




Health conditions of older adults in complex humanitarian settings in low- and middle-income countries: a retrospective analysis of 2019–2025 data from Médecins Sans Frontières-supported inpatient departments

Elburg van Boetzelaer ^{1,2,3}, Patrick Keating,^{1,2} Grazia Caleo,¹ Bukola Oluyide,⁴ Rezwanur Rahman Masum,⁵ Abdul Mullahzada,² Umberto Pellecchia,^{6,7} Judith van de Kamp ³, Martins Dada,² Amrish Baidjoe,^{6,7} Oscar Franco,³ Favila Escobio,⁸ Joyce L Browne,³ Jason W Nickerson ^{9,10}

To cite: van Boetzelaer E, Keating P, Caleo G, *et al.* Health conditions of older adults in complex humanitarian settings in low- and middle-income countries: a retrospective analysis of 2019–2025 data from Médecins Sans Frontières-supported inpatient departments. *BMJ Glob Health* 2025;**10**:e018667. doi:10.1136/bmjgh-2024-018667

Handling editor Helen J Surana

► Additional supplemental material is published online only. To view, please visit the journal online (<https://doi.org/10.1136/bmjgh-2024-018667>).

Received 17 December 2024
Accepted 25 September 2025



© Author(s) (or their employer(s)) 2025. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ Group.

For numbered affiliations see end of article.

Correspondence to

Elburg van Boetzelaer;
elburg.vanboetzelaer@london.msf.org

ABSTRACT

Background Inpatient admissions of older adults in humanitarian settings in low-income and middle-income countries remain poorly documented, likely leading to gaps in the delivery of age-appropriate health services. This analysis aims to contribute to age-adapted and gender-adapted healthcare strategies in humanitarian settings.

Methods This multicountry study includes adults who were admitted at Médecins Sans Frontières-supported inpatient departments in humanitarian settings across four regions between July 2019 and April 2025.

Diagnoses of diseases and syndromes were compared between younger adults (20–49 years old) and older adults (50 years or older), stratified by sex, using regression analyses.

Results Data of 149 483 adults were included. Most adults were admitted to inpatient departments for non-communicable diseases (NCDs) (40.7%), followed by communicable diseases (23.3%) and trauma or injury (20.4%). Compared with younger adults, older adults had higher odds of admission being for chronic non-infectious respiratory diseases (OR=2.32; 95% CI 2.27 to 2.38), acute cerebrovascular events (OR=2.17; 95% CI 2.09 to 2.26), acute cardiogenic events (OR=1.93; 95% CI 1.90 to 1.97), lower respiratory tract infections (LRTIs) (OR=1.42; 95% CI 1.41 to 1.44) and acute watery diarrhoea (AWD) (OR=1.20; 95% CI 1.17 to 1.22). Across age groups, women had higher odds of admission being for malaria, AWD, LRTIs, chronic non-infectious respiratory diseases and acute hypertensive crises than men. Older women had higher odds of admission being for complications of diabetes than older men. LRTIs were the leading cause of hospitalisation for older adults in three out of four regions.

Conclusions Older adults in humanitarian settings face intersecting vulnerabilities related to age, gender and geography, with a dual burden of infectious

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ By 2050, one in five people globally will be over the age of 60, with 80% living in low and middle-income countries. Despite this demographic shift, older adults remain largely invisible in humanitarian health responses. They often face compounded vulnerabilities during crises due to pre-existing health conditions, limited mobility and restricted access to and inadequate care. While some evidence exists on the health needs of older people in stable settings, there is limited data on the conditions leading to hospitalisation among older adults in humanitarian contexts, resulting in services that are often ill-adapted to their specific needs.

WHAT THIS STUDY ADDS

⇒ This is the largest multicountry analysis to date of inpatient admissions among older adults in humanitarian settings, applying an intersectional lens. It shows that older adults face a dual burden of disease, with higher odds of admission for both non-communicable and communicable conditions compared with younger adults. The analysis also reveals significant gender disparities, with women, particularly older women, more likely to be admitted for complications related to diabetes and infectious diseases. Finally, regional variation highlights that lower respiratory tract infections were consistently among the top three causes of hospitalisation for older adults in three out of four regions.

and NCDs. Gender disparities were evident, as older women were more frequently admitted. Including older adults in preventive interventions, while addressing care gaps such as trauma, multimorbidity and palliative needs, is essential to deliver more equitable, inclusive and effective health responses.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study brings much-needed visibility to a large, often under-served population in humanitarian settings, older adults, who face intersecting vulnerabilities related to age, gender, geographical location and limited access to care. The coexistence of non-communicable and communicable diseases within this group underscores the urgent need for integrated, tailored health services. The findings emphasise the importance of including older adults in preventive strategies, particularly immunisation campaigns targeting respiratory infections, as well as preventive interventions for malaria and acute watery diarrhoea. Additionally, targeted measures such as active case finding and screening for tuberculosis should be implemented. Importantly, gender disparities, especially the higher admission rates among older women for complications from diabetes and infectious diseases, highlight the need for gender-responsive approaches to healthcare. Strengthening age-responsive and gender-responsive and preventive approaches within humanitarian health systems is essential to improve health outcomes and reduce avoidable hospital admissions.

INTRODUCTION

By 2050, a fifth of the global population will be over 60, of which 80% will live in low and middle-income countries (LMICs).¹ Concurrently, humanitarian crises caused by conflict, environmental disasters, food insecurity or famine and disease outbreaks are projected to become more complex and protracted over the years and decades to come.²⁻⁵

Humanitarian crises have immediate and long-term effects on population health and health and social systems.⁴ These crises disproportionately affect people aged 50 years and older, due to pre-existing health issues, limited physical functioning and reduced access to services.⁵⁻⁸ In contrast to other groups that are often seen as more vulnerable in humanitarian crises such as children and women, older people are structurally neglected in humanitarian response and research.^{9,10} Besides a study assessing the unmet burden of surgical disease among adults aged 50 years or older in Sierra Leone,¹¹ and a multicountry analysis of operative procedures in older adults in low resource settings,¹² health conditions of older adults in humanitarian settings in LMICs that lead to an inpatient admission remain under-researched and poorly documented.¹³ This directly results in a reduced visibility of older adults' health needs and negatively impacts the appropriateness of the healthcare services available to them.¹⁴

Older adults are a heterogeneous group and include adults of different ages, gender, ethnicity, sexual orientation, socioeconomic status, displacement status and disability status. Intersectionality is a framework that seeks to understand how interactions between multiple social identities effect health.^{15,16} Applying a lens of intersectionality, we aimed to describe the health conditions associated with inpatient admission of older adults (aged 50 years or older) who were admitted to inpatient health

services that were supported by Médecins Sans Frontières (MSF). This study aimed to compare these with the health conditions associated with inpatient admissions of younger adults (aged 20–49), stratified by sex, age group and geographical region. This analysis will contribute important evidence to guide the development of age-adapted and gender-adapted healthcare for older adults in humanitarian crises.

