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Perceived current needs, psychological distress and functional impairment in a war-affected setting: a cross-sectional study in South Sudan

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ABSTRACT

Objectives: To examine the current perceived needs of the general population in a war-affected setting, and to study the influence of perceived needs on the participants' mental health status and functional impairment across genders.

Methods: A cross-sectional community survey (n=464) was conducted in war-affected South Sudan. Three regression models were analysed. Perceived needs were assessed with the Humanitarian Emergency Settings Perceived Needs Scale. Psychological distress was measured with the General Health Questionnaire and level of functioning by the Short Form Health Survey (SF-12).

Results: The most frequently expressed needs were related to drinking water, alcohol and drug use in the community and access to sanitation facilities. No gender differences were found regarding the level of perceived needs or the number of traumatic events. Higher level of perceived needs significantly predicted psychological distress and lower level of functioning even when numbers of experienced trauma events were taken into account.

Conclusions: The associations of higher level of needs and trauma experiences, on the one hand, and negative health outcomes on the other, necessitate a greater integration of interventions directed towards the population's perceived needs and mental health, particularly for those who have been exposed to trauma.

Strengths and limitations of this study

- Applies the newly introduced WHO-developed instrument to assess the perceived needs of war-affected populations and the impact of these on the mental health of the individuals.
- The results of the current study may help health personnel and policymakers to focus attention on what the populations perceive as their needs.
- The cross-sectional method used in the current study is a limitation.
- Self-reported method of measuring is a limitation.

INTRODUCTION

The negative effect of traumatic events on mental health and level of functioning in war-affected populations are well documented.[1 2] The role of stressful social and material conditions, besides the direct exposure to war-related traumatic events, has gained attention in recent years. Several studies have shown that stressful social and material conditions account for a large proportion of mental distress.[3 4] Indeed, it has been argued that the 'level of exposure' to daily stressors has consistently been a stronger predictor than direct war exposure on most mental health outcomes.[5] However, such a strong claim still needs to be substantiated by further empirical studies.

Alongside this standpoint, needs assessment has gradually become a widely accepted component of relief work in humanitarian crises. Indeed, addressing locally perceived needs has been suggested as a prioritised research area to strengthen mental health and psychosocial support in humanitarian settings.[6] Thapa and Hauff[7], in a study among internally displaced people in Nepal, documented associations between perceived needs and mental distress and disability. Perceived needs were assessed through open-ended questions and consisted of: financial needs, housing, food, education for their children, safety and healthcare needs. Roberts *et al*[8] studied the influence of living conditions and traumatic events on general physical and mental health in South Sudan. The results showed that some of the living condition variables were associated with general physical and mental health. Nonetheless, terms such as 'daily stressor' and 'ongoing adversity' have been criticised for being imprecise as these include a variety of conditions and

events,[9] and systematic examination of perceived needs and studies on the impact of unmet everyday needs on a population's mental health are scarce. An attempt to establish a more systematic categorisation and assessment of unmet needs/daily stressors/ongoing adversities has been the development of Humanitarian Emergency Settings Perceived Needs Scale (HESPER)[10] by the WHO. Jordans *et al*[11] applied HESPER in a study of humanitarian settings in Nepal and Jordan, and showed that the population's current perceived needs mediated the association between past exposure to traumatic events and distress. HESPER is also applied in assessment of ongoing adversities and their association with post-traumatic stress disorder (PTSD) symptoms among West Papuan refugees.[12 13]

The present study draws on data from a community survey of the population of Bahr al Ghazal region of South Sudan, which is one of the most economically disadvantaged countries in the world.[14] Besides an impoverished economy, the country has experienced more than 20 years of armed conflict. The signing of the Comprehensive Peace Agreement in 2005 ended extensive war-related violence and large-scale forced displacement, and resulted in the creation of the new state of South Sudan in 2011. Despite this positive pattern of change, the growing influx of returnees to South Sudan has placed an extraordinary strain on already scant services and resources (a returnee is a person who has left his/her place of origin, regardless of the reason, but who has returned to his/her place of origin). In addition, violent intertribal conflict, although not a new phenomenon, took on a new and dangerously politicised character in the recent years.[15] As such, the setting of this study can be described as a war-affected setting with frequent violent conflicts. The few studies conducted among the South Sudanese population show high levels of trauma exposure and psychological distress.[16 17] Our previous studies suggest a possible association between socioeconomic disadvantage and mental disorders such as PTSD, depression and anxiety disorders.[16 18 19]

