

Self-reported diseases and their associated risk factors among camp-dwelling conflict-affected internally displaced populations in Nigeria

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ABSTRACT

Background Conflict in Nigeria displaced millions of people, and some settled in camp-like locations within the country. Evidence on the association between living conditions and health outcomes among these populations are limited. This study investigated the risk factors associated with illnesses among camp-dwelling internally displaced persons (IDPs) in northern Nigeria.

Methods A cross-sectional study was conducted in nine camps in 2016. Self-reported data on socio-demography, resource utilization and disease outcomes were collected. Association between health conditions and various factors, including sanitation and healthcare access, was investigated.

Results Data from 2253 IDPs showed 81.1% (CI = 79.5–82.7) experienced one or more health conditions; however, over 20% did not access healthcare services. Most common diseases were malaria, fever, typhoid and diarrhoea. Multivariable logistic regression presented as adjusted odds ratios (aOR) and 95% confidence intervals (CIs) showed factors significantly associated with increased likelihood of illnesses included being female (aOR = 1.53; CI = 1.19–1.96), overcrowding (aOR = 1.07; CI = 1.00–1.36), long-term conditions (aOR = 2.72; CI = 1.88–3.94), outdoor defecation (aOR = 2.37; CI = 1.14–4.94) and presence of disease-causing vectors (aOR = 3.71; CI = 1.60–8.60).

Conclusion Most diseases in the camps were communicable. Modifiable risk factors such as overcrowding and poor toilet facilities were associated with increased poor health outcomes. This evidence highlights areas of high priority when planning humanitarian public health interventions.

Keywords morbidity and mortality, public health, refugees

Introduction

An increase in conflict-related human displacement has prompted the need to consider conflict as a determinant of health.^{1,2} Over 40 million people have been internally displaced by conflict and violence globally, including approximately 2 million from the Boko Haram crisis in northern Nigeria.^{3,4} Most displaced populations remain within the affected countries as internally displaced persons (IDPs) or migrate to other countries as refugees and asylum seekers.⁵ Although IDPs reside within the same country, they often have less access to basic services compared to refugees.^{6,7}

For displaced populations to have better chances of receiving humanitarian aid, most live in camp-like settings, where they can be identified and supported, as opposed to living

within hosting communities where they can be hidden and their needs unknown.⁸ Nevertheless, residing in camps does not necessarily guarantee sufficient support.⁹ To improve overall health and wellbeing, as well as to attain the global 2030 Sustainable Development Goals (SDGs), all displaced

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populations need to be taken into consideration when planning global and national healthcare strategies.^{10,11} Achieving this requires an understanding of the factors that influence health and wellbeing in displacement settings and integrating these into local healthcare management.^{12,13}

Populations in camp settlements frequently live in overcrowded accommodations which are often unhygienic and lack privacy and access to food and essential healthcare.^{14,15} Consequently, the occurrence of infectious disease outbreaks and other non-communicable health conditions increase due to such poor living conditions.^{16–18} Combined effects of these factors significantly increase the risk of diseases and mortality rates, and this is often higher in less-developed countries like those in Sub-Saharan Africa.^{14,19,20}

Conflict crisis in Nigeria

The Boko Haram armed conflict in northern Nigeria, which started in 2009 and reached a peak in 2015–2016, displaced over 2 million people from the country's total population of approximately 180 million.^{4,21,22} The conflict significantly impacted the health system in the region which prior to the crisis had some of the worst health indices.²³ For instance in 2016 about 450 health facilities were damaged, and only 46% of facilities in the most affected state, Borno, was functional.²⁴ The crisis has directly impacted about 26 million people²⁴, and, as of December 2019, 7.9 million are still in need of humanitarian aid.²⁵

At the peak of the crisis in February 2016, about 53% of the IDPs were female and 47% male; and among this, 55% were children, and 26% were 5 years or younger.⁴ Approximately 8% of the IDPs settled in camp-like settings, most of which were not officially recognized, while 92% lived within host communities.^{4,26}

Generally, displacement settlements differ in form as camps, planned formal settlements, informal settlements and self-settlement sites; however, distinctions between these are not always clear.^{27,28} In Nigeria, most IDP camps had no official approval from local or national authorities, and such locations were considered 'self-settled' camps. Camp settings, especially informal ones, are associated with increased disease susceptibility due to suboptimal living conditions, poor nutrition, scarcity of safe water and inaccessibility of healthcare.^{12,29–31} Evidence of these gaps has previously been presented in the related audit assessment conducted in the IDP locations visited for this study.³² The audit outlined details of the selected camps and an overview of assessable resource comparison to international standards.

