Role of current perceived needs in explaining the association between past trauma exposure and distress in humanitarian settings in Jordan and Nepal

Mark J. D. Jordans,* Maya Semrau,* Graham Thornicroft** and Mark van Ommeren**

Background
Attention is increasingly shifting towards the role of daily stressors in explaining mental health outcomes in humanitarian emergencies.

Aims
To assess the role of current perceived needs in explaining the association between past traumatic exposure and distress in humanitarian settings.

Method
A series of mediator analyses were conducted, using data from Jordan (displaced Iraqi people) and Nepal (Bhutanese refugees). The General Health Questionnaire (GHQ-12), the newly developed Humanitarian Emergency Settings Perceived Needs Scale (HESPER) and the traumatic events list of the Composite International Diagnostic Interview (CIDI) were used

as measures of distress, current perceived needs and past traumatic events respectively.

Results
Current perceived needs were found to mediate the association between past traumatic exposure and distress in Jordan and, less strongly, in Nepal.

Conclusions
An integrated approach that includes a focus on daily stressors should be adopted to mitigate the impact of traumatic exposure in humanitarian settings.

Declaration of interest
None.

Populations affected by humanitarian emergencies such as those involving natural disasters, conflict or war are often exposed to a wide range of stressors, with elevated levels of distress and mental disorders commonly found in these settings.[1–5] Historically, there has been a heavy emphasis placed within relevant research and mental health interventions on potentially traumatic events experienced during the emergency (for instance exposure to violence, torture, forced recruitment to fight, loss of home or loved ones, etc.), and the effects these have on emergency-affected people's mental health. Post-traumatic stress disorder (PTSD) has featured most prominently as the mental health outcome indicator of choice in evaluation studies.[6–9] Recent reviews and other studies have confirmed that experience of torture, violence, conflict and other potentially traumatic events are strongly associated with mental disorders, such as PTSD and depression.[1,5,6]

In recent years, however, a debate has arisen over the relative value of trauma-focused perspectives in emergency settings. The World Health Organization (WHO) is one of several agencies which, along with others, have called for a refocusing of mental health interventions in humanitarian emergency settings towards a broader framework incorporating mental disorders such as PTSD.[1,2,9–11] An integrative 'mental health and psychosocial support' approach has been advocated in emergency settings, incorporating a range of social (non-clinical) programmes as well as mental health interventions (including trauma-focused ones).[2,3,10,12–14] The broader framework has a bearing on the assessment of needs in humanitarian settings, exemplified by the development of a new scale.

The development and initial validation of the Humanitarian Emergency Settings Perceived Needs Scale (HESPER) has been described in detail elsewhere.[15] In short, the HESPER Scale was

developed by the WHO and the Institute of Psychiatry at King's College London, to rapidly assess perceived needs of populations in humanitarian settings during conflict or other disasters in low- and middle-income countries. The scale, uniquely, provides a population-level assessment of the prevalence and distribution of needs as perceived by members of the population themselves. In addition to providing descriptive data to inform and monitor humanitarian response, the scale can help answer the following policy question. To what extent do daily stressors (i.e. current needs) experienced in the post-emergency environment (for instance poverty, forced displacement to camps, overcrowding, malnutrition, etc.) account for the impact of traumatic exposure on mental health (for example Miller & Rasmussen,[12,16] Neuner,[17] Ager[18])? It is not clear how much of the variance in mental health outcome may be predicted by current needs or stressors in the potentially modifiable post-emergency recovery environment *v.* traumatic events that have already occurred previously. Recently, various models have been proposed that attempt to explain the interaction between these variables. One such model, proposed by Miller & Rasmussen[12,16] purports that daily stressors mediate the relationship between traumatic experiences and mental health in conflict and post-conflict settings. They argue that the direct traumatising effects of war exposure on affected populations' mental health are often overemphasised compared with the impact of daily stressors present in post-conflict environments, and advocate an integrative intervention approach, which addresses daily stressors first, and specialised trauma interventions next only for those individuals who are still very distressed. In strong contrast, another model has suggested that poor mental health (which may be caused or exacerbated by past traumatic experiences) may conversely result in a change in the perception of daily stressors, or even the self-generation of daily stressors.[17] This paper aims to further this discussion by assessing the

---

*Joint first authors, **joint last authors.

relationship between current perceived needs, past traumatic events and distress in two humanitarian settings. Specifically, the role of perceived needs in explaining the association between traumatic exposure and distress is investigated.

