Political violence and mental health in Nepal: prospective study*[†]

Brandon A. Kohrt, Daniel J. Hruschka, Carol M. Worthman, Richard D. Kunz, Jennifer L. Baldwin, Nawaraj Upadhaya, Nanda Raj Acharya, Suraj Koirala, Suraj B. Thapa, Wietse A. Tol, Mark J. D. Jordans, Navit Robkin, Vidya Dev Sharma and Mahendra K. Nepal

Background
Post-conflict mental health studies in low-income countries have lacked pre-conflict data to evaluate changes in psychiatric morbidity resulting from political violence.

Aims
This prospective study compares mental health before and after exposure to direct political violence during the People's War in Nepal.

Method
An adult cohort completed the Beck Depression Inventory and Beck Anxiety Inventory in 2000 prior to conflict violence in their community and in 2007 after the war.

Results
Of the original 316 participants, 298 (94%) participated in the post-conflict assessment. Depression increased from 30.9 to 40.6%. Anxiety increased from 26.2 to 47.7%. Post-conflict post-traumatic stress disorder (PTSD) was 14.1%. Controlling

for ageing, the depression increase was not significant. The anxiety increase showed a dose–response association with conflict exposure when controlling for ageing and daily stressors. No demographic group displayed unique vulnerability or resilience to the effects of conflict exposure.

Conclusions
Conflict exposure should be considered in the context of other types of psychiatric risk factors. Conflict exposure predicted increases in anxiety whereas socioeconomic factors and non-conflict stressful life events were the major predictors of depression. Research and interventions in post-conflict settings therefore should consider differential trajectories for depression v. anxiety and the importance of addressing chronic social problems ranging from poverty to gender and ethnic/caste discrimination.

Declaration of interest
None.

Low-income countries are home to more than one-sixth of the world's population, but bear a disproportionate burden of the world's violent conflicts.[1] Cross-sectional epidemiological studies have demonstrated the association of torture and political terror with psychiatric morbidity.[2] However, a weakness of psychiatric epidemiology studies in low-income countries has been a lack of pre-war estimates of mental illness prevalence. Owing to limitations in studying unpredictable events and the lack of routine psychiatric surveillance in low-resource settings, researchers generally rely upon observations after a violent conflict to estimate how war influences mental health. This has led some mental health experts to conclude that post-conflict psychiatric morbidity is attributable predominantly to war experiences. A review of violent conflict and mental health in low- and middle-income countries exemplifies the problematic conclusions drawn from existing epidemiological studies: 'The exposure [to war] of large population groups, *mostly having no mental health problems prior to the exposure*, and the subsequent development, in *a significant proportion of the population*, of a variety of psychiatric symptoms and disorders represent both a challenge and an opportunity for psychiatrists' (emphasis added).[3] These authors also suggest that the impact on mental health as a result of war are greater for children, women and elderly people.[3] However, these conclusions are difficult to support without evidence of low psychiatric morbidity prior to political violence. War trauma may not be the sole or dominant determinant of post-conflict mental health. Psychiatric morbidity may have been elevated before the outbreak of war. Populations in low-income countries

not only suffer from war trauma but also from other psychiatric risk factors such as poverty, high burdens of infectious disease, high maternal and infant mortality, gender-based violence and limited access to healthcare and education.[4–6] Moreover, high prevalence rates among certain demographic groups, such as women and elderly people, may not reflect greater vulnerability to the effects of war. Elevated rates in certain groups could result from factors that operate similarly in non-war settings, such as gender discrimination.[7,8] It is difficult to disentangle the influence of war from these chronic societal problems because of the lack of pre-conflict data.

The goal of this study is to use a prospective design to address three questions: (a) is there an increase in mental health problems from the pre- to post-conflict period, (b) if there were an increase, could it be attributed to conflict-related exposures, and (c) are some groups more vulnerable to the effects of conflict on mental health? To answer these questions, the mental health of a cohort in Nepal is compared across two time points: in 2000 before the outbreak of conflict-related violence in their community and in 2007–2008 after the signing of peace accords. This is the first study conducted in a low-income country that examines individual differences in mental health before and after exposure to war.

Method

Setting and study participants

Nepal is among the world's poorest countries[9] and recently endured the People's War fought between the Communist Party of Nepal (Maoists) and government security forces from 1996 until 2006. Although the People's War officially began in 1996, its effects were differentially felt throughout the country during the early years of the insurgency. Prior to 2000, violence was

limited to a few regions of Nepal, and most of the general population considered the Maoists a 'law and order problem' rather than a significant military threat.[10] This study was conducted in Jumla, a mountainous district in northwestern Nepal with no conflict mortality prior to 2001. It is important to note that the term 'pre-conflict' is employed in this study to refer to the data collection in 2000 because this was prior to any Maoist attacks in the study area of Jumla. Also, ethnographic research in Jumla during 2000 found that Maoist-related concerns did not dominate health narratives among people with anxiety and depression.[11] It was not until after the Royal Massacre of 2001 when King Gyanendra came to power that the Royal Nepal Army became engaged in the conflict. Of the 14 000 killed in the decade-long war, 92.5% of all deaths occurred after King Gyanedra assumed power in 2001.[12] In the study area of Jumla, there were no war-related casualties until late 2001. Between 2001 and 2006, Jumla suffered the effects of the People's War, including major battles leading to civilian, Maoist and government casualties, destruction of all telecommunication infrastructure, abduction and torture of residents, government blockades, decreased food availability, bombing of schools and destruction of medical infrastructure.[13] (See Tol et al's review for more information on the war history and psychosocial impacts.[14])

The baseline 'pre-conflict' data for this study are from a community epidemiology study of depression and anxiety conducted in Jumla in 2000. The baseline study was an evaluation of somatisation, depression and anxiety,[15] as well as caste and gender differences in mental health.[16–18] In the baseline study, random sampling of one adult per household was used for recruitment with an nth-household sampling strategy.[16] After the war ended in late 2006, the research team began tracking original participants for post-conflict interviews, which took place in 2007–2008. In cases of participants who died in the interim of 2000 to 2007, the cause, age and year of death were recorded.

