

Conflict and mental health: a cross-sectional epidemiological study in Nepal

Nagendra P. Luitel · Mark J. D. Jordans · Ram P. Sapkota · Wietse A. Tol ·
Brandon A. Kohrt · Suraj B. Thapa · Ivan H. Komproe · Bhogendra Sharma

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Abstract

Purpose The aim of this epidemiological study was to identify prevalence rates of mental health problems, factors associated with poor mental health and protective and risk factors in a post-conflict situation in Nepal.

Methods This cross-sectional study was conducted among 720 adults in 2008. A three-stage sampling procedure was used following a proportionate stratified random sampling strategy. The outcome measures used in the study were locally validated with Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Post-Traumatic Stress Disorder (PTSD)—Civilian Version (PCL-C) and locally constructed function impairment scale, resources and coping.

Results Of the sample, 27.5 % met threshold for depression, 22.9 % for anxiety, and 9.6 % for PTSD. Prevalence rates were higher among women (depression,

OR 2.14 [1.52–3.47]; anxiety, OR 2.30 [1.45–3.17] and PTSD, OR 3.32 [1.87–5.89]) and older age categories (depression, OR 1.02 [1.01–1.04]; anxiety, OR 1.04 [1.03–1.05] and PTSD, OR 1.02 [1.0–1.03]). Respondents who perceived more negative impact of the conflict (e.g., hampered the business/industry; hindered in getting medical treatment, etc.) in their communities were more at risk for depression (OR 1.1 [1.06–1.14]), anxiety (OR 1.05 [1.01–1.09]) and PTSD (OR 1.09 [1.04–1.14]). Other risk factors identified in the study were ethnicity, district of residence and poverty (lack of clothing, medicine and information via radio at home).

Conclusion Overall, the prevalence rates of depression and anxiety in the sample are comparable to, or lower than, other studies conducted with populations affected by conflict and with refugees. However, the findings underscore the need to address the current lack of mental health care

N. P. Luitel (✉) · M. J. D. Jordans · B. A. Kohrt
Transcultural Psychosocial Organization (TPO) Nepal,
Baluwatar, Kathmandu, Nepal
e-mail: luiteln@gmail.com

M. J. D. Jordans · W. A. Tol · I. H. Komproe
Department of Research and Development, Healthnet TPO,
Amsterdam, The Netherlands
e-mail: mark.jordans@hntpo.org

M. J. D. Jordans
Center for Global Mental Health, London School of Hygiene
and Tropical Medicine, London, UK

R. P. Sapkota · B. Sharma
Centre for Victims of Torture (CVICT), Kathmandu, Nepal
e-mail: rp@cvict.org.np

B. Sharma
e-mail: bhogendra@cvict.org.np

W. A. Tol
Department of Mental Health, Bloomberg School of Public
Health, Johns Hopkins University, Baltimore, USA
e-mail: wietse.tol@yale.edu

B. A. Kohrt
Department of Psychiatry and Behavioral Sciences,
The George Washington University School of Medicine,
Washington, DC, USA
e-mail: brandonkohrt@gmail.com

S. B. Thapa
Institute of Psychiatry, University of Oslo, Oslo, Norway
e-mail: thapasuraj@hotmail.com

I. H. Komproe
Faculty of Social and Behavioural Sciences, Utrecht University,
Utrecht, The Netherlands
e-mail: ivan.komproe@hntpo.org

resources in post-conflict rural Nepal, especially for marginalized populations.

Keywords Political violence · Mental health · PTSD · Risk factors · Nepal

Background

In 1996, the Unified Communist Party of Nepal (Maoist) (hereafter Maoists) announced a ‘People’s War’ against the government of Nepal, out of dissatisfaction with gender and caste inequality and low quality governance in rural areas [1]. Common to international trends in armed conflicts, the Maoist insurgency in Nepal was an intra-state conflict, mainly affecting civilian-populated areas beset by chronic poverty [2]. It formally ended in November 2006 with a comprehensive peace agreement between an alliance of political parties and Maoists, which stipulated the participation of the CPN-M in government and the monitoring of weapons by a United Nations Mission in Nepal.

During the 10 years of conflict, especially people in the countryside lived in fear of reprisals from both sides on suspicion of having aided the other side. From the start of the Maoist insurgency in 1996 through the signing of the Comprehensive Peace Agreement (CPA) in 2006, it has claimed over 16,000 lives [3] and there were serious human rights violations committed by both security forces and members of the Maoists, including extra-judicial executions, disappearances, torture, arbitrary arrests and detention on the part of the police. Nepal had the highest number of “disappearances” in the world in 2003 [4].

Globally, mental health problems constitute a serious public health problem, contributing 14 % to the global burden of disease [5]. In recent years, a large number of studies have been conducted on mental health of refugees and populations affected by conflict, presenting a large variation on the rates of depression (3–85.5 %), PTSD (0–99 %) [6] and anxiety (6–72.2 %) [7–11].