In the present study, we examined the associations of perceived needs with not only psychological distress, but also with functional impairment. Investigating functional impairments, in addition to psychological distress, provides a more comprehensive understanding of the patient's health.[20] A large body of reports from disaster-related settings suggests a pattern of gender differences in exposure to risk, risk perception, preparedness, response, physical impact, psychological impact, recovery and reconstruction.[21] For instance, women tend to have a higher rate of mortality in disasters, which in some occurrences have been explained by women's limited mobility at the time of disaster due to traditional gender roles (responsible for children, restriction to leave the house). Women tend to have less access to information and less access to response (food, medicine, etc), compared to men. Women are likely to have an increased risk of violence in crisis as compared to non-crisis settings. Women also have a higher risk of having psychological distress and higher risk of meeting diagnostic criteria for PTSD.[21] The information available is, however, largely from small-scale studies[21] and only a few studies are based on a comprehensive analysis of gender-specific vulnerabilities.[22]

This study examines:

A. The current perceived needs of the general adult population in a war-affected setting
B. The influence of the participants' current perceived needs and history of exposure to traumatic events on their mental health status and level of functioning, across genders.

METHODS

We conducted a cross-sectional community survey (n=464) in the Greater Bahr el Ghazal States, South Sudan, in 2012. The sample frame was the general population of the four states in the Greater Bahr el Ghazal region. A multistage random cluster sampling method was used. The four states with 156 administrative units ('Boma') were divided into 30 survey clusters (our primary sample units). Highly politically insecure areas were not included in the survey. Eight bomas were randomly selected among the 30 clusters. The population data were based on the 2008 Sudan census.[23] These data were considered the most accurate population data available. The bomas were of different population size, and consisted of rural and urban areas (adapted from the local authorities' classification of the areas).The cluster selection was proportional to relative population size of each boma to ensure that each boma had the same probability of selection.

The politically insecure areas were not included in the survey. The urban areas in the context of this study can be characterised as areas between urban and rural systems; these include a mixture of rural and urban properties, and are much less developed than the larger, more cosmopolitan African cities like Nairobi, Abuja and Kampala. In the next stage, the 'spin-the-pen' method from the WHO Expanded Programme on Immunisation[24] was used for household selection: the approximate geographic centre of the area was identified and one household along an imaginary line connecting the centre to the periphery was selected at random. Subsequent households were then selected by visiting every third-closest household. Within each selected household, individuals who were 18 years or above, and who gave informed consent to take part in the study were assigned a number. A card was drawn at random from a deck of cards with corresponding numbers, and the household member with that number was then interviewed.

The interviewers were health personnel (n=6, 3 women and 3 men) from the region who were familiar with the cultural traditions and fluent in the relevant

local languages. They participated in training workshops (3 days) prior to the data collection, during which they were trained in using the survey instruments, and the cultural acceptability of the interview protocol was discussed. The research instruments were available in English and Arabic, but the main language used was Arabic. In addition, the key terms of the questionnaire were discussed and translated (back and forth) into the indigenous languages of the area to ensure that the interviewers could easily explain all the items to the participants. In this way, we ensured that the meaning of the source language statement was preserved (semantic equivalence), the same concept was being measured (conceptual questionnaire) and addressed the social norms of the society (normative equivalence).

Each household was approached by a male and a female interviewer to ensure the interviewer's gender would match that of the participant. A total of 484 households were contacted from which 464 participants were recruited. The response rate was 96%. Ethical clearance was obtained from the Research Department in the Ministry of Health of the Government of South Sudan and the Norwegian Regional Committee for Medical Research. Privacy and confidentiality were among the main topics in the training workshops for the interviewers. The participants were ensured about the anonymity and confidentiality of the data. The location of the interview was determined by the participant in order to maximise confidentiality during the interview process. Information that could lead to identifying participants was available only to staff who had legitimate access.