Method

Sample

In Jordan, Iraqi people ($n = 269$) displaced following the 2003 invasion of Iraq were interviewed in July 2010 (Amman, Zarqa, Irbid, and Madaba). In Nepal, Bhutanese refugees ($n = 269$) were interviewed in October to November 2010 (Beldangi-II camp in Jhapa district).

Measures

Distress was used as dependent variable, as measured by the General Health Questionnaire (GHQ-12).[19] The main independent variables were perceived needs (as measured by the newly developed HESPER Scale)[20] and past traumatic events (as measured by the traumatic events list of the PTSD section of the Composite International Diagnostic Interview (CIDI) 3.0).[21]

The GHQ-12 provides a distress score based on 12 questions relating to symptoms of depression and anxiety.[19] An Arabic and Nepali version have been validated.[22,23] It has been used as a measure of distress in the World Mental Health Survey Initiative in 28 countries.[24] The traumatic events list of the CIDI lists 27 potentially traumatic events, several of which (though not all) directly relate to events common in conflict or other disastrous situations; a total score of traumatic exposure can then be computed by counting the number of events experienced. Participants are also able to list additional events experienced.[21] In the present study, Cronbach's alphas for internal consistency of the GHQ-12 were 0.89 in Jordan and 0.88 in Nepal; for the CIDI traumatic events list, the alphas were 0.71 in Jordan and 0.72 in Nepal.

The HESPER Scale assesses the perceived physical, social, and psychological needs of the general adult population in humanitarian settings. Perceived needs are defined here as needs expressed by members of the affected population themselves. They are thus problem areas for which people would likely want help. Perceived needs are assessed on the HESPER Scale across 26 need items. Examples of need items include 'Place to live in' ('Do you have a serious problem because you do not have an adequate place to live in?'), and 'Education for your children' ('Do you have a serious problem because your children are not in school or are not getting a good enough education?'). Ratings are then made for each need item according to unmet need (or serious problem; '1' rating), no need (or no serious problem; '0' rating), or no answer (i.e. refused, not known, or not applicable; '9' rating). A total score of unmet needs can be calculated by adding up the number of items rated as serious problems.

Validation of the HESPER Scale was conducted with the same data-sets as were used for the present study.[15] In brief, the HESPER Scale demonstrated excellent interrater reliability (intraclass correlation coefficients (ICCs, absolute agreement) for total number of unmet needs were 0.998 in Jordan and 0.995 in Nepal; Cohen's kappas for need ratings of the 26 individual need items ranged between 0.66 and 1.0 across sites, with 94.9% of items having kappas over 0.8), and good to excellent test–retest reliability (ICCs, absolute agreement, for total number of unmet needs were 0.961 in Jordan and 0.773 in Nepal; need ratings of individual need items ranged between 0.07 and 1.0, with 55.8% of items having kappas over 0.6). Additionally, acceptable criterion (concurrent) validity was established by comparison with the World Health Organization Quality of Life (WHOQOL-100);[25] total number of unmet needs correlated with total WHOQOL-100 score as predicted in both settings ($r = -0.629$ in Jordan and $r = -0.469$ in Nepal), and correlations between individual need items and related WHOQOL-100 questions were mostly as predicted.[15] Internal consistency was assessed by calculating Cronbach's alpha, where '0' ('no serious problem') and '9' ('not applicable') ratings were combined into one rating, as was done for the initial study into the psychometric properties of the HESPER Scale.[15] Cronbach's alphas of the HESPER Scale were 0.89 in Jordan and 0.80 in Nepal.

