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Original Research Article

Knowledge, awareness and burden of different diseases among Rohingya refugee people: a cross-sectional study on forcibly displaced Myanmar nationals' community in Rohingya refugee settlement, Cox's Bazar, Bangladesh

M. Jahedul Islam*, M. Monir Hossen Mamun

Department of Public Health, Premier University, Chittagong, Bangladesh

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***Correspondence:**
Dr. M. Jahedul Islam,
E-mail: shikder.ahmedkamal@gmail.com

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ABSTRACT

Background: Rohingya refugees [forcibly displaced Myanmar nationals (FDMN)] live in crowded Cox's Bazar camps, where communicable and non-communicable diseases (NCDs) are common and worsened by malnutrition, poor sanitation and limited access to care. This study examined knowledge, awareness and burden of these diseases among Rohingya refugees in Kutupalong camp, Bangladesh.
Methods: A descriptive cross-sectional study was conducted from March to September 2023 among 251 Rohingya refugees aged 15 years or older, chosen purposively. Data were gathered through face-to-face interviews using a pretested semi-structured questionnaire and analyzed descriptively with SPSS and excel. Premier University, Chittagong, granted ethical clearance.
Results: Most participants were male (84.5%) and aged 18-35 years (65.7%). Malaria was the most frequently reported communicable disease (41.8%), followed by COVID-19 or influenza (27.1%) and skin infections (18.3%). Among NCDs, anxiety, depression or fatigue (33.9%) and anemia (33.1%) were most common, with cancer (21.5%) and cardiovascular disease (CVD) (20.7%) also frequent. All had heard of COVID-19, while 66.5% were aware of NCDs and 70.1% of malnutrition. Knowledge of mechanisms was limited: 34.7% knew tuberculosis (TB) is bacterial, and 27.1% named contaminated food and water as the route of diarrheal infection. Only 39.0% ate fruits and vegetables daily and 22.3% ate protein-rich food daily, yet 95.2% consulted a doctor when ill.
Conclusions: Rohingya refugees in Kutupalong camp face a dual burden of communicable and non-communicable disease, poor dietary diversity and knowledge gaps. Culturally adapted health education, routine NCD screening, malaria and sanitation control, nutritional support and mental health services are urgently needed.

Keywords: Rohingya refugees, Non-communicable diseases, Communicable diseases, Disease burden, Health awareness

INTRODUCTION

Forced displacement has placed a heavy load on the health systems of host countries, and displaced people suffer disproportionately high morbidity and mortality from both communicable diseases and NCDs.[1] The Rohingya, officially termed FDMN, are among the largest stateless populations in the world; about one million of them have fled ethnic violence and persecution in Myanmar's Rakhine State for Bangladesh since 2017.[2] Most now live in densely crowded camps in the Cox's Bazar district, and the Kutupalong settlement has grown into one of the largest refugee camps anywhere.[3]

Malnutrition, in the form of both undernutrition and overnutrition, is well documented among displaced populations.[4] Children under five in refugee settings often show high rates of stunting, wasting and underweight, and the physical and cognitive effects can persist into adulthood.[5] Worldwide, malnutrition is linked to 3.5 million deaths each year and to 35% of illness among children under five.[6] Stunting among Bangladeshi under-fives stands at 36.2% nationally, compared with a global developing-country average of 25%, and the rate is considerably higher in refugee settlements marked by food insecurity and limited livelihoods.[7]

Cholera, dysentery, malaria, TB, acute respiratory infections and dengue remain constant threats in humanitarian camps because water, sanitation and hygiene (WASH) services are inadequate.[8] The Rohingya crisis also brought new challenges, among them COVID-19 spreading through communities that already had limited health-seeking behavior and, in some cases, hesitancy toward vaccination.[9] At the same time, NCDs such as hypertension, CVD, diabetes mellitus, cancer and mental disorders are increasingly seen as major causes of ill health among refugees and displaced people worldwide.[10]