INSTRUMENTS

A questionnaire designed to gather information about sociodemographic factors was administered to all participants.

The participants' perceived needs were assessed using the HESPER.[10] Perceived needs are defined as the matters that are indicated subjectively by the participants as problematic, as opposed to objective needs, which are based on 'objective' and standard indicators such as malnutrition rates or livelihood data.[10] The HESPER covers 26 areas of psychological, physical and social needs (listed in table 2). For each need item, participants indicated on a nominal scale whether it was perceived as a serious problem (=1) or not (=0). The total score for the level of needs was calculated by adding up the number of needs identified as a serious problem; the larger the HESPER total score, the greater the perceived level of needs. The participants were also asked to indicate the three most important needs among HESPER items. HESPER has adequate psychometric properties across different population groups in a variety of humanitarian settings. It has been pilot tested in South Sudan, and its validity and reliability have been confirmed in several settings, including among displaced Iraqis in Jordan and Bhutanese refugees in Nepal.[11] HESPER has been developed by involving community members from emergency settings in LIC to develop the items, and it is more relevant than using an instrument measuring daily stressors, hassles or negative life events in other more stable contexts. Furthermore, HESPER is based on a well-established need-assessment instrument, the Camberwell Assessment of Need Short Appraisal Schedule (CANSAS), which is developed for other settings, and thus is anchored in a solid research tradition. HESPER is developed by WHO and is likely to be used widely in emergency settings worldwide and therefore, it is important to obtain systematic experience with this newly introduced instrument in different community settings.

To assess exposure to recent traumatic events, participants were asked whether (1) their property had been looted, confiscated or destroyed; (2) they had been exposed to a combat situation; (3) they had suffered serious physical injuries; (4) their family members had experienced serious physical injures; and (5) they had experienced the disappearance or kidnapping of a family member ('yes' or 'no' answer to each event). These items were included because they have frequently been reported in recent studies conducted in the same region of South Sudan.[16 17] A total trauma exposure score was obtained by adding up the responses of the five types of traumatic events (range=0–5), with higher scores representing a higher level of exposure to traumatic events.

Psychological distress was measured by the General Health Questionnaire (GHQ-28). The GHQ-28 is a screening instrument that is widely used to detect psychological distress in community settings and non-psychiatric clinical settings.[25] It has been used in various populations and cultural settings, including Sudan.[26] Each item has a four-point severity scale ('not at all', 'no more than usual', 'rather more than usual' and 'much more than usual') with corresponding values of 0, 1, 2 or 3. A total GHQ-28 score is calculated for each participant by adding the scores for each individual item. A higher total score on the GHQ-28 indicates more severe psychological distress (score range=0–84).[25] Level of functioning was measured by the Medical Outcomes Study Short-Form Health Survey (SF-12),[27] which has two subscales for measuring Physical Functioning (PCS) (including general health, physical function and bodily pain) and SF-12 Mental Functioning (MCS) (including social functioning, role-emotional, and mental health). Scores for the SF-12 can range from 0 to 100, and higher scores indicate better functioning. Internal reliability was evaluated using Cronbach's α. In this population it was found to be 0.94 for GHQ-28 (psychological distress) and 0.89 for SF-12. The obtained Cronbach's α values were above the commonly accepted level of 0.70.[28]

DATA ANALYSES

Data analyses were conducted using SPSS (PASW) V.20.0. Missing data were excluded from the analysis.

For any given variable, the maximum amount of missing data was less than 5%.

A series of separate hierarchical linear regression analyses, using a three-step model with three blocks of independent variables, was conducted to determine which factors were the best predictors of the health outcomes. The independent variables were sex, age, urban/rural setting, marital status, level of education, employment status, having a regular monthly income, being a returnee, exposure to traumatic events and level of needs (continuous variable based on the HESPER total score). The dependent variables were level of psychological distress, physical and mental health functioning.