METHODOLOGY

Study population

The study population consists of all adults aged 20 years and older who were admitted to MSF-supported inpatient departments, between July 2019 and April 2025 in humanitarian settings in 10 countries across Sub-Saharan Africa, South Asia, South America and the Caribbean and the Middle East and North Africa. In many included humanitarian settings, life expectancy is low and many conditions usually associated with older age, such as disability and chronic disease, are present at earlier ages. Therefore, 'older adult' was defined as a person aged 50 years or older.^{17,18} 'Younger adult' was defined as a person aged 20–49 years old.¹⁹

All data were collected in areas that are classified as 'humanitarian settings', that is, settings in which an event (eg, armed conflict, environmental disaster, food insecurity or famine and disease outbreaks) or series of events have resulted in a critical threat to the health, safety, security of a community or other large group of adults.²⁰

Outcomes and independent variables

Diagnosis was considered as a dependent outcome variable. On exit, primary and secondary diagnoses of the adult were recorded by medical staff. Diagnoses were categorised by WHO's International Classification of Diseases, 11th revision.²¹ Considering the focus of this study on the health conditions of older adults, diagnoses related to pregnancy, childbirth or the puerperium (ICD-11 code 18) were excluded from this analysis. Online supplemental annex 1 contains a detailed list of diagnoses and their definitions.

Sex, age group and geographic region were considered independent variables. All older ages were self-reported and were categorised by 10-year increments (50–59, 60–69, 70–79, 80+). Sex was self-reported and could be male, female or unknown/unspecified. As unknown/unspecified sex occurred for only 14 adults, we did not include them in these analyses. Geographic regions included in this analysis were based on the World Bank categorisation: South Asia, Sub-Saharan Africa, South America and the Caribbean and the Middle East and North Africa.²²

Data sources and data collection

All adult inpatient data were used, except from the maternity department, that is, from the adult internal medicine (includes intensive and other special care units), adult surgery (includes recovery units) and gynaecology

departments. A total of 75 inpatient departments across 10 countries were included. Due to the support model that MSF applies, in which secondary health facilities are typically partially supported (eg, only the maternity and neonatal ward are supported by MSF, while other wards are fully led by the Ministry of Health or supported by other non-governmental organisations), we only include data from wards within inpatient departments that were supported by MSF. This support is not static and likely changed during the study period (eg, MSF may have supported all wards at a hospital 1 year, and due to changes in the operational context only supported the maternity and neonatal wards the next year).

Data were collected as part of the routine monitoring of MSF-supported inpatient departments. Since 2019, all data were recorded on the adult file by medical staff and subsequently entered in the District Health Information System 2 by data encoders and stored by MSF.

Intersectionality lens

Among the older adults who were included in this analysis, we identified different subgroups. We compared the diagnoses between these subgroups. Subgroups were identified based on the sex, age group and region. We compared diagnoses between younger and older adults by 10-year age increments; younger and older men; younger and older women; and younger and older adults by geographical region.

Statistical methods

All analyses were conducted using RStudio.²³ If independent variables were missing (age group or sex), the record was removed from data analysis. Similarly, if the diagnosis was missing, the record was removed.

In the descriptive analysis, variables were presented either as proportions or medians with their range. Tables included only the most frequently reported diagnoses for patients aged 50 years or older. Only diagnoses that accounted for at least 1% of cumulative diagnoses among patients aged 50 years or older were included in the tables in this manuscript. Diagnoses that account for less than 1% of cumulative diagnoses among patients aged 50 years and older were captured in the tables under the 'other' category. These specific diagnoses and their proportions and effect sizes by age group, sex and geographical area can be found in the annexes. Proportions were calculated over the total number of diagnoses (including primary and secondary diagnoses). Differences in proportions between adults by age group and sex were measured using logistic regression, presenting an ORs and 95% CIs. Since this is a descriptive observational study, we present effect size (ORs) and 95% CIs as a measure of the magnitude of the effect to guide interpretation rather than p values.

Ethics

This study was based on anonymised MSF patient data, and all analyses were conducted without revealing the

identity of any of the programmes or countries represented. Consequently, this research fulfilled the exemption criteria set by the MSF Ethics Review Board for a posteriori analyses of routinely collected clinical data and did not require full MSF Ethics Review Board review. It was conducted with permission from the MSF Operational Centre Amsterdam Medical Director.

Patient and public involvement

It was not appropriate or possible to involve patients or the public in the design, or conduct, or reporting, or dissemination plans of our research.

RESULTS

Demographic characteristics

During the study period, 149 483 adults aged 20 years and older were admitted at MSF-supported inpatient departments across humanitarian settings in 10 countries. Among these were 104 321 adults aged 20–49 (70%) and 45 162 adults aged 50 years or older (30%). Among younger adults, median age was 30.0 years (IQR: 24.0–36.0). Among older adults, median age was 60.0 years (IQR: 55.0–70.0). Women were over-represented in both age groups (younger adults: 55% female; older adults: 51% female). Most young adults in this cohort were admitted at inpatient departments in Sub-Saharan Africa, while the majority of older adults in this cohort was admitted at inpatient departments in South Asia (table 1). In Sub-Saharan Africa and South Asia, a quarter of admitted adults were 50 years or older, while in South America and the Caribbean almost half of admitted adults were 50 years or older (online supplemental annex 2).

Diagnoses of diseases and syndromes by age group

Most adults were admitted at inpatient department services for non-communicable diseases (NCDs) (40.7%), followed by communicable diseases (23.3%), trauma or injury (20.4%) and other unspecified diagnoses (15.6%). More specifically, admissions of adults were most frequently for lower respiratory tract infections (LRTIs) (8.8%), malaria (7.4%) and acute watery diarrhoea (AWD) (3.3%).

Younger adults were admitted to inpatient department services for NCDs (34.7%), followed by communicable diseases (24.9%), trauma or injury (24.7%) and other unspecified diagnoses (15.7%). Older adults were admitted at inpatient department services for NCDs (53.0%), followed by communicable diseases (20.1%), trauma or injury (11.5%) and other unspecified diagnoses (15.4%). Admissions of older adults specifically were most frequently for LRTIs (older adults: 13.5%; younger adults: 6.5%), acute cardiogenic events (older adults: 6.9%; younger adults: 0.9%), non-infectious chronic respiratory diseases (older adults: 5.3%; younger adults: 0.4%), chronic cardio and cerebrovascular disease (older adults: 5.0%; younger adults: 1.0%) and malaria (older adults: 4.0%; younger adults: 9.1%) (table 2).

