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

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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 gender.

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 number of traumatic events or the level of perceived needs. 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. No gender differences were found in the level of needs.

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 toward the population's perceived needs and mental health, and in particular those that have been exposed to trauma.

Strengths and limitations of this study

- Very few studies are conducted on the perceived needs of war-affected populations and the impact of these on the mental health of the individuals.
- The relatively large sample of participants (n=464) is an advantage.
- The results of the current study may help health personnel and policy makers 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].

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]. Nonetheless, terms such as 'daily stressor' have been criticized for being imprecise as they include a variety of conditions and events[7], and systematic examination of perceived needs and studies on the impact of unmet everyday needs on a population's mental health are scarce. Thapa and Hauff[8] 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 health care needs. In a study of humanitarian settings in Nepal and Jordan, Jordans et al.[9] used a recently developed instrument, the Humanitarian Emergency Settings Perceived Needs Scale (HESPER), to measure perceived needs in conflict affected situations. The results of this study showed that a population's current perceived needs mediated the association between past exposure to traumatic events and distress.

The present study draws on data from a community survey of the population of South Sudan, which is one of the most economically disadvantaged countries in the world 10 (World Bank, 2008). 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. In addition, violent intertribal conflict, although not a new phenomenon, took on a new and dangerously politicized character in the recent years[11]. 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[12,13]. Our previous studies suggest a possible association

between socioeconomic disadvantage and mental disorders such as PTSD, depression, and anxiety disorders [12,14,15].

The present study aimed to investigate various aspects of the perceived needs of the population in war-affected South Sudan. We wished to examine the associations of these 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[16]. 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. The information available is largely from small scale studies [17] and only a few studies are based on a comprehensive analysis of gender specific vulnerabilities[18].

We wished to examine possible gender differences in the associations of perceived needs with health outcomes.

This study attempted to:

(a) examine the current perceived needs of the general adult population,

(b) investigate 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 gender.

Methods

We conducted a cross-sectional community survey ($n = 464$) in the Greater Bahr el Ghazal States, South Sudan in 2012. The population data were based on the 2008 Sudan census[19]. These data were considered the most accurate population data available. A multistage random cluster sampling method was used. Eight randomly selected administrative units ('Boma') constituted the survey clusters with a corresponding running cumulative population size for each Boma consisting of both rural and urban areas (adapted from the local authorities' classification of the areas). The politically insecure areas were not included in the survey. The urban areas in the context of this study can be characterized as areas between urban and rural systems; they include a mixture of both 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 Immunization[20] 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 older and 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 ($n = 6$, three women and three 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 both English and Arabic but the main language used was Arabic. In addition, the key terms of the questionnaire were discussed and translated into the indigenous languages of the area to ensure that the interviewers could easily explain all the items to the participants. Each household was approached by both a male and a female interviewer to ensure the interviewer's gender would match that of the participant. 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.

Instruments

A questionnaire designed to gather information about socio-demographic factors was administered to all participants.

The participants' perceived needs were assessed using the Humanitarian Emergency Settings Perceived Needs Scale (HESPER)[21]. 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[21]. 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 been pilot tested in South Sudan and it's validity and reliability have been confirmed in several settings, including among displaced Iraqis in Jordan and Bhutanese refugees in Nepal[9].

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 [12,13]. 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 [22]. It has been used in various populations and cultural settings, including Sudan [23]. 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)[22]. Level of functioning was measured by the Medical Outcomes Study Short-Form Health Survey (SF-12)[24], 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 alpha. 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 alpha values were above the commonly accepted level of 0.70[25].

Data analyses

Data analyses were conducted using SPSS (PASW) version 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, socio-demographic 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 socio-demographic variables and the traumatic exposure.

Results

Table 1 shows the socio-demographic 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% female14. Gender differences were observed in socio-demographic 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.

PLEASE PLACE TABLE 1 ABOUT HERE

Table 2 shows the perceived needs of participants, across gender. The most frequently expressed needs were related to drinking water, alcohol and drug use in the community an access to sanitation facilities and food. Gender differences were observed regarding the rate of perceived needs: 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 (perceived needs). 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 (both men and women) as the most important needs (not displayed in the Tables).

PLEASE PLACE TABLE 2 ABOUT HERE

Table 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.

PLEASE PLACE TABLE 3 AND 4 ABOUT HERE

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. Exposure to traumatic events was not significantly associated with higher level of psychological distress, after the number of need was controlled for. 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. Mental functioning

amongst men was associated with rural residency and 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. Exposure to traumatic events was not significantly associated with higher level of psychological distress, after the number of needs was controlled for. 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 chance 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 male and female. The 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 [26,27,28]. 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 six-year absence of large-scale war-related atrocities and post-war reconstruction aid flow [29]. 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.[9]. Direct comparison of level of needs amongst these contexts is however difficult due to variation in the socio-economic 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 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 disproportionately compared to men in exposure to risk, response and psychological impact [30,31]. Increased psychological distress has, nonetheless, been partly attributed to the social and household roles occupied by men and women[32]. As such, the genders may be viewed as more similar than different, according to the gender similarities hypothesis[33]. More investigation is needed to examine male and female social and household roles and impact of these on the level

of perceived needs and health outcomes. 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, 9,34]. The reduced impact of traumatic events with negative health outcomes is an added support for the negative impact 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 [35,36]; rural residency remained a significant predictor of psychological distress/lower level of mental functioning (MCS) when 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 to estimate. These limitations influence the generalizability 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[37]. Self-reported measures rely on the participant's memory and are prone to the influence of dominating attitudes towards the themes of the study.

Conclusions

Our findings show a high level of perceived needs among the study population, particularly in rural areas. The results have implications for both 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 toward various needs and mental health. Interventions should focus not just on traumatic events but on everyday needs of the populations.