Procedure

Ethics approval for both settings was obtained through the King's College London Psychiatry, Nursing and Midwifery Research Ethics Committee. In Nepal, ethical approval was obtained from the Nepal Health Research Council, and in Jordan permission for the study was obtained from the Ministry of Planning and Ministry of Health. All participants gave their voluntary written or verbal consent to take part. Arabic and Nepali versions of the GHQ-12 and the traumatic events list of the CIDI were obtained from distributors or other research groups before testing commenced; all other project materials (including the HESPER Scale) were translated using back-translation methods. The traumatic events list of the CIDI was adapted to suit the local contexts, i.e. a few items were added or removed based on previous research of what items were locally relevant. In Jordan, an additional need item was added to the HESPER Scale based on previous findings made during pilot-testing. This item pertains to problems related to legal residency and potential resettlement to a third country.

Different sampling methods were employed in the two sites. Iraqi participants in Jordan were recruited through a multistage cluster sampling design, involving 30 clusters of city districts. The sample was geographically representative of Iraqis living in Jordan (around 75% of the sample lived in Amman and 25% outside Amman). In Jordan, the random-walk method was employed to recruit households within clusters or camps; a random-number Kish Table[26] was used to select individuals from within chosen households. In Nepal, participants were recruited though simple random sampling methods; a list of randomly selected Bhutanese refugees in the camp was obtained from the United Nation High Commissioner for Refugees.

Interviews were conducted during one-to-one assessments in participants' homes in Arabic in Jordan and Nepali in Nepal; these were conducted by 12 and 6 local interviewers respectively, who had previously been trained for 3.5 to 4 days. Interviewers were supervised by a local team leader. Participants were first administered the HESPER Scale, followed by the GHQ-12 and then the traumatic events list of the CIDI.

Statistical analyses

To identify the mechanism that underlies the relationship between trauma exposure and distress in humanitarian settings, a series of mediation analyses were conducted. A mediator model hypothesises that the effect of the independent variable on the dependent variable is transformed by the mediator variable.[27,28] The mediator variable thus clarifies the nature of the relationship between the independent and dependent variables and is the mechanism through which a predictor influences an outcome variable. Traditional approaches to mediator testing have been criticised, and alternative approaches have been developed to test direct v. indirect effects and using bootstrapping procedures.[29]

Direct effects refer to the relationship between a predictor variable (X) and outcome variable (Y). Indirect effects refer to the effect of (X) on (Y) via a mediator variable (M). Predictor variables may have both direct and indirect effects on an outcome variable. The hypothesised mediator between trauma exposure and distress in the current study was perceived needs. Therefore, both the direct effect of trauma exposure on distress and the indirect effect of trauma exposure on distress via perceived needs were examined.

A regression-based approach to mediation analysis was used with bootstrap estimation of indirect effects, with data being resampled 5000 times. Many mediation studies use regression analysis-based approaches.[30] Bootstrapping is a non-parametric technique for obtaining parameter estimates by numerous resamplings of the data, and is used for testing the likelihood of the mediation by producing robust confidence intervals for the estimates. A Preacher & Hayes' 'indirect' macro for SPSS was used in the present study, which calculates bootstrap estimates of indirect effect for models of one or more mediators[31] (see www.afhayes.com/spss-sas-and-mplus-macros-and-code.html for the macro). Simulation studies have shown that bootstrap estimation compares favourably with distribution-based estimation or significance tests for simple mediation models (i.e. one mediator).[32] A further strength of the 'indirect' macro is that it allows for the inclusion of covariates. In case the problem of confounding (of associations) is present, a model that does not control for the effect of the confounding variable produces a biased estimate of the exposure effect. The present study includes covariates of age and gender, as these variables have been significant covariates in prior multiple mediation models in Nepal.[33] All statistical analyses were performed in SPSS v.17.0 on Windows. Standardised scores were used for analyses of mediator models. Standardised variables were employed (obtained by subtracting the mean and dividing by the standard deviation) in the mediator analyses, in order to reduce the problem of multicollinearity that partly (but not exclusively) arises when interaction terms are introduced in the analysis.