Table 1 Demographic characteristics of adults aged 20 years and older at MSF-supported secondary healthcare facilities between 2019 and 2025

Characteristic	Total N=149 483*	20–49 N=104 321*	50+N=45 162*
Age (years)	35.0 (26.0–52.0)	30.0 (24.0–36.0)	60.0 (55.0–70.0)
Age category			
20–49	104 321 (70%)	104 321 (70%)	
50–59	15 272 (10%)		15 272 (10%)
60–69	15 395 (10%)		15 395 (10%)
70–79	9087 (6.1%)		9087 (6.1%)
80+	5408 (3.6%)		5408 (3.6%)
Sex			
Female	80 252 (54%)	57 273 (55%)	22 979 (51%)
Male	69 231 (48%)	47 048 (45%)	22 183 (49%)
Region			
Sub-Saharan Africa	77 902 (52%)	60 575 (58%)	17 327 (38%)
South Asia	64 729 (43%)	39 627 (38%)	25 102 (56%)
South America and Caribbean	4421 (3.0%)	2267 (2.2%)	2154 (4.8%)
Middle East and North Africa	2431 (1.6%)	1852 (1.8%)	579 (1.3%)

*Median (25%–75%); n (%).
MSF, Médecins Sans Frontières.

Diagnoses included in the ‘other’ category of [table 2](#) are found in online supplemental annex 3.

Increasing age was associated with increased odds of an admission being for certain communicable diseases, specifically LRTIs (OR=1.42; 95% CI 1.41 to 1.44), AWD (OR=1.20; 95% CI 1.17 to 1.22), sepsis (OR=1.17; 95% CI 1.14 to 1.20) and pulmonary tuberculosis (OR=1.14; 95% CI 1.11 to 1.16). However, the inverse was seen with other communicable diseases including HIV and HIV-related illnesses (OR=0.78; 95% CI 0.75 to 0.81) and malaria (OR=0.67; 95% CI 0.65 to 0.68). The odds of an admission being for NCDs were higher in more advanced age, including chronic non-infectious chronic respiratory diseases (OR=2.32; 95% CI 2.27 to 2.38), acute cardiogenic events (OR=1.93; 95% CI 1.90 to 1.97), chronic cardio and cerebrovascular disease (OR=1.81; 95% CI 1.77 to 1.85) and acute cerebrovascular events (OR=2.17; 95% CI 2.09 to 2.26). More advanced age also led to higher odds of an admission being for acute hypertensive crises (OR=1.59; 95% CI 1.54 to 1.64) and acute complications of diabetes (OR=1.47; 95% CI 1.43 to 1.50) ([table 3](#)).

Diagnoses of diseases and syndromes in adults by age group and sex

Women of all ages were admitted at inpatient department services for NCDs (42.7%), followed by communicable diseases (26.2%), other unspecified diagnoses (18.3%) and trauma or injury (12.8%). Men of all ages were admitted at inpatient department services for NCDs (38.3%), followed by trauma or

injury (29.3%), communicable diseases (19.9%) and other unspecified diagnoses (12.5%).

Women had higher odds of an admission being for certain communicable diseases including malaria (older adults: OR=1.73; 95% CI: 1.59 to 1.89; younger adults: OR=1.60; 95% CI 1.25 to 2.07), AWD (older adults: OR=1.36; 95% CI 1.25 to 1.49; younger adults: OR=1.54; 95% CI 1.43 to 1.65) and LRTIs (older adults: OR=1.10; 95% CI 1.05 to 1.16; younger adults: OR=1.06; 95% CI 1.02 to 1.12). Women had higher odds of an admission being for certain NCDs including chronic non-infectious respiratory diseases (older adults: OR=1.96; 95% CI 1.81 to 2.12; younger adults: OR=2.23; 95% CI 1.81 to 2.76) and chronic cardio and cerebrovascular disease (older adults: OR=1.16; 95% CI 1.07 to 1.25; younger adults: OR=1.57; 95% CI 1.39 to 1.77). Women had higher odds of an admission being for acute hypertensive crises (older adults: OR=1.37; 95% CI 1.21 to 1.54; younger adults: OR=1.90; 95% CI 1.59 to 2.26). Compared with older men, older women had higher odds of an admission being for acute complications of diabetes (OR=1.57; 95% CI 1.44 to 1.72), while younger women had lower odds compared with younger men. Compared with younger men, younger women had higher odds of an admission being for acute cardiogenic events. This difference was not observed between older women and men ([table 4](#)).

Diagnoses of diseases and syndromes in adults by age group and region

Most older adults (50+) in this analysis were admitted in South Asia (n=25 102), followed by Sub-Saharan

Table 2 Diagnoses of diseases and syndromes by age group at MSF-supported secondary healthcare facilities between 2019 and 2025

Diagnoses*	Total (N=172 307)†	20–49 (N=115 645)†	50+ (N=56 662)†
Lower respiratory tract infection	15 172 (8.8%)	7543 (6.5%)	7629 (13.5%)
Acute cardiogenic events	4862 (2.8%)	969 (0.9%)	3893 (6.9%)
Non-infectious respiratory diseases—chronic	3443 (2.0%)	419 (0.4%)	3024 (5.3%)
Chronic cardio and cerebrovascular disease	4054 (2.4%)	1202 (1.0%)	2852 (5.0%)
Malaria	12 817 (7.4%)	10 557 (9.1%)	2260 (4.0%)
Acute watery diarrhoea	5611 (3.3%)	3383 (2.9%)	2228 (3.9%)
Acute complications of diabetes	3429 (2.0%)	1305 (1.1%)	2124 (3.7%)
Tuberculosis, pulmonary	5190 (3.0%)	3129 (2.7%)	2061 (3.6%)
Anaemia	4848 (2.8%)	3308 (2.9%)	1540 (2.7%)
Sepsis	3797 (2.2%)	2276 (2.0%)	1521 (2.7%)
Acute hypertensive crisis	1674 (1.0%)	574 (0.5%)	1100 (1.9%)
Non-infectious respiratory disease—acute exacerbation	1183 (0.7%)	216 (0.2%)	967 (1.7%)
Fracture, closed	3352 (1.9%)	2405 (2.1%)	947 (1.7%)
Upper gastro-intestinal disorders	3284 (1.9%)	2371 (2.1%)	913 (1.6%)
Acute cerebrovascular event	1043 (0.6%)	137 (0.1%)	906 (1.6%)
HIV and HIV-related illnesses	3103 (1.8%)	2326 (2.0%)	777 (1.4%)
Acute abdomen	3306 (1.9%)	2563 (2.2%)	743 (1.3%)
Skin and soft tissue diseases	2006 (1.2%)	1413 (1.2%)	593 (1.0%)
Other	90 133 (52.3%)	69 549 (60.1%)	20 584 (36.5%)

*Including primary and secondary diagnoses. Table includes only the most frequently reported diagnoses for adults aged 50 years or older. Inclusion criterion for table: diagnosis accounts for at least 1% of cumulative diagnoses among adults aged 50+ at MSF-supported secondary healthcare facilities during study period. For a complete overview of diagnoses by age group, see online supplemental annex 3.