In Nepal, very few epidemiological studies have been conducted among the general population; no such study has been conducted in the context of the conflict, despite a number of qualitative and quantitative studies documenting the impacts of political violence [2]. A study conducted by Kohrt and colleagues [12] reported rates for depression (33.7 %) and anxiety (27.7 %) among the general population in Jumla District based on data collected in 2000. There have been a few epidemiological studies conducted to estimate the incidence and prevalence of mental disorders within specific populations. Shrestha and colleagues conducted a case–control study with 1,052 randomly selected tortured and non-tortured Bhutanese refugees, reporting rates for PTSD (14 %), depression (25 %) and

anxiety (43 %) among tortured refugees and PTSD (3 %), depression (14 %) and anxiety (43 %) among non-tortured refugees [8]. Van Ommeren and colleagues reported even higher rates of PTSD (43 %), yet lower generalized anxiety and depressive disorder (6 and 8 % respectively) among tortured Bhutanese refugee [7]. Thapa and Hauff reported rates for PTSD (53.4 %), anxiety (80.7 %) and depression (80.3 %) among displaced people during the conflict with data collected in 2003 [13]. Tol and colleagues found high rates for PTSD (59.7 %); depression (81.1 %) and anxiety disorder (85.6 %) among torture survivors in highly conflict-affected areas in mid-western rural Nepal with data collected in 2003 [14]. Finally, a study with former child soldiers and children never conscripted by armed groups found that former child soldiers suffered more symptoms of depression (53.2 %), anxiety (46.1 %) and PTSD (55.3 %) than children who were never conscripted by armed groups (24.1, 37.6 and 20 % respectively) [15]. This large range of prevalence rate could be due to difference in the methodology of the studies.

In Nepal, mental health resources are scarce, with no formal mental health care in rural areas where more than 85 % of the total population resides. Less than 1 % of the national health budget is allocated to mental health in Nepal [16]. A national mental health policy was adopted in 1997 in which mental health is proposed as an element of primary health care, but little progress has been made in implementing this policy framework. Though mental health services are scarce in Nepal, a few non-governmental organizations (NGOs) are providing mental health services for specific population groups (e.g., victims of torture, refugees, conflict-affected children and survivors of trafficking). NGO services and government service provision have been implemented rather independently of each other and for shorter periods of time. The primary aim of the study was to identify prevalence rates of mental health problems, factors associated with poor mental health and protective and risk factors in post-conflict rural Nepal to inform subsequent program development.

Methods

Setting

Nepal, a land-locked country situated between India and China, is the poorest country in South Asia. It has a total population of approximately 27.5 million. Nepal is predominantly rural, with about 14 % of the population living in urban areas. Geographically, it is divided into three regions: the northern mountains, the middle hills and the southern plains. For administrative purposes, it has been divided into five development regions, 14 zones, and 75

districts. This study was conducted in three districts of Nepal (Chitwan, Tanahu and Dang), representing the central, western and mid-western regions, respectively. The rationale behind selecting three districts was to develop and implement a pilot community mental health promotion program (CMHP) after research had taken place in these districts, which could be replicated in other areas of Nepal. The study districts were selected to represent the geographic and population diversity of Nepal as well as the relative impact of armed conflict. In general, all three districts were directly affected by the conflict. However, their relative impact in terms of conflict-related incidents such as abduction, killings and destruction of private and public properties somewhat varied. Dang was the most affected, whereas Tanahu and Chitwan were moderately affected. The average mortality per district was 180 people. Tanahu and Chitwan are districts that had comparable or lower total conflict mortality, with 95 people in the Tanahu district and 196 people in Chitwan district being killed due to war-related violence (0.03 and 0.04 % of the districts' populations, respectively). In contrast, Dang is a district with among the highest war-related mortality: 686 people were killed during the war, 0.15 % of the district population [17]. Five village development committees (VDCs)/municipalities from each district were purposively selected based on: (1) rural versus urban areas, (2) extent of being affected by violence (high/moderate/low), and (3) caste and ethnicity (homogeneous vs. heterogeneous VDCs). Information on socio-demographic, economic characteristics and impact of violence was collected from field research assessors, local organizations and published reports. All the municipalities and the district headquarters were considered as urban areas and all the VDCs were considered rural areas. Municipalities/VDCs where there were recorded incidents of cross firing or killing, abduction and 'donation' requests by Maoists, Maoists' requests for food and shelter, and destruction of private and public properties were taken as highly affected; municipalities/VDCs where there were recorded incidents of abduction, asking for donations, asking for food and shelter and threatening but not cross firing or killing, and destruction of private and public properties were taken as moderately affected; municipalities/VDCs where there were no incidents of cross firing or killing, or abduction or threatening, but only rare incidents of asking for donations, asking for food and shelter, and destruction of private and public properties were taken as less affected [17].