In Nigeria, the combined effects of lack of resources and poor living conditions significantly increased mortality rates.³³

Understanding the disease burden among IDPs and their risk factors is essential for identifying priority areas for immediate action when planning humanitarian support. Despite the human rights and public health challenges arising from the crisis in Nigeria, including food insecurity and strained basic health resources,^{24,34,35} very few studies have assessed the relationship between risk factors and poor health outcomes among IDPs in camps.^{34,36–40} This research aimed to investigate the illnesses experienced by camp-dwelling IDPs and their associated risk factors. The study is part of a doctoral thesis assessing the availability of essential health services in IDP camps in Northern Nigeria.

Methods

Study setting and sampling

A face-to-face cross-sectional survey was conducted between September and October 2016 in 7 of the 13 states where IDPs from the Boko Haram conflict had settled in camp-like sites as at December 2015.²⁶ The study design was selected based on feasibility and suitability for a rapid assessment.

A three-stage cluster sampling technique was used for selection of states, camps and households. According to the International Organization on Migration, there were 78 camp-like sites across the 3 northern regions hosting the IDPs. The states selected had the highest numbers of IDPs and accounted for 86% of all camp-dwelling IDPs.²⁶

Fourteen camps within the seven states, two camps per state, were original sampled based on population size and security clearance. Nine locations were visited: North-East region [Borno state (Bakassi camp) and Taraba state (Mullum and Gullum camps)]; North-Central region [Nasarawa state (Guruku camp), Plateau state (Stefanos Foundation camp), and the Federal Capital Territory (Durumi and Kuchingoro camps)]; and North-West region [Kaduna state (Kyauta camp) and Kano state (Gaida camp)]. While five camps were later excluded due to rising security concerns at the time of data collection.

Using a probability proportional to size sampling method, the estimated sample size required was 1594, based on an assumption of a 2.5% margin for error and a 95% confidence interval. However, the study adjusted for nonresponse, incomplete and missing data and therefore included a 10% sample contingency for each selected state. At the household level, stratified random sampling was used to select individual participants. For this research, households represented everyone living under the same residential unit. The first household visited was identified randomly using spinning a pen method, and after that subsequent odd-numbered households were

selected. Five people were sampled per household, one from each of the following age groups: children under 5, children 5–17, one adult male and female between 18 and 69 and an elderly person 70 and above. All IDP camp residents were considered for inclusion, but children under 18 years of age were interviewed with an adult present or responding on their behalf.

Data collection

The survey questionnaire was adapted from the *Médecins Sans Frontières* Refugee Health guidelines⁴¹ and Oxfam Guidelines for Public Health Promotion in Emergency.⁴² This included questions on socio-demography, living conditions, personal health experiences and healthcare services. The questionnaires were written in English but administered face-to-face by trained field data collectors fluent in the most common languages of the region: Hausa and Fulani. The questionnaire was pretested in a different IDP camp, and modifications made to emphasize the data required were for the ‘current camp’ only. Information collected was based on IDP self-reports, and health conditions were based on either clinical diagnosis or related symptoms experienced. Medical records of the diagnosis were not available for verification.

Data analysis

The primary outcome of interest was personal experiences of illnesses (sickness) while residing in the current camp. Distinctions were made between the ‘current camp’ (i.e. camp where the survey took place) and ‘previous camp’ (i.e. last camp location before arrival on the current camp). Sickness in the context of this question was a self-report of conditions that were initiated while an individual was in the camp, e.g. malaria and cough, and defined as ‘acute conditions’. Prolonged health issues experienced before arrival to the camp or developed while living in the current camp (e.g. high blood pressure and diabetes) were considered long-term health conditions and captured as ‘persisting conditions’. Multiple responses provided for both acute and persisting conditions were split into the appropriate category. A secondary outcome assessed was the utilization of healthcare services for managing the reported condition, and this was captured as medical attention received.

Risk factors (exposure variables) for illnesses were selected based on the four Sphere minimum standard sectors:⁴³ WASH (water, sanitation and hygiene), shelter, food and healthcare. Factors assessed were environmental predictors (shelter type, household size, drinking water source, toilet type, distance between toilets used and drinking water sources and problems with rodents or disease-causing

vectors), health behaviours (water storage method and handwashing practice) and daily feeding frequency. Potential confounders considered were camp location, age, gender, religion, vaccination status, education, long-term conditions and duration of stay at the camp.