In resource-poor humanitarian settings, health literacy and awareness of disease strongly influence whether people seek care and adopt preventive practices.[11] Evidence from refugee populations in Sub-Saharan Africa, the Middle East and South Asia suggests that poor awareness of NCD risk factors, cultural health beliefs and limited health education reduce the uptake of preventive services.[12] For the Rohingya in particular, language barriers, low literacy, mistrust of formal health services and cultural norms make health awareness programs harder to deliver.[13]

Bangladesh carries a double burden, with infectious diseases still unresolved while NCDs are rising.[14] Nationally, 39.9% of women of reproductive age are anemic, 10.3% of adult men have diabetes, and CVD is the main cause of adult death.[15] In the Rohingya community these vulnerabilities are compounded by camp conditions, limited dietary diversity, physical inactivity and the psychological stress of displacement and trauma.[16] Earlier epidemiological work in Cox's Bazar has recorded outbreaks of diphtheria, hepatitis E and measles, as well as high rates of acute malnutrition among children.[17]

Although UNHCR, WHO, MSF, BRAC and many international NGOs coordinate the humanitarian response, peer-reviewed assessments of knowledge, awareness and disease burden among Rohingya adults remain scarce.[18] Most published studies concentrate on single disease groups, children or nutritional outcomes, so little is known about how adult refugees perceive and understand disease overall.[19] This gap makes it difficult for policymakers and health planners to design interventions that are targeted and culturally appropriate.[20] This study therefore aimed to assess knowledge, awareness and the burden of communicable and NCDs among adult Rohingya refugees in Kutupalong camp, Cox's Bazar, Bangladesh. Its findings are intended to guide health education programs, NCD screening protocols and food-security interventions in one of the most complex humanitarian settings in the world.

METHODS

Study design

This was a descriptive, observational, cross-sectional study. Data were collected through direct face-to-face interviews with a structured questionnaire. The design was chosen because it allows disease prevalence and levels of knowledge in the refugee community to be estimated at a single point in time.

Study population

The study population consisted of Rohingya refugees of both sexes living in Kutupalong refugee camp, Cox's Bazar, Bangladesh. Adults aged 18 years or older and adolescents aged 15 years or older were eligible if they could give informed consent.

Study area

The study took place in Kutupalong refugee settlement, Cox's Bazar District, in southeastern Bangladesh. Kutupalong is the world's largest refugee camp, with roughly 620,000 FDMN, and it serves as a sentinel site for health surveillance in the Rohingya response.

Study period

Data were collected over six months, from March to September 2023, so that seasonal variation in disease could be captured and enough participants recruited.

Sample size calculation

The sample size was calculated with the standard formula for cross-sectional studies, $n=z^2pq/d^2$, where z=1.96 (95% confidence level), p=0.12 (expected prevalence from earlier literature), q=0.88 (1-p) and d=0.05 (margin of error). The minimum sample size came to 163. To increase power and allow for non-response, the final sample was raised to 251 on the advice of the thesis supervisor.

Inclusion criteria

Rohingya refugee individuals residing in Kutupalong camp at the time of data collection, participants aged ≥15 years, individuals who voluntarily provided written or verbal informed consent and participants physically and

mentally able to respond to the interview questionnaire were included in study.

Exclusion criteria

Rohingya refugees who were temporarily absent or had relocated from Kutupalong camp, individuals unable or unwilling to provide informed consent, severely ill individuals whose participation could compromise their well-being and individuals who had already participated in the study (to avoid duplication) were excluded.

Data collection tools

A pretested, semi-structured, interviewer-administered questionnaire was prepared in English and translated into Bengali and the Rohingya dialect. It had four modules: (i) socio-demographic characteristics; (ii) knowledge and awareness of communicable diseases (diarrhea, COVID-19, pneumonia, TB, malaria, dengue, HIV/AIDS); (iii) knowledge and awareness of NCDs (diabetes, hypertension, CVD, cancer, malnutrition); and (iv) current disease burden (self-reported diagnosed conditions) and dietary and lifestyle behaviors. The questionnaire was pretested on 20 people from a neighboring camp who were not part of the main study, and it was revised in light of the results.