Nepal's population comprises more than 60 caste and ethnic groups; broad categorizations comprise Brahmin and Chhetri (high-caste groups), Dalit (low-caste groups, historically referred to as 'untouchable') and Janajati (ethnic minority groups, more likely to be speakers of Tibeto-Burmese languages and more likely to be Buddhist)

[18]. The major caste/ethnic groups in Chitwan District are Brahmin/Chhetri (40.26 %), Tharu (12.7 %), Tamang (7.36 %) and Gurung (6.7), whereas in Tanahu, Magar (26.5 %) are on top followed by Brahmin/Chhetri (25.9 %), Gurung (12.5 %) and Newar (7.98). Brahmin/Chhetri (33.5 %), Tharu (31.9 %) and Magar (12.1) are major caste/ethnic groups in Dang.

Study participants and sampling

A cross-sectional study design was used. The inclusion criteria for the study were at least 18 years of age and having resided in the VDCs/municipalities for at least 6 months prior to the study. A three-stage sampling technique was used following a proportionate stratified random sampling strategy. Five VDCs/municipalities were selected from each district based on the geographical diversity and extent of impact of conflict. A household was defined as a unit for sampling. The samples were drawn from five VDCs/municipalities proportionate to the relative total adult population of each selected VDC/municipality in each district. The most recent available data sources (updated voter list 2006 and census 2001) were used and triangulated to maximize the accuracy of sampling. We used both census and voter lists for sampling to determine the proportionate number of each VDC's/municipality's population in five broad age groups (18–24, 25–34, 35–44, 45–54, 55+) to ensure proportionate representation of different age groups in the sample. Once households were selected, it was randomly determined which age group and gender (50 % male, 50 % female) would be needed from that household. In cases where there was no one of the requested gender and age group, the interviewer would go to the nearest neighboring household considering the inclusion criteria. Only one person from each household was included in the study. In case there was more than one member in a household in a particular age and sex category, one member was selected using a simple random sampling method. The sample size of the study was 720 (240 in each district).

Instruments

The study used several outcome measures which included four standardized instruments: World Health Organization Disability Assessment Scale-II (WHODAS-II), Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), and PTSD—civilian version (PCL-C). We also used locally constructed instruments to measure mental health-related problems not covered in existing instruments to identify participants' perceptions of the impact of conflict in the community, level of exposure to traumatic events and the protective factors for emotional support. Socio-

demographic characteristics such as age, education, caste/ethnicity, marital status, occupation, ownership of land, access to basic needs (food, clothes, shelter, medicine, drinking water, etc.) and number of family members were also assessed. The standardized instruments BDI, BAI and PCL-C were already validated for use in Nepali using a five-step translation method for cross-cultural research [13, 19, 20]. WHODAS-II was developed for global use, and for this study we used the South Asia specific cutoff score. Test–retest reliability of the instruments was determined among an additional sample of 25 participants over a week period in Dang and Chitwan districts.

WHODAS-II

Function impairment was assessed using the WHODAS-II [21]. The WHODAS-II consists of 12 items in a five-point rating scale ranging from 12 to 60. The internal consistency (Cronbach's alpha) of the WHODAS-II in this study was 0.81 with test–re-test reliability of 0.89 (Spearman Brown Coefficient) (in the remainder of this paragraph, the instruments' response categories, score range, internal and test–retest reliability are mentioned, respectively, in parentheses).

Beck Depression Inventory (BDI)

Depression symptoms were assessed using the 21-item Beck Depression Inventory (BDI) [22] (4; 0–63; 0.83, 0.96).

Beck Anxiety Inventory (BAI)

BAI is a widely used self-report scale to measure the severity of anxiety [23]. The scale has 21 items and the respondent is asked to score 21 common symptoms of anxiety in the past 2 weeks (4; 0–63; 0.90, 0.90). BDI and BAI have been translated and validated in Nepali. The BDI was validated in Nepal with the external criterion of a clinical diagnosis of major depressive disorder using a mixed sample of adult clinic patients at a teaching hospital outpatient department in Kathmandu and community-dwelling adults in rural Nepal [19]. The BAI was validated with the same population using a diagnosis of generalized anxiety disorder as the external criterion [20]. The clinical diagnoses were made by Nepali psychiatrists or by an expatriate psychiatric resident who collected the case histories and reviewed them with the Nepali psychiatrists at the teaching hospital (for further details, see [19, 20]). The validated cutoff for depression symptoms and anxiety symptoms at the moderate severity level were ≥ 20 (sensitivity = 0.73 and specificity = 0.91) for the BDI and ≥ 17 (sensitivity = 0.77 and specificity = 0.81) for the

BAI, respectively [12]. As with the use of the BDI and BAI use in other settings, the instruments are used here to evaluate depression and anxiety symptom severity with the cutoff indicating moderate or greater level of symptom severity to severe symptom presentation. The BDI and BAI cutoffs as applied in this study are used to bifurcate the sample into those with no or mild depression versus those with moderate to severe depression, with the split point indicating the need for clinical treatment in the context of Nepal. The cutoffs are not used to make diagnoses of major depressive disorder or generalized anxiety disorder.