Descriptive analyses were performed to explore distribution of the results and were expressed as percentages with 95% confidence intervals (CIs). Missing data and responses of ‘do not know’ or ‘not applicable’ were included in the analyses and presented in the tables. Logistic regression analysis was conducted to investigate possible relationships between the risk factors and primary health outcome. All variables were included in a multivariable logistic regression model, and a stepwise backward selection approach was used to determine the final model, which retained only statistically significant variables ($P < 0.05$). All analysis was undertaken using Stata 15 statistical software.

Ethics

Research clearance was gotten from the Nigerian National Health Research and the University of Nottingham Medical School Research Ethics Committees. Permits to access the camps were obtained from the Nigerian National Emergency Maintenance Agency, and individual consents were received from all participants.

Results

Participant characteristics

A total of 2253 IDPs were included in the study, and gender representation was similar (male 49.2%, female 50.6%) (Table 1). From the sample, 93.8% had little or no formal basic education up to primary school level, 27.6% had lived in previous IDP displacement locations before the current survey sites, and average duration of stay on the camps was 2 years (52.2%).

Health outcomes and healthcare utilization

Almost one-third of households (28.9%) reported at least one death during their stay in the current camp (Table 2). The most frequently reported cause of death was illnesses (87.2%) and mostly among children <5 years (56.2%).

In response to the primary outcome, over 80% of IDPs reported experiencing acute health conditions while residing in the current camp. The most common complaints were malaria (69.7%) and fever (28.3%). Other communicable diseases experienced included typhoid (9.8%) and diarrhoea (6.5%), while 3.9% had experienced coughs. Other less reported acute conditions were pneumonia, heartburn

Table 1 Sociodemographic characteristics of IDP survey participants

Sociodemographic characteristics (n = 2253)		n	% (95% CI)
Gender	Male	1112	49.4 (47.3–51.4)
	Female	1141	50.6 (48.6–52.7)
Age	<5 years	381	16.9 (15.4–18.5)
	5–17 years	679	30.1 (28.3–32.1)
	18–69 years	1173	52.1 (50.0–54.1)
	>70 years	20	0.9 (0.6–1.4)
Education	None	954	42.3 (40.3–44.4)
	Basic	1161	51.5 (49.5–53.6)
	Secondary and above	136	6.0 (5.1–7.1)
	Missing	2	0.1 (0.0–0.3)
Previously stayed in an IDP camp	Yes	622	27.6 (25.8–29.5)
	No	1438	63.8 (61.8–65.8)
	Missing	193	8.6 (7.5–9.8)
Length of stay in current IDP camp	<1 year	238	10.6 (9.3–11.9)
	1 year	286	12.7 (11.4–14.1)
	2 years	1176	52.2 (50.1–54.3)
	3 years	401	17.8 (16.3–19.4)
	4 years	34	1.5 (1.1–2.1)
	5 years and above	11	0.5 (0.3–0.9)
	Do not know	106	4.7 (3.9–5.7)
	Missing	1	0.0 (0.0–0.3)

and skin infections. Overall, 18.8% reported experiencing more than one of these acute conditions. Persisting health problems were reported by 20.3%, and this included stomach ulcers (37.9%) and headaches (9.8%). Other notable non-communicable conditions mentioned were high blood pressure (hypertension), diabetes, haemorrhoids and hernia. Approximately 12.3% of IDPs with persisting health challenges had two or more of these conditions.

Healthcare services were not accessed by all IDPs who experienced illnesses. Among those with acute diseases, 77.6% sought medical care, and the proportion was lesser among those with persisting conditions at 65.6%.

Risk factors for poor health outcomes

After adjustment in the final regression model, 11 factors were identified to be significantly associated with an increased risk of illnesses (Table 3). These risk factors were gender (being female), age groups under 5 and between 18 and 69 years old, having a persistent health condition, household size, drinking water sourced from street vendors, use of mobile and outdoor toilets, toilets at a very close or long distance to households and rodent problems. Duration in camp showed borderline significance ($P = 0.051$).

The results indicated the likelihood of developing illnesses was influenced by the age of the IDPs, mostly among those under 5 and between 18 and 69 years old (aOR = 0.001) which represented most of the population. It also revealed this risk was 53% more likely for females compared to males (aOR = 1.53, $P = 0.001$) and 7% higher for those living in overcrowded households (aOR = 1.07, $P = 0.001$). Falling ill was nearly three times more likely if the IDPs had a long-term condition (aOR = 2.72, $P = 0.0001$) or used outdoor toilets (aOR = 2.32, $P = 0.02$). Also, experiencing poorer health outcomes was nearly four times likely if the IDPs had rodent problems in the household (aOR = 3.71, $P = 0.001$). Although staying longer in the camp did not show a statistically significant association, it still increased the chances of illness by 16% (aOR = 1.16, $P = 0.051$).