In 2000, all participants were aged 18 years or older. Consent was recorded with a signature for literate participants or a thumbprint for illiterate participants. Participants did not receive compensation. The Department of Psychiatry at Tribhuvan University Teaching Hospital/Institute of Medicine (TUTH/IOM) in Kathmandu provided consultation prior to and during the assessment and gave final approval for the study in 2000. The protocol for the follow-up study in 2007–2008 was approved by the Institutional Review Board of Emory University and the Nepal Health Research Council, with modifications approved by TUTH/IOM. Interviews at both waves of assessment were conducted in participants' homes with only the interviewer and participant present. Interviews lasted 60–90 min. In 2007–2008, participants with high levels of psychological distress and impaired functioning (58 individuals) were evaluated by the study's principal investigator. A subset of these was referred for psychosocial care (43 individuals).

Instruments

The 21-item Beck Depression Inventory (BDI)[19] and Beck Anxiety Inventory (BAI)[20] were used to assess depression and anxiety symptoms over the prior 2 weeks. Items are scored 0–3 with an instrument range of 0 to 62. Scales were validated for use in Nepal[21,22] with clinical DSM-IV[23] diagnoses of major depressive disorder or generalised anxiety disorder: area under the curve (AUC) 0.92 (95% CI 0.88–0.96) for the BDI and 0.85 (95% CI 0.79–0.91) for the BAI; internal reliability (Cronbach alpha), BDI $\alpha = 0.90$ and BAI $\alpha = 0.90$. Based on the clinical validation of the BDI in Nepal, a score of 20 or higher suggests moderate

depression symptoms with the need for mental health intervention (sensitivity 0.73, specificity 0.91).[21] On the BAI, a score of 17 or higher indicates moderate anxiety symptoms with need for intervention (sensitivity 0.77, specificity 0.81).[22] These cut-off scores are intended only to reflect symptom burden at the level requiring intervention; the cut-offs do not indicate diagnoses of major depressive disorder or generalised anxiety disorder. Test–retest reliability Spearman–Brown coefficients for the BDI were 0.84 and for the BAI were 0.88. The validated BDI and BAI were used in the pre-conflict and post-conflict assessments.

The 17-item Post-traumatic stress disorder (PTSD) Checklist-Civilian Version (PCL-C) is a self-report rating scale for assessing PTSD symptoms and severity within the past week.[24] The English-language measure has good psychometric properties in Western populations[24] and the validated Nepali version performs similarly,[25] with a cut-off score of 50 or above indicating need for intervention.[26] For this study, internal reliability was 0.83. Test–retest reliability was 0.82.

The 64-item Stressful Life Events Rating Scale for Cross Cultural Research (SLERS) was used to assess stressful events over the preceding 12 months prior to the 2000 and 2007 assessments.[27] The SLERS has shown association with poor mental health in other Asian populations.[28,29] At the baseline pre-conflict assessment in 2000, greater frequency of stressful life events in the preceding 12 months as measured with the SLERS was associated with greater depression,[16] anxiety,[17] psychosomatic complaints[15] and general psychological morbidity.[18]

A self-report conflict exposure scale was developed to assess exposures to political violence-related traumatic events during the People's War. The items were chosen based on focus-group discussions, key informant interviews and review of documents about the conflict in Jumla. Mental health professionals who are natives of Jumla reviewed the political violence questionnaire for content and comprehensibility. Additionally, 30 Jumla residents conducted pile sorts and ranking tasks to indicate level of traumatic severity. Factor analysis demonstrated one cultural model for the group of traumatic events, i.e. there were not significant differences in rankings of traumatic events. For the analyses presented here, objective items (such as abduction, witnessed a killing) were retained, and subjective items (such as less access to healthcare, unable to meet daily needs) were removed because of increased risk of appraisal bias from current mental health status. Of the 32 proposed items, the final instrument included 14 items (Cronbach's $\alpha = 0.69$), which were considered locally severe and putatively objective. For these analyses, the results were dichotomised to '0' no exposure and '1' any exposure. The total number of types of exposure were summed (total: 0 to 14), and individuals were categorized into four groups according to quartiles of total exposures (0–3, 4–5, 6–7, >7 exposures). Only four individuals reported no trauma exposures; they were included in the low-exposure quartile.

Analyses

We first compared baseline (pre-conflict) characteristics between those who did and did not participate in the follow-up. Chi-squared for categorical outcomes tested differences among three groups: those who participated in the follow-up study, those who died before the follow-up study and those who were lost to follow-up or refused to participate. McNemar chi-squared tests were used to assess crude changes in income, education, stressful life events and depression and anxiety.

Generalised estimating equations (GEEs) were used to model the effect of assessment period (0: pre-conflict, 1: post-conflict), age (divided into 7-year age brackets), gender, caste (Bahun –'high

caste', Chhetri – 'high caste', Dalit – 'low caste' and Janajati-Buddhist ethnic minority groups), education (no education *v.* any education), income (no income *v.* any income), and stressful life events (median split: < 15 events *v.* ⩾ 15 events) and conflict exposure (quartiles) on binary outcomes for depression and anxiety. Generalised estimating equations can be used for longitudinal data analysis,[30] such as this study that includes two data points (pre- and post-conflict) for each individual. We used GEEs to ensure appropriate estimates and inferences from correlated repeated measures within individuals.