Sampling methods

Non-probability purposive sampling was used. Participants were recruited in sequence from households during systematic field visits to different blocks of Kutupalong camp. Community health workers (CHWs) and NGO field officers helped to identify eligible households and to gain entry to the community. Household members were listed and eligible individuals were interviewed; when a household had more than one eligible person, one adult was chosen to avoid clustering.

Quality control

The following quality control measures were implemented: Regular supervision and guidance from the thesis supervisor was maintained throughout the data collection process. Data collection was performed exclusively by the principal researcher, ensuring consistency in interview technique. Questionnaires were explained in the Rohingya dialect with support from bilingual CHWs to ensure comprehension. All completed questionnaires were reviewed daily for completeness, consistency, and legibility. Double data entry was performed with a 10% random check for entry errors. Data were checked and cross-validated against frequency distributions before analysis.

RESULTS

In total, 251 Rohingya refugees were enrolled from Kutupalong camp. The findings are presented under three headings: socio-demographic characteristics, knowledge and awareness of disease, and reported disease burden.

Table 1 describes the 251 respondents. Most were young men aged 18-35 years with primary-level education. More than 96% were Muslim, and the majority lived in shelters of bamboo, brick and mud within joint families. Nearly two-thirds reported a monthly household income below BDT 10,000, which points to widespread poverty.

Table 2 gives the burden of communicable diseases. Malaria was reported most often (41.8%), followed by COVID-19 (27.1%) and skin infections (18.3%). Vector-borne, waterborne and respiratory infections all featured prominently, in keeping with inadequate WASH facilities and crowded living conditions.

Table 3 shows the NCD burden. Anxiety, depression or fatigue (33.9%) and anemia (33.1%) were the most common conditions, which indicates that psychological distress and nutritional deficiency occur together. Cancer, CVD and neurological disorders were each reported by more than 19% of respondents.

Table 4 summarizes awareness of communicable diseases. Every respondent had heard of COVID-19 (100%), but knowledge of the disease was only partial: 68.5% named a virus as the cause, 75.7% knew that it spreads from person to person and 58.2% knew about droplet transmission, whereas barely half recognized the typical symptoms (51.4%). Awareness was moderate for TB (71.3%), pneumonia (58.9%) and helminthiasis (45.8%). Diarrhea was familiar to 63.3%, yet only 5.2% knew that bacteria, viruses and other agents can all cause it.

Table 5 gives further detail on diarrhea, TB and pneumonia. Almost 44% could not name any symptom of diarrhea and 41.4% did not know how it is transmitted; only 27.1% mentioned contaminated food and water. For TB, 34.7% correctly identified the bacterial cause and 38.6% knew that it passes from person to person, while 45.8% did not know how it is diagnosed. For pneumonia, 69.3% agreed that a physician should be consulted, and the Internet (44.6%) and TV or radio (41.8%) were the main sources of information, which suggests that digital and broadcast media could be used for health education.

Table 6 sets NCD awareness against self-reported burden. Two-thirds of respondents were aware of NCDs, but 40.6% wrongly classified malaria or dengue as NCDs, which reveals some conceptual confusion. There was a marked gap between awareness and burden: although 67-74% were aware of these conditions, the reported burden remained high, particularly for CHD (22.3%), anemia (33.1%) and mental health disorders (33.9%), and these figures need clinical verification. Gap refers to the difference between awareness and preventive action or health-seeking for that NCD. Percentages are of all 251 respondents.

Table 7 presents nutrition knowledge and dietary and lifestyle practices. Almost all respondents (95.2%) sought a doctor when ill, but dietary diversity was clearly poor: only 22.3% ate protein-rich foods daily and 39.0% ate fruits and vegetables daily. Although 70.1% had heard of malnutrition, only 49.0% described it correctly as an imbalance of food intake, so nutritional vulnerability persists despite reasonable health-seeking habits.

Table 1: Socio-demographic profile of study respondents, (n=251).