References

1 de Jong JT, Komproe IH, Van Ommeren M, El Masri M, Araya M, Khaled N, van De Put W, Somasundaram D. Lifetime events and posttraumatic stress disorder in 4 postconflict settings. *JAMA* 2001; 286(5):555-562.

2 Steel Z, Chey T, Silove D, Marnane C, Bryant RA, van Ommeren M. Association of torture and other potentially traumatic events with mental health outcomes among populations exposed to mass conflicts and displacement: a systematic review and meta-analysis. *Journal of the American Medical Association* 2009; 302(5):537-549.

3 Fernando GA, Miller KE, Berger DE. Growing pains: the impact of disaster-related and daily stressors on the psychological and psychosocial functioning of youth in Sri Lanka. *Child Dev* 2010; 81(4):1192–210.

4 Miller KE, Omidian P, Rasmussen A, Yaqubi A, Daudzai H. Daily stressors, war experiences, and mental health in Afghanistan. *Transcultural Psychiatry* 2008; 45(4): 611–638.

5 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(8):1385–1389.

6 Tol WA, Patel V, Tomlinson M, Baingana F, Galappatti A, Panter-Brick C, Silove D, Sondorp E, Wessells M, van Ommeren M. Research priorities for mental health and psychosocial support in humanitarian settings. *PLoS Med* 2011; 8(9):e1001096.

7 Neuner F. Assisting war-torn populations–should we prioritize reducing daily stressors to improve mental health? Comment on Miller and Rasmussen. *Soc Sci Med* 2010; 71(8):1381–4.

8 Thapa SB, Hauff E. Perceived needs, self-reported health and disability among displaced persons during an armed conflict in Nepal. *Soc Psychiatry Psychiatr Epidemiol* 2012; 47(4):589-95.

9 Jordans MJ, Semrau M, Thornicroft G, van Ommeren M. Role of current perceived needs in explaining the association between past trauma exposure and distress in humanitarian settings in Jordan and Nepal. *Br J Psychiatry* 2012; 201:276–81.

10 World Bank: *Key Indicators for Southern Sudan*. Southern Sudan Centre for Census, Statistics and Evaluation; 2008.
http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/SOUTHSUD
ANEXT/0,,contentMDK:22950607~pagePK:141137~piPK:141127~theSitePK:8019852,00.ht ml

11 International Crisis Group: Jonglei's Tribal Conflicts: Countering Insecurity in South Sudan.
[http://www.crisisgroup.org/en/publication-type/media-releases/2009/africa/jongleis- tribal-conflicts-countering-insecurity-in-south-sudan.aspx]

12 Ayazi T, Lien L, Eide AH, Ruom MM, Hauff E. What are the risk factors for the comorbidity of posttraumatic stress disorder and depression in a war-affected population? A cross-sectional community study in South Sudan. *BMC Psychiatry* 2012; 12:175.

13 Roberts B, Damundu EY, Lomoro O, Sondorp E. Post-conflict mental health needs: a cross-sectional survey of trauma, depression and associated factors in Juba, Southern Sudan. *BMC Psychiatry* 2009; 4:7.

14 Ayazi T, Lien L, Eide AH, Jenkins R, Albino RA, Hauff E. Disability associated with exposure to traumatic events: results from a cross-sectional community survey in South Sudan. *BMC Public Health* 2013; May 14;13:469.

15 Ayazi T, Lien L, Eide A, Swartz L, Hauff E. Association between exposure to traumatic events and anxiety disorders in a post-conflict setting: a cross-sectional community study in South Sudan. *BMC Psychiatry* 2014; 10;14(1):6.

16 Ustün B, Kennedy C. What is "functional impairment"? Disentangling disability from clinical significance. *World Psychiatry* 2009; 8(2):82-5.

17 World Health Organization. Department of Gender and Women's Health 20, Avenue Appia Geneva, Switzerland http://www.who.int/gender/other_health/en/genderdisasters.pdf

18 Eklund L, Tellier S. Gender and international crisis response: do we have the data, and does it matter? *Disasters* 2012; 36(4):589-608.

19 South Sudan National Bureau of Statistics: *Sudan Census. Priority Result*; 2008.
http://ssnbs.org/census-2008-priority-results/

20 World Health Organization Department of Immunization Vaccines and Biologicals: *Immunization Coverage Cluster Survey – Reference Manual*. Geneva: World Health Organization. Report No.: WHO/IVB/04.23; 2005.

21 Semrau M, van Ommeren M, Blagescu M, Griekspoor A, Howard LM, Jordans MJD, Lempp H, Anita Marini A, Pedersen J, Pilotte I, Slade M, Thornicroft G. The development and psychometric properties of the Humanitarian Emergency Settings Perceived Needs (HESPER) Scale. *Am J Public Health* 2012; 102 (10): 55-63.

14

22 Goldberg P, Williams P. *A User's Guide to the General Health Questionnaire.* Windsor, UK: NFER-NELSON, 1998.

23 Osman AM, Elkordufani Y, Abdullah MA. The psychological impact of vitiligo in adult Sudanese patients. *African Journal of Psychiatry (Johannesburg)* 2009; 12(4):284–286.

24 Ware J, Jr, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Med Care* 1996; 34(3):220–233.

25 George D, Mallery P. SPSS for Windows Step by Step: A Simple Guide and Reference. 11.0 update (4th ed.). Boston: Allyn & Bacon; 2003.

26 Redmond AD. ABC of conflict and disaster. Needs assessment of humanitarian crises. *BMJ* 2005; 330:1320-1322.

27 Kolbe AR, Hutson RA, Shannon H, Trzcinski E, Miles B, Levitz N, Puccio M, James L, Noel JR, Muggah R. Mortality, crime and access to basic needs before and after the Haiti earthquake: a random survey of Port-au-Prince households. *Medicine, Conflict and Survival* 2010; 26(4): 281–297.