We used GEEs to test four models. In the first model, the effect of period of assessment (pre- *v.* post-conflict) on depression and anxiety was calculated to determine whether rates increased over time. In the second model, gender, age and caste were included to determine whether the effect of period of assessment remained significant after controlling for ageing. Gender and caste were included because of their association with outcomes in the pre-conflict period.[16,17] By including current age in 7-year age brackets in the model, we account for the effect of ageing of the sample over the 7 years between assessment periods. In the third model, the level of conflict exposure was entered to determine whether this accounted for the differences in period of assessment. In the final model, stressful life events in the past year and income were entered to determine whether conflict exposure remained significant when controlling for these more proximal stressors.

We used GEEs to determine whether specific demographic groups demonstrated greater change in mental health from the pre- to post-conflict period. Separate models were created for each interaction of interest: exposure (pre- *v.* post-conflict) × gender, exposure × age and exposure × caste. The sample was dichotomised at 39 years old to compare differential effect by age. For the caste model, Dalit *v.* all other groups was compared because the Dalit caste displayed the poorest outcomes in pre-conflict analysis.[16]

In the final analysis, logistic regression was used to determine the effects of pre-conflict depression, anxiety, education and income on post-conflict PTSD, when controlling for age, gender and caste. This was done because PTSD was not assessed in the pre-conflict period. *P*-values less than 0.05 were considered statistically significant unless otherwise noted. Statistical analyses were performed with SPSS v.16.0 for Windows.

Results

Table 1 presents the baseline characteristics of the sample prior to conflict, categorised by follow-up status. Of the original 316 participants, 298 people were re-interviewed at follow-up (94% of the original participants). Of these 298 follow-up participants, 266 (89.3%) were residing in Jumla and 32 (10.7%) had moved to other Nepal districts. Twelve (3.8%) of the original 316 participants were deceased. Of the remaining six people (1.9%) who did not participate, one refused participation and the other five were lost to follow-up.

There were no significant differences in baseline characteristics between the six people who did not participate and those who did participate in the follow-up study. The three groups (follow-up,

Table 1	Baseline characteristics of all participants (pre-conflict, year 2000) (*n* = 316)					
	n (%)				Test statistic	
	Total original participants (*n* = 316)	Follow-up participants (*n* = 298)	Deceased at follow-up (*n* = 12)	Lost to follow-up (*n* = 6)	χ^2	*P*
Gender					5.06	0.08
Male	183 (57.9)	168 (56.4)	10 (83.3)	5 (83.3)		
Female	133 (42.1)	130 (43.6)	2 (16.7)	1 (16.7)		
Age (years)					57.22	< 0.001
18–24	81 (25.6)	79 (26.5)	0 (0)	2 (33.3)		
25–31	67 (21.2)	66 (22.1)	0 (0)	1 (16.7)		
32–38	58 (18.4)	58 (19.5)	0 (0)	0 (0)		
39–45	45 (14.2)	44 (14.8)	0 (0)	1 (16.7)		
46–51	25 (7.9)	22 (7.4)	3 (25.0)	0 (0)		
52+	40 (12.7)	29 (9.7)	9 (75.0)	2 (33.3)		
Caste					14.00	0.03
Bahun	79 (25.0)	75 (25.2)	2 (16.7)	2 (33.3)		
Chhetri	153 (48.4)	149 (50.0)	2 (16.7)	2 (33.3)		
Dalit	75 (23.7)	65 (21.8)	8 (66.7)	2 (33.3)		
Janajati	9 (2.8)	9 (3.0)	0 (0)	0 (0)		
Education					4.22	0.12
No education	137 (43.4)	125 (41.9)	8 (66.7)	4 (66.7)		
Any education	179 (56.6)	173 (58.1)	4 (33.3)	2 (33.3)		
Household income					4.65	0.10
No income	142 (44.9)	130 (43.6)	9 (75.0)	3 (50.0)		
Any income	174 (55.1)	168 (56.4)	3 (25.0)	3 (50.0)		
Stressful life events					0.08	0.96
0–14 events	201 (63.6)	189 (63.4)	8 (66.7)	4 (66.7)		
⩾15 events	115 (36.4)	109 (36.6)	4 (33.3)	2 (33.3)		
Depression, BDI[a]					10.23	0.006
Below cut-off	213 (67.4)	206 (69.1)	3 (25.0)	4 (66.7)		
Above cut-off	103 (32.6)	92 (30.9)	9 (75.0)	2 (33.3)		
Anxiety, BAI[b]					6.37	0.04
Below cut-off	230 (72.8)	220 (73.8)	5 (41.7)	5 (83.3)		
Above cut-off	86 (27.2)	78 (26.2)	7 (58.3)	1 (16.7)		

BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory.
a. Cut-off is 20 or greater.
b. Cut-off is 17 or greater.

deceased and lost to follow-up) only differed in baseline characteristics for age, caste and mental health. Of the 12 participants who died, one was killed in crossfire between Maoists and the Nepal Army. The other 11 died from health problems, most commonly respiratory disease. Participants who died were more likely to be older, Dalit and have had depression (75%) and anxiety (58%) at the baseline pre-conflict assessment. When examining pre- to post-conflict changes in variables among all follow-up participants, the participants were more likely to have any education, any household income and a greater number of recent stressful events during the post-conflict assessment compared with the pre-conflict period (Table 2).