In the first step, sociodemographic variables were entered into the model. Exposure to traumatic events (continuous variable, range=0–5) was entered in the second step. Level of needs was entered in the final step, which allowed the examination of the significance of level of needs in predicting health outcomes (psychological distress, physical and mental health functioning), while controlling for sociodemographic variables and the traumatic exposure.

RESULTS

Table 1 shows the sociodemographic characteristics of the study population. There were 46.8% male and 53.2% female participants. The corresponding rate for the general population in South Sudan is 51.8% male and 48.2% female.[11] Gender differences were observed in sociodemographic variables. While the majority of the participants reported high levels of psychological distress, female participants had a higher reported level of distress than males. No gender differences were found regarding the number of traumatic events or the level of needs.

Table 2 shows the perceived needs of participants, across genders. The most frequently expressed needs in the total sample were related to drinking water, alcohol and drug use in the community, and access to sanitation facilities and food. A higher percentage of women perceived alcohol and drug use in the community, food, the way aid was provided, support from others, law and justice in the community, and having too much free time as being serious problems. There was, however, a great degree of agreement between men and women in their *ranking* of their perceived needs. Drinking water, healthcare and education for children were ranked by the majority of participants (men and women) as the most important needs (not displayed in the tables).

Tables 3 and 4 show the results of separate regression analyses for the three health outcome measures: psychological distress, physical and mental health functioning for men and women, respectively.

For men, the results of regression analyses for psychological distress showed that having a higher level of needs predicted a greater level of psychological distress. Rural residency and being a returnee were significantly associated with a greater level of psychological distress. After the number of needs was controlled for, exposure to traumatic events was not significantly associated with higher level of psychological distress. Higher level of needs and higher number of trauma exposures were significantly associated with lower level of physical functioning. Rural residency, older age and being a returnee increased the chance of low physical functioning. Lower mental functioning among men was associated with rural residency and higher level of needs.

For women, a greater level of psychological distress was associated with having a higher level of needs, older age and rural residency. After the number of needs was controlled for, exposure to traumatic events was not significantly associated with higher level of psychological distress. Lower levels of physical and mental functioning were predicted by a higher level of needs and higher number of trauma exposures. In addition, rural residency, older age, and being a returnee increased the risk of low physical and mental functioning.

The R^2 coefficients indicate that close to 50% of the total variation in the health outcomes can be predicted by the final models for both males and females. R^2 increases when the variable 'level of need' is added into the models, indicating the effect of this variable on the health outcomes. Possible interactions between independent variables were examined and no significant associations were found.

DISCUSSION

The current study is the first to examine the perceived needs of the South Sudan population. The high level of perceived needs and the types of needs expressed by the participants illustrate the magnitude of hardship in the community. Indeed, the level of needs and the rate and prioritising of needs in this conflict-affected community are remarkably similar to other populations' needs immediately after natural disasters.[29–31] This is despite the fact that at the time of the current study, South Sudan was not recovering from any natural disasters and had experienced a 6-year absence of large-scale war-related atrocities and post-war reconstruction aid flow.[32] The level of needs found in the current study was higher than in the two conflict-affected communities in Nepal and Jordan reported by Jordans *et al*.[11] Direct comparison of level of needs among these contexts is, however, difficult due to variation in the socioeconomic conditions and due to the fact that the measure used depends on perceptions of needs rather than on standard measurement across contexts.

Some minor gender differences were observed regarding patterns of risk factors associated with negative health outcomes. However, the similarity in the reported level of needs and the ranking of the most important needs by men and women in our study is noteworthy. This lack of gender differences is not in accordance with previous studies that show women are affected