Post-traumatic stress disorder

PTSD—Civilian Version (PCL-C) was used to measure PTSD symptoms [24]. The PCL-C has 17 items that correspond with the symptoms of PTSD specified by the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM IV) (5; 17–85; 0.90, 0.77). A condition for probable PTSD disorder in this study was ≥ 50 (sensitivity = 0.80 and specificity = 0.80) score on PTSD—Civilian Version (PCL-C) [13].

Based on the findings of an explorative qualitative study, additional context-specific instruments were developed to measure the level of exposure to traumatic events, functional impairment, and psychosocial and mental health problems not covered in BAI and BDI, impact of the conflict in the community and protective factors. Focus group discussions (FGD) ($N = 36$) and key informant interviews (KII) ($N = 72$) were conducted to explore community perception on the above-mentioned themes prior to the survey in all three districts. In the first step, qualitative data were transcribed immediately after field work. Second, among the available 36 FGDs and 72 KIIs, only 18 KIIs and 6 FGDs (6 KIIs and 2 FGDs from each district) were randomly selected for the analysis due to feasibility reason. The selected KIIs and FGDs were read thoroughly and the relevant words/expressions/sentences were highlighted; the highlighted information was then categorized and compiled under each of the selected themes district-wise. Third, the frequencies of each of the items were reviewed to ensure its commonality within all three districts. Finally, based on the frequency of the items, four context-specific instruments were developed to measure psychosocial problems not covered in BAI and BDI, function impairment, level of exposure to traumatic events, coping and perceived impact of the conflict. Items with at least three frequencies in each district were considered in the final selection.

Our context-specific function impairment scale consists of ten items in a four-point rating scale with a range of 0–30, which was developed following a procedure developed by Bolton and Tang [25], and includes tasks common

to men and women (separate scales) in terms of individual functioning (3 items, e.g., getting up in the morning, taking meal/breakfast and maintaining personal hygiene), family functioning (3 items, e.g., doing farm-related work, helping household activities and taking care of children), community functioning (3 items, e.g., attending community meeting, attending religious activities and festivals, and helping neighbors), and one open item. A 17-item psychosocial and mental health symptoms scale was developed as a 4-point response scale, which ranges from 17 to 68. The perceived impact of the conflict on various aspects in the community was assessed using a 19-item questionnaire with a four-point response scale. Of the 19 items, 11 items were about negative impact (such as hampered the business/industry; hindered in getting medical treatment; created problems on social work; increased looting and robbery, etc.) and 8 were about positive impact of the conflict (such as increased women's participation and empowerment, decreased racial discrimination; decreased gender discrimination, helped women to be aware of their rights, etc.). Whether respondents were exposed to conflict-induced traumatic events such as witnessing destruction of public property, people being harassed, people being killed, people being physically hurt and witnessing a bomb blast and/or cross firing in the last 6 month reference period was asked in a five-point scale. Further, a 15-item resource and coping scale was used to explore the coping behaviors of participants. Of the 15 items, 9 were related to individual-level coping methods like interaction with general community members, keeping oneself busy (i.e., distraction) and sharing feelings with others. The other six items were related to receiving and providing community-level support such as listening to others, receiving advice from others and receiving financial support. In the four-point response scale, 1 is 'never' and 4 'always'. The total score of individual-level and community-level coping scale ranges from 9–36 and 6–24, respectively; a higher score indicated more use of resources.

Procedures

The study was jointly conducted by Transcultural Psychosocial Organization (TPO) Nepal and Centre for Victims of Torture (CVICT) Nepal from December 2007 to January 2008. It was conducted 1 year after the peace accord. Nine research assistants (three from each district) having at least intermediate levels of education and previous experience on mental health research were selected for data collection. Two-and-a-half weeks of training covering structured interviewing, rapport building, ethical considerations, informed consent, inclusion/exclusion criteria and scoring was provided. Research assistants visited the respondents' place of residence for the interviews. The study received

technical and ethical approval from the Nepal Health Research Council (NHRC). Each study participant was asked to sign a written informed consent prior to enrollment in the study. Each interview lasted approximately an hour.