Depression and anxiety prevalence increased from the pre- to post-conflict assessment periods (Table 2). During the pre-conflict period, 92 of the 298 follow-up participants (30.9%) were above

the cut-off for depression. At post-conflict assessment, 121 (40.6%) were above the cut-off for depression. For anxiety, 78 of the 298 participants (26.2%) were above the cut-off at baseline. At follow-up, 142 of the 298 participants (47.7%) were above the cut-off. The correlation between BDI measures pre- and post-conflict was 0.37 ($P < 0.001$). For the BAI, the correlation between pre- and post-conflict measures was 0.34 ($P < 0.001$).

The odds of depression and anxiety increased from the pre- to post-conflict period (Table 3, Model 1). When using GEE to account for ageing of the population, there is not a significant effect of assessment period (pre- to post-conflict) on depression whereas the assessment period remains a significant predictor of anxiety (Table 3, Model 2). Figure 1 is a presentation of this effect of ageing for depression and anxiety. The increase in depression from pre- to post-conflict is no greater than what would be expected with ageing of the population alone. In contrast, increases in anxiety were greater than would be expected from ageing.

The next step was to evaluate whether conflict-related traumas can account for observed changes in anxiety. Participants experienced a range of exposures to political violence (Table 4). When conflict exposure was entered into the GEE, the effect of pre- v. post- conflict assessment period was no longer significant for anxiety (Table 3, Model 3), suggesting that conflict exposure accounts for the difference in anxiety levels between the two assessments. Moreover, this showed a dose–response effect of number of types of conflict events on anxiety. In the final GEE model, conflict exposure remained significant in a dose–response relationship for anxiety even when controlling for stressful life events in the past year and household income (Table 3, Model 4). Table 5 presents the final model including the effects of gender, age, caste, education, income and stressful life events. For depression, these factors are significant. For anxiety, gender, age, caste and stressful life events are significant in addition to conflict exposure. For both depression and anxiety, Dalit caste had the greatest odds of poor mental health compared with other ethnic/caste groups.

We evaluated whether any specific demographic group showed greater change in mental health outcomes between the pre- and post- conflict periods. The absolute increases were greater for

Table 2 Comparison of characteristics between pre-conflict (year 2000) and post-conflict (year 2007) among follow-up participants (n = 298)

	n (%)		
	Pre-conflict	Post-conflict	McNemar χ^2, P
Education			<0.001
No education	125 (41.9)	92 (30.9)	
Any education	173 (58.1)	206 (69.1)	
Household income			<0.001
No income	130 (43.6)	72 (24.2)	
Any income	168 (56.4)	226 (75.8)	
Stressful life events			<0.001
0–14 events	189 (63.4)	106 (35.6)	
⩾15 events	109 (36.6)	192 (64.4)	
Depression, BDI[a]			0.005
Below cut-off	206 (69.1)	177 (59.4)	
Above cut-off	92 (30.9)	121 (40.6)	
Anxiety, BAI[b]			<0.001
Below cut-off	220 (73.8)	156 (52.3)	
Above cut-off	78 (26.2)	142 (47.7)	

BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory.
a. Cut-off is 20 or greater.
b. Cut-off is 17 or greater.

Table 3 Generalised estimating equations for effect of assessment period and conflict exposure on depression and anxiety among follow-up participants (n = 298)[a]
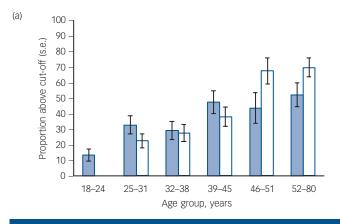
	Model 1		Model 2		Model 3		Model 4	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Depression, BDI[b]								
Assessment period		0.009		0.22		0.66		0.97
Pre-conflict (year 2000)	1 (Reference)		1 (Reference)		1 (Reference)		1 (Reference)	
Post-conflict (year 2007)	1.44 (1.09–1.91)		1.27 (0.87–1.84)		0.88 (0.50–1.55)		0.99 (0.54–1.79)	
Conflict exposure	N/A		N/A			0.36		0.56
0–3 events					1 (Reference)		1 (Reference)	
4–5 events					1.75 (0.89–3.45)		1.49 (0.75–2.95)	
6–7 events					1.42 (0.70–2.91)		1.32 (0.63–2.75)	
8–13 events					1.80 (0.81–4.00)		1.72 (0.76–3.89)	
Anxiety, BAI[c]								
Assessment period		<0.001		<0.001		0.54		0.57
Pre-conflict (year 2000)	1 (Reference)		1.0 (Reference)		1 (Reference)		1 (Reference)	
Post-conflict (year 2007)	2.46 (1.82–3.32)		3.04 (2.03–4.53)		1.22 (0.64–2.31)		1.21 (0.63–2.33)	
Conflict exposure	N/A		N/A			<0.001		0.001
0–3 events					1 (Reference)		1 (Reference)	
4–5 events					2.32 (1.11–4.83)		1.96 (0.92–4.16)	
6–7 events					4.26 (1.93–9.41)		3.17 (1.41–7.23)	
8–13 events					6.64 (2.90–15.19)		5.73 (2.38–13.84)	

BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory; N/A, not applicable.
a. All predictors are measured at pre- and post-conflict, except conflict exposure. Model 1: pre- v. post-conflict assessment period; Model 2: Model 1 plus age, caste, gender and education; Model 3: Model 2 plus conflict exposure; Model 4: Model 3 plus past year stressful life events and household income.
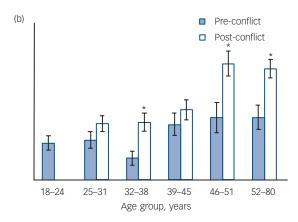b. Cut-off is 20 or greater.
c. Cut-off is 17 or greater.