Table 1 Characteristics of participants by gender

Variable	N (%)		
Sex			
Male	217 (46.8)		
Female	247 (53.2)		
Urban/rural setting		Male	Female
Urban	243 (52.5)	121 (56.0)	122 (49.4)
Rural	220 (47.5)	95 (44.0)	125 (50.6)
Age (years)			
18–25	132 (28.5)	61 (28.2)	71 (28.7)
26–35	185 (39.8)	81 (37.5)	104 (42.1)
36–50	113 (24.4)	61 (28.2)	52 (21.1)
>50	33 (7.1)	13 (6.0)	20 (8.1)*
Marital status			
Single	120 (26.3)	81 (37.7)	39 (16.2)
Married	336 (73.7)	134 (62.3)	202 (83.8)*
Religion			
Christian	374 (81.0)	189 (87.9)	185 (74.9)
Muslim	21 (4.5)	7 (3.3)	14 (5.7)
Traditional beliefs	67 (14.4)	19 (8.8)	48 (19.4)*
Education			
Secondary school or higher	123 (26.6)	63 (29.2)	143 (57.9)
Primary school	134 (28.9)	66 (30.6)	68 (27.5)
Did not attend school	206 (44.5)	87 40.3)	36 (14.6)*
Employment			
Paid work	333 (76.9)	153 (73.6)	180 (80.0)
Student	57 (13.2)	38 (18.3)	19 (8.4)
Unemployed	43 (9.9)	17 (8.2)	26 (11.6)*
Regular monthly income			
No	177 (38.6)	69 (32.4)	138 (43.9)
Yes	282 (61.4)	144 (67.6)	108 (43.9)*
Returnee			
No	327 (70.9)	145 (67.4)	182 (74.0)
Yes	134 (29.1)	70 (32.6)	64 (26.0)
Exposure to recent traumatic event			
Property looted, confiscated or destroyed	205 (44.3)	103 (47.7)	102 (41.3)
Exposed to combat situation	96 (20.8)	43 (20.0)	53 (21.5)
Serious physical injuries	80 (17.3)	33 (15.3)	47 (19.0)
Serious physical injuries of family members	192 (41.5)	90 (41.7)	102 (41.3)
Disappearance or kidnapping of a family member	101 (21.8)	48 (22.2)	53 (21.5)
	Mean (95% CI)		
Traumatic events	1.45 (1.31 to 1.60)	1.47 (1.26 to 1.67)	1.45 (1.25 to 1.64)
HESPER total score	12.18 (11.57 to 12.80)	11.71 (10.77 to 12.64)	12.60 (11.78 to 13.43)
Psychological distress (GHQ-12)	51.18 (49.80 to 52.55)	49.62 (47.61 to 51.62)	52.54 (50.65 to 54.41)†
Functional impairment SF-12 (MCS)	49.14 (48.31 to 49.97)	49.71 (48.42 to 50.99)	48.63 (47.55 to 49.72)
Functional impairment SF-12 (PCS)	47.08 (46.25 to 47.90)	47.38 (46.21 to 48.55)	46.81 (45.62 to 47.98)

*χ^2 significant difference; p<0.05.
†Significant difference; p<0.05.
GHQ, General Health Questionnaire; HESPER, Humanitarian Emergency Settings Perceived Needs Scale; MCS, Mental Functioning; PCS, Physical Functioning; SF-12, Study Short-Form Health Survey.

disproportionately compared to men in exposure to risk, response and psychological impact.[33 34] Increased psychological distress has, nonetheless, been partly attributed to the social and household roles occupied by men and women.[35] As such, the genders may be viewed as more similar than different, according to the gender similarities hypothesis.[36] Another explanation for gender similarities in level of needs may be that HESPER is less adequate to capture gender-specific needs. Further studies are needed to investigate the possible gender differences in perceived needs in war-affected settings and to ensure the ability of HESPER to assess these differences.

The association between greater level of needs and higher level of psychological distress/lower level of functioning is consistent with previous findings in conflict-affected populations.[5 11 37] Our result shows some similarities with Roberts *et al*[8] study on the