†Frequencies and percentages are calculated over the total number of diagnoses, see online supplemental annex 3 for complete table. MSF, Médecins Sans Frontières.

Africa (n=17 327), South America and the Caribbean (n=2154) and the Middle East and North Africa (n=579). In South America and the Caribbean, the most common reasons for admission were LRTIs (32.6%), followed by acute abdomen (8.5%) and skin and soft tissue diseases (5.8%). In the Middle East and North Africa, admissions were most frequently due to other trauma or surgical conditions (13.0%), upper gastrointestinal disorders (12.0%) and chronic cardiovascular and cerebrovascular diseases (10.2%). In South Asia, older adults were most frequently admitted for LRTIs (11.8%), acute cardiogenic events (11.7%) and non-infectious chronic respiratory diseases (8.6%). In Sub-Saharan Africa, the leading causes of admission were LRTIs (15.4%), malaria (10.7%) and other trauma or surgical conditions (6.6%) (online supplemental annex 5).

DISCUSSION

This large multicountry analysis of over 149 000 adult inpatient admissions across MSF-supported humanitarian settings provides critical insights into the health needs of older adults (50+), a population often overlooked in

humanitarian responses. Older adults had higher odds of being admitted for NCDs such as chronic respiratory diseases, cardiogenic and cerebrovascular events, hypertensive crises and complications from diabetes. They also faced higher odds of communicable conditions like LRTIs, AWD, sepsis and TB, highlighting a dual burden of disease. Younger adults were more often admitted for malaria and LRTIs. Women across age groups had higher odds of admission for several communicable diseases (malaria, AWD, LRTIs). Notably, older women were more likely than older men to be admitted for acute diabetes complications. While disease patterns varied by region, LRTIs were among the top three causes of hospital admission for older adults in three of the four regions analysed (South America and the Caribbean (32.6%), Sub-Saharan Africa (15.4%) and South Asia (11.8%), with South America and the Caribbean experiencing the highest burden).

The proportional morbidity of older adults presented in this analysis is largely consistent with the proportional morbidity of adults aged 50 years or older who are admitted at inpatient departments in high-income countries (HICs) and non-humanitarian settings in

Table 3 Diagnoses of diseases and syndromes by age group at MSF-supported secondary healthcare facilities between 2019 and 2025

Diagnoses*	Age group					OR (95% CI)‡
	20–49 (N=115 645)†	50–59 (N=18519)†	60–69 (N=19414)†	70–79 (N=11 604)†	80+ (N=7125)†	
Lower respiratory tract infection	7543 (6.5%)	2062 (11.1%)	2533 (13.0%)	1891 (16.3%)	1143 (16.0%)	1.42 (1.41 to 1.44)
Acute cardiogenic events	969 (0.8%)	991 (5.4%)	1359 (7.0%)	853 (7.4%)	690 (9.7%)	1.93 (1.90 to 1.97)
Non-infectious respiratory diseases—chronic	419 (0.4%)	471 (2.5%)	972 (5.0%)	861 (7.4%)	720 (10.1%)	2.32 (2.27 to 2.38)
Chronic cardio and cerebrovascular disease	1202 (1.0%)	620 (3.3%)	900 (4.6%)	747 (6.4%)	585 (8.2%)	1.81 (1.77 to 1.85)
Malaria	10557 (9.1%)	1061 (5.7%)	729 (3.8%)	356 (3.1%)	114 (1.6%)	0.67 (0.65 to 0.68)
Acute watery diarrhoea	3383 (2.9%)	613 (3.3%)	765 (3.9%)	479 (4.1%)	371 (5.2%)	1.20 (1.17 to 1.22)
Acute complications of diabetes	1305 (1.1%)	675 (3.6%)	824 (4.2%)	408 (3.5%)	217 (3.0%)	1.47 (1.43 to 1.50)
Tuberculosis, pulmonary	3129 (2.7%)	683 (3.7%)	721 (3.7%)	451 (3.9%)	206 (2.9%)	1.14 (1.11 to 1.16)
Anaemia	3308 (2.9%)	484 (2.6%)	530 (2.7%)	355 (3.1%)	171 (2.4%)	1.02 (1.00 to 1.05)
Sepsis	2276 (2.0%)	489 (2.6%)	487 (2.5%)	313 (2.7%)	232 (3.3%)	1.17 (1.14 to 1.20)
Acute hypertensive crisis	574 (0.5%)	291 (1.6%)	405 (2.1%)	253 (2.2%)	151 (2.1%)	1.59 (1.54 to 1.64)
Non-infectious respiratory disease—acute exacerbation	216 (0.2%)	243 (1.3%)	415 (2.1%)	200 (1.7%)	109 (1.5%)	1.81 (1.75 to 1.88)
Fracture, closed	2405 (2.1%)	398 (2.1%)	331 (1.7%)	154 (1.3%)	64 (0.9%)	0.90 (0.87 to 0.93)
Upper gastro-intestinal disorders	2371 (2.1%)	433 (2.3%)	290 (1.5%)	143 (1.2%)	47 (0.7%)	0.87 (0.84 to 0.90)
Acute cerebrovascular event	137 (0.1%)	160 (0.9%)	303 (1.6%)	229 (2.0%)	214 (3.0%)	2.17 (2.09 to 2.26)
HIV and HIV-related illnesses	2326 (2.0%)	417 (2.3%)	253 (1.3%)	96 (0.8%)	11 (0.2%)	0.78 (0.75 to 0.81)
Acute abdomen	2563 (2.2%)	346 (1.9%)	262 (1.3%)	79 (0.7%)	56 (0.8%)	0.78 (0.75 to 0.81)
Skin and soft tissue diseases	1413 (1.2%)	235 (1.3%)	211 (1.1%)	112 (1.0%)	35 (0.5%)	0.93 (0.89 to 0.97)
Other	69 549 (60.2%)	7847 (42.5%)	7124 (36.9%)	3624 (31.2%)	1989 (27.9%)	

*Including primary and secondary diagnoses. Table includes only the most frequently reported diagnoses for adults aged 50 years or older. Inclusion criterion for table: diagnosis accounts for at least 1% of cumulative diagnoses among adults aged 50+ at MSF-supported secondary healthcare facilities during study period. For a complete overview of diagnoses by age group, see online supplemental annex 3.

