Women's Health, 20,* 1325-1332.

Dubois, V., Tonglet, R., Hoyois, P., et al. (2004). Houshold survey of psychiatric morbidity in Cambodia. *International Journal of Social Psychiatry, 50,* 174-185.

Eng, S., Li, Y., Mulsow, M., et al. (2010). Domestic violence against women in Cambodia: husband's control, frequency of spousal discussion, and domestic violence reported by Cambodian women. *Journal of Family Violence, 25,* 237-246.

Engwall, A., Sjöberg, Ö., & Sjöholm, F. (2007). *Understanding Rural Poverty in Cambodia*. Stockholm, Sweden: Sida Country Economic Report.

Fernando, G. A., Miller, K.E., & Berger, D. E. (2010). Growing pains: The impact of disaster-related and daily stressors on the psychological and psychosocial functioning of youth in Sri Lanka. *Child Development, 81,* 1192-1210.

Flores, E.C., Carnero, A, & Bayer, A.M. (2014). Social capital and chronic post-traumatic stress disorder among survivors of the 2007 earthquake in Pisco, Peru. *Social Science & Medicine, 101,* 9-17.

Hill, H., & Menon, J. (2013). Cambodia: rapid growth with weak institutions. *Asian Economic Policy Review, 8,* 46-65.

Johnson, H., & Thompson, A. (2008). The development and maintenance of post-traumatic stress disorder (PTSD) in civilian adult survivors of war trauma and torture: A review. *Clinical Psychology Review, 28,* 36-47.

Kroll, J. Posttraumatic symptoms and the complexity of responses to trauma. (2003). *JAMA, 290,* 667-670.

Maneesriwongul W., & Dixon, J.K. (2004). Instrument translation process: a methods review. *Journal of Advanced Nursing,* 48, 175-186.

Miller, K. E., & Rasmussen, A. (2010). War exposure, daily stressors, and mental health in conflict and post-conflict settings: Bridging the divide between trauma-focused and psychosocial frameworks. *Social Science & Medicine, 70,* 7-16.

Miller, K.E., Omidian, P., Rasmussen, A., et al. (2008). Daily stressors, war experiences, and mental health in Afghanistan. *Transcultural Psychiatry, 45,* 611-638.

Mollica, R. F., Wyshak, G., de Marneffe , D. et al. (1987). Indochinese versions of the Hopkins Symptom Check List-25: A screening instrument for the psychiatric care of refugees. *American Journal of Psychiatry, 44,* 497-500.

Mollica, R. F., Caspi-Yavin, Y., Bollini, P., et al. (1992). The Harvard trauma questionnaire: validating a cross-cultural instrument for measuring torture, trauma and PTSD in Indochinese refugees. *Journal of Nervous and Mental Disease, 180,* 111-116.

Mollica, R. F., McInnes, K., Poole, C., et al. (1998). Dose-effect relationships of trauma to symptoms of depression and post-traumatic stress disorder among Cambodian survivors of mass violence. *British Journal of Psychiatry, 173,* 482-488.

Mollica, R.F., Brooks, R., Tor, S., et al. (2014). The enduring mental health impact of mass violence: a community comparison study of Cambodian civilian living in Cambodia and Thailand. *International Journal of Social Psychiatry, 60,* 6-20.

Murthy, R.S., & Lakshminarayana, R. (2006). Mental health consequences of war: a brief review of research findings. *World Psychiatry, 5,* 25-30.

Rasmussen, A., Wilkinson, J., Raghavan, S., et al. (2010). Rates and impact of trauma and current stressors among Darfuri refugees in Eastern Chad. *American Journal of Orthopsychiatry*, *80*, 227-236.

Rodin, D., & van Ommeren, M. (2009). Commentary: Explaining enormous variations in rates of disorder in trauma-focused psychiatric epidemiology after major emergencies. *International Journal of Epidemiology*, *38*, 1045-1048.

Sonis, J., Gibson, J. L., de Jong, J. T., et al. (2009). Probable posttraumatic stress disorder and disability in Cambodia. *JAMA*, *302*(5), 527-536.