Characteristics	Category	N (%)
Age group (in years)	<18	51 (20.3)
	18-35	165 (65.7)
	36-55	26 (10.4)
	>55	9 (3.6)
Gender	Male	212 (84.5)
	Female	38 (15.1)
	Third gender	1 (0.4)
Educational status	Illiterate	56 (22.3)
	Primary	105 (41.8)
	SSC	53 (21.1)
	HSC	23 (9.2)
	Madrasha	9 (3.6)
	Graduate	5 (2.0)
Marital status	Single	114 (45.4)
	Married	132 (52.6)
	Divorced/widowed	5 (2.0)
Family type	Nuclear	77 (30.7)
	Joint	174 (69.3)
Monthly income (BDT)	<10,000	162 (64.5)
	10,000-15,000	82 (32.7)
	>15,000	7 (2.8)
Religion	Muslim	242 (96.4)
	Hindu	6 (2.4)
	Buddhist	3 (1.2)
Housing condition	Bamboo, brick and mud	143 (57.0)
	Tin shed	70 (27.9)
	Tent and brick	33 (13.1)
	Very poor condition	22 (8.8)

Table 2: Burden of communicable / infectious diseases (self-reported diagnosed cases, (n=251).

Communicable diseases	N	Percentage (%)
Malaria	105	41.8
COVID-19/viral flu/ influenza	68	27.1
Skin infections (Scabies, tinea, chickenpox)	46	18.3
Dengue/ chikungunya	45	17.9
Cholera, diarrhea and dysentery	42	16.7
Tonsillitis	41	16.3
Diphtheria	38	15.1
Viral fever	30	11.9
Measles/mumps / rubella	29	11.6
TB	22	8.8
Conjunctivitis	21	8.4
HIV/AIDS	20	7.9
Helminthiasis	19	7.6
Viral hepatitis (A, B, C and E)	14	5.6
Pneumonia	13	5.2

Table 3: Burden of NCDs (self-reported diagnosed cases, (n=251).

NCDs	N	Percentage (%)
Anemia	83	33.1
Cancer (various types)	54	21.5
CVDs	52	20.7
Neurological disorders (stroke, mental disorder, etc.)	50	19.9

Continued.

NCDs	N	Percentage (%)
Vision problems/ cataract	58	23.1
Anxiety/ depression / fatigue	85	33.9
Arthritis/ osteoporosis	51	20.3
Diabetes mellitus and complications	38	15.1
Vitamin and mineral deficiency disorders	69	27.5
Asthma and COPD	24	9.6
Thyroid disorders	24	9.6
NUD/ PUD (Peptic ulcer disease)	28	11.2
Non-viral hepatitis (AJS)	14	5.6
Rheumatic fever	7	2.8

Table 4: Knowledge and awareness of communicable diseases (Diarrhea, COVID-19, TB, pneumonia and helminthiasis).

Diseases	Question / response	N	Percentage (%)
Diarrhea	Knows about diarrhea-Yes	159	63.3
	Knows about diarrhea-No	68	27.1
	Knows about diarrhea-Don't know	24	9.6
	Causative agent: Bacteria	65	25.9
	Causative agent: Virus	107	42.6
	Causative agent: All (correct)	13	5.2
COVID-19	Heard of COVID-19	251	100
	Caused by a virus (correct)	172	68.5
	Spreads person-to-person (correct)	190	75.7
	Spreads via respiratory droplets/sneeze (correct)	146	58.2
	Close contact/ wild animals increase risk (correct)	122	48.6
	Fever, dry cough, shortness of breath=symptoms (correct)	129	51.4
TB	Aware of TB	179	71.3
Pneumonia	Aware of pneumonia	148	58.9
Helminthiasis	Aware of worm infection	115	45.8

Table 5: Detailed knowledge of diarrhea, TB and pneumonia (Symptoms, transmission, causes and information sources).