Analysis

Inconsistencies and missing values in the data were changed manually. Altogether, 31 cells were identified blank throughout the entire data. Since we could not identify any patterns in missing data, we assumed they were distributed randomly and replaced missing values with group (district) means. We tested associations between the outcome measures, depression, anxiety and PTSD (probable vs. unlikely disorder), with logistic regression analysis. Pre-defined risk factors were age, sex, education, caste, place of residence, marital status, availability of own land, access to food, clothing, medicine and radio, perception on impact of conflict, exposure to traumatic events and use of resources and coping (both individual and community). We tested multivariate models to adjust the estimates of the pre-defined risk factors. Risk factors that had no significant association with the mental health outcomes in the multivariate models are not discussed or presented in the table. To assess the effect of cluster sampling design, we conducted intra-class correlation coefficient (ICC) to better interpret outcomes. We calculated the ICC on the basis of the outcome of ANOVAs in SPSS 16.0 via the formula: $\rho = (MS_b - MS_w) / (MS_b + (k - 1)MS_w)$, in which $\rho = ICC$; MS_b = mean between group variance, MS_w = mean within group variance and k = mean observations per group. Statistical significance was defined as $P < 0.05$. Data entry and statistical analysis was performed using Statistical Package for the Social Science (SPSS) version 16.0.

Results

Demographics

The age of the respondents ranged from 18 to 89 years with a mean of 37 years ($SD = 16.1$). More than two-fifths (41 %) were Brahmin/Chhetri, followed by Janajati (Gurung, Magar, Newar, Shrestha, Lama, Rai, and Tamang) (ethnic minority groups) (32 %), Tharu (15 %, an indigenous group to the southern plane of Nepal) and Dalit (11.8 %, such as Bishwokarma, Sunar, Dhaulagiri, Nepali, Yogi, Pariyar and Gandharya). Tharus were analyzed separately because it was the second largest group after Brahmin/Chhetri. Of the sample, a large majority (90 %) was Hindu and close to one-fifth (21 %) were illiterate. About half (49 %) were farmers followed by housewives (15.4 %), students (12.4 %) and businessmen (8 %) (see Table 1).

Table 1 Socio-demographic characteristics of the respondents ($n = 720$)

	<i>N</i>	%
Sex		
Male	367	51.0
Female	353	49.0
Place of residence (district)		
Chitwan	240	33.3
Dang	240	33.3
Tanahu	240	33.3
Age		
Below 24 years	207	28.8
25–34	172	23.9
35–44	131	18.2
45 years and above	210	29.2
Caste/ethnicity		
Brahmin/Chhetri	294	40.8
Tharu	110	15.3
Janajati (Gurung, Magar, Newar, Shrestha, Lama, Rai, and Tamang)	231	32.1
Dalit (Bishwokarma, Sunar, Dhaulagiri, Nepali, Yogi, Pariyar and Gandharya)	85	11.8
Literacy status		
Literate	570	79.2
Illiterate	150	20.8
Marital status		
Unmarried	136	18.9
Currently married	539	74.9
Widow/widower/separated	45	6.9
Mother tongue		
Nepali	499	69.3
Tharu	100	13.9
Magar/Gurung	99	13.7
Other	22	3.1
Number of family members		
Less than five	169	23.4
5–7	361	50.2
Eight and more	180	25.0
Not stated	10	1.4
Occupation		
Agriculture	352	48.9
Housewife	111	15.4
Student	89	12.4
Business	57	7.9
Job/service	38	5.3
Unemployed	30	4.2
Others	43	6.0

In terms of exposure to traumatic events, it was found that 73 % of the sample were exposed to people being killed 6 months prior to the survey, followed by people being

physically hurt (70 %), witnessed people being harassed (68 %) and destruction of property (60 %). About 38 of the sample reported that they were frequently exposed to bomb explosions and/or a cross firing in the 6 months period.

Table 2 presents the prevalence rates of depression, anxiety and PTSD in the sample. Of the sample, 27.5 % were above the Nepali BDI cutoff for moderate severity of depression, 22.9 % for moderate severity of anxiety, and 9.6 % for PTSD. The prevalence rates vary based on sex, age, literacy status, place of residence, marital status and caste/ethnicity. Prevalence rates are highest among women, the oldest age group (aged 45 years or above), those who are illiterate and those who are widow/widower or separated. Rates of psychopathology are highest in Dang District and lowest in Tanahu. There was a strong positive correlation between disability (assessed by WHODAS-II) and all outcome measures: anxiety ($r = 0.624$, $P < 0.001$), depression ($r = 0.616$, $P < 0.001$) and PTSD ($r = 0.499$, $P < 0.001$). The intra-class correlation coefficient between districts ranges from 0.04 to 0.096 (PTSD 0.094, depression 0.096 and anxiety 0.042).

About two-thirds of the sample did not have any psychopathology, whereas nearly 11 % had moderate severity of depression and anxiety disorder. The percentages of the sample having only depression, only anxiety and only PTSD symptoms were 8.3, 5.1 and 1.3, respectively. The proportion of the sample having high score in all three symptom domains was 1.7 %.