Table 2 Perceived needs of participants by gender

HESPER item	Serious problem N (%) Total	Male	Female
Do you have a serious problem with….			
Drinking water	377 (81.1)	168 (78.1)	209 (85.0)
Alcohol or drug use in the community	372 (80.0)	164 (77.0)	208 (84.6)*
Toilets	356 (76.6)	164 (76.3)	192 (78.4)
Food	349 (75.1)	152 (70.7)	197 (80.1)*
Education for the children	297 (63.9)	139 (65.0)	158 (64.2)
The way aid is provided	260 (55.9)	107 (51.4)	153 (63.5)*
Care for people in the community who are on their own	251 (54.0)	108 (52.9)	143 (61.9)
Healthcare	242 (52.0)	109 (51.2)	133 (54.1)
Support from others	231 (49.7)	93 (45.1)	138 (56.8)*
Safety or protection from violence for women in the community	225 (48.4)	100 (46.9)	125 (51.2)
Place to live in	225 (48.4)	95 (44.4)	130 (53.1)
Clothes, shoes, bedding or blankets	217 (46.7)	93 (43.5)	124 (50.4)
Income or livelihood	215 (46.2)	104 (48.4)	111 (45.1)
Mental illness in the community	214 (46.0)	91 (43.8)	123 (51.7)
Information	203 (43.7)	98 (46.0)	105 (43.0)
Safety	190 (40.9)	93 (43.3)	97 (39.4)
Distress	163 (35.1)	65 (30.7)	98 (40.3)*
Law and justice in the community	160 (34.4)	75 (35.5)	85 (34.7)
Keeping clean	156 (33.5)	77 (36.0)	79 (32.1)
Too much free time	148 (31.8)	54 (25.2)	94 (38.2)*
Care for family members	135 (29.0)	70 (33.3)	65 (26.5)
Physical health	131 (28.2)	60 (28.0)	71 (29.0)
Separation from family members	123 (26.5)	55 (25.7)	68 (27.8)
Being displaced from home	123 (26.5)	61 (28.5)	62 (25.2)
Moving between places	104 (22.4)	52 (24.3)	52 (21.1)
Respect	73 (15.7)	33 (15.6)	40 (16.3)

*χ^2 significant difference; p<0.05.
HESPER, Humanitarian Emergency Settings Perceived Needs Scale.

influence of living conditions and traumatic events on general physical and mental health (measured by SF-8) in South Sudan. Aspects of living conditions included in this study were availability and sources of drinking water and food, use of household soap, sense of security, access to health services, and utilisation of sources of support. The results showed significant association of higher number of traumatic events with general physical and mental health. In addition, some of the living condition variables (lack of food, water, soap and medical care) were associated with general physical and mental health.

In the current study, the lack of significant association between trauma exposure on the GHQ-28 when controlling for other variables, including perceived needs variables, is particularly worth mentioning. However, this result may be due to the limited sample size and the limited number of traumatic events investigated.

The decreased impact of traumatic events on health outcomes and the larger magnitude of perceived needs on health outcomes is an added support for the negative influence of stressful social and material conditions on conflict-affected populations.

The participants from rural areas reported higher numbers of traumatic events and higher level of needs. This finding is not surprising given the level of underdevelopment in South Sudan's rural areas;[38 39] rural residency remained a significant predictor of psychological distress/lower level of mental functioning (MCS) when the level of needs and traumatic experiences were accounted for. However, the way that these trends may influence the association between the level of needs and health outcomes among rural population in South Sudan is unknown.

STRENGTHS AND LIMITATIONS

Despite the challenges of carrying out research in conflict-affected settings, this study demonstrates that it was possible to conduct a community survey under very difficult circumstances. The current study had some limitations. Being a cross-sectional study, it cannot identify cause-and-effect relationships between various independent variables and health outcomes. The 2008 Sudan census, which was used as the source of population data and in the sampling process, has inaccuracies, particularly because of the large-scale migration process and the influx of returnees. In addition, the a priori exclusion of the insecure areas creates a bias that is difficult

Table 3 Results of separate regression analyses examining the association between predictor variables and the level of health status (psychological distress, physical and mental health functioning) for male participants