†Frequencies and percentages are calculated over the total number of diagnoses, see online supplemental annex 3 for complete table.

‡Odds ratio for trend—increased odds per increase in age group.

MSF, Médecins Sans Frontières.

LMICs. Studies from Europe and Australia identified that older adults are hospitalised most frequently due to diseases in the circulatory and respiratory system and hip injuries.^{24–26} Similarly, a state-wide study from Brazil highlighted that pneumonia, diabetes mellitus and heart failure were highest ranked as specific causes for hospitalisation.²⁷

Limited diagnostic capacity at secondary healthcare facilities in humanitarian settings in LMICs has likely led to an underestimation in our data of certain diagnoses in our study, including cancer and dementia. Cancer remains underprioritised in emergency preparedness and response frameworks and humanitarian operational planning, leaving significant gaps in service provision

Table 4 Frequencies of diagnoses of diseases and syndromes by age group and sex at MSF-supported secondary healthcare facilities between 2019 and 2025

Diagnoses*	20–49			50+		
	Female (N=63 755)†	Male (N=51 888)†	OR (95% CI)‡	Female (N=29 458)†	Male (N=27 202)†	OR (95% CI)‡
Lower respiratory tract infection	4097 (6.4%)	3446 (6.6%)	1.06 (1.02 to 1.12)	4015 (13.6%)	3614 (13.3%)	1.10 (1.05 to 1.16)
Acute cardiogenic events	544 (0.9%)	425 (0.8%)	1.14 (1.01 to 1.30)	1963 (6.7%)	1930 (7.1%)	0.79 (0.69 to 0.92)
Non-infectious respiratory diseases—chronic	299 (0.5%)	120 (0.2%)	2.23 (1.81 to 2.76)	1990 (6.8%)	1034 (3.8%)	1.96 (1.81 to 2.12)
Chronic cardio and cerebrovascular disease	765 (1.2%)	437 (0.8%)	1.57 (1.39 to 1.77)	1542 (5.2%)	1310 (4.8%)	1.16 (1.07 to 1.25)
Malaria	7577 (11.9%)	2980 (5.7%)	1.60 (1.25 to 2.07)	1432 (4.9%)	828 (3.0%)	1.73 (1.59 to 1.89)
Acute watery diarrhoea	2131 (3.3%)	1252 (2.4%)	1.54 (1.43 to 1.65)	1291 (4.4%)	937 (3.4%)	1.36 (1.25 to 1.49)
Acute complications of diabetes	637 (1.0%)	668 (1.3%)	0.85 (0.76 to 0.95)	1301 (4.4%)	823 (3.0%)	1.57 (1.44 to 1.72)
Tuberculosis, pulmonary	1471 (2.3%)	1658 (3.2%)	0.78 (0.73 to 0.84)	1003 (3.4%)	1058 (3.9%)	0.92 (0.84 to 1.01)
Anaemia	2442 (3.8%)	866 (1.7%)	2.59 (2.39 to 2.80)	794 (2.7%)	746 (2.7%)	1.04 (0.94 to 1.15)
Sepsis	1400 (2.2%)	876 (1.7%)	1.44 (1.32 to 1.56)	785 (2.7%)	736 (2.7%)	1.04 (0.94 to 1.15)
Acute hypertensive crisis	390 (0.6%)	184 (0.4%)	1.90 (1.59 to 2.26)	640 (2.2%)	460 (1.7%)	1.37 (1.21 to 1.54)
Non-infectious respiratory disease—acute exacerbation	138 (0.2%)	78 (0.2%)	1.58 (1.20 to 2.09)	580 (2.0%)	387 (1.4%)	1.47 (1.29 to 1.68)
Fracture, closed	550 (0.9%)	1855 (3.6%)	0.26 (0.23 to 0.28)	418 (1.4%)	529 (1.9%)	0.77 (0.67 to 0.87)
Upper gastro-intestinal disorders	1619 (2.5%)	752 (1.4%)	1.95 (1.79 to 2.13)	574 (1.9%)	339 (1.2%)	1.67 (1.46 to 1.91)
Acute cerebrovascular event	77 (0.1%)	60 (0.1%)	1.14 (0.82 to 1.61)	464 (1.6%)	442 (1.6%)	1.02 (0.90 to 1.17)
HIV and HIV-related illnesses	1228 (1.9%)	1098 (2.1%)	1.00 (0.92 to 1.08)	414 (1.4%)	363 (1.3%)	1.11 (0.97 to 1.28)
Acute abdomen	1190 (1.9%)	1373 (2.6%)	0.77 (0.71 to 0.83)	334 (1.1%)	409 (1.5%)	0.79 (0.69 to 0.92)
Skin and soft tissue diseases	659 (1.0%)	754 (1.5%)	0.78 (0.70 to 0.86)	257 (0.9%)	336 (1.2%)	0.74 (0.63 to 0.87)
Other	36 541 (57.4%)	33 006 (70.3%)		9661 (32.7%)	10 921 (40.5%)	

*Including primary and secondary diagnoses. Table includes only the most frequently reported diagnoses for adults aged 50 years or older. Inclusion criterion for table: diagnosis accounts for at least 1% of cumulative diagnoses among adults aged 50+at MSF-supported secondary healthcare facilities during study period. For a complete overview of diagnoses by age group, see online supplemental annex 4.

†Frequencies and percentages are calculated over the total number of diagnoses, see online supplemental annex 4 for complete table.

‡Reference group=men.

MSF, Medecins Sans Frontieres.

during crises.²⁸ As a result of the lack of prevention, screening and diagnostic services in conflict, patients are frequently diagnosed at later stages and are less likely to receive optimal management plans.^{29 30} However, there is a growing recognition of the need to integrate cancer

into emergency preparedness and response, particularly in protracted crises.²⁸ Similarly, dementia is not screened for or diagnosed at participating sites, leading to a likely underestimation in these numbers. This underestimation is possibly further compounded by lower likelihood

that older people with dementia would be presenting at the hospital with complaints.