Within the employed statistical procedure, the c path refers to a significant relation between the predictor (X) and the outcome (Y), when not accounting for indirect effects (i.e. total effect). The a path refers to the relationship of the predictor (X) with the mediator (M). The b path refers to the relationship of the mediator (M) with the outcome variable (Y). When M is included in the model, the indirect effect refers to the $a\,b$ pathway, and c' refers to the direct effect of X on Y. The indirect effect also can be conceptualised as the difference between the total effect and the direct effect ($c - c'$). The present study investigated the theoretical model in which the 'current perceived needs' variable was the mediator (M) for the association between the predictor 'trauma exposure' (X) and the outcome 'distress' (Y). Analyses per country sample were conducted and no between-country comparisons were performed.

Results

Sociodemographic information for respondents in both study sites is presented in Table 1. Table 2 presents the mean scores of the hypothesised predictor (CIDI total score), outcome (GHQ total score) and mediator (HESPER total score) variables.

In both samples a significant total effect was found for trauma exposure on distress when covariates were taken into account, but possible mediation was not (Jordan: 0.42, Nepal: 0.32). In the Jordan sample, there was a significant indirect effect via perceived needs. Analyses confirmed a significant association between the

Table 1 Demographic characteristics of respondents at both study sites
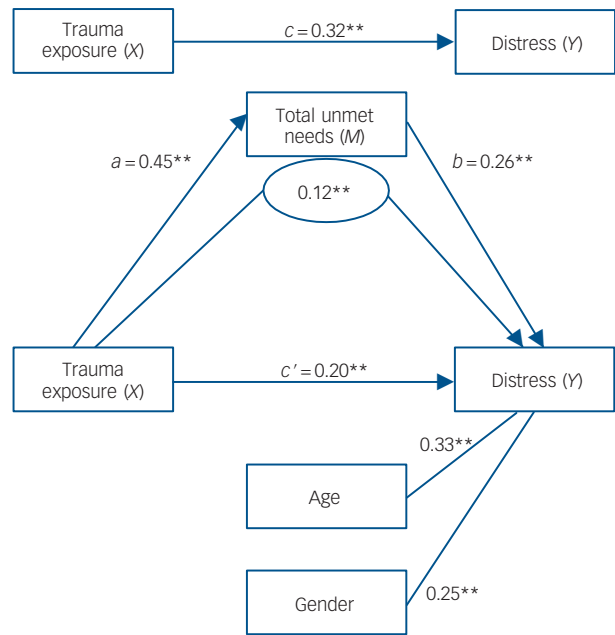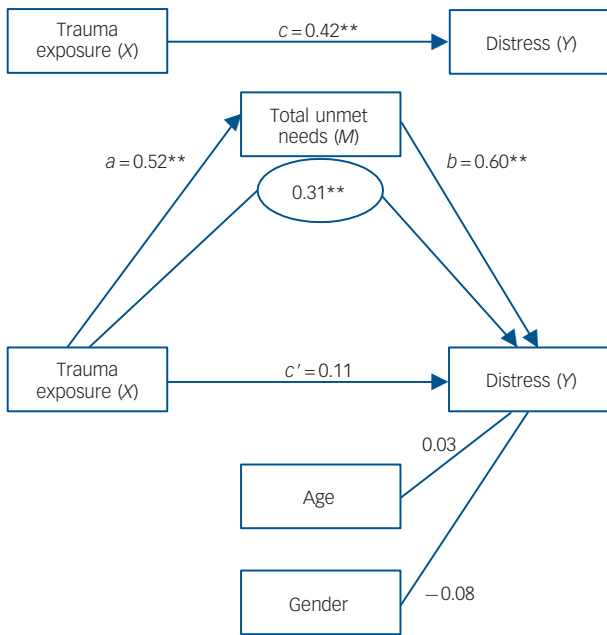
	Jordan ($n = 269$)	Nepal ($n = 269$)
Gender, n (%)		
Men	116 (43.1)	139 (51.7)
Women	153 (56.9)	139 (51.7)
Age, years: mean (s.d.)	40.24 (13.36)	36.92 (14.15)
Marital status, n (%)		
Married	191 (71.0)	217 (80.7)
Unmarried	56 (20.8)	50 (18.6)
Widowed	16 (5.9)	0
Divorced/separated	6 (2.2)	2 (0.7)
Cohabiting	0	0
Number of children, mean (s.d.)	2.11 (1.95)	2.39 (2.37)
Level of education, n (%)		
Illiterate/no formal education	7 (2.6)	108 (40.1)
Primary school (grades 1–6)	29 (10.8)	63 (23.4)
Secondary school (grades 7–12)	104 (38.7)	89 (33.1)
University	129 (48.0)	9 (3.3)
Religion, n (%)		
Christian	45 (16.7)	16 (5.9)
Muslim	221 (82.2)	0
Hindu	0	178 (66.2)
Buddhist	0	52 (19.3)
Other religion[a]	3 (1.1)	23 (8.6)
No religion	0	0
Time displaced, year: mean (s.d.)	3.84 (2.18)	18.95 (0.93)