Diseases	Question / response	N	Percentage (%)
Diarrhea	Symptoms: watery stools, abdominal cramps, pain (correct)	90	35.9
	Symptoms: constipation, stomach pain, fever (incorrect)	54	21.5
	Symptoms: cough, sputum, weight loss (incorrect)	31	12.4
	Symptoms: don't know	110	43.8
	Transmission: polluted food and water (correct)	68	27.1
	Transmission: sneeze and cough (incorrect)	66	26.3
	Transmission: mosquito vector (incorrect)	34	13.5
	Transmission: don't know	104	41.4
TB	Causative agent: bacteria (correct)	87	34.7
	Causative agent: virus (incorrect)	80	31.9
	Personal hygiene reduces TB risk (yes)	106	42.2
	Sharing personal items increases TB risk (yes)	92	36.7
	Transmitted person-to-person (yes)	97	38.6
	Main symptom: cough with blood and weight loss (correct)	88	35.1
	Diagnosis: don't know	115	45.8
Pneumonia	Symptoms: fever, cough and respiratory distress (correct)	86	34.3
	Symptoms: cough and wheezing	71	28.3
	Causative agent: viral (correct for viral pneumonia)	106	42.2
	Causative agent: bacterial (correct for bacterial pneumonia)	77	30.7
	Information source: Internet	112	44.6
	Information source: TV/ radio	105	41.8
	Physician consultation necessary (agree)	174	69.3

Table 6: Knowledge and awareness of NCDs versus self-reported disease burden.

NCD parameters	Aware / Yes, N (%)	Not aware / No, N (%)	Diagnosed, N (%)	Gap
Aware of NCDs as a category	167 (66.5)	84 (33.5)		-
Correctly identified NCDs (diabetes, hypertension, stroke)	65 (25.9)	-	-	-
Incorrectly identified NCDs (malaria, dengue)	102 (40.6)	-	-	-
Diabetes mellitus	168 (66.9)	83 (33.1)	37 (14.7)	High
Hypertension	168 (66.9)	83 (33.1)	42 (16.7)	High
Coronary heart disease	168 (66.9)	83 (33.1)	56 (22.3)	High
Cancer	186 (74.1)	65 (25.9)	40 (15.9)	Moderate
Malnutrition/ anemia	176 (70.1)	75 (29.9)	83 (33.1)	Very high
Mental health/ depression	Not assessed	-	85 (33.9)	Critical

Table 7: Nutrition knowledge, dietary habits and lifestyle behaviors of respondents.

Domains	Behavior / response	N	Percentage (%)
Fruit and vegetable intake	Daily intake-Yes	98	39.0
	Daily intake-No	53	21.1
	Daily intake-Sometimes	59	23.5
	Daily intake-Very rarely	41	16.3
Protein-rich food	Daily intake-Yes	56	22.3
	Daily intake-No	48	19.1
	Daily intake-Sometimes	107	42.6
	Daily intake-Very rarely	40	15.9
Other dietary/ lifestyle practices	Daily milk and dairy products-Yes	62	24.7
	Milk and dairy products-sometimes / very rarely	123	49.0
	Sufficient daily water intake-Yes	191	76.1
	Regular meal at proper time-Yes	156	62.2
	Regular exercise-Yes	92	36.7
	Regular exercise-No	70	27.9
	Seeks doctor when ill-Yes	239	95.2
Nutrition knowledge	Knows about malnutrition	176	70.1
	Malnutrition=imbalance of food intake (correct)	123	49.0
	Malnutrition=only too little food	65	25.9
	Malnutrition=only too much food	63	25.1
	Currently suffering from anemia	44	17.5

DISCUSSION

This study describes disease knowledge, awareness and self-reported burden among 251 Rohingya (FDMN) residents of Kutupalong camp. The results indicate a double burden of communicable and non-communicable disease in a population living with crowding, limited livelihoods and poor dietary diversity. Each group of findings is interpreted below and set against earlier studies. Because most previous work used clinical records, laboratory confirmation or validated screening tools, whereas our data come from self-report, some differences in magnitude are to be expected, and they are noted where they arise.