Although we are unable to confirm the pathogen responsible for LRTIs in this study, one of the leading causes of LRTIs among older adults is *Streptococcus pneumoniae*,³¹ which can cause pneumonia, meningitis and sepsis, particularly in children under 5 and people with weakened immune systems including adults aged 50 years or older.^{32 33} Pneumococcal pneumonia is a major concern, as risk factors, including malnutrition, indoor air pollution, smoke inhalation, overcrowding and inadequate water and sanitation, are commonly exacerbated in humanitarian crises.³² Additionally, displacement and crowding in camps for internally displaced persons or refugees may expose them to serotypes of the bacteria that they have not been exposed to before, extending the risk of disease even more into older age groups.³² Our analysis demonstrated that women of all age groups had higher odds of admission being for LRTIs compared with men, which could be explained by gender roles, with women of all ages being more likely to be responsible for the cooking, frequently indoors, leading to substantial smoke inhalation.^{34–36} Alternatively, gender inequality in healthcare seeking behaviours could explain the gender disparity in admissions being for LRTIs.^{37 38} In many HICs, pneumococcal vaccination is recommended for older adults. However, few LMICs provide pneumococcal vaccination. In humanitarian crises, immunisation campaigns for all antigens typically target children³⁹ and do not include older adults. There are insufficient data on the burden of disease, and on vaccine efficacy, effectiveness and cost-effectiveness in LMICs, and further research needs to be conducted to inform policy recommendations on pneumococcal vaccination in older adults in LMICs in general, and in humanitarian crises specifically.³³

This analysis showed that while older adults had lower odds of admission being for malaria than younger adults, women of all age groups had higher odds of admission being for malaria compared with men. This warrants further study, particularly given that these malaria admissions represent malarial infections severely enough to warrant admission, rather than outpatient treatment. A study from Ghana suggests that differential malaria exposure behaviours, such as household tasks outside before sunset or after sundown, and preventive measures, such as bed net use, may explain gendered differences in malaria incidence.⁴⁰ Similarly, older women in Nigeria were less likely to sleep under bed nets than older men.⁴¹

In humanitarian crises, the management of chronic diseases is often deprioritised to cope with competing urgent health needs. At outpatient departments, the focus is often on infectious disease and acute medical conditions, while NCD care is not prioritised.⁴² A systematic review found that acute NCD complications, such as myocardial infarction, were higher in conflict settings and after natural disasters than in pre-emergency circumstances.⁴³ Women had higher odds of an admission being

for complications of diabetes and acute hypertensive crises than men. This could be explained by gender disparities in healthcare seeking behaviours.^{37 38} A prior study by MSF showed that delay in care seeking at emergency departments primarily occurred among children and women due to insufficient resources and insecurity, particularly in highly violent and insecure contexts.⁴⁴ This gender inequality could also be related to educational gaps, low (health) literacy, gender roles⁴⁵ and low socioeconomic status.⁴⁶ The strengthening of the continuum of care for NCDs that are age-appropriate and gender-appropriate will help reduce the burden of inpatient department admissions due to acute NCD exacerbations,⁴⁴ for example, through community participation in health promotion and prevention interventions, healthcare design, extended community outreach promotion and support to community health workers including in the provision of palliative care and long-term care support.^{47–49}

Younger adults were over-represented in our admissions compared with older adults (70% vs 30%), even after the exclusion of adults admitted with diagnoses related to pregnancy, childbirth or the puerperium, which may reflect the population demographics in the included countries. Additionally, while barriers to healthcare services related to their accessibility, availability, appropriateness and acceptability, tend to affect healthcare utilisation by the general population in humanitarian settings,^{47 50} the ability of older adults to access healthcare is disproportionately affected by limited mobility, hearing or vision, dependence on a caregiver to accompany, lack of information, lack of transport, economical barriers or stigma.^{12 51} Ageism at the institutional, interpersonal and self-directed level may further affect healthcare seeking.¹⁶ Older adults may face additional challenges when seeking healthcare including inappropriate medical services to meet their specific needs and insufficient expertise in ageing and geriatric healthcare among medical staff.^{52 53} Community-based care is limited in humanitarian settings, and those that exist tend to focus on populations under 5 and women of reproductive age.⁵⁴ Additionally, self-directed ageism could affect decision-making around healthcare.¹⁶ For example, older people might decide not to seek healthcare because they do not want to be a burden to their family, use scarce resources or slow their family down.⁵⁵ Ageism as a barrier to healthcare in humanitarian settings could be addressed by specific interventions such as the training of healthcare workers on geriatric care, implementing policies to reduce age discrimination, promoting awareness in communities, providing healthcare that is accessible to all, for instance, through mobile clinics.¹⁶

As with any retrospective analysis of routinely collected medical data, this study has its limitations. While this analysis aimed to expose general patterns of admissions, we see across humanitarian settings, more context-specific case studies are needed to better understand

how patterns of morbidity vary between contexts. While data collection was standardised across MSF-supported inpatient departments, we cannot be certain that all medical staff across 10 countries completely and accurately completed the patient files. Primary and secondary diagnoses were recorded by medical staff. This presents two important considerations for interpretation. Where more than one diagnosis was relevant to the admission, both were included in our analysis however these admissions are not hierarchical. Thus, some adults who may have had secondary, minor illnesses that may or not have been relevant to the admission, would be recorded here as having both. Second, adults with multimorbidity for whom more than two conditions may have been relevant to their admission would not be fully captured here. We believe that while this warrants caution in the interpretation of these results, one or two diagnoses are still relevant for identifying significant health issues that contribute to inpatient care in humanitarian crises among this population. Further investigation into multimorbidity among older adults in LMICs would be an important avenue for further study. Analysis of primary healthcare facilities or outpatient departments would complement our analysis to better understand the health conditions of older adults in humanitarian settings. The nature of this data excludes any adults with health conditions for whom hospitals were not accessible due to distance, mobility limitations, dependence on a caregiver or family member to accompany or other barriers. This may have led to an under-representation of specific groups of older people who were more impacted by barriers to secondary healthcare services.

CONCLUSION

This study highlights a large but often underserved population in humanitarian settings, older adults, who face intersecting vulnerabilities related to age, gender and geography. The dual burden of infectious and NCDs underscores the need for integrated, person-centred and equitable care that includes geriatric expertise and preventive strategies, such as immunisation for respiratory infections and interventions for malaria, diarrhoeal diseases and tuberculosis. Gender disparities were pronounced, with older women more frequently admitted.

To improve outcomes, humanitarian health systems must collect age-disaggregated and sex-disaggregated data and address critical care gaps, including multimorbidity, palliative care and the social determinants of health. Tailored, equitable approaches at all healthcare levels are essential to reduce avoidable admissions and meet the complex needs of older adults.