Fig. 1 (a) Depression (Beck Depression Inventory (BDI)) and (b) anxiety (Beck Anxiety Inventory (BAI)) by age at time of pre- *v.* post-conflict assessment.

There are no participants in the 18- to 24-year-old age group at the post-conflict assessment because they aged out of this cohort. Error bars represent standard error of the proportion above the cut-off. Cut-off for BDI is 20 or greater, and cut-off for BAI is 17 or greater. The '*' refers to pre- *v.* post-conflict differences $P < 0.05$ for the specific age group.

anxiety *v.* depression for all groups (Fig. 2). Using GEE accounting for the two observations per person, interaction effects were examined in separate models for gender × exposure, age × exposure, and Dalit × exposure. In each of the separate models, interactions were not significant ($P < 0.05$). Women, elderly people and marginalised caste groups did not show a greater increase in psychiatric morbidity compared with other demographic groups.

Post-traumatic stress disorder was assessed only during the post-conflict period. Based on the validated cut-off score of 50 or greater, 42 participants (14.1%) met criteria for PTSD. In a logistic regression including gender, age, caste, conflict exposure and pre-conflict measures of education, income, depression and anxiety, the only significant predictors were conflict exposure ($P < 0.05$) and pre-conflict anxiety, with the latter showing a protective relationship for PTSD risk (odds ratio (OR) = 0.33, 95% CI 0.11–0.97).

Table 4 Conflict exposure among follow-up participants ($n = 298$)

Exposure type	n (%)
House searched by armed group[a]	256 (85.9)
Witnessing someone killed by armed group	234 (78.5)
Forced to feed and shelter armed group	220 (73.8)
Witnessing someone beaten by armed group	213 (71.5)
Witnessing bomb explosion	191 (64.1)
Threatened by armed group for political involvement	121 (40.6)
Family member tortured by armed group	75 (25.2)
Forced into political involvement by armed group	64 (21.5)
Family member abducted by armed group	37 (12.4)
Property damaged in battle	35 (11.7)
Displaced due to conflict	34 (11.4)
Sexual violence perpetrated by armed group	26 (8.7)
Domestic violence perpetrated by family member in armed group	23 (7.7)
Family member killed by armed group	14 (4.7)
Total conflict exposure (quartiles)	
0–3 exposures	75 (25.2)
4–5 exposures	85 (28.5)
6–7 exposures	92 (30.9)
8–13 exposures	46 (15.4)

a. 'Armed group' can refer to either government forces (Nepal Army and Armed Police Force) or Maoist forces (People's Liberation Army).

Discussion

Main findings and their signficance

The goal of this study was to examine the effects of exposure to war on mental health using a prospective cohort design comparing prevalence of depression and anxiety prior to the outbreak of widespread violence *v.* after peace accords were signed. This is the first study to assess the same group of individuals before and after a violent conflict in a low-income country. Crude prevalence rates increased. Anxiety rose from 26.2 to 47.7%. Participants had nearly three times greater risk for anxiety during the post-conflict period compared with the pre-conflict period, even when controlling for ageing of the cohort. The number of conflict exposures had a dose–response effect on anxiety. When controlling for pre- to post-conflict changes in recent stressful life events, conflict exposure continued to predict anxiety in a dose–response manner.

Depression rose from 30.9 to 40.6%. In contrast to anxiety, the increase in depression was attributable to ageing of the population but was not associated with war trauma. Regarding reputed vulnerable groups, we found that women, elderly people and those from marginalised caste groups were not more susceptible to increases in either depression or anxiety because of the conflict. These groups had a high symptom burden prior to conflict exposure. In summary, exposure to political violence led to an increase in anxiety but not depression in a rural community in Nepal, and the effects of political violence on psychiatric morbidity were felt equally across demographic groups.

These findings challenge some generalisations about the effects of war on mental health. Counter to the assumption that societies have low psychiatric morbidity prior to war,[3] this study suggests that (a) post-conflict societies may have had high rates of mental health problems prior to conflict exposure, especially in marginalised communities such as this study site, (b) exposure to conflict may play a dominant role in anxiety prevalence but may not be the primary risk factor for other forms of psychiatric morbidity such as mood disorders, which may be influenced more by ongoing non-war risk factors such as poverty and ethnic/caste-based discrimination, and (c) putative risk groups may not show a greater rise in psychiatric problems as a result of conflict exposure but instead may have chronically elevated risks observable even during peacetime.
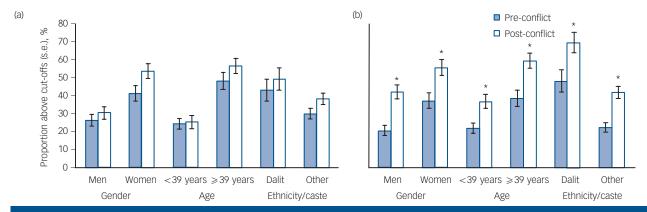
Fig. 2 (a) Depression (Beck Depression Inventory (BDI)) and (b) anxiety (Beck Anxiety Inventory (BAI)) by demographic group pre- and post-conflict.

Error bars represent standard error of the proportion above the cut-off. Cut-off for BDI is 20 or greater, and cut-off for BAI is 17 or greater. The '*' refers to pre- v. post-conflict differences $P<0.05$ for the specific demographic group.