Socio-demographic characteristics

Respondents were mostly young (65.7% aged 18-35 years) and male (84.5%), with little formal schooling (22.3% illiterate, 41.8% primary education only) and low incomes (64.5% earning under BDT 10,000 a month). Poverty was widespread, although less extreme than the 94.3% of households below BDT 10,000 a month reported in a survey of 545 FDMN adolescents in the camps.[21] The young age profile reflects the demography of the displaced population, so conditions associated with ageing would be expected to be uncommon. The predominance of men is most likely a result of purposive recruitment through community health workers and the limited availability of women for interview in a conservative community; it restricts how far the findings can be applied to women.

Burden of communicable diseases

Malaria was the infection reported most often (41.8%). Transmission in the camps is markedly seasonal. A four-year study in a Rohingya camp confirmed malaria in 345

of 582 participants and found that transmission peaked in the monsoon, particularly in August.[22] Our data collection from March to September covered the monsoon, so a large share of recent episodes is plausible. Even so, people who report "malaria" often mean any febrile illness, and the figure is therefore likely to exceed the proportion with parasitologically confirmed infection.

The 18.3% prevalence of skin infections fits with the large scabies upsurge documented across 35 IOM-supported health facilities in the camps between 2021 and 2024, which called for an expensive outbreak response and mass drug administration.[23] Overcrowded shelters, shared bedding and scarce water for hygiene favor transmission of this kind. Cholera, diarrhea and dysentery were reported by 16.7% of respondents. In surveillance of acute watery diarrhea among 4,881 FDMN during 2017-2019, Vibrio cholerae was found in only 0.7% of cases, against 4.9% for enterotoxigenic *E. coli* and 1.5% for *Shigella*.[24] Most diarrheal illness in the camps therefore appears to be non-cholera enteric infection related to unsafe water and sanitation, which is consistent with our findings.

Diphtheria was reported by 15.1% of respondents, which is far higher than the epidemic record would suggest: 7,064 cases were notified during the 2017-2019 outbreak, a crude attack rate of 51.5 per 10,000 person-years.[25] Respondents may have mistaken sore throat or tonsillitis (reported by 16.3% here) for diphtheria, and recall bias may also contribute, so this figure should not be taken as incidence. A similar pattern applies to TB. A history of TB was reported by 8.8%, whereas 1.54% of 3,579 patients with a cough lasting more than two weeks in Kutupalong were smear-positive.[26] Our figure is higher because it captures lifetime self-reported history and not active smear-positive disease among symptomatic patients, yet both point to TB as a continuing concern. The self-reported HIV/AIDS prevalence of 7.9% is implausibly high against clinical data, since none of the 55 smear-positive TB patients in the same camp tested HIV-positive.[26] It probably reflects misunderstanding of the term and needs laboratory-based assessment. For dengue/chikungunya (17.9%), COVID-19/influenza (27.1%), measles/mumps/rubella (11.6%) and other infections we found no directly comparable community-based estimates, but the mix of vector-borne, respiratory and vaccine-preventable infections is typical of crowded camps.

Burden of NCDs and mental health

Anxiety, depression and fatigue formed the commonest NCD category (33.9%). This is close to the 30.0% prevalence of significant depressive symptoms (PHQ-9 score of 10 or above) found among Rohingya adults in a survey of 6,906 people older than 15 years.[27] That the two estimates are so similar despite different instruments supports the view that psychological distress is a leading cause of morbidity in this population, in line with trauma, persecution, the stresses of displacement and loss of livelihood.

The prevalence of anemia (33.1%) falls between the 24.1% recorded in women of reproductive age and the 38.2% in children aged 6-59 months in the 2023 UNHCR nutrition survey of the camps, and it is below the 39.9% reported nationally for women of reproductive age.[15,28] Because our sample was largely male and the figure is self-reported, these comparisons are only approximate. Poor dietary diversity and repeated malaria are likely contributors. In the Rohingya camp malaria study, infected participants were anemic, more so with Plasmodium falciparum, which fits the high malaria burden reported here.[22]