28 Kirsch TD, Wadhwani C, Sauer L, Doocy S, Catlett C. Impact of the 2010 Pakistan floods on rural and urban populations at six months. *PLoS Curr* 4: e4fdfb212d2432

29 Downie R. *The state of public health in South Sudan, critical condition. A report of the CSIS Global Health Policy Center*. 2012. http://csis.org/files/publication/121114_Downie_HealthSudan_Web.pdf

30 Bromet EJ, Havenaar JM, Guey LT. A 25 year retrospective review of the psychological consequences of the Chernobyl accident. *Clin Oncol (R Coll Radiol)* 2011;23: 297–305.

31 Bloem CM, Miller AC. Disasters and women's health: reflections from the 2010 earthquake in Haiti. *Prehosp Disaster Med* 2013; 28(2):150-4.

32 Piccinelli M, Wilkinson G. Gender differences in depression. Critical review. *Br J Psychiatry* 2000; 177:486–492.

33 Hyde, J. S. The gender similarities hypothesis. *American Psychologist*. 2005; 60:581–592.

34 Rasmussen A, Nguyen L, Wilkinson J, Raghavan S, Vundla S, Miller KE. Rates and impact of trauma and current stressors among Darfuri refugees in eastern Chad. *Am J Orthopsychiatry* 2010; 80(2):227–236.

35 The International Fund for Agricultural Development (IFAD): *Rural poverty in South*

15

Sudan. http://www.ruralpovertyportal.org/country/home/tags/south_sudan

36 Alem A, Jacobsson L, Hanlon C. Community-based mental health care in Africa: mental health workers' views. *World Psychiatry* 2008; 7(1): 54–57.

37 Southwick SM, Morgan CA III, Nicolaou AL, Charney DS. Consistency of memory for combat-related traumatic events in veterans of Operation Desert Storm. *American Journal of Psychiatry*, 1997; 154:173–177.

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Tables

Table 1 Characteristics of participants by gender

Variable	N (%)	Male	Female
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 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 (1.31–1.60)	1.47 (1.26–1.67)	1.45 (1.25–1.64)
HESPER total score	12.18 (11.57–12.80)	11.71 (10.77–12.64)	12.60 (11.78–13.43)
Psychological distress (GHQ-12)	51.18 (49.80–52.55)	49.62 (47.61–51.62)	52.54 (50.65–54.41)**
Functional impairment SF-12 (MCS)	49.14 (48.31-49.97)	49.71 (48.42-50.99)	48.63 (47.55-49.72)
Functional impairment SF-12 (PCS)	47.08 (46.25-47.90)	47.38 (46.21-48.55)	46.81 (45.62-47.98)

*χ^2 significant difference. $P < 0.05$

**Significant difference. $P < 0.05$

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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. $P < 0.05$

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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.

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

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.

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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.

Predictor	Psychological distress: (GHQ-28)		Physical functioning (SF-12: PCS)		Mental functioning (SF-12: MCS)	
	B	β (CI 95%)	B	β (CI 95%)	B	β (CI 95%)
Age	0.24	0.08 (0.08–0.40)*	−0.30	−0.38 (−0.40 to−0.21)*	−0.16	−0.21 (−0.26 to −0.70)*
Rural residency	8.44	0.30 (4.43–12.45)*	−0.43	−0.02 (−2.91 −2.10)	−2.75	−0.16 (−5.17 to−0.33)*
Regular income	0.28	0.01 (−3.42–3.98)	1.73	0.09 (−0.60–4.05)	−1.55	−0.09 (−3.81–0.71)
Marital status: Married (reference: single)	2.35	0.06 (−2.63–7.33)	−0.82	0.03 (−3.97–2.34)	1.13	0.05 (−1.95–4.21)
Employment: Student (reference: paid work)	−2.82	−0..05 (−11.14–5.49)	−0.95	−0.02 (−6.22 -4.33)	1.70	0.04 (−3.45–6.83)
Employment: Unemployed (reference: paid work)	5.95	0.13 (−0.36–12.26)	−3.76	−0.13 (−7.69 −0.18)	−0.22	−0.08 (−4.06–3.61)
Level of education: Primary (reference: no formal education)	1.43	0.05 (−2.71 −5.58)	0.84	0.04 (−1.76–3.43)	0.17	0.09 (−2.36–2.71)
Level of education: Secondary or higher (reference: no formal education)	2.10	0.50 (−4.08–8.26)	2.64	0.09 (−1.15–6.44)	0.50	0.02 (−3.21–4.20)
Returnee	3.98	0.12 (−0.34–8.30)	−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 (−1.07–1.48)	−0.25	−0.44 (−1.05 −0.55)	−0.67	−0.12 (−1.45 −0.11)
Level of needs (HESPER score)#	0.89	0.37 (0.54–1.24)*	−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 2 = 0.33
R^2 model 3 = 0.41

R^2 model 1 = 0.28
R^2 model 2 = 0.38
R^2 model 3 = 0.42

R^2 model 1 = 0.39
R^2 model 2 = 0.43
R^2 model 3 = 0.47

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

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Competing interests

The authors declare that they have no competing interests.

Authors' contributions

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

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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 gender.

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 number of traumatic events or the level of perceived needs. 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. No gender differences were found in the level of needs.

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 toward the population's perceived needs and mental health, and in particular those that have been exposed to trauma.

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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 policy makers 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.

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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 needs yet 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 health care needs. Roberts et al.[8] studied the influence of living conditions and traumatic events on general physical and mental health in South Sudan. Aspects of living conditions included in this study was 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 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 criticized for being imprecise as they 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 categorization and assessment of unmet needs/daily stressors/ongoing adversities is the development of Humanitarian Emergency Settings Perceived Needs Scale (HESPER)[10] by the World Health Organization (WHO). Jordans et al.[11] applied HESPER in a study of humanitarian settings in Nepal and Jordan and showed that 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 PTSD symptoms amongst 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

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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 politicized 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].