	Psychological distress: (GHQ-28)		Physical functioning (SF-12: PCS)		Mental functioning (SF-12: MCS)	
Predictor	**B**	**β (CI 95%)**	**B**	**β (CI 95%)**	**B**	**β (CI 95%)**
Age	0.29	0.20 (0.06 to 0.51)*	−0.19	−0.22 (−0.32 to 0.58)*	0.10	0.11 (−0.05 to 0.25)
Rural residency	5.55	0.19 (0.86 to 10.24)*	−0.44	−0.24 (−3.24 to 2.37)	−4.63	−0.24 (−7.76 to −1.50)*
Regular income	0.45	0.01 (−5.13 to 6.03)	1.37	−0.07 (−1.93 to 4.67)	0.59	0.32 (−3.10 to 4.28)
Marital status: married (reference: single)	0.28	0.01 (−4.76 to 5.33)	0.51	0.03 (−2.46 to 3.49)	−0.43	−0.02 (−3.76 to 2.90)
Employment: student (reference: paid work)	1.43	0.04 (−5.65 to 8.51)	−4.25	−0.18 (−8.50 to −0.10)*	0.39	0.02 (−4.25 to 5.12)
Employment: unemployed (reference: paid work)	2.51	0.05 (−5.60 to 10.62)	−4.99	−0.15 (−9.89 to −0.10)*	−2.97	−0.08 (−8.44 to 2.50)
Level of education: primary (reference: no formal education)	0.80	0.03 (−4.333 to 5.91)	1.58	0.83 (−1.44 to 4.61)	0.73	0.04 (−2.65 to 4.10)
Level of education: Secondary or higher (reference: no formal education)	−0.20	0.01 (−5.41 to 5.18)	1.26	0.07 (−1.87 to 4.33)	2.03	0.10 (−1.43 to 5.49)
Returnee	9.23	0.30 (4.54 to 13.93)*	−2.83	−0.15 (−5.61 to −0.05)*	−0.92	−0.05 (−4.03 to 2.17)
Traumatic event exposure	1.05	0.11 (−0.48 to 2.58)	−1.56	−0.27 (−2.45 to −0.67)*	−0.93	−0.15 (−1.92 to 0.06)
Level of needs (HESPER score)†	0.78	0.34 (0.41 to 1.16)*	−0.33	−0.24 (−0.55 to −0.11)*	−0.73	−0.48 (−0.98 to −0.49)*
		R^2 model 1=0.31		R^2 model 1=0.35		R^2 model 1=0.23
		R^2 model 2=0.34		R^2 model 2=0.43		R^2 model 2=0.39
		R^2 model 3=0.41		R^2 model 3=0.47		R^2 model 3=0.47

*Significant value: P<0.05.
†To reduce redundancy, the item 'Distress' was excluded from the total score on HESPER because we intended to examine the level of psychological distress (GHQ-28) as an independent variable.
GHQ, General Health Questionnaire; HESPER, Humanitarian Emergency Settings Perceived Needs Scale; MCS, Mental Functioning; PCS, Physical Functioning; SF-12, Study Short-Form Health Survey.

Table 4 Results of separate regression analyses examining the association between predictor variables and the level of health status (psychological distress, physical and mental health functioning) for female participants