Discussion

Main findings of this study

Observations from this study suggested that health challenges faced by the IDPs were mainly environment-related. Low healthcare service utilization implied increased susceptibility to poorer health outcomes, especially from communicable diseases. As such, several factors were positively associated

Table 2 Health outcomes and healthcare among IDPs

<i>Health outcomes</i>		<i>n</i>	<i>% (95% CI)</i>	
Experienced death in households (<i>n</i> = 781 households)	Yes	226	28.9 (25.8–32.3)	
	No	555	71.1 (67.7–74.2)	
Reported household deaths by age group (<i>n</i> = 226 households)	Children	127	56.2 (49.5–62.8)	
	Adults	88	38.9 (32.5–45.6)	
Causes of deaths (<i>n</i> = 226 households)	Accident	30	13.3 (9.1–18.4)	
	At birth	7	3.1 (1.3–6.3)	
	Injury	2	0.9 (0.1–3.2)	
	Nutrition deficiency	1	0.4 (0.0–2.4)	
	Premature birth	4	1.8 (0.5–4.5)	
	Sickness	197	87.2 (82.1–91.2)	
	Old age	1	0.4 (0.0–2.4)	
	Unknown	4	1.8 (0.5–4.5)	
	Missing	17	7.5 (4.4–11.8)	
	Illness on current camp (<i>n</i> = 2253)	Yes	1828	81.1 (79.5–82.7)
		No	417	18.5 (16.9–20.2)
Missing		8	0.4 (0.2–0.7)	
Types of acute conditions (<i>n</i> = 1828)	Malaria	1274	69.7 (67.5–71.8)	
	Fever	517	28.3 (26.2–30.4)	
	Cough	71	3.9 (3.0–4.9)	
	Typhoid	180	9.8 (8.5–11.3)	
	Watery stool	118	6.5 (5.3–7.7)	
	Others	104	5.7 (4.7–6.9)	
	Multiple	424	23.2 (21.3–25.2)	
	Missing	8	0.4 (0.2–0.7)	
Persisting conditions (<i>n</i> = 2253)	Yes	457	20.3 (18.6–22.0)	
	No	1654	73.4 (71.5–75.2)	
	Do not know	21	0.9 (0.6–1.4)	
	Missing	121	5.4 (4.5–6.4)	
Types of persisting conditions (<i>n</i> = 457)	High blood pressure	90	19.7 (16.1–23.6)	
	Stomach ulcer	173	37.9 (33.4–42.5)	
	Headaches	45	9.8 (7.3–13.0)	
	Back pain	16	3.5 (2.0–5.6)	
	Haemorrhoids	13	2.8 (1.5–4.8)	
	Hepatitis	22	4.8 (3.0–7.2)	
	Diabetes	10	2.2 (1.1–4.0)	
	Hernia	12	2.6 (1.4–4.5)	
	Others	75	16.6 (13.1–20.1)	
	Multiple	56	12.3 (9.4–15.6)	
	Acute conditions for which medical attention was received (<i>n</i> = 1828)	Yes	1418	77.6 (75.6–79.4)
No		397	21.7 (19.9–23.7)	
Missing		13	0.7 (0.4–1.2)	
Persisting conditions for which medical attention was received (<i>n</i> = 457)	Yes	300	65.6 (61.1–70.0)	
	No	140	30.6 (26.6–35.0)	
	Missing	17	3.7 (2.3–5.9)	

with an increased risk of falling ill. These factors included being female, age groups under <5 years and between 18 and 69 years old, persistent long-term conditions, household size,

type of toilets used and its location (distance) and presence of disease vectors, while prolonged duration of stay in the camps showed a weak association.