The present study aimed to investigate various aspects of the perceived needs of the population in war-affected South Sudan. We wished to examine the associations of these 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 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].

We aimed at examining 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 gender.

This study examines:

(a) the current perceived needs of the general adult population,

(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 gender.

Methods
We conducted a cross-sectional community survey (*n* = 464) in the Greater Bahr el Ghazal

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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 in thirty survey clusters (our primary sample units). Highly politically insecure areas were not included in the survey. Eight bomas were randomly selected among the thirty 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 both 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 characterized as areas between urban and rural systems; they include a mixture of both 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 Immunization[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 older and 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 ($n = 6$, three women and three 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 both English and Arabic but the main language used was Arabic. In addition, the key terms of the questionnaire were discussed and translated into the indigenous languages of the area to ensure that the interviewers could easily explain all the items to the participants.

The research instruments were available in both English and Arabic but the main language used was Arabic. In addition to discussing the general feasibility of the instruments, we discussed the key terms of the questionnaire and translated (back and forth) these into the indigenous languages of the area. 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).

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Each household was approached by both 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 maximize 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 socio-demographic factors was administered to all participants.

The participants' perceived needs were assessed using the Humanitarian Emergency Settings Perceived Needs Scale (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 it's 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 in emergency setting 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 well-established need-assessment instrument, the Camberwell Assessment of Need Short Appraisal Schedule (CANSAS), which is developed for other settings, and thus it is anchored in a solid research tradition. HESPER is developed by WHO and thus it is likely to be used widely in emergency settings worldwide and therefore it is important to obtain systematic experience with this newly introduced instruments 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 alpha. 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 alpha values were above the commonly accepted level of 0.70[28].

Data analyses

Data analyses were conducted using SPSS (PASW) version 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, socio-demographic 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 socio-demographic variables and the traumatic exposure.

Results

Table 1 shows the socio-demographic 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 socio-demographic 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.

PLEASE PLACE TABLE 1 ABOUT HERE

Table 2 shows the perceived needs of participants, across gender. The most frequently expressed needs were related to drinking water, alcohol and drug use in the community an access to sanitation facilities and food. Gender differences were observed regarding the rate of perceived needs: 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 (perceived needs). 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 (both men and women) as the most important needs (not displayed in the Tables).

PLEASE PLACE TABLE 2 ABOUT HERE

Table 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.

PLEASE PLACE TABLE 3 AND 4 ABOUT HERE

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. Exposure to traumatic events was not significantly associated with higher level of psychological distress, after the number of need was controlled for. Higher level of needs and higher number of trauma exposures were significantly associated with lower level of physical

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functioning. Rural residency, older age, and being a returnee increased the chance of low physical functioning. Mental functioning amongst men was associated with rural residency and 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. Exposure to traumatic events was not significantly associated with higher level of psychological distress, after the number of needs was controlled for. 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 chance 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 male and female. The 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 [29,30,31]. 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 six-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 amongst these contexts is however difficult due to variation in the socio-economic 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 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 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]. More investigation is needed to examine male and female social and household roles and impact of these on the level of perceived needs and health outcomes. Another explanation for gender similarities in

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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 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 was 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 both general physical and mental health. In addition, some of the living condition variables (lack 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 reduced impact of traumatic events with negative health outcomes is an added support for the negative impact 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 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 to estimate. These limitations influence the generalizability of our findings. The use of an additive scale of traumatic events is a simple way of including an indicator of

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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 socio-cultural setting, no formal socio-cultural 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 both 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 toward various needs and mental health. Interventions should focus not just on traumatic events but on everyday needs of the populations.

References

1 de Jong JT, Komproe IH, Van Ommeren M, El Masri M, Araya M, Khaled N, van De Put W, Somasundaram D. Lifetime events and posttraumatic stress disorder in 4 postconflict settings. *JAMA* 2001; 286(5):555-562.

2 Steel Z, Chey T, Silove D, Marnane C, Bryant RA, van Ommeren M. Association of torture and other potentially traumatic events with mental health outcomes among populations exposed to mass conflicts and displacement: a systematic review and meta-analysis. *Journal of the American Medical Association* 2009; 302(5):537-549.

3 Fernando GA, Miller KE, Berger DE. Growing pains: the impact of disaster-related and daily stressors on the psychological and psychosocial functioning of youth in Sri Lanka. *Child Dev* 2010; 81(4):1192–210.

4 Miller KE, Omidian P, Rasmussen A, Yaqubi A, Daudzai H. Daily stressors, war experiences, and mental health in Afghanistan. *Transcultural Psychiatry* 2008; 45(4): 611–638.

5 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(8):1385–1389.

6 Tol WA, Patel V, Tomlinson M, Baingana F, Galappatti A, Panter-Brick C, Silove D, Sondorp E, Wessells M, van Ommeren M. Research priorities for mental health and psychosocial support in humanitarian settings. *PLoS Med* 2011; 8(9):e1001096.

7 Thapa SB, Hauff E. Perceived needs, self-reported health and disability among displaced persons during an armed conflict in Nepal. *Soc Psychiatry Psychiatr Epidemiol* 2012;47(4):589-95.

8 Roberts B, Damundu EY, Lomoro O, Sondorp E: The influence of demographic characteristics, living conditions, and trauma exposure on the overall health of a conflict-affected population in Southern Sudan. *BMC Public Health* 2010; 10: 518.

9 Neuner F. Assisting war-torn populations–should we prioritize reducing daily stressors to improve mental health? Comment on Miller and Rasmussen. *Soc Sci Med* 2010; 71(8):1381–4.

10 Semrau M, van Ommeren M, Blagescu M, Griekspoor A, Howard LM, Jordans MJD, Lempp H, Anita Marini A, Pedersen J, Pilotte I, Slade M, Thornicroft G. The development and psychometric properties of the Humanitarian Emergency Settings Perceived Needs (HESPER)

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Scale. *Am J Public Health* 2012; 102 (10): 55-63.