a. Other religions include Kirat, Sanatan, Biswasi, Manab, Nastak (Nepal), Haba'i, Sa'aebiya (Jordan).

Table 2 Mean scores for trauma exposure, distress and perceived needs for both study sites

	Mean (s.d.)	
	Jordan	Nepal
GHQ total score	16.50 (7.30)	13.77 (7.01)
CIDI total score	7.53 (3.62)	4.51 (3.23)
HESPER total score	10.61 (5.88)	8.10 (4.64)

GHQ, General Health Questionnaire; CIDI, Composite International Diagnostic Schedule, past traumatic life events as measured by the traumatic events list (28 items were included in Nepal and 16 in Jordan); HESPER, Humanitarian Emergency Settings Perceived Needs Scale (27 items were included in Jordan and 26 in Nepal).

predictor and the putative mediator (a path). Furthermore, perceived needs had a statistically significant association with distress (b path). The association between trauma exposure and distress was no longer statistically significant (c' 0.11) when accounting for the indirect effect of perceived needs (0.31). Age and gender as covariates played no role in predicting distress in this model. The adjusted R^2 was 0.44 for the distress variable in the tested model (i.e. 44% of the distress variance was explained by the tested meditational model) (Fig.1).

In the Nepal sample similarly there was an indirect effect via perceived needs of trauma exposure on distress. Analyses confirmed a statistically significant association between all of the variables in the model. When the indirect effect of perceived needs was included in the model, the direct effect regression coefficient between trauma exposure and distress was reduced from a total effect (c path) of 0.32 to an adjusted effect (c' path) of 0.20. Thus, there remained a direct effect of traumatic exposure on distress when accounting for the perceived needs indirect effect. Trauma exposure in Nepal therefore predicted distress directly as well as

Fig. 1 Mediation model Jordan ($n = 269$).

*$P < 0.05$, **$P < 0.001$; bootstrap resamples: 5000.

Fig. 2 Mediation model Nepal ($n = 269$).

*$P < 0.05$, **$P < 0.001$; bootstrap resamples: 5000.

indirectly through perceived needs. The significant association of age (older) and gender (female) meant that these were independent predictors of distress in addition to the earlier mentioned direct and indirect pathways of trauma exposure. The adjusted R^2 was 0.34 for the distress variable in the tested model (Fig. 2). Table 3 presents all confidence intervals for the above findings.

Discussion

Main findings

This study tested the hypothesis that there are indirect effects of trauma exposure on distress via current perceived unmet needs. This question informs mental health policy and programmes in humanitarian settings. The study's hypothesis was confirmed for both the Jordan and Nepal samples. It was found that the tested

model had a good fit with the Jordan data, where the direct association between traumatic exposure and distress was no longer significant in the model with indirect effects of unmet perceived needs. Similarly, an indirect effect for current needs was found in Nepal. Nepal differed from Jordan in that the Nepal sample showed a significant direct effect of trauma on distress when accounting for unmet needs. Age and gender were significant covariates in Nepal (being female and being older respectively).