Table 3 Factors associated with illnesses among IDPs while residing in camps

Risk factors		Adjusted* aOR (95% CI)	P-value
Gender	Male	Reference	
	Female	1.53 (1.19–1.96)	0.001**
Age	<5 years	Reference	0.001**
	5–17 years old	0.82 (0.52–1.28)	0.38
	18–69 years old	0.43 (0.28–0.65)	0.001**
	>70 years old	2.37 (0.30–18.93)	0.42
Have long-term conditions	No		
	Yes	2.72 (1.88–3.94)	0.001**
Duration of time in camp		1.16 (1.00–1.36)	0.051
Household size		1.07 (1.03–1.11)	0.001**
Source of drinking water	Borehole	Reference	0.06
	Rain	0.88 (0.39–1.98)	0.76
	Street vendor	0.34 (0.16–0.72)	0.001**
	Water tank	0.76 (0.48–1.20)	0.23
	Well	0.44 (0.04–4.61)	0.49
	None	1.17 (0.78–1.76)	0.45
Type of toilets used	Mobile toilet	Reference	0.003**
	Outdoor/bush	2.37 (1.14–4.94)	0.02**
	Pit	1.90 (0.91–3.98)	0.09
	Water closet	1.36 (0.61–3.03)	0.46
	Others	0.49 (0.14–1.69)	0.26
Distance between toilet and drinking water	Not too far	Reference	0.01**
	Very close	1.08 (0.80–1.45)	0.62
	Very far	0.63 (0.46–0.87)	0.01**
Problems with rodents and disease vectors	No		
	Yes	3.71 (1.60–8.60)	0.002**

*Adjusted factors: camp location, gender, age, religion, education, vaccination, long-term conditions and duration of time in camp.

** $P < 0.05$.

What is already known on this topic?

These observations corroborate with the findings reported in the review by Connolly *et al.* which outlined the risk factors for communicable diseases in complex emergencies.¹² Factors mentioned in the review included mass population movement and resettlement in temporary locations, overcrowding, scarcity of safe water, poor sanitation and waste management, absence of shelter, poor nutritional status as a result of food shortages and poor access to health care.¹² As identified in the audit conducted in the same study sites, most of these factors, especially lack of sanitation facilities, were significant challenges.³²

Mortality reported across 29% of households and morbidity experienced by 81% of IDPs indicated both outcomes were of critical concern, therefore making all IDP camp residents vulnerable to adverse health outcomes. The identified disease burden was also similar to that observed in

other displacement settings, with malaria, fever, cough and diarrhoeal diseases being significantly higher among displaced populations.^{12,44–47} Most of these diseases have also been noted to be related to environmental conditions.⁴⁸ Previous evidence have shown that without direct access to drinking water sources, IDPs were more susceptible to water-borne diseases like diarrhoea due to poor water handling (e.g. purchase from water vendors).^{49,50} Connolly *et al.* also stated that in camp situations, diarrhoeal diseases could cause more than 40% of deaths in the acute phase of an emergency and acute respiratory infections accounted for a large proportion of observed morbidity.¹² This, therefore, pointed at the need for improved access to protective and treatment healthcare services, for the well-being of both displaced and neighbouring non-displaced populations.^{51,52} However, the findings showed limited healthcare service utilization among the IDPs.

Factors identified to significantly influence the increased likelihood of illnesses in this study have also been reported in similar settings.^{31,53,54} Roberts *et al.* stated that factors associated with the poor physical health of IDPs in Uganda were being female, absence of soap and lack of food, water and medical care.⁵⁴ Hershey *et al.* also showed that proximity to water sources and camp population size were risk factors for malaria, pneumonia and diarrhoeal diseases among children in camps.³¹ The effects of poor sanitary conditions, including experience with rodents and disease-causing vectors, had the greatest impact on health outcomes and supported the evidence in other studies that showed the relationship between high malaria incidence, water and sanitation, among displaced groups.^{46,55} Although not statistically significant, duration of stay in the camp locations could be considered a weak risk factor. As such, seeing that the average camp stay duration and household sizes were about 2 years and seven people per shelter, respectively, overcrowding could have long-term health implications like increasing the chances of tuberculosis occurrence.^{56,57} Therefore to combat diseases on camps, environmental management and effective interventions, including more efficient shelter materials, are required.^{55,58–61} Overall, multiple local factors appeared to contribute to higher disease incidence within IDP camps in Nigeria. This indicated both demographic characteristics and availability of resources that influenced the risk of poor health outcomes in the camps.

What this study adds

This study provides evidence on the burden of diseases among IDPs and risk factors associated with the increased likelihood of developing an illness. The observations suggest socio-demographic and settlement resource factors impacted the overall wellbeing of camp-dwelling IDPs. Understanding the health impact of the identified risk factors can enhance awareness of the interaction between risk factors and IDP health status. Despite the availability of guidance for environmental management in humanitarian settings,⁶² specific policies and implementations are required in IDP settings. As such, the information presented here supports the World Health Organization refugee health improvement strategy and the SDG goals which are aimed at strengthening the capacity of affected countries through strengthening early warning, risk reduction and management of health risks.^{11,13}

Limitations of this study

The present study was able to identify a wide range of health determinants but also had some limitations. Logistics and security constraints limited data collection to only accessible

locations. The use of self-reported data may have led to underestimation or misclassification of health conditions and the inability to accurately identify health challenges and distinguish acute from chronic conditions. Due to lack of adequate health facilities, medical records were not available to validate the responses from the IDPs. Hence, the study focused only on estimating diseases experienced on the current camps and identifying related risk factors. Furthermore, considering rapid changes in humanitarian situations, the health outcome proportions may have changed since the time of data collection; therefore, the results need to be interpreted within the study context and time period and care taken when making generalizations.