Stevens, C. A. (2001). Perspectives on the meanings of symptoms among Cambodian refugees. *Journal of Sociology*, *37*, 81-98.

Straus, M. A., Hamby, S. L., Boney-McCoy, S., et al. (1996). The revised conflict tactics scales (CTS2): Development and preliminary psychometric data. *Journal of Family Issues*, *17*, 283-316.

Usta, J., Farver, J. M., & Zein, L. (2008). Women, war, and violence: Surviving the experience. *Journal of Women's Health*, *17*, 793-804.

Ware, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short form health survey (SF-36). I. Conceptual framework and item selection. *Medicine and Care*, *30*,473-483.

WHO. (2004). *Composite International Diagnostic Interview 3.0* (CIDI). Geneva: WHO.

Table 1. Study sample characteristics (n = 3200).

Characteristics[a]	**Northwest** (n = 1701)	**Southeast** (n = 1499)	**Total** (n = 3200)
Age, mean (sd)	38.2 (17.2)*	40.3 (8.8)	39.8 (11.3)
Sex, n (%)			
Males	846 (51.8%)	744 (49.7%)	1590 (50.3%)
Females	855 (48.2%)	755 (50.3%)	1610 (49.7%)
Marital status, n (%)			
Single/divorced/widowed	405 (22.8%)*	243 (16.6%)	648 (18.3%)
Married/cohabiting	1296 (77.2%)	1256 (83.4%)	2552 (81.7%)
Educational level, n (%)			
None to 6 years	1248 (74.3%)	1018 (68.2%)	2266 (69.9%)
7 years or higher	452 (25.7%)	479 (31.8%)	931 (30.2%)
Intimate partner violence, n (%)			
Ever any type, yes[b]	364 (21.7%)	410 (26.1%)	774 (24.9%)
Ever emotional, yes	347 (20.8%)	397 (25.5%)	744 (24.2%)
Ever physical violence, yes	141 (8.3%)*	83 (4.8%)	224 (5.7%)

[a] All n's are unweighted, while all other statistics are adjusted for sampling design and weights. Adjusted Wald tests and Pearson's chi square tests were used for regional comparisons of means and proportions, respectively; * $p<0.01$.

[b] Affirmative response to emotional or physical violence or to both.

Table 2. Exposure to traumatic events, comparisons by region, age group, gender (n=3200).

	Northwest		**Southeast**		**Total**
	(n=1701)		(n=1499)		(n=3200)
Measures, mean (sd)					
HTS, total trauma[a]	4.24 (5.7)		3.65 (2.8)		3.81 (3.7)
	18-39 years	**40-60 years**	**18-39 years**	**40-60 years**	
	(n=906)	(n=795)	(n=703)	(n=796)	
	1.77 (2.3)	7.04 (3.8)**	1.07 (1.5)	5.85 (3.2)**	
	Males	**Females**	**Males**	**Females**	
	(n =846)	**(**n=855)	(n=744)	(n=755)	
	4.76 (4.1)**	3.68 (3.9)	4.26 (3.5)**	3.05 (3.4)	
CIDI, total trauma[a]	1.97 (2.8)**		1.20 (1.1)		1.41 (1.6)
	18-39 years	**40-60 years**	**18-39 years**	**40-60 years**	
	(n=906)	(n=795)	(n=703)	(n=796)	
	1.44 (1.6)	2.58 (2.2)**	0.96 (1.1)	1.39 (1.4)*	
	Males	**Females**	**Males**	**Females**	
	(n =846)	**(**n=855)	(n=744)	(n=755)	
	2.49 (2.2)**	1.42 (1.6)	1.32 (1.3)	1.07 (1.3)	

[a] All n's are unweighted, while all other statistics are adjusted for sampling design and weights. Between-group comparisons by Adjusted Wald tests; ** = $p<0.001$, * = $p<0.01$. HTS events = Harvard Trauma Scale, and CIDI events = Composite International Diagnostic Interview).

Table 3. Psychiatric symptoms, self-rated health, current stress, and functional impairment, in total sample and by region.