The indirect effects in Jordan and Nepal are consistent with previous research. In particular, they support Miller & Rasmussen's mediation model,[16] in that the addition of unmet needs to the model increases the overall explanatory power and it weakens the direct association between trauma exposure and distress.[12] It suggests that the model, which advocates an increased focus on ongoing stressors arising from current difficulties and challenges that life poses compared with a focus largely on past traumatic exposure, may extend beyond conflict and post-conflict

Table 3 Direct and indirect effects for trauma exposure on distress		
	Effect (95% CI)	
	Jordan	Nepal
Model 1: total trauma exposure effect (without mediator)[a]		
Trauma exposure	0.42 (0.30 to 0.54)	0.32 (0.22 to 0.42)
Age	−0.02 (−0.13 to 0.09)	0.34 (0.24 to 0.45)
Gender	−0.02 (−0.14 to 0.09)	0.21 (0.11 to 0.32)
Model 2a: direct effects		
Direct effect of trauma and covariates		
Trauma (c' path)	0.11 (−0.01 to 0.23)	0.20 (0.08 to 0.32)
Age	0.03 (−0.07 to 0.13)	0.33 (0.23 to 0.43)
Gender	−0.08 (−0.18 to 0.02)	0.25 (0.15 to 0.35)
Direct effect of potential mediator		
Perceived needs (b path)	0.60 (0.48 to 0.72)	0.26 (0.14 to 0.38)
Model 2b: indirect effect		
Perceived needs	0.31 (0.24 to 0.39)	0.12 (0.06 to 0.19)
a. Standard multivariate regression with the predictor (trauma exposure) and the covariates (age, gender).		

settings to include wider humanitarian settings. These data suggest that for populations that have undergone large-scale traumatic experiences, it is important to look beyond the direct effect model in guiding intervention strategies. As the present study involved samples that had undergone the potentially traumatic experiences several years prior, a plausible explanation for these findings is that the potentially traumatic stressors were distal, whereas perceived needs were proximal. The results also tie in with previous studies that have emphasised the importance of post-displacement stressors compared with past traumatic experiences in predicting mental health outcome, both in post-emergency settings themselves,[34,35] as well as among refugees and asylum seekers in other countries, including Western ones.[36–38] Finally, the results support the relevance of measuring perceived unmet needs, using the newly developed HESPER Scale,[15] also in light of the prevailing broad mental health and psychosocial support framework.[2]

Although the results of this study provide further support for the importance of current stressors in explaining the association between past traumatic exposure and mental health outcomes in humanitarian settings, further research across different settings is required to shed more light on this association. Conceptually, reverse causation in the tested model is unlikely, but could nonetheless be examined through longitudinal study. Regarding statistical analyses, an alternative mediation analysis method for handling multiple mediators is structural equation modelling. However, given the small sample size, the bootstrapping technique employed here made multiple mediator regression analysis the preferred analytical approach. Future studies need to include analyses with additional covariants (for example time since displacement) included in the model.

The finding that older age and female gender independently predicted distress in one of the two settings fits in with the inconsistent results previous research has produced. These variables, in particular female gender, have been found to be predictive of mental health outcome in some studies,[4,38,39] but not in others.[5,39] An explanation for this may be that both older age and female gender as risk factors for poor mental health outcome may be context-dependent, for example according to culture, or type of mental health outcome.[33]

Implications

This study has several implications for policy and practice. If poor mental health (such as distress) may in part be mediated by post-emergency current stressors, as the findings of this study suggest, it is highly plausible – and testable – that positive changes to the post-emergency environment may potentially attenuate the impact of past traumatic experiences. Inter-sectoral humanitarian action targeting perceived unmet needs may therefore have a substantial impact in reducing (or in absence potentially worsening) mental health complaints experienced by emergency-affected populations.[38] As has been advocated recently by several authors,[2,3,10,12–14] rather than relying solely on resource-intensive trauma-focused interventions to mitigate the impact of traumatic exposure, the results indicate that interventions that broadly affect the recovery environment may hold promise. Multidisciplinary interventions that aim to reduce current stressful social and material conditions caused or worsened by humanitarian emergencies may potentially buffer against the negative impact of traumatic experiences on an individual's mental health. Clearly, trauma-focused care is indicated for those with serious post-traumatic stress complaints; however, it does confirm the need for a more integrated approach to mitigate the impact of potential traumatic exposure in humanitarian settings. In line with a recent