Despite these limitations, the survey provides valuable insights into some of the factors that influence IDP health outcomes in Nigeria. The large sample size and inclusion of different camp locations presented a significant representation of the IDP population and strengthen generalisability of the findings. As such, the highlighted influencing factors can be considered when developing strategies to address healthcare issues among displaced populations in other settings. Further studies are however needed for the 92% of IDPs in non-camp settings.

Conclusion

The study highlights important factors that impact the physical health of conflict-affected IDPs in northern Nigeria, including some of the social determinants of health in displacement settings. Since most research on the health of IDPs has focused on health need assessments or review of specific outcomes, evidence on associations between living conditions and overall health of IDPs in camp settings is limited. Though the study reports on how individual and environmental factors influence the health of IDPs in one country, the findings are relevant to other displacement settings, including refugee and natural disaster displacement settlements. Further research is, however, required to describe the effects of each risk factor on the different health outcomes, towards informing more strategic health intervention initiatives.

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Conflict of interest

None.

References

- Martin L, Evans D. Conflict as a social determinant of health. *SM J Public Heal Epidemiol* 2015;**1**(2):1008.
- CSDH. *Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health*. Geneva, 2008.
- IDMC, NRC. *Global Report on Internal Displacement 2019*; 2019. <http://www.internal-displacement.org/global-report/grid2019/> (13 May 2019, date last accessed).
- International Organization for Migration (IOM). *Displacement Tracking Matrix Nigeria Round 8 - February 2016*; 2016. <https://displacement.iom.int/nigeria> (17 February 2017, date last accessed).
- United Nations. *Guiding Principles on Internal Displacement*, 2nd edn. Office for the Coordination of Humanitarian Affairs (OCHA), 1998.
- Muecke MA. New paradigms for refugee health problems. *Soc Sci Med* 1992;**35**(4):515–23.
- Couldrey M, Morris T. *Putting IDPs on the Map: Achievements and Challenges*, 2006.
- International Organization for Migration (IOM), Norwegian Refugee Council (NRC), (UNHCR) UNHC for R. *Camp Management Toolkit*. June 2015.
- Khan S. Provision of health assistance to internally displaced persons of South Waziristan Agency in camps. *Int J Public Adm Manag Res* 2014;**2**(3):84–97.
- Seifman R. Refugees, migrants, and displaced populations: the United Nations New York declaration and the WHO International Health Regulations. *Int Health* 2017;**9**:325–6.
- United Nations. *Transforming Our World: The 2030 Agenda for Sustainable Development*; 2015. <https://sustainabledevelopment.un.org/?menu=1300> (9 October 2018, date last accessed).
- Connolly MA, Gayer M, Ryan MJ *et al*. Communicable diseases in complex emergencies: impact and challenges. *Lancet* 2004;**364**(9449):1974–83.
- WHO. *Promoting the Health of Refugees and Migrants: Draft Global Action Plan, 2019–2023*; 2019. <http://www.unhcr.org/uk/figures-a-t-a-glance.html> (7 August 2019, date last accessed).
- Owoaje ET, Uchendu OC, Ajayi TO *et al*. A review of the health problems of the internally displaced persons in Africa. *Niger Postgrad Med J* 2016;**23**(4):161–71.