	Psychological distress: (GHQ-28)		Physical functioning (SF-12: PCS)		Mental functioning (SF-12: MCS)	
Predictor	**B**	**β (CI 95%)**	**B**	**β (CI 95%)**	**B**	**β (CI 95%)**
Age	0.24	0.08 (0.08 to 0.40)*	−0.30	−0.38 (−0.40 to −0.21)*	−0.16	−0.21 (−0.26 to −0.70)*
Rural residency	8.44	0.30 (4.43 to 12.45)*	−0.43	−0.02 (−2.91 to −2.10)	−2.75	−0.16 (−5.17 to −0.33)*
Regular income	0.28	0.01 (−3.42 to 3.98)	1.73	0.09 (−0.60 to 4.05)	−1.55	−0.09 (−3.81 to 0.71)
Marital status: married (reference: single)	2.35	0.06 (−2.63 to 7.33)	−0.82	0.03 (−3.97 to 2.34)	1.13	0.05 (−1.95 to 4.21)
Employment: student(reference: paid work)	−2.82	−0.05 (−11.14 to 5.49)	−0.95	−0.02 (−6.22 to 4.33)	1.70	0.04 (−3.45 to 6.83)
Employment: unemployed (reference: paid work)	5.95	0.13 (−0.36 to 12.26)	−3.76	−0.13 (−7.69 to −0.18)	−0.22	−0.08 (−4.06 to 3.61)
Level of education: primary (reference: no formal education)	1.43	0.05 (−2.71 to 5.58)	0.84	0.04 (−1.76 to 3.43)	0.17	0.09 (−2.36 to 2.71)
Level of education: secondary or higher (reference: no formal education)	2.10	0.50 (−4.08 to 8.26)	2.64	0.09 (−1.15 to 6.44)	0.50	0.02 (−3.21 to 4.20)
Returnee	3.98	0.12 (−0.34 to 8.30)	−4.90	−0.23 (−3.56 to −2.18)*	−3.85	−0.19 (−6.50 to −1.22)*
Traumatic event exposure	0.20	0.02 (−1.07 to 1.48)	−0.25	−0.44 (−1.05 to −0.55)	−0.67	−0.12 (−1.45 to −0.11)
Level of needs (HESPER score)†	0.89	0.37 (0.54 to 1.24)*	−0.36	−0.37 (−0.58 to −0.15)*	−0.47	−0.32 (−0.68 to −0.26)*
		R^2 model 1=0.21		R^2 model 1=0.28		R^2 model 1=0.39
		R^2 model 2=0.33		R^2 model 2=0.38		R^2 model 2=0.43
		R^2 model 3=0.41		R^2 model 3=0.42		R^2 model 3=0.47

*Significant value: P<0.05.
†To reduce redundancy, the item 'Distress' was excluded from the total score on HESPER because we intended to examine the level of psychological distress (GHQ-28) as an independent variable.
GHQ, General Health Questionnaire; HESPER, Humanitarian Emergency Settings Perceived Needs Scale; MCS, Mental Functioning; PCS, Physical Functioning; SF-12, Study Short-Form Health Survey.

to estimate. These limitations influence the generalisability of our findings. The use of an additive scale of traumatic events is a simple way of including an indicator of exposure. However, this would not differentiate between the types and severity of events. A further limitation is that self-reported measures were used to assess exposure to traumatic events; inconsistencies in the recall of events may introduce a bias.[40] Self-reported measures rely on the participant's memory and are prone to the influence of dominating attitudes towards the themes of the study. The traumatic events investigated are limited in their scope and timing. This may in turn have influenced how well this variable performed in multivariate analyses, particularly in comparison to HESPER which, by virtue of its large number of constituent items, would have a much wider range of scores. It is worth mentioning that unusually few independent variables were significantly associated with the outcomes which may be due to the current study's fairly limited sample size. There is a possibility that persons who have experienced higher level of traumatic events report a high level of perceived needs in the aftermath (they have experienced material losses; their distress causes them to report greater perceived needs, etc). However, we find no collinearity between traumatic events and perceived needs in the regression analyses. Finally, although the instruments used in this study have been used in various cultural settings, and the interviewers were familiar with the sociocultural setting, no formal sociocultural validation was conducted. The interviewers translated some of the words in the questionnaire into the indigenous languages. This was the case in about 20% of the interviews. The use of the indigenous languages was, however, not systematically measured and hence, represents a possible source of bias. We were not able to formally assess inter-rater reliability. However, an attempt was made, through repeated and supervised interview practice, to ensure a satisfactory level of rating agreement among the interviewers.

CONCLUSIONS

Our findings show a high level of perceived needs among the study population, particularly in rural areas. The results have implications for health and humanitarian services. The associations of higher level of needs and trauma experiences, on the one hand, and negative health outcomes on the other, demand greater integration of interventions directed towards various needs and mental health. Interventions should focus not just on traumatic events, but on everyday needs of the populations.

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Contributors All authors contributed to the design of the study. TA executed the statistical analysis, drafted the manuscript. LS participated in the interpretation of data and the revision of the manuscript. AHE participated in the interpretation of data and the revision of the manuscript. LL participated in interpretation of data and revision of the manuscript. EH supervised, interpretation of data and drafting of the manuscript. All authors read and approved the final manuscript.

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