Author affiliations

¹Manson Unit, Medecins sans Frontieres, London, UK

²Public Health Department, Medecins Sans Frontieres Operational Center Amsterdam, Amsterdam, Netherlands

³Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht, Netherlands

⁴Medecins Sans Frontieres, Freetown, Sierra Leone

⁵Medecins Sans Frontieres, Cox's Bazar, Bangladesh

⁶Medecins Sans Frontieres Luxembourg, Luxembourg City, Luxembourg

⁷Medecins Sans Frontieres, Brussels, Belgium

⁸Helpage International, London, UK

⁹Medecins sans Frontieres, Toronto, Ontario, Canada

¹⁰Bruyere Research Institute, Ottawa, Ontario, Canada

Acknowledgements Our deepest gratitude and respect go to the teams that provide vital health services to those in need in humanitarian crises.

Contributors EvB acted as guarantor. EvB, PK, JWN and JLB conceptualised the study. EvB was responsible for the data analysis and drafted the first version of the manuscript. EvB, PK, BO, RRM, GC, AM, UP, JvdK, MD, FE, JLB, JWN, AB and OF were responsible for data interpretation. All authors reviewed and approved the final manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This research fulfilled the exemption criteria set by the Médecins Sans Frontières Ethics Review Board for a posteriori analyses of routinely collected clinical data and thus did not require MSF ERB review. It was conducted with permission from Medical Director, Operational Center OCA Médecins Sans Frontières.

Provenance and peer review Not commissioned; externally peer-reviewed.

Data availability statement Data are available upon reasonable request. The datasets generated and/or analysed during the current study are not publicly available due to individual privacy of included adults but are available from the corresponding author on reasonable request.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <https://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iDs

Elburg van Boetzelaer <https://orcid.org/0000-0002-1168-8491>

Judith van de Kamp <https://orcid.org/0000-0001-6958-9579>

Jason W Nickerson <https://orcid.org/0000-0003-3692-999X>

REFERENCES

- 1 United Nations Department of Economic and Social Affairs Population Division. World population prospects - population division. Available: <https://population.un.org/wpp/> [Accessed 17 Jun 2024].
- 2 United Nations High Commissioner for Human Rights. Climate resilience and older refugees. OHCHR. Available: <https://www.ohchr.org/en/special-procedures/ie-older-persons/climate-resilience-and-older-refugees> [Accessed 14 Aug 2023].
- 3 Aptel C. The growing gaps in global humanitarian challenges. 2024. Available: <https://www.orfonline.org/research/the-growing-gaps-in-global-humanitarian-challenges>
- 4 Nickerson JW, Hatcher-Roberts J, Adams O, *et al*. Assessments of health services availability in humanitarian emergencies: a review of