Our study also suggests different trajectories and risk factors for mood v. anxiety disorders. Studies in Algeria and Afghanistan also have demonstrated trauma exposure associated with increased risk of anxiety but not depression.[31,32] In a study of 2000 survivors of 9/11, there were different profiles for depression including one group characterised by chronic depression with risk factors including high stressors, low social support, a lifetime history of depression and non-terror chronic traumas;[33] this depression subgroup parallels the profile of depression in our Nepal sample. Furthermore, there is increasing evidence for differing trajectories and risk factors for mood and anxiety disorders in non-conflict affected populations.[34,35] Therefore, whereas others have argued that the distinction between anxiety and depression in low-income settings is not clinically relevant,[36] the differences in trajectory suggest some divergence in public health prevention strategies for mood and anxiety disorders.

Table 5 Generalised estimating equations for predictors of depression and anxiety among follow-up participants ($n = 298$)[a]

	Depression, Beck Depression Inventory[b]		Anxiety, Beck Anxiety Inventory[c]	
	OR (95% CI)	P	OR (95% CI)	P
Gender		<0.001		<0.001
Male	1 (Reference)		1 (Reference)	
Female	3.02 (1.85–4.92)		4.55 (2.67–7.74)	
Age, years		<0.001		<0.001
25–31	1 (Reference)		1 (Reference)	
32–38	2.05 (0.90–4.64)		0.44 (0.21–0.92)	
39–45	3.56 (1.57–8.06)		1.12 (0.51–2.47)	
46–51	7.60 (2.94–19.68)		1.86 (0.80–4.33)	
52–80	10.91 (4.58–25.99)		2.81 (1.28–6.20)	
Caste		0.04		<0.001
Chhetri	1 (Reference)		1 (Reference)	
Dalit	1.69 (1.01–2.83)		5.80 (3.44–9.78)	
Bahun	1.06 (0.65–1.75)		2.51 (1.55–4.06)	
Janajati	0.10 (0.01–0.92)		0.11 (0.01–1.19)	
Education		0.03		0.26
Any education	1 (Reference)		1 (Reference)	
No education	1.72 (1.07–2.76)		1.33 (0.81–2.20)	
Household cash income		<0.001		0.44
Any income	1 (Reference)		1 (Reference)	
No income	2.49 (1.65–3.76)		1.19 (0.77–1.85)	
Stressful life events in past year		0.005		<0.001
0–14 events	1 (Reference)		1 (Reference)	
⩾15 events	1.86 (1.20–2.88)		2.55 (1.60–4.05)	
Conflict exposure		0.56		0.001
0–3 events	1 (Reference)		1 (Reference)	
4–5 events	1.49 (0.75–2.95)		1.96 (0.92–4.16)	
6–7 events	1.32 (0.63–2.75)		3.17 (1.41–7.23)	
8–13 events	1.72 (0.76–3.89)		5.73 (2.38–13.84)	
Assessment period		0.97		0.57
Pre-conflict (year 2000)	1 (Reference)		1 (Reference)	
Post-conflict (year 2007)	0.99 (0.54–1.79)		1.21 (0.63–2.33)	

a. All predictors are measured at pre- and post-conflict, except conflict exposure.
b. Cut-off is 20 or greater.
c. Cut-off is 17 or greater.

Strengths and limitations

The strengths of this study include the use of validated instruments, the ability to employ a prospective sample, and a follow-up rate of 98% of living original participants. Regarding limitations, it is difficult to specify what qualifies as 'pre-conflict' mental health. As with most settings of political violence, the historical date a war begins, the date violence reaches a community and the time when a community suffers the psychological sequelae of political violence all may differ. Even though direct violence did not occur in Jumla before this study was conducted, anticipatory concerns cannot be excluded. Anxiety rates may have been lower in this community prior to the war's officially recognised start date in 1996. There is likely a gradient ranging from anticipating conflict to actually experiencing violence. The increase in anxiety that occurred after direct violence reached the community in 2001 and the dose–response pattern suggest that direct exposure to violence has an added effect upon anxiety beyond possible pre-violence anticipatory anxiety. Ceiling effects also may have influenced the findings in that high levels of depression prior to the conflict may have precluded observing a significant increase at the post-conflict assessment. A major limitation is that PTSD was not assessed in 2000, so the change in prevalence attributable to the conflict could not be quantified.

Implications

These findings have implications for global mental healthcare. Whereas high levels of mental health problems alone demand attention and intervention, prevention and palliative treatment will differ depending on the nature of war-related factors *v.* other risk factors.[37–39] More detailed knowledge of the impact of political violence *v.* other chronic social problems can lead to better-informed interventions in post-conflict settings with scarce resources. The identification of mental health problems in these settings preceding conflict demonstrates the need for investment in mental healthcare infrastructure and other psychosocial services in impoverished communities.[40] Social marginalisation can be as damaging to mental health as war trauma: being from a low caste Dalit group has the same effect size (OR = 5.80) as having experienced conflict exposure at the highest quartile (OR = 5.73) for anxiety. Therefore, although trauma-specific interventions may be helpful for anxiety, social interventions to reduce and prevent depression and anxiety in this setting should focus on education, poverty reduction, minimising stressful life events, improving healthcare and reducing other risk factors associated with ageing, low caste and female gender.