Table 3 presents the odds ratios of risk factors for anxiety, depression and PTSD from multivariate logistic regression models. Four variables: being a female, older age, not having sufficient clothes and more perceived negative impact of the conflict in the community, were significantly associated with all three mental disorders. District of residence (Dang and Chitwan) was associated with higher levels of depression and anxiety symptoms, whereas more use of individual resources was predictive of increased levels of anxiety and PTSD symptoms. No access to medicines and being widowed/separated were associated with depression only (Table 3).

Discussion

To the best of our knowledge, this is the first multi-site epidemiological study on mental health among the general population in rural post-conflict Nepal. It shows that the prevalence rates of depression in the sample are comparable to, or lower than, other studies conducted with refugees and populations affected by conflict, based on self-report questionnaires and probability sampling. Similarly, the rates of PTSD are relatively low compared to other studies [6]. Poorer mental health status was associated with

Table 2 Prevalence of mental health problems

Outcome measures	<i>N</i>	Anxiety (95 %, CI)	Depression (95 %, CI)	PTSD (95 %, CI)	
Districts					
Dang	240	32.1 (26.3–38.4)	43.3 (37.0–49.9)	14.6 (10.9–19.8)	
Tanahu	240	17.1 (12.6–22.6)	16.7 (12.3–22.1)	6.7 (3.9–10.8)	
Chitwan	240	19.6 (14.9–25.3)	21.7 (16.7–27.5)	7.5 (4.6–11.8)	
Sex					
Men	367	18.0 (14.3–22.4)	21.5 (17.5–26.2)	5.4 (3.5–8.4)	
Women	353	28.0 (23.5–33.1)	33.1 (28.3–38.4)	13.9 (10.5–18.0)	
Age					
Up to 24	207	12.6 (8.5–18.0)	18.8 (13.9–25.0)	7.7 (4.6–12.5)	
25–44	303	20.5 (16.2–25.5)	25.1 (20.4–30.4)	9.2 (6.3–13.2)	
45–59	124	36.3 (28.0–45.5)	37.9 (29.5–47.1)	8.9 (4.7–15.7)	
60+	86	37.2 (27.2–48.4)	39.5 (29.3–50.7)	16.3 (9.5–26.2)	
Literacy status					
Illiterate	150	41.3 (33.5–49.7)	44.0 (36.0–52.3)	14.0 (9.1–20.8)	
Literate	570	18.1 (15.1–21.5)	23.3 (20.0–27.1)	8.4 (6.3–11.1)	
Caste/ethnicity					
Brahmin/Chhetri	294	21.8 (17.3–27.0)	26.5 (21.7–32.0)	10.9 (7.7–15.2)	
Tharu	110	19.1 (12.5–27.9)	34.5 (25.9–44.3)	8.2 (4.1–15.4)	
Janajati	231	19.5 (14.7–25.3)	19.0 (14.3–24.8)	6.1 (3.5–10.2)	
Dalit	85	41.2 (30.3–52.4)	42.4 (31.9–53.5)	16.5 (9.6–26.4)	
Marital status					
Never married	136	8.8 (4.8–15.2)	15.4 (10.0–22.9)	6.6 (3.3–12.6)	
Currently married	539	24.9 (21.3–28.8)	28.0 (24.3–32.0)	9.5 (7.2–12.3)	
Widow/widower/separated	45	42.2 (28.0–57.8)	53.3 (38.0–68.1)	20.0 (10.1–35.1)	
<i>PTSD</i> post-traumatic stress disorder	Total	720	22.9 (20.0–26.2)	27.5 (24.3–31.0)	9.6 (7.6–12.0)

being female, older age, being a widow/widower or being separated, being a Dalit (low-caste groups), residing in Dang and Chitwan districts, perceiving more negative impact of the conflict in the community and being of low socioeconomic status such as not having sufficient clothing, not having radio at home and not having access to medicine.

Due to a lack of sufficient literature on mental health in Nepal, possibilities for comparison are limited (for example, with data from before the conflict); yet, overall, the rates appear to be lower than from previous epidemiological studies conducted on specific populations. Prevalence rates of anxiety and depression in the sample were slightly lower than in a study with a community sample in Jumla, a western Himalayan district, which was conducted prior to conflict-related mortality in that area [12]. The rates in our study were dramatically lower than that observed by Kohrt and colleagues after the war using the same instruments for depression, anxiety and PTSD [26] and lower in persons internally displaced during the conflict [13], torture survivors in highly conflict-affected areas [14] and former child soldiers [15]. The rate of depression found in this study was consistent with or lower than that of tortured Bhutanese refugees, although the anxiety rate among the refugees was

higher [7, 8]. The prevalence of PTSD in the sample was relatively low in comparison with specific vulnerable populations in Nepal [7, 8, 13–15] and lower than the 14.1 % community-level prevalence observed in north-western Nepal [26].