global research priority setting exercise for mental health and psychosocial support in humanitarian settings,[40] future research should increasingly evaluate the distinctive pathways by which emergencies have an impact on mental health. The better science unravels the mechanisms of that association (i.e. influence of contextual or protective factors), the easier it becomes to match scarce resources with adequate intervention.

Mark J. D. Jordans, PhD, Department of Research and Development HealthNet TPO, Amsterdam, The Netherlands, and Centre for Global Mental Health, London School of Hygiene and Tropical Medicine, UK; **Maya Semrau**, MSc, MSc, BSc, **Graham Thornicroft**, MB, BS, PhD, Health Service and Population Research Department, Institute of Psychiatry, King's College London, UK; **Mark van Ommeren**, PhD, Department of Mental Health and Substance Abuse, World Health Organization, Geneva, Switzerland

Correspondence: Mark J. D. Jordans, PhD, Health Net TPO, Lizzy Ansinghstraat 163, 1072 RG, Amsterdam, The Netherlands. Email: mark.jordans@hntpo.org

First received 31 Aug 2011, final revision 21 May 2012, accepted 14 June 2012

References

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

2 Inter-Agency Standing Committee (IASC). *IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings*. IASC, 2007.

3 Mollica RF, Lopes Cardozo B, Osofsky HJ, Raphael B, Ager A, Salama P. Mental health in complex emergencies. *Lancet* 2004; **364**: 2058–67.

4 Foa EB, Stein DJ, McFarlane AC. Symptomatology and psychopathology of mental health problems after disaster. *J Clin Psychiatr* 2006; **67** (suppl 2): 15–25.

5 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. *JAMA* 2009; **302**: 537–49.

6 de Jong JTVM, Komproe IH, van Ommeren M, El Masri M, Araya M, Khaled N, et al. Lifetime events and posttraumatic stress disorder in 4 postconflict settings. *JAMA* 2001; **286**: 555–62.

7 Mollica RF, Caridad KR, Massagli MP. Longitudinal study of posttraumatic stress disorder, depression, and changes in traumatic memories over time in Bosnian refugees. *J Nerv Ment Dis* 2007; **195**: 572–9.

8 Karunakara UK, Neuner F, Schauer M, Singh K, Hill K, Elbert T, et al. Traumatic events and symptoms of post-traumatic stress disorder amongst Sudanese Nationals, refugees and Ugandans in the West Nile. *Afr Health Sci* 2004; **4**: 83–93.

9 Medicins Sans Frontieres (MSF). *Mental Health Guidelines – A Handbook for Implementing Mental Health Programmes in Areas of Mass Violence*. Lightning Source UK, 2005.

10 van Ommeren M, Saxena S, Saraceno B. Mental and social health during and after acute emergencies: emerging consensus? *Bull World Health Organ* 2005; **83**: 71–6.

11 Weiss MG, Saraceno B, Saxena S, van Ommeren M. Mental health in the aftermath of disasters: consensus and controversy. *J Nerv Ment Dis* 2003; **191**: 611–5.

12 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.

13 van Ommeren M, Saxena S, Saraceno B. Aid After disasters - needs as long term public mental health perspective. *BMJ* 2005; **330**: 1160–1.

14 Jordans MJD, Tol WA, Komproe IH, Susanty D, Vallipuram A, Ntamatumba P, et al. Development of a multi-layered psychosocial care system for children in areas of political violence. *Int J Ment Health Syst* 2010; **4**: 15.

15 Semrau M, van Ommeren M, Blagescu M, Griekspoor A, Howard LM, Jordans MJD, et al. The development and psychometric properties of the Humanitarian Emergency Settings Perceived Needs (HESPER) Scale. *Am J Public Health* 2012; in press.