- De Bruijn B. *The Living Conditions and Well-Being of Refugees*. Vol. **25**; 2009. http://hdr.undp.org/sites/default/files/hdrp_2009_25.pdf (8 July 2017, date last accessed).
- Watson JT, Gayer M, Connolly MA. Epidemics after natural disasters. *Emerg Infect Dis* 2007;**13**(1):1–5.
- Siriwardhana C, Wickramage K. Conflict, forced displacement and health in Sri Lanka: a review of the research landscape. *Confl Health* 2014;**8**(1):22.
- Kouadio IK, Koffi AK, Attoh-Toure H *et al*. Outbreak of measles and rubella in refugee transit camps. *Epidemiol Infect* 2009;**137**(11):1593–601.
- Spiegel PB, Salama P. War and mortality in Kosovo, 1998–99: an epidemiological testimony. *Lancet* 2000;**355**(9222):2204–9.
- Burkholder BT, Toole MJ. Evolution of complex disasters. *Lancet* 1995;**346**(8981):1012–5.
- World Health Organization (WHO). *Nigeria statistics*. <https://www.who.int/countries/nga/en/> (Published 2019; 18 February 2019, date last accessed).
- Walker A. *What Is Boko Haram?* Washington, DC; 2012. <https://www.usip.org/publications/2012/05/what-boko-haram> (8 July 2019, date last accessed).
- Obi FA, Eboreime E. How boko haram is devastating health services in North-East Nigeria. *The Conversation*. <https://theconversation.com/how-boko-haram-is-devastating-health-services-in-north-east-nigeria-65751> Published 3 May 2017; 31 May 2018, date last accessed).
- United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA). *Nigeria: Humanitarian Needs Overview 2017*; 2016. <https://www.humanitarianresponse.info/en/programme-cycle/space/document/nigeria-humanitarian-needs-overview-2017> (23 January 2017, date last accessed).
- International Organization for Migration (IOM). *Nigeria: Humanitarian Needs Overview 2020*, 2020.
- International Organization for Migration (IOM). *Displacement Tracking Matrix Nigeria Round 7 - December 2015*; 2015. <https://displacement.iom.int/nigeria> (6 June 2018, date last accessed).
- Kett ME. Internally displaced peoples in Bosnia-Herzegovina: impacts of long-term displacement on health and well-being. *Med Confl Surviv* 2005;**21**(3):199–215.
- Idris I. *Effectiveness of Various Refugee Settlement Approaches*. Brighton, UK; 2017. <https://assets.publishing.service.gov.uk/media/5a5f337ee915d7dfea66cdf/223-Effectiveness-of-Variou-Refugee-Settleme-nt-Approaches.pdf> (18 May 2018, date last accessed).
- Lam E, McCarthy A, Brennan M. Vaccine-preventable diseases in humanitarian emergencies among refugee and internally-displaced populations. *Hum Vaccin Immunother* 2015;**11**(11):2627–36.
- Kouadio IK, Kamigaki T, Oshitani H. Measles outbreaks in displaced populations: a review of transmission, morbidity and mortality associated factors. *BMC Int Health Hum Rights* 2010;**10**(5). Published 2010 Mar 19. doi: 10.1186/1472-698X-10-5.
- Hershey CL, Doocy S, Anderson J *et al*. Incidence and risk factors for malaria, pneumonia and diarrhea in children under 5 in UNHCR refugee camps: a retrospective study. *Confl Health* 2011;**5**(24). Published 2011 Oct 26. doi: 10.1186/1752-1505-5-24.
- Ekezie W, Timmons S, Myles P *et al*. An audit of healthcare provision in internally displaced population camps in Nigeria. *J Public Health* 2019;**4**(3):583–92.
- United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA). *Nigeria: Humanitarian Needs Overview 2016*; 2015. http://reliefweb.int/sites/reliefweb.int/files/resources/nigeria_hno_2016_23122015.pdf (17 February 2017, date last accessed).