- assessments in Haiti and Sudan using a health systems approach. *Confl Health* 2015;9:20.
- 5 HelpAge International. Hidden victims of the syrian crisis: disabled, injured and older refugees - Syrian Arab Republic. 2014. Available: <https://reliefweb.int/report/syrian-arab-republic/hidden-victims-syrian-crisis-disabled-injured-and-older-refugees>
 - 6 HelpAge International. Older people in africa: a forgotten population. 2008. Available: <http://eng.zivoi90.cz/uploads/document/205.pdf>
 - 7 Summers A, Leidman E, Pereira Figueira Periquito IM, et al. Serious psychological distress and disability among older persons living in conflict affected areas in eastern Ukraine: a cluster-randomized cross-sectional household survey. *Confl Health* 2019;13:10.
 - 8 HelpAge International. Health interventions for older people in emergencies. 2012. Available: <https://www.helpage.org/silo/files/health-interventions-for-older-people-in-emergencies.pdf>
 - 9 HelpAge International. End the neglect: a study of humanitarian financing for older people. 2016. Available: <https://www.helpage.org/silo/files/end-the-neglect-a-study-of-humanitarian-financing-for-older-people.pdf>
 - 10 Hachem S, Ali S, Al-Omari S, et al. "Older people tend to be invisible": a qualitative study exploring the needs and inclusion of older Syrian refugees in the context of compounding crises in host country, Lebanon. *Confl Health* 2022;16:61.
 - 11 Wong EG, Kamara TB, Groen RS, et al. Prevalence of surgical conditions in individuals aged more than 50 years: a cluster-based household survey in Sierra Leone. *World J Surg* 2015;39:55–61.
 - 12 Wong EG, Trelles M, Dominguez L, et al. Operative procedures in the elderly in low-resource settings: a review of Médecins Sans Frontières facilities. *World J Surg* 2015;39:652–7.
 - 13 van Boetzelael E, Rathod L, Keating P, et al. Health needs of older people and age-inclusive health care in humanitarian emergencies in low-income and middle-income countries: a systematic review. *Lancet Healthy Longev* 2025;6:100663.
 - 14 HelpAge International. Out of sight, out of mind: the inclusion and use of data on older people in the humanitarian programme cycle. 2022. Available: <https://www.helpage.org/silo/files/out-of-sight-out-of-mind-technical-report.pdf>
 - 15 Bauer GR. Incorporating intersectionality theory into population health research methodology: Challenges and the potential to advance health equity. *Soc Sci Med* 2014;110:10–7.
 - 16 van Boetzelael E, van de Kamp J, Keating P, et al. Involving older people in the preparedness, response, and recovery phases in humanitarian emergencies: a theoretical framework on ageism, epistemic injustice, and participation. *Lancet Healthy Longev* 2024;5:e76–82.
 - 17 HelpAge International. Protection interventions for older people in emergencies. 2013. Available: <https://www.helpage.org/silo/files/protection-interventions-for-older-people-in-emergencies.pdf>
 - 18 United Nations High Commissioner for Refugees. Older persons - emergency handbook. UNHCR. Available: <https://emergency.unhcr.org/protection/persons-risk/older-persons> [Accessed 10 Aug 2023].
 - 19 Canêo LF, Neirotti R. The Importance of the Proper Definition of Adulthood: What is and What is Not Included in a Scientific Publication. *Braz J Cardiovasc Surg* 2017;32:60.
 - 20 Inter Agency Working Group on Reproductive Health in Crises. Inter-agency Field Manual on Reproductive Health in Humanitarian Settings. 2010. Available: <https://eeca.unfpa.org/en/publications/inter-agency-field-manual-reproductive-health-humanitarian-settings>
 - 21 World Health Organization. International classification of diseases, 11th revision. 2024.
 - 22 World Bank. The world by income and region. Available: <https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html> [Accessed 19 May 2025].
 - 23 RStudio. Integrated Development for R. RStudio. Available: <http://www.rstudio.com>
 - 24 Lundgren M, Segernäs A, Nord M, et al. Reasons for hospitalisation and cumulative mortality in people, 75 years or older, at high risk of hospital admission: a prospective study. *BMC Geriatr* 2024;24:176.
 - 25 Veronese N, Siri G, Cella A, et al. Older women are frailer, but less often die than men: a prospective study of older hospitalized people. *Maturitas* 2019;128:81–6.
 - 26 Kaldas P, Ratajczyk-Pakalska E. Reasons for elderly patient hospitalization in departments of internal medicine in Lodz. *Aging Clin Exp Res* 2003;15:25–31.
 - 27 Júnior AMde M, Macêdo J, Cardoso T, et al. Analysis of the reasons for hospitalization of elderly people in the extreme north of Brazil. 2022. Available: <https://www.semanticscholar.org/paper/Analysis-of-the-reasons-for-hospitalization-of-in-J%C3%BAnior-Mac%C3%AAdo/b1c4b326df63316e90908213f8a34b7bef22f43> [Accessed 8 Oct 2024].
 - 28 Casolino R, Sullivan R, Jobanputra K, et al. Integrating cancer into crisis: a global vision for action from WHO and partners. *Lancet Oncol* 2025;26:e55–66.
 - 29 Spiegel PB, Cheaib JG, Aziz SA, et al. Cancer in Syrian refugees in Jordan and Lebanon between 2015 and 2017. *Lancet Oncol* 2020;21:e280–91.
 - 30 Al-Ibraheem A, Abdulkadir AS, Mohamedkhair A, et al. Cancer diagnosis in areas of conflict. *Front Oncol* 2022;12:1087476.
 - 31 Flamaing J, De Backer W, Van Laethem Y, et al. Pneumococcal lower respiratory tract infections in adults: an observational case-control study in primary care in Belgium. *BMC Fam Pract* 2015;16:66.
 - 32 van Zandvoort K, Checchi F, Diggle E, et al. Pneumococcal conjugate vaccine use during humanitarian crises. *Vaccine (Auckl)* 2019;37:6787–92.
 - 33 World Health Organization. Considerations for pneumococcal vaccination in older adults. 2021. Available: <https://www.who.int/publications/i/item/WER9623-217-228> [Accessed 21 Mar 2025].
 - 34 Taylor ET, Nakai S. Prevalence of acute respiratory infections in women and children in Western Sierra Leone due to smoke from wood and charcoal stoves. *Int J Environ Res Public Health* 2012;9:2252–65.
 - 35 Orozco-Levi M, Garcia-Aymerich J, Villar J, et al. Wood smoke exposure and risk of chronic obstructive pulmonary disease. *Eur Respir J* 2006;27:542–6.
 - 36 Kilabuko JH, Matsuki H, Nakai S. Air quality and acute respiratory illness in biomass fuel using homes in Bagamoyo, Tanzania. *Int J Environ Res Public Health* 2007;4:39–44.
 - 37 Kalindi AM, Houle B, Smyth BM, et al. Gender inequities in women's access to maternal health care utilisation in Zambia: a qualitative analysis. *BMC Pregnancy Childbirth* 2023;23:755.
 - 38 Shaikh BT, Hatcher J. Health seeking behaviour and health service utilization in Pakistan: challenging the policy makers. *J Public Health (Oxf)* 2005;27:49–54.
 - 39 Allison LE, Alhaffar M, Checchi F, et al. A Systematic Review of Vaccination Guidance for Humanitarian Responses. *Vaccines (Basel)* 2023;11:1743.
 - 40 Quaresima V, Agbenyega T, Oppong B, et al. Are Malaria Risk Factors Based on Gender? A Mixed-Methods Survey in an Urban Setting in Ghana. *Trop Med Infect Dis* 2021;6:161.
 - 41 Balogun S, Yusuf H, Adeleye B, et al. Determinants of bed net use among older people in Nigeria: results from a nationally representative survey. *Pan Afr Med J* 2018;31:112.
 - 42 Slama S, Kim H-J, Roglic G, et al. Care of non-communicable diseases in emergencies. *The Lancet* 2017;389:326–30.
 - 43 Hayman KG, Sharma D, Wardlow RD, et al. Burden of cardiovascular morbidity and mortality following humanitarian emergencies: a systematic literature review. *Prehosp Disaster Med* 2015;30:80–8.
 - 44 Beltrán Guzmán I, Gil Cuesta J, Trelles M, et al. Delays in arrival and treatment in emergency departments: Women, children and non-trauma consultations the most at risk in humanitarian settings. *PLoS One* 2019;14:e0213362.
 - 45 Hendrickson ZM, Tibbels N, Sidikiba S, et al. "I can't leave everything in the hands of my husband": Economic constraints and gender roles in care-seeking in post-Ebola Guinea. *Glob Public Health* 2022;17:1578–93.
 - 46 Gelaw KA, Atalay YA, Zeretu F, et al. Delays in the decision to seek care and associated factors among mothers who delivered in rural health centers in Wolaita Zone, Southern Ethiopia. *Front Glob Womens Health* 2023;4:1236242.
 - 47 Rass E, Lokot M, Brown FL, et al. Participation by conflict-affected and forcibly displaced communities in humanitarian healthcare responses: A systematic review. *J Migr Health* 2020;1–2:100026.
 - 48 Asgary R, Garland V, Ro V, et al. A systematic review of effective strategies for chronic disease management in humanitarian settings; opportunities and challenges. *Prev Med* 2022;161:107154.
 - 49 Thapa R, Zengin A, Thrift AG. Continuum of care approach for managing non-communicable diseases in low- and middle-income countries. *J Glob Health* 2020;10:010337.
 - 50 Omam L-A, Jarman E, O'Laughlin KN, et al. Primary healthcare delivery models in African conflict-affected settings: a systematic review. *Confl Health* 2023;17:34.
 - 51 HelpAge International. Older People in Disasters and Humanitarian Crises: Guidelines for Best Practice. 2000. Available: <https://www.refworld.org/docid/4124b9f44.html> [Accessed 10 Aug 2023].
 - 52 Wells J. Protecting and assisting older people in emergencies. 2005. Available: <https://odhpn.org/publication/protecting-and-assisting-older-people-in-emergencies/> [Accessed 10 Aug 2023].

- 53 Medecins sans Frontieres. Older people in crisis: a review of msf's approach to vulnerability and needs. 2012. Available: https://www.lekari-bez-hranic.cz/sites/czech/files/older_people_in_crisis_final_oct_2012.pdf
- 54 Miller NP, Ardestani FB, Dini HS, *et al*. Community health workers in humanitarian settings: Scoping review. *J Glob Health* 2020;10:020602.
- 55 Abi Chahine M, Kienzler H. Ageism, an invisible social determinant of health for older Syrian refugees in Lebanon: a service providers' perspective. *Confl Health* 2022;16:62.