16 Miller KE, Rasmussen A. Mental health and armed conflict: the importance of distinguishing between war exposure and other sources of adversity: a response to Neuner. *Soc Sci Med* 2010; **71**: 1385–9.

17 Neuner F. Assisting war-torn populations – should we prioritize reducing daily stressors to improve mental health? Comment on Miller and Rasmussen (2010). *Soc Sci Med* 2010; **71**: 1381–4.

18 Ager A. Psychosocial needs in complex emergencies. *Lancet* 2002; **360**: s43–4.

19 Goldberg D. *General Health Questionnaire (GHQ-12)*. GL Assessment Limited, 1978.

20 World Health Organization, King's College London. *The Humanitarian Emergency Settings Perceived Needs Scale (HESPER): Manual with Scale*. WHO, 2011.

21 World Health Organization. *Composite International Diagnostic Interview (CIDI) 3.0*. WHO, 2004.

22 Daradkeh TK, Ghubash R, El-Rufaie OEF. Reliability, validity, and factor structure of the Arabic version of the 12-Item General Health Questionnaire. *Psychol Rep* 2001; **89**: 85–94.

23 Koirala NR, Regmi SK, Sharma VD, Khalid A, Nepal MK. Sensitivity and validity of the General Health Questionnaire-12 (GHQ-12) in a rural community setting in Nepal. *Nepalese J Psychiatry* 1999; **1**: 34–40.

24 Harvard School of Medicine. *The World Mental Health Survey Initiative*. Harvard School of Medicine, 2005 (http://www.hcp.med.harvard.edu/wmh/index.php).

25 World Health Organization, The WHOQOL-Group, Division of Mental Health. *WHOQOL-100*. WHO, 1995.

26 Kish L. A procedure for objective respondent selection within the household. *J Am Stat Assoc* 1949; **44**: 380–7.

27 Frazier PA, Tix AP, Barron KE. Testing moderator and mediator effects in counseling psychology research. *J Couns Psychol* 2004; **51**: 115–34.

28 Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J Pers Soc Psychol* 1986; **51**: 1173–82.

29 Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav Res Methods* 2008; **40**: 879–91.

30 MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. A comparison of methods to test mediation and other intervening variable effects. *Psychol Methods* 2002; **7**: 83–104.

31 Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav Res Methods* 2008; **40**: 879–91.

32 MacKinnon DP, Lockwood CM, Williams J. Confidence limits for the indirect effect: distribution of the product and re-sampling methods. *Multivariate Behav Res* 2004; **39**: 99–128.

33 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 Biol* 2009; **36**: 261–80.

34 Betancourt TS, Brennan RT, Rubin-Smith J, Fitzmaurice GM, Gilman SE. Sierra Leone's former child soldiers: a longitudinal study of risk, protective factors, and mental health. *J Am Acad Child Adolesc Psychiatry* 2010; **49**: 606–15.

35 Miller KE, Omidian P, Rasmussen A, Yaqubi A, Daudzai H. Daily stressors, war experiences, and mental health in Afghanistan. *Transcult Psychiatry* 2008; **45**: 611–38.

36 Laban CJ, Gernaat HBPE, Komproe IH, Schreuders BA, de Jong JTVM. Impact of a long asylum procedure on the prevalence of psychiatric disorders in Iraqi Asylum seekers in the Netherlands. *J Nerv Ment Dis* 2004; **192**: 843–51.

37 Miller KE, Weine SM, Ramic A, Brkic N, Bjedic ZD, Smajkic A, et al. The relative contribution of war experiences and exile-related stressors to levels of psychological distress among Bosnian refugees. *J Trauma Stress* 2002; **15**: 377–87.

38 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.

39 Brewin CR, Andrews B, Valentine JD. Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *J Consult Clin Psychol* 2000; **68**: 748–66.

40 Tol WA, Patel V, Tomlinson M, Baingana F, Galappatti A, Panter-Brick C, et al. Research priorities for mental health and psychosocial support in humanitarian settings. *PLoS Med* 2011; **8**: e1001096.