When we compare the findings with other conflict settings, the rates of depression and anxiety in this study are comparable or lower than those found in Sri Lanka [27], Algeria, Cambodia [9] and Afghanistan [10]. However, the rates of depression and anxiety in our sample are higher than those in conflict-affected populations in Ethiopia and Palestine [9]. The rate of PTSD in the sample is low compared to other post-conflict settings [11, 27].

Generally, mental health problems are reported to vary widely among populations exposed to mass conflict and displacement. Both methodological and contextual factors are reported to be major contributing factors in the variability of prevalence across epidemiological study [6, 28]. The reason behind mostly lower rates of mental health problems in our sample can be explained by both contextual and methodological factors. Stigma and discrimination associated with some mental health problems are not uncommon in Nepal. Self-disclosure of traumatic events is stigmatized [29]. Kohrt and Hruschka have shown that

Table 3 Variables associated with depression, anxiety and PTSD

	Likelihood of anxiety		Likelihood of depression		Likelihood of PTSD	
	Adjusted OR	<i>P</i> value	Adjusted OR	<i>P</i> value	Adjusted OR	<i>P</i> value
Sex						
Men	1	–	1		1	
Women	2.30 (1.53–3.47)	<0.001	2.14 (1.45–3.17)	<0.001	3.32 (1.87–5.89)	<0.001
Age						
Per year increases	1.04 (1.03–1.05)	<0.001	1.02 (1.01–1.04)	0.001	1.02 (1.0–1.03)	0.036
Caste/ethnicity						
Brahmin/Chhetri	1	–				
Tharu	0.68 (0.36–1.29)	0.238	–		–	–
Janajati	1.42 (0.82–2.46)	0.218				
Dalit	2.62 (1.42–4.84)	0.002				
Marital status						
Widow/widower/separated			1			
Currently married	–		0.30 (0.11–0.82)	0.019	–	–
Single			0.41 (0.19–0.88)	0.022		
Access to clothing						
Yes	1	–			1	
No	3.28 (2.08–5.16)	<0.001	3.17 (2.03–4.96)	<0.001	4.13 (2.30–7.41)	<0.001
Access to radio at home						
Yes	1	–				
No	2.24 (1.46–3.44)	<0.001	–		–	–
Access to medicine						
Yes	–		1			
No			1.98 (1.25–3.13)	0.004	–	–
Place of residence (district)						
Tanahu	1	–	1		–	–
Dang	2.13 (1.21–3.73)	0.009	1.93 (1.16–3.22)	0.012		
Chitwan	2.40 (1.31–4.38)	0.004	2.61 (1.58–4.31)	<0.001		
Perceived impact of conflict						
Per unit increase score on negative impact	1.05 (1.01–1.09)	0.013	1.1 (1.06–1.14)	<0.001	1.09 (1.04–1.14)	0.001
Use of individual coping mechanism						
Per unit increase on individual coping mechanism	1.11 (1.04–1.19)	0.001	–	–	1.13 (1.04–1.23)	0.004

CI 95 % confidence intervals, PTSD post-traumatic stress disorder

PTSD symptoms may be underreported because of the cultural connection between experiencing traumatic events and having bad karma (personally having done bad deeds in a former life or a family ancestor having done bad deeds, thus leading to negative consequences in this life). Therefore, disclosing that one has experienced a traumatic event is socially stigmatized, because it reflects badly on the person and his family. This may lead to minimization of traumatic event reporting or of the psychological sequelae of trauma [29]. Moreover, Steel et al. [6] in their meta-analysis reported that non-probability sampling and small survey (sample size) yield higher prevalence rates. We have applied random sampling with a fairly large sample

size, which may have an effect on the level of significance of the rates of mental health outcomes.

A number of significant associations of independent variables were found with the outcomes of depression, anxiety and PTSD disorder after adjusting for the effects of demographic, exposure and coping variables. The prevalence rates were higher in women, which is consistent with findings of other post-conflict epidemiological studies [10, 11, 30, 31]. Women were two to three times more likely than men to have anxiety, depression and PTSD. This is comparable to the gender difference in a study conducted in 2000 in rural Nepal that found women were 2.3 times more likely than men to endorse high symptom severity on

the BAI [32]. There are various possible explanations for higher prevalence rates among women. Kohrt et al. [32] reported that women were at higher risk due to the experience of domestic violence and other stressful events related to their intimate partners. In addition, the qualitative study conducted prior to this study also documented how women suffered more during the conflict. During the conflict, the situation was not favorable for men to stay at home; many men either became involved in outside activities or migrated to India or other countries for work. Women reported that both security personnel and Maoists frequently asked them about the status of the male members in the household. Females were also threatened with death if they did not give accurate information about male household members who were not at home. Females were forced to cook food for Maoists at night, but the security personnel would come next day and threaten them, asking why they cooked food for Maoists [33]. Finally, a study has also demonstrated that suicide was the first leading cause of death among women in the reproductive age in Nepal [34].