Measures[a]	**Northwest** (n=1701)	**Southeast** (n=1499)	**Total Sample** (n=3200)
HSCL *total score*, mean (sd)	1.40 (0.6)**	1.22 (0.2)	1.27 (0.3)
HSCL *depression*, mean (sd)	1.36 (0.6)**	1.18 (0.2)	1.23 (0.3)
HSCL *anxiety*, mean (sd)	1.46 (0.7)**	1.28 (0.3)	1.33 (0.4)
Current stress, mean (sd)	1.63 (0.4)**	1.41 (0.2)	1.47 (0.3)
SF-36, mean (sd)	1.35 (0.6)**	1.17 (0.2)	1.22 (0.3)
CTP, mean (sd)	1.36 (0.5)**	1.16 (0.2)	1.22 (0.3)
Self-rated health, n (%)			
Excellent/very good/good	637 (38.5%)	664 (45.0%)	1301 (43.2%)
Fair/poor	1064 (61.5%)	835 (55.0%)	1899 (56.8%)

All n's are unweighted, while all other statistics are adjusted for sampling design and weights. Adjusted Wald tests and Pearson's chi square tests were used for comparisons of means and proportions, respectively; ** = $p<0.001$.

HSCL=Hopkins Symptom Check List, CTP=Cambodian Task Performance scale.

[a] Higher scores indicate more symptoms, more experienced stress, greater functional impairment (SF-36, CTP, respectively).

Table 4. HTS and CIDI trauma exposure (high vs. low) in relation to selected outcome measures, total sample (n=3200).

Outcome measures	HTS trauma exposure[a] OR (95% CI)	CIDI trauma exposure[b] OR (95% CI)
Hopkins Symptom Check List (HSCL)		
High total symptoms, ref = low	1.69 (1.22-2.33)*	2.91 (1.85-4.57)**
High depression scores, ref = low	1.85 (1.28-2.67)*	3.04 (2.03-4.53)**
High anxiety scores, ref = low	1.56 (1.11-2.19)	2.66 (1.79-3.96)**
Poor self-rated health, ref = good	1.77 (1.29-2.42)**	1.55 (1.24-1.93)**
High current stress, ref = low	1.55 (1.16-2.06)*	3.34 (2.45-4.57)**
Intimate partner violence (IPV)		
Emotional IPV, ref = no experience	1.27 (0.84-1.91)	1.54 (1.29-1.84)**
Physical IPV, ref = no experience	1.57 (1.01-2.43)	3.06 (2.13-4.39)**
Functional impairment		
High impairment (SF-36), ref = low	1.76 (1.23-2.51)*	2.65 (1.88-3.75)**
High impairment (CTP), ref = low	2.11 (1.52-2.93)**	3.13 (2.06-4.77)**

Age-and sex-adjusted outcomes in association with the two separate trauma exposures (HTS and CIDI), analyzed by logistic regression models. Results adjusted for sampling design and weights and presented as odds ratios (OR) with 95% confidence intervals (CI); ** = $p<0.001$, * $p<0.01$.

CTP = Cambodian Task Performance scale.

[a] High trauma exposure = 4 or more events (median-split).

[b] High trauma exposure = 2 or more events (median-split).

Table 5. HTS and CIDI trauma exposure (high vs. low) in relation to selected outcome measures, stratified by region.

	Northwest (n=1701)		Southeast (n=1499)	
Outcome measures	**HTS exposure** OR (95% CI)	**CIDI exposure** OR (95% CI)	**HTS exposure** OR (95% CI)	**CIDI exposure** OR (95% CI)
Hopkins Symptom Check List (HSCL)				
High total symptoms, ref=low	1.61 (1.22-2.13)*	3.01 (2.32-3.90)**	1.46 (0.93-2.30)	2.26 (1.31-3.91)*
Poor self-rated health, ref=good	3.22 (2.35-4.42)**	2.57 (1.90-3.46)**	1.31 (0.85-2.02)	1.11 (0.80-1.54)
High current stress, ref = low	1.51 (1.07-2.14)	2.00 (1.50-2.68)**	1.30 (0.87-1.93)	3.27 (2.27-4.72)**
Intimate partner violence (IPV)				
Emotional IPV, ref=no experience	1.42 (0.98-2.07)	1.62 (1.04-2.53)	1.26 (0.72-2.23)	1.76 (1.40-2.21)**
Physical IPV, ref=no experience	1.59 (0.79-3.19)	2.26 (1.46-3.47)*	1.33 (0.81-2.19)	3.27 (2.01-5.32)**
Functional impairment				
High impairment (SF-36), ref = low	2.26 (1.66-3.06)**	3.02 (2.29-3.98)**	1.40 (0.83-2.37)	2.00 (1.34-2.98)*
High impairment (CTP), ref = low	2.42 (1.85-3.16)**	2.76 (2.16-3.52)**	1.54 (0.93-2.55)	2.41 (1.48-3.94)*