11 Jordans MJ, Semrau M, Thornicroft G, van Ommeren M. Role of current perceived needs in explaining the association between past trauma exposure and distress in humanitarian settings in Jordan and Nepal. *Br J Psychiatry* 2012; 201:276–81.

12 Tay AK, Rees S, Chan J, Kareth M, Silove D. Examining the broader psychosocial effects of mass conflict on PTSD symptoms and functional impairment amongst West Papuan refugees resettled in Papua New Guinea. Soc Sci Med. 2015 May;132:70-8.

13 Tay AK, Rees S, Chen J, Kareth M, Silove D.The coherence and correlates of intermittent explosive disorder amongst West Papuan refugees displaced to Papua New Guinea. J Affect Disord. 2015 May 15;177:86-94.

14 World Bank: *Key Indicators for Southern Sudan*. Southern Sudan Centre for Census, Statistics and Evaluation; 2008.
http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/SOUTHSUD
ANEXT/0,,contentMDK:22950607~pagePK:141137~piPK:141127~theSitePK:8019852,00.ht
ml

15 International Crisis Group: Jonglei's Tribal Conflicts: Countering Insecurity in South Sudan.
http://www.crisisgroup.org/en/publication-type/media-releases/2009/africa/jongleis- tribal-
conflicts-countering-insecurity-in-south-sudan.aspx

16 Ayazi T, Lien L, Eide AH, Ruom MM, Hauff E. What are the risk factors for the comorbidity of posttraumatic stress disorder and depression in a war-affected population? A cross-sectional community study in South Sudan. *BMC Psychiatry* 2012; 12:175.

17 Roberts B, Damundu EY, Lomoro O, Sondorp E. Post-conflict mental health needs: a cross-sectional survey of trauma, depression and associated factors in Juba, Southern Sudan. *BMC Psychiatry* 2009; 4:7.

18 Ayazi T, Lien L, Eide AH, Jenkins R, Albino RA, Hauff E. Disability associated with exposure to traumatic events: results from a cross-sectional community survey in South Sudan. *BMC Public Health* 2013; May 14;13:469.

19 Ayazi T, Lien L, Eide A, Swartz L, Hauff E. Association between exposure to traumatic events and anxiety disorders in a post-conflict setting: a cross-sectional community study in South Sudan. *BMC Psychiatry* 2014; 10;14(1):6.

20 Ustün B, Kennedy C. What is "functional impairment"? Disentangling disability from clinical significance. *World Psychiatry* 2009; 8(2):82-5.

15

21 World Health Organization. Department of Gender and Women's Health 20, Avenue Appia Geneva, Switzerland http://www.who.int/gender/other_health/en/genderdisasters.pdf

22 Eklund L, Tellier S. Gender and international crisis response: do we have the data, and does it matter? *Disasters* 2012; 36(4):589-608.

23 South Sudan National Bureau of Statistics: *Sudan Census. Priority Result*; 2008. http://ssnbs.org/census-2008-priority-results/

24 World Health Organization Department of Immunization Vaccines and Biologicals: *Immunization Coverage Cluster Survey – Reference Manual*. Geneva: World Health Organization. Report No.: WHO/IVB/04.23; 2005.

25 Goldberg P, Williams P. *A User's Guide to the General Health Questionnaire*. Windsor, UK: NFER-NELSON, 1998.

26 Osman AM, Elkordufani Y, Abdullah MA. The psychological impact of vitiligo in adult Sudanese patients. *African Journal of Psychiatry (Johannesburg)* 2009; 12(4):284–286.

27 Ware J, Jr, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Med Care* 1996; 34(3):220–233.

28 George D, Mallery P. SPSS for Windows Step by Step: A Simple Guide and Reference. 11.0 update (4th ed.). Boston: Allyn & Bacon; 2003.

29 Redmond AD. ABC of conflict and disaster. Needs assessment of humanitarian crises. *BMJ* 2005; 330:1320-1322.

30 Kolbe AR, Hutson RA, Shannon H, Trzcinski E, Miles B, Levitz N, Puccio M, James L, Noel JR, Muggah R. Mortality, crime and access to basic needs before and after the Haiti earthquake: a random survey of Port-au-Prince households. *Medicine, Conflict and Survival* 2010; 26(4): 281–297.

31 Kirsch TD, Wadhwani C, Sauer L, Doocy S, Catlett C. Impact of the 2010 Pakistan floods on rural and urban populations at six months. *PLoS Curr* 4: e4fdfb212d2432

32 Downie R. *The state of public health in South Sudan, critical condition. A report of the CSIS Global Health Policy Center*. 2012. http://csis.org/files/publication/121114_Downie_HealthSudan_Web.pdf

33 Bromet EJ, Havenaar JM, Guey LT. A 25 year retrospective review of the psychological consequences of the Chernobyl accident. *Clin Oncol (R Coll Radiol)* 2011;23: 297–305.

34 Bloem CM, Miller AC. Disasters and women's health: reflections from the 2010 earthquake in Haiti. *Prehosp Disaster Med* 2013; 28(2):150-4.

35 Piccinelli M, Wilkinson G. Gender differences in depression. Critical review. *Br J Psychiatry* 2000; 177:486–492.

36 Hyde, J. S. The gender similarities hypothesis. *American Psychologist*. 2005; 60:581–592.

37 Rasmussen A, Nguyen L, Wilkinson J, Raghavan S, Vundla S, Miller KE. Rates and impact of trauma and current stressors among Darfuri refugees in eastern Chad. *Am J Orthopsychiatry* 2010; 80(2):227–236.

38 The International Fund for Agricultural Development (IFAD): *Rural poverty in South Sudan.* http://www.ruralpovertyportal.org/country/home/tags/south_sudan

39 Alem A, Jacobsson L, Hanlon C. Community-based mental health care in Africa: mental health workers' views. *World Psychiatry* 2008; 7(1): 54–57.