Mounting evidence suggests that the impact on mental health of war is not inevitable, but rather intimately related to the social, economic and cultural conditions that precede and follow violent conflict.[5,38,39,41] These suppositions are in no way intended to diminish the emphasis placed upon the suffering caused by political violence. Rather, the goal is to increase attention to the equally damaging forces of chronic injustice in the form of ongoing financial, social and health-related threats that erode everyday mental health. Moreover, pre-conflict marginalisation may increase vulnerability to exploitation by militant groups. Maoists used the promise of eradicating social inequities to recruit adults and children into their military.[14,42] This leads to a final important observation of this study: psychiatric morbidity did not *decrease* for any demographic group. This challenges suggestions, such as those proffered by militant revolutionary movements, that violent uprising is a form of psychological emancipation. Ultimately, addressing risk factors for poor mental health such as poverty, lack of education, inadequate healthcare and gender- and ethnic/caste-based discrimination, in addition to trauma healing, may not only ameliorate mental health problems, but also help to reduce vulnerability to exploitation and involvement in political violence.

Brandon A. Kohrt, MD, PhD, Department of Psychiatry and Behavioral Sciences, The George Washington University, Washington DC, USA; **Daniel J. Hruschka**, PhD, MPH, School of Human Evolution and Social Change, Arizona State University, Tempe, Arizona, USA; **Carol M. Worthman**, PhD, Department of Anthropology, Emory University, Atlanta, Georgia, USA; **Richard D. Kunz**, MD, Department of Physical Medicine & Rehabilitation, Virginia Commonwealth University Health Systems, Richmond, Virginia, USA; **Jennifer L. Baldwin**, MA, MPH, Department of Anthropology, University of Illinois-Urbana Champaign, Urbana Champaign, Illinois, USA; **Nawaraj Upadhaya**, MA, University of Amsterdam, Amsterdam, The Netherlands; **Nanda Raj Acharya**, **Suraj Koirala**, MA, Transcultural Psychosocial Organization Nepal, Kathmandu, Nepal; **Suraj B. Thapa**, MD, Institute of Psychiatry, University of Oslo, Institute of Psychiatry, Oslo, Norway; **Wietse A. Tol**, PhD, Department of Anthropology, Yale University, New Haven, Connecticut, USA; **Mark J. D. Jordans**, PhD, Department of Research and Development, HealthNet TPO & Centre for Global Mental Health, London School of Hygiene and Tropical Medicine; **Navit Robkin**, MPH, Rollins School of Public Health, Emory University, Atlanta, Georgia, USA; **Vidya Dev Sharma**, MBBS, MD, **Mahendra K. Nepal**, MBBS, MD, Department of Psychiatry, Institute of Medicine, Tribhuvan University Teaching Hospital, Maharajgunj, Nepal

Correspondence: Brandon A. Kohrt, Department of Psychiatry and Behavioral Sciences, The George Washington University, 2150 Pennsylvania Avenue, 8th Floor, Washington, DC 20037, USA. Email: brandonkohrt@gmail.com

First received 1 May 2011, final revision 23 Jan 2012, accepted 22 Feb 2012

References

1 Tol WA, Barbui C, Galappatti A, Silove D, Betancourt TS, Souza R, et al. Mental health and psychosocial support in humanitarian settings: linking practice and research. *Lancet* 2011; **378**: 1581–91.

2 Steel Z, Chey T, Silove D, Marnane C, Bryant RA, van Ommeren M. Association of torture and other potentially traumatic events with mental health outcomes among populations exposed to mass conflict and displacement: a systematic review and meta-analysis. *JAMA* 2009; **302**: 537–49.

3 Murthy RS, Lakshminarayana R. Mental health consequences of war: a brief review of research findings. *World Psychiatry* 2006; **5**: 25–32.

4 Desjarlais RR, Eisenberg L, Good B, Kleinman AM. *World Mental Health: Problems and Priorities in Low-Income Countries*. Oxford University Press, 1995.

5 Pedersen D. Political violence, ethnic conflict, and contemporary wars: broad implications for health and social well-being. *Soc Sci Med* 2002; **55**: 175–90.

6 de Jong JTVM. Public mental health, traumatic stress, and human rights violations in low-income countries. In *Trauma, War, and Violence: Public Mental Health in Socio-cultural Context* (ed JTVM de Jong): 1–91. Kluwer Academic/Plenum Publishers, 2002.

7 Patel V, Kirkwood BR, Pednekar S, Pereira B, Barros P, Fernandes J, et al. Gender disadvantage and reproductive health risk factors for common mental disorders in women. *Arch Gen Psychiatry* 2006; **63**: 404–13.

8 Das J, Do Q-T, Friedman J, McKenzie D, Scott K. Mental health and poverty in developing countries: revisiting the relationship. *Soc Sci Med* 2007; **65**: 467–80.

9 World Bank. *Nepal at a Glance*. World Bank, 2007.

10 Thapa D, Sijapati B. *A Kingdom under Siege: Nepal's Maoist Insurgency, 1996 to 2003 (updated edn)*. The Printhouse, 2004.

11 Kohrt BA. *Political Violence and Mental Health in Nepal: War in Context, Structural Violence, and the Erasure of History (PhD Dissertation)*. Anthropology Department, Emory University, 2009.

12 Informal Sector Service Centre (INSEC). *Fact Sheet: Number of Children Killed by State and Maoists*. INSEC, 2008.

13 Watchlist. *Caught in the Middle: Mounting Violations Against Children in Nepal's Armed Conflict*. Watchlist on Children and Armed Conflict, 2005.

14 Tol WA, Kohrt BA, Jordans MJD, Thapa SB, Pettigrew J, Upadhaya N, et al. Political violence and mental health: a multi-disciplinary review of the literature on Nepal. *Soc Sci Med* 2010; **70**: 35–44.