Age-and sex-adjusted outcomes in association with the two separate trauma exposures (HTS and CIDI), analyzed by logistic regression models. Results adjusted for sampling design and weights and presented as odds ratios (OR) with 95% confidence intervals (CI); ** $p<0.001$, * $p<0.01$.

CTP = Cambodian Task Performance scale.

HTS, high trauma exposure = 4 or more events (median-split); CIDI, high trauma exposure = 2 or more events (median-split).

Table 6. HTS, CIDI trauma exposure (high vs. low) and other covariates in relation to psychiatric symptoms, self-rated health, and functional impairment, stratified by region.

	Northwest *(n=1701)*		**Southeast** *(n=1499)*	
Outcome	OR (95% CI)		OR (95% CI)	
HSCL, high total	HTS	1.03 (0.67-1.58)	HTS	1.26 (0.78-2.04)
	CIDI	2.58 (1.83-3.65)**	CIDI	1.59 (0.95-2.65)
	Age	1.05 (1.04-1.07)**	**Age**	1.05 (1.03-1.07)**
	Stress	3.06 (2.32-4.03)**	**Stress**	6.08 (3.96-9.33)**
	IPV-P	2.59 (1.31-5.12)*	IPV-P	1.44 (0.67-3.09)
Poor self-rated health	**HTS**	2.43 (1.77-3.32)**	HTS	1.32 (0.79-2.18)
	CIDI	1.92 (1.41-2.61)**	CIDI	0.79 (0.58-1.09)
	Age	1.05 (1.03-1.07)**	**Age**	1.06 (1.03-1.10)*
	Stress	1.75 (1.25-2.46)*	**Stress**	4.25 (2.86-6.30)**
	Sex	6.93 (4.65-10.31)**	**Sex**	5.63 (3.81-8.32)**
	IPV-P	0.66 (0.34-1.28)	**IPV-P**	2.34 (1.41-3.91)*
SF-36 Impairment	HTS	1.57 (1.12-2.20)	HTS	1.22 (0.73-2.04)
	CIDI	2.45 (1.75-3.43)**	CIDI	1.43 (0.98-2.11)
	Age	1.08 (1.06-1.10)**	**Age**	1.08 (1.06-1.10)**
	Stress	2.42 (1.70-3.44)**	**Stress**	4.66 (2.89-7.51)**
CTP impairment	**HTS**	1.77 (1.30-2.40)*	HTS	1.30 (0.78-2.15)
	CIDI	2.14 (1.57-2.93)**	CIDI	1.59 (1.10-2.29)
	Age	1.02 (1.01-1.04)*	Age	1.01 (0.99-1.02)
	Stress	3.38 (2.48-4.61)**	**Stress**	7.09 (4.05-12.41)**
	Sex	1.86 (1.19-2.90)*	Sex	1.34 (0.88-2.03)

Trauma and other potential risk factors in association with various outcomes analyzed by logistic regression models, adjusted for sampling design and weights. All risk factors were simultaneously adjusted for HTS (high vs. low), CIDI (high vs. low), age (continuous), sex (ref=males), marital status (ref=married/cohabiting), educational level (ref=7 yrs. or more), current perceived stress (ref=low), and exposure to intimate partner violence (IPV-E=emotional violence, IPV-P = physical violence, ref=no).

For each outcome, only covariates with ORs solely at $p<0.01$*, $p<0.001$** in the models are shown; however, ORs for HTS and CIDI are shown regardless, and covariates that were significant solely in one region are also shown for both regions.