40 Southwick SM, Morgan CA III, Nicolaou AL, Charney DS. Consistency of memory for combat-related traumatic events in veterans of Operation Desert Storm. *American Journal of Psychiatry,* 1997; 154:173–177.

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Tables

Table 1 Characteristics of participants by gender

Variable	N (%)	Male	Female
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 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 (1.31–1.60)	1.47 (1.26–1.67)	1.45 (1.25–1.64)
HESPER total score	12.18 (11.57–12.80)	11.71 (10.77–12.64)	12.60 (11.78–13.43)
Psychological distress (GHQ-12)	51.18 (49.80–52.55)	49.62 (47.61–51.62)	52.54 (50.65–54.41)**
Functional impairment SF-12 (MCS)	49.14 (48.31-49.97)	49.71 (48.42-50.99)	48.63 (47.55-49.72)
Functional impairment SF-12 (PCS)	47.08 (46.25-47.90)	47.38 (46.21-48.55)	46.81 (45.62-47.98)

* χ^2 significant difference. $P < 0.05$

** Significant difference. $P < 0.05$

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. $P < 0.05$

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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.

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

\# 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.

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.

Predictor	Psychological distress: (GHQ-28)		Physical functioning (SF-12: PCS)		Mental functioning (SF-12: MCS)	
	B	*β* (CI 95%)	*B*	*β* (CI 95%)	*B*	*β* (CI 95%)
Age	0.24	0.08 (0.08–0.40)*	−0.30	−0.38 (−0.40 to−0.21)*	−0.16	−0.21 (−0.26 to −0.70)*
Rural residency	8.44	0.30 (4.43–12.45)*	−0.43	−0.02 (−2.91 −2.10)	−2.75	−0.16 (−5.17 to−0.33)*
Regular income	0.28	0.01 (−3.42–3.98)	1.73	0.09 (−0.60–4.05)	−1.55	−0.09 (−3.81–0.71)
Marital status: Married (reference: single)	2.35	0.06 (−2.63–7.33)	−0.82	0.03 (−3.97–2.34)	1.13	0.05 (−1.95–4.21)
Employment: Student (reference: paid work)	−2.82	−0..05 (−11.14–5.49)	−0.95	−0.02 (−6.22 -4.33)	1.70	0.04 (−3.45–6.83)
Employment: Unemployed (reference: paid work)	5.95	0.13 (−0.36–12.26)	−3.76	−0.13 (−7.69 −0.18)	−0.22	−0.08 (−4.06–3.61)
Level of education: Primary (reference: no formal education)	1.43	0.05 (−2.71 −5.58)	0.84	0.04 (−1.76–3.43)	0.17	0.09 (−2.36–2.71)
Level of education: Secondary or higher (reference: no formal education)	2.10	0.50 (−4.08–8.26)	2.64	0.09 (−1.15–6.44)	0.50	0.02 (−3.21–4.20)
Returnee	3.98	0.12 (−0.34–8.30)	−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 (−1.07–1.48)	−0.25	−0.44 (−1.05 −0.55)	−0.67	−0.12 (−1.45 −0.11)
Level of needs (HESPER score)#	0.89	0.37 (0.54–1.24)*	−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

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

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Competing interests

The authors declare that they have no competing interests.

Authors' contributions

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

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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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2

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 gender.

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 toward the population's perceived needs and mental health, and in particular those that have been exposed to trauma.

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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 policy makers 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.

4

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 needs yet 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 health care 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 criticized for being imprecise as they 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 categorization and assessment of unmet needs/daily stressors/ongoing adversities is the development of Humanitarian Emergency Settings Perceived Needs Scale (HESPER)[10] by the World Health Organization (WHO). Jordans et al.[11] applied HESPER in a study of humanitarian settings in Nepal and Jordan and showed that 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 PTSD symptoms amongst 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 politicized 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 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 gender.

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 in thirty survey clusters (our primary sample units). Highly politically insecure areas were not included in the survey. Eight bomas were randomly selected among the thirty 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 both 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

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probability of selection.

The politically insecure areas were not included in the survey. The urban areas in the context of this study can be characterized as areas between urban and rural systems; they include a mixture of both 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 Immunization[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 older and 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 ($n = 6$, three women and three 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 both 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 both 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 maximize 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 socio-demographic factors was

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administered to all participants.

The participants' perceived needs were assessed using the Humanitarian Emergency Settings Perceived Needs Scale (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 it's 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 in emergency setting 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 well-established need-assessment instrument, the Camberwell Assessment of Need Short Appraisal Schedule (CANSAS), which is developed for other settings, and thus it is anchored in a solid research tradition. HESPER is developed by WHO and thus it is likely to be used widely in emergency settings worldwide and therefore it is important to obtain systematic experience with this newly introduced instruments 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

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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 alpha. 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 alpha values were above the commonly accepted level of 0.70[28].

Data analyses

Data analyses were conducted using SPSS (PASW) version 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, socio-demographic 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 socio-demographic variables and the traumatic exposure.

Results

Table 1 shows the socio-demographic 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 socio-demographic 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.

PLEASE PLACE TABLE 1 ABOUT HERE

Table 2 shows the perceived needs of participants, across gender. The most frequently

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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 (both men and women) as the most important needs (not displayed in the tables).

PLEASE PLACE TABLE 2 ABOUT HERE

Table 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.

PLEASE PLACE TABLE 3 AND 4 ABOUT HERE

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. Exposure to traumatic events was not significantly associated with higher level of psychological distress, after the number of need was controlled for. 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 amongst 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. Exposure to traumatic events was not significantly associated with higher level of psychological distress, after the number of needs was controlled for. 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. The 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

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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 prioritizing of needs in this conflict-affected community are remarkably similar to other populations' needs immediately after natural disasters [29,30,31]. 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 six-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 amongst these contexts is however difficult due to variation in the socio-economic 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 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 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 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 was 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 both general physical and mental health. In addition, some of the living condition variables (lack 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.