15 Kohrt BA, Kunz RD, Baldwin JL, Koirala NR, Sharma VD, Nepal MK. 'Somatization' and 'comorbidity': a study of Jhum-Jhum and depression in rural Nepal. *Ethos* 2005; **33**: 125–47.

16 Kohrt BA, Speckman RA, Kunz RD, Baldwin JL, Upadhaya N, Acharya NR, et al. Culture in psychiatric epidemiology: using ethnography and multiple mediator models to assess the relationship of caste with depression and anxiety in Nepal. *Ann Hum Bio* 2009; **36**: 261–80.

17 Kohrt BA, Worthman CM. Gender and anxiety in Nepal: the role of social support, stressful life events, and structural violence. *CNS Neurosci Ther* 2009; **15**: 237–48.

18 Kohrt BA. Vulnerable social groups in post-conflict settings: a mixed-methods policy analysis and epidemiology study of caste and psychological morbidity in Nepal. *Interv* 2009; **7**: 239–64.

19 Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry* 1961; **4**: 561–71.

20 Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol* 1988; **56**: 893–7.

21 Kohrt BA, Kunz RD, Koirala NR, Sharma VD, Nepal MK. Validation of a Nepali version of the Beck Depression Inventory. *Nepal J Psychiatry* 2002; **2**: 123–30.

22 Kohrt BA, Kunz RD, Koirala NR, Sharma VD, Nepal MK. Validation of the Nepali Version of the Beck Anxiety Inventory. *J Instit Med* 2003; **25**: 1–4.

23 American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorder (4th edn) (DSM-IV)*. APA, 1994.

24 Weathers FW, Litz BT, Herman DS, Huska JA, Keane TM. *The PTSD Checklist (PCL): Reliability, Validity, and Diagnostic Utility*. Paper presented at: 9th Annual Meeting of International Society for Traumatic Stress Studies, October1993 (http://www.pdhealth.mil/library/downloads/PCL_sychometrics.doc).

25 Tol WA, Komproe IH, Thapa SB, Jordans MJD, Sharma B, De Jong JTVM. Disability associated with psychiatric symptoms among torture survivors in rural Nepal. *J Nerv Ment Dis* 2007; **195**: 463–9.

26 Thapa SB, Hauff E. Psychological distress among displaced persons during an armed conflict in Nepal. *Soc Psychiatry Psychiatr Epidemiol* 2005; **40**: 672–9.

27 Li C, Ma A, Fu L. Investigation of stressful life events and mental health in railway workers. *Chin Ment Health J* 1994; **8**: 49–52.

28 Zheng Y-P, Lin K-M. A nationwide study of stressful life events in Mainland China. *Psychosom Med* 1994; **56**: 296–305.

29 Kohrt BA, Hruschka DJ, Kohrt HE, Panebianco NL, Tsagaankhuu G. Distribution of distress in post-socialist Mongolia: a cultural epidemiology of yadargaa. *Soc Sci Med* 2004; **58**: 471–85.

30 Ballinger GA. Using generalized estimating equations for longitudinal data analysis. *Organiz Res Method* 2004; **7**: 127–50.

31 de Jong JTVM, Komproe IH, Van Ommeren M. Common mental disorders in postconflict settings. *Lancet* 2003; **361**: 2128–30.

32 Lopes Cardozo BL, Bilukha OO, Crawford CA, Shaikh I, Wolfe MI, Gerber ML, et al. Mental health, social functioning, and disability in postwar Afghanistan. *JAMA* 2004; **292**: 575–84.

33 Nandi A, Tracy M, Beard JR, Vlahov D, Galea S. Patterns and predictors of trajectories of depression after an urban disaster. *Ann Epidemiol* 2009; **19**: 761–70.

34 Penninx BWJH, Nolen WA, Lamers F, Zitman FG, Smit JH, Spinhoven P, et al. Two-year course of depressive and anxiety disorders: results from the Netherlands Study of Depression and Anxiety (NESDA). *J Affect Disord* 2011; **133**: 76–85.

35 Nandi A, Beard JR, Galea S. Epidemiologic heterogeneity of common mood and anxiety disorders over the lifecourse in the general population: a systematic review. *BMC Psychiatry* 2009; **9**: 31.

36 Patel V. Cultural factors and international epidemiology. *Br Med Bull* 2001; **57**: 33–45.

37 de Jong JTVM. *Trauma, War, and Violence: Public Mental Health in Socio-Cultural Context*. Kluwer Academic/Plenum Publishers, 2002.

38 Miller KE, Rasmussen A. War exposure, daily stressors, and mental health in conflict and post-conflict settings: bridging the divide between trauma-focused and psychosocial frameworks. *Soc Sci Med* 2010; **70**: 7–16.

39 Betancourt TS, Agnew-Blais J, Gilman SE, Williams DR, Ellis BH. Past horrors, present struggles: the role of stigma in the association between war experiences and psychosocial adjustment among former child soldiers in Sierra Leone. *Soc Sci Med* 2010; **70**: 17–26.

40 Patel V, Thornicroft G. Packages of care for mental, neurological, and substance use disorders in low- and middle-income countries. *PLoS Med* 2009; **6**: e1000160.

41 Porter M, Haslam N. Predisplacement and postdisplacement factors associated with mental health of refugees and internally displaced persons: a meta-analysis. *JAMA* 2005; **294**: 602–12.

42 Kohrt BA, Tol WA, Pettigrew J, Karki R. Children and revolution: the mental health and psychosocial wellbeing of child soldiers in Nepal's Maoist army. In *The War Machine and Global Health* (eds M Singer, GD Hodge): 89–116. Altamira Press, 2010.