- 34 Olanrewaju FO, Omotoso F, Alabi JO. Datasets on the challenges of forced displacement and coping strategies among displaced women in selected internally displaced persons' (IDPs) camps in Nigeria. *Data Br* 2018;**20**:152–8.
- 35 Olanrewaju SO, Jelili MO. Realities of IDPs camps in Nigeria. *Glob J Human-Social Sci Res* 2016;**16**(4):11–6.
- 36 Omole O, Welye H, Abimbola S. Boko haram insurgency: implications for public health. *Lancet* 2015;**385**(9972):941.
- 37 Taylor-Robinson SD, Oleribe O. Famine and disease in Nigerian refugee camps for internally displaced peoples: a sad reflection of our times. *QJM* 2016;**109**(12):831–4.
- 38 Suleiman MS. Assessment of health risks amongst vulnerable groups of internally displaced persons in Pompomari camp, Damaturu, Yobe state, Nigeria. *IGWEBUIKE An African J Arts Humanit* 2018;**4**(1):82–99.
- 39 Loewenberg S. Famine fears in Northeast Nigeria as boko haram fight rages. *Lancet* 2017;**389**:352.
- 40 Adewale S. Internally displaced persons and the challenges of survival in Abuja. *African Secur Rev* 2016;**25**(2):176–92.
- 41 Médecins Sans Frontières. *Refugee Health: An Approach to Emergency Situations*. Macmillan, 1997.
- 42 Oxfam. *Guidelines for Public Health Promotion in Emergencies*, 2001.
- 43 Sphere Association. *The Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response*, Vol. 1, 4th edn. Geneva, Switzerland, 2018.
- 44 Roberts B, Felix Ocaka K, Browne J *et al*. Factors associated with the health status of internally displaced persons in northern Uganda. *J Epidemiol Community Health* 2009;**63**(3):227–32.
- 45 Bellos A, Mulholland K, O'Brien KL *et al*. The burden of acute respiratory infections in crisis-affected populations: a systematic review. *Confl Health* 2010;**4**(3). Published 2010 Feb 11. doi: 10.1186/1752-1505-4-3.
- 46 Anderson J, Doocy S, Haskew C *et al*. The burden of malaria in post-emergency refugee sites: a retrospective study. *Confl Health* 2011;**5**(1):1–8.
- 47 Charchuk R, Paul MKJ, Claude KM *et al*. Burden of malaria is higher among children in an internal displacement camp compared to a neighbouring village in the Democratic Republic of the Congo. *Malar J* 2016;**15**(431):431.
- 48 Bruckner C, Checchi F. Detection of infectious disease outbreaks in twenty-two fragile states, 2000–2010: a systematic review. *Confl Health* 2011;**5**(13). Published 2011 Aug 23. doi: 10.1186/1752-1505-5-13.
- 49 Walden VM, Lamond E-A, Field SA. Container contamination as a possible source of a diarrhoea outbreak in Abou Shouk camp, Darfur province, Sudan. *Disasters* 2005;**29**(3):213–21.
- 50 Swerdlow DL, Malenga G, Begkoyian G *et al*. Epidemic cholera among refugees in Malawi, Africa: treatment and transmission. *Epidemiol Infect* 1997;**118**(3):207–14.
- 51 Blanchet K, Ramesh A, Frison S *et al*. Evidence on public health interventions in humanitarian crises. *Lancet* 2017;**390**:2287–96.
- 52 Lam E, Diaz M, Maina AGK *et al*. Displaced populations due to humanitarian emergencies and its impact on global eradication and elimination of vaccine-preventable diseases. *Confl Health* 2016;**10**(27). Published 2016 Nov 30. doi: 10.1186/s13031-016-0094-5.
- 53 Hynes M, Sheik M, Wilson HG *et al*. Reproductive health indicators and outcomes among refugee and internally displaced persons in postemergency phase camps. *JAMA* 2002;**288**(5):595–603.
- 54 Roberts B, Damundu EY, Lomoro O *et al*. 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). Published 2010 Aug 27. doi: 10.1186/1471-2458-10-518.
- 55 Cronin AA, Shrestha D, Spiegel P *et al*. Quantifying the burden of disease associated with inadequate provision of water and sanitation in selected sub-Saharan refugee camps. *J Water Health* 2009;**7**(4):557–68.
- 56 International Rescue Committee (IRC). *Poor Shelter Conditions: Threats to Health, Dignity and Safety - Analyzing Overcrowded Camp Conditions in Sittwe and Their Impact on Health and Protection*; 2017. <https://www.rescue.org/sites/default/files/document/1664/ircsittweshelterbriefupdate.pdf>.
- 57 Kimbrough W, Saliba V, Dahab M *et al*. The burden of tuberculosis in crisis-affected populations: a systematic review. *Lancet Infect Dis* 2012;**12**(12):950–65.
- 58 Burns M, Rowland M, N'Guessan R *et al*. Insecticide-treated plastic sheeting for emergency malaria prevention and shelter among displaced populations: an observational cohort study in a refugee setting in Sierra Leone. *Am J Trop Med Hyg* 2012;**87**(2):242–50.
- 59 Lindsay SW, Jawara M, Paine K *et al*. Changes in house design reduce exposure to malaria mosquitoes. *Trop Med Int Health* 2003;**8**(6):512–7.
- 60 Richards AK, Banek K, Mullany LC *et al*. Cross-border malaria control for internally displaced persons: observational results from a pilot programme in eastern Burma/Myanmar. *Trop Med Int Health* 2009;**14**(5):512–21.
- 61 Zhou G, Lo E, Zhong D *et al*. Impact of interventions on malaria in internally displaced persons along the China-Myanmar border: 2011–2014. *Malar J* 2016;**15**(471). Published 2016 Sep 15. doi: 10.1186/s12936-016-1512-2.
- 62 United Nations Environment Programme (UNEP). *Mainstreaming the environment into humanitarian action – Resource centre*. https://postconflict.unep.ch/humanitarianaction/02_02.html (14 May 2020, date last accessed).