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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 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 to estimate. These limitations influence the generalizability 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 socio-cultural setting, no formal socio-cultural 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

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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 both 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 toward various needs and mental health. Interventions should focus not just on traumatic events but on everyday needs of the populations.

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References

1 de Jong JT, Komproe IH, Van Ommeren M, El Masri M, Araya M, Khaled N, van De Put W, Somasundaram D. Lifetime events and posttraumatic stress disorder in 4 postconflict settings. *JAMA* 2001; 286(5):555-562.

2 Steel Z, Chey T, Silove D, Marnane C, Bryant RA, van Ommeren M. Association of torture and other potentially traumatic events with mental health outcomes among populations exposed to mass conflicts and displacement: a systematic review and meta-analysis. *Journal of the American Medical Association* 2009; 302(5):537-549.

3 Fernando GA, Miller KE, Berger DE. Growing pains: the impact of disaster-related and daily stressors on the psychological and psychosocial functioning of youth in Sri Lanka. *Child Dev* 2010; 81(4):1192–210.

4 Miller KE, Omidian P, Rasmussen A, Yaqubi A, Daudzai H. Daily stressors, war experiences, and mental health in Afghanistan. *Transcultural Psychiatry* 2008; 45(4): 611–638.

5 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(8):1385–1389.

6 Tol WA, Patel V, Tomlinson M, Baingana F, Galappatti A, Panter-Brick C, Silove D, Sondorp E, Wessells M, van Ommeren M. Research priorities for mental health and psychosocial support in humanitarian settings. *PLoS Med* 2011; 8(9):e1001096.

7 Thapa SB, Hauff E. Perceived needs, self-reported health and disability among displaced persons during an armed conflict in Nepal. *Soc Psychiatry Psychiatr Epidemiol* 2012;47(4):589-95.

8 Roberts B, Damundu EY, Lomoro O, Sondorp E: The influence of demographic characteristics, living conditions, and trauma exposure on the overall health of a conflict-affected population in Southern Sudan. *BMC Public Health* 2010; 10: 518.

9 Neuner F. Assisting war-torn populations–should we prioritize reducing daily stressors to improve mental health? Comment on Miller and Rasmussen. *Soc Sci Med* 2010; 71(8):1381–4.

10 Semrau M, van Ommeren M, Blagescu M, Griekspoor A, Howard LM, Jordans MJD, Lempp H, Anita Marini A, Pedersen J, Pilotte I, Slade M, Thornicroft G. The development and psychometric properties of the Humanitarian Emergency Settings Perceived Needs (HESPER)

14

Scale. *Am J Public Health* 2012; 102 (10): 55-63.

11 Jordans MJ, Semrau M, Thornicroft G, van Ommeren M. Role of current perceived needs in explaining the association between past trauma exposure and distress in humanitarian settings in Jordan and Nepal. *Br J Psychiatry* 2012; 201:276–81.

12 Tay AK, Rees S, Chan J, Kareth M, Silove D. Examining the broader psychosocial effects of mass conflict on PTSD symptoms and functional impairment amongst West Papuan refugees resettled in Papua New Guinea. Soc Sci Med. 2015 May;132:70-8.

13 Tay AK, Rees S, Chen J, Kareth M, Silove D.The coherence and correlates of intermittent explosive disorder amongst West Papuan refugees displaced to Papua New Guinea. J Affect Disord. 2015 May 15;177:86-94.

14 World Bank: *Key Indicators for Southern Sudan*. Southern Sudan Centre for Census, Statistics and Evaluation; 2008.
http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/SOUTHSUD
ANEXT/0,,contentMDK:22950607~pagePK:141137~piPK:141127~theSitePK:8019852,00.ht
ml

15 International Crisis Group: Jonglei's Tribal Conflicts: Countering Insecurity in South Sudan.
http://www.crisisgroup.org/en/publication-type/media-releases/2009/africa/jongleis- tribal-
conflicts-countering-insecurity-in-south-sudan.aspx

16 Ayazi T, Lien L, Eide AH, Ruom MM, Hauff E. What are the risk factors for the comorbidity of posttraumatic stress disorder and depression in a war-affected population? A cross-sectional community study in South Sudan. *BMC Psychiatry* 2012; 12:175.

17 Roberts B, Damundu EY, Lomoro O, Sondorp E. Post-conflict mental health needs: a cross-sectional survey of trauma, depression and associated factors in Juba, Southern Sudan. *BMC Psychiatry* 2009; 4:7.

18 Ayazi T, Lien L, Eide AH, Jenkins R, Albino RA, Hauff E. Disability associated with exposure to traumatic events: results from a cross-sectional community survey in South Sudan. *BMC Public Health* 2013; May 14;13:469.

19 Ayazi T, Lien L, Eide A, Swartz L, Hauff E. Association between exposure to traumatic events and anxiety disorders in a post-conflict setting: a cross-sectional community study in South Sudan. *BMC Psychiatry* 2014; 10;14(1):6.

20 Ustün B, Kennedy C. What is "functional impairment"? Disentangling disability from clinical significance. *World Psychiatry* 2009; 8(2):82-5.

15

21 World Health Organization. Department of Gender and Women's Health 20, Avenue Appia Geneva, Switzerland http://www.who.int/gender/other_health/en/genderdisasters.pdf

22 Eklund L, Tellier S. Gender and international crisis response: do we have the data, and does it matter? *Disasters* 2012; 36(4):589-608.

23 South Sudan National Bureau of Statistics: *Sudan Census. Priority Result*; 2008. http://ssnbs.org/census-2008-priority-results/

24 World Health Organization Department of Immunization Vaccines and Biologicals: *Immunization Coverage Cluster Survey – Reference Manual*. Geneva: World Health Organization. Report No.: WHO/IVB/04.23; 2005.