Other variables associated with poorer mental health outcomes were older age, lower/marginalized caste, being a widow/widower or separated, not having sufficient clothing, not having access to medicine and not having radio at home. Except older age, all these variables are linked with poverty, which may have influence for reporting relatively higher mental health problems [28]. The finding of this study is also consistent with other studies in non-conflict setting where poverty was associated with worse mental health [35]. The qualitative exploratory study found that, during the conflict, Dalits (low-caste groups) were victimized by the government more than other castes/ethnic groups because government forces assumed that people of these classes were mostly Maoist. Likewise, Kohrt and colleagues also found worse mental health among Dalit groups compared with upper-caste Bahun/Chhetri groups in Jumla District [36]. Regarding the place of residence, respondents from Dang and Chitwan districts demonstrated more problems. This is not surprising because the impact of the conflict in these two districts was much greater than in Tanahu [37].

Individuals who perceived a negative impact of the conflict on their communities had worse mental health than those who thought that conflict had a positive impact, which may indicate actual events, political opinion or a demoralized stance that may affect mental well-being. There is evidence to assume that negative views of the conflict are associated with poorer mental health [15]; however, a reverse causality can also be argued such that poorer mental health results in a more demoralized stance toward politics or the conflict. Unexpectedly, we found a positive association between poor mental health and use of resources and support system (i.e., use of more coping

strategies was associated with worse mental health). This may be explained by individuals with increased mental health complaints using more coping strategies, but that these coping strategies do not effectively decrease mental health complaints. A previous relation with Nepali-speaking Bhutanese refugees was found in support of this possible explanation [38].

Unexpectedly, his study found no association between recent traumatic events and level of PTSD symptoms, which contrasts with other studies [9–11]. There are possible explanations regarding the lack of association between exposure to trauma and mental health outcomes, especially PTSD, in our sample. We only asked about respondents' level of exposure to traumatic events for 6 months preceding the survey, therefore we did not have information about exposures during the war itself. Second, the study was conducted 1 year after the signing of the comprehensive peace accord; hence, the trauma memory may have changed over time which was also found in a Bosnian refugee population [39, 40]. Third, the level of exposure to traumatic events was also very low; only few respondents reported being directly exposed to traumatic events, but most of them reported that they had either heard about or seen such events on television.

There are limitations in this study. First, it was conducted in three districts representing three development regions; due to the diverse ethnic and cultural composition of Nepal, however, the results of the study might not be representative of the whole country. Second, specific idioms of distress associated with mental health problems were not assessed in this study. Third, this study was conducted a year after the formal peace agreement between the government and the Maoists, even though many people were still frightened and so they may not have openly shared their experiences. Fourth, the study relied on self-reports, which has been shown to predict inflated rates of mental health problems in a recent meta-analysis [6]. Fifth, there was a possibility that people felt inhibited to share negative effects of armed conflict. However, this is the first study of the general population conducted by using both validated and locally constructed instruments and the sample size represents diverse regions and ethnic groups of Nepal. Finally, the test–re-test reliability of the instruments was conducted only with 25 respondents.

Conclusion

In summary, this is the first epidemiological study on mental health with a large community sample in Nepal. It provides prevalence rates of mental health problems and associated risk and protective factors in rural communities. The prevalence rates of mental disorders are high,

especially among women, elderly, widows/widowers or people who are separated from their partner. Dalit (low-caste groups), those residing in Dang and Chitwan districts and those who perceived a negative impact of the conflict in the community were also more vulnerable to the development of mental health problems. The prevalence rates of depression and anxiety in the sample are high compared to epidemiological studies in high-income settings and comparable to, or lower than, the prevalence rates found in other conflict-affected settings. Still, the presented problems among the study population raises concern for the provision of immediate mental health care, because there is no provision of formal mental health system in rural Nepal, with suicide already identified as one of the leading causes of death among women in the reproductive age in Nepal. Therefore, first, capacity building and training program should be conducted in collaboration with private sectors or NGOs/INGOs to overcome the current chronic scarcity of trained human resources, especially in the rural areas. Second, immediate action should be taken to incorporate mental health services into the existing public health-care system. Third, an awareness program should be conducted to increase the current low public knowledge and awareness on mental health and to minimize stigma and discrimination associated with mental health. Finally, more attention should be given to the most vulnerable groups such as women, older people, widow/widower or separated, low-caste groups and those residing in Dang and Chitwan districts.

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Conflict of interest The authors declare that they have no competing interest.

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