25 Goldberg P, Williams P. *A User's Guide to the General Health Questionnaire*. Windsor, UK: NFER-NELSON, 1998.

26 Osman AM, Elkordufani Y, Abdullah MA. The psychological impact of vitiligo in adult Sudanese patients. *African Journal of Psychiatry (Johannesburg)* 2009; 12(4):284–286.

27 Ware J, Jr, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Med Care* 1996; 34(3):220–233.

28 George D, Mallery P. SPSS for Windows Step by Step: A Simple Guide and Reference. 11.0 update (4th ed.). Boston: Allyn & Bacon; 2003.

29 Redmond AD. ABC of conflict and disaster. Needs assessment of humanitarian crises. *BMJ* 2005; 330:1320-1322.

30 Kolbe AR, Hutson RA, Shannon H, Trzcinski E, Miles B, Levitz N, Puccio M, James L, Noel JR, Muggah R. Mortality, crime and access to basic needs before and after the Haiti earthquake: a random survey of Port-au-Prince households. *Medicine, Conflict and Survival* 2010; 26(4): 281–297.

31 Kirsch TD, Wadhwani C, Sauer L, Doocy S, Catlett C. Impact of the 2010 Pakistan floods on rural and urban populations at six months. *PLoS Curr* 4: e4fdfb212d2432

32 Downie R. *The state of public health in South Sudan, critical condition. A report of the CSIS Global Health Policy Center*. 2012. http://csis.org/files/publication/121114_Downie_HealthSudan_Web.pdf

33 Bromet EJ, Havenaar JM, Guey LT. A 25 year retrospective review of the psychological consequences of the Chernobyl accident. *Clin Oncol (R Coll Radiol)* 2011;23: 297–305.

16

34 Bloem CM, Miller AC. Disasters and women's health: reflections from the 2010 earthquake in Haiti. *Prehosp Disaster Med* 2013; 28(2):150-4.

35 Piccinelli M, Wilkinson G. Gender differences in depression. Critical review. *Br J Psychiatry* 2000; 177:486–492.

36 Hyde, J. S. The gender similarities hypothesis. *American Psychologist*. 2005; 60:581–592.

37 Rasmussen A, Nguyen L, Wilkinson J, Raghavan S, Vundla S, Miller KE. Rates and impact of trauma and current stressors among Darfuri refugees in eastern Chad. *Am J Orthopsychiatry* 2010; 80(2):227–236.

38 The International Fund for Agricultural Development (IFAD): *Rural poverty in South Sudan*. http://www.ruralpovertyportal.org/country/home/tags/south_sudan

39 Alem A, Jacobsson L, Hanlon C. Community-based mental health care in Africa: mental health workers' views. *World Psychiatry* 2008; 7(1): 54–57.

40 Southwick SM, Morgan CA III, Nicolaou AL, Charney DS. Consistency of memory for combat-related traumatic events in veterans of Operation Desert Storm. *American Journal of Psychiatry*, 1997; 154:173–177.

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Tables

Table 1 Characteristics of participants by gender

Variable	N (%)	Male	Female
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 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 (1.31–1.60)	1.47 (1.26–1.67)	1.45 (1.25–1.64)
HESPER total score	12.18 (11.57–12.80)	11.71 (10.77–12.64)	12.60 (11.78–13.43)
Psychological distress (GHQ-12)	51.18 (49.80–52.55)	49.62 (47.61–51.62)	52.54 (50.65–54.41)**
Functional impairment SF-12 (MCS)	49.14 (48.31-49.97)	49.71 (48.42-50.99)	48.63 (47.55-49.72)
Functional impairment SF-12 (PCS)	47.08 (46.25-47.90)	47.38 (46.21-48.55)	46.81 (45.62-47.98)

*χ^2 significant difference. $P < 0.05$

** Significant difference. $P < 0.05$

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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. $P < 0.05$

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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.

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

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.

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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.

Predictor	Psychological distress: (GHQ-28)		Physical functioning (SF-12: PCS)		Mental functioning (SF-12: MCS)	
	B	β (CI 95%)	B	β (CI 95%)	B	β (CI 95%)
Age	0.24	0.08 (0.08–0.40)*	−0.30	−0.38 (−0.40 to−0.21)*	−0.16	−0.21 (−0.26 to −0.70)*
Rural residency	8.44	0.30 (4.43–12.45)*	−0.43	−0.02 (−2.91 −2.10)	−2.75	−0.16 (−5.17 to−0.33)*
Regular income	0.28	0.01 (−3.42–3.98)	1.73	0.09 (−0.60–4.05)	−1.55	−0.09 (−3.81–0.71)
Marital status: Married (reference: single)	2.35	0.06 (−2.63–7.33)	−0.82	0.03 (−3.97–2.34)	1.13	0.05 (−1.95–4.21)
Employment: Student (reference: paid work)	−2.82	−0..05 (−11.14–5.49)	−0.95	−0.02 (−6.22 -4.33)	1.70	0.04 (−3.45–6.83)
Employment: Unemployed (reference: paid work)	5.95	0.13 (−0.36–12.26)	−3.76	−0.13 (−7.69 −0.18)	−0.22	−0.08 (−4.06–3.61)
Level of education: Primary (reference: no formal education)	1.43	0.05 (−2.71 −5.58)	0.84	0.04 (−1.76–3.43)	0.17	0.09 (−2.36–2.71)
Level of education: Secondary or higher (reference: no formal education)	2.10	0.50 (−4.08–8.26)	2.64	0.09 (−1.15–6.44)	0.50	0.02 (−3.21–4.20)
Returnee	3.98	0.12 (−0.34–8.30)	−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 (−1.07–1.48)	−0.25	−0.44 (−1.05 −0.55)	−0.67	−0.12 (−1.45 −0.11)
Level of needs (HESPER score)#	0.89	0.37 (0.54–1.24)*	−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

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

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

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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