Self-reported hypertension (16.7%) and diabetes (14.7%) were close to, or above, clinic-based figures from 51,270 Rohingya patients in Kutupalong and Balukhali, where adult prevalence was 14.1% for hypertension and 11.0% for diabetes.[29] Hypertension was lower than the 27.4% measured among Bangladeshi adults nationally, as might be expected in a young population, although undiagnosed disease may also play a part.[30] The higher figure for diabetes may arise because respondents counted complications or remembered raised blood glucose readings. The cardiovascular (20.7%) and cancer (21.5%) figures are hard to reconcile with the age structure of the sample, and we found no community-based Rohingya estimates to compare them with. They probably reflect lay misclassification of chest pain or lumps and need diagnostic confirmation. The same clinic series found 34.4% of adults underweight, showing that undernutrition and chronic disease occur side by side in this population.[29]

Knowledge of communicable diseases

Awareness of COVID-19 was universal (100%), which reflects the intensive communication campaigns during the pandemic. Understanding of the disease was nevertheless incomplete: 68.5% knew the viral cause, 58.2% knew about droplet spread and 51.4% could name the main symptoms. A survey of 400 Rohingya refugees similarly judged knowledge to be unsatisfactory, with a mean score of 5.8 out of 10.[31] Awareness of a disease, then, did not guarantee an accurate understanding of it.

Knowledge of TB was similarly limited. Only 34.7% identified the bacterial cause, 38.6% knew that it spreads from person to person, 35.1% recognized the classic symptoms and 45.8% did not know how TB is diagnosed. We found no published surveys of TB knowledge among Rohingya adults to compare with. Since smear-positive TB is found among symptomatic patients in Kutupalong, however, poor recognition of its causes and symptoms may delay people in seeking care.[26] For diarrhea, only 27.1% named contaminated food and water as the route of transmission, 26.3% wrongly cited sneezing and coughing, and 43.8% could not name any symptom.

As non-cholera enteric pathogens predominate in the camps, messages on hand washing and safe water deserve priority.[24] Awareness of pneumonia was moderate (58.9%), and 69.3% agreed that a physician should be consulted. The Internet (44.6%) and TV or radio (41.8%) were the main information sources, so mobile and broadcast channels could be used to deliver health messages.

Awareness of NCDs

Awareness of NCDs as a category was 66.5%, awareness of diabetes, hypertension and CHD was 66.9%, and 40.6% classified malaria or dengue as NCDs. This is lower than in rural Bangladesh, where 93.1% of adults had heard of hypertension and 94.3% of diabetes, although 46.8% and 64.4%, respectively, could not name a single risk factor.[32] Low literacy, language barriers and limited health education probably account for the lower awareness among the Rohingya. Knowing the name of a disease is also different from knowing one's own status: nationally, only 42.4% of hypertensive adults were aware that they had hypertension.[30] The awareness–burden gap in Table 6 therefore supports routine screening during primary care contacts to find undiagnosed cases, together with simple health-literacy materials in the Rohingya dialect.

Dietary habits, nutrition knowledge and lifestyle

Only 39.0% ate fruits and vegetables daily, 22.3% ate protein-rich food daily and 24.7% consumed dairy products daily. Among FDMN adolescents in the camps, 82.8% did not eat fruits and vegetables regularly, 89.9% did not eat protein regularly and 90.8% did not often consume dairy.[21] Our adult respondents fared somewhat better, but the pattern is the same. In a rural Bangladeshi population, 76.0% had inadequate fruit and vegetable intake, close to the 61% of our respondents who did not eat them daily.[32] In the 2023 UNHCR survey, 43.8% of children aged 6-23 months ate no fruits or vegetables.[28] Taken together, these findings suggest that ration-dependent diets and limited purchasing power, rather than knowledge alone, restrict dietary diversity.

Only 49.0% described malnutrition correctly as an imbalance of intake, and 25.9% thought it meant too little food alone. This narrow understanding overlooks overnutrition and micronutrient deficiency, which is important because both diabetes and micronutrient deficiency were common here (14.7% and 27.5%). Regular exercise was reported by 36.7%. We found no Rohingya-specific studies of physical activity, meal regularity or water intake for comparison.

Health-seeking behavior

Nearly all respondents (95.2%) said they saw a doctor when ill, but this figure should be read with caution. A qualitative study in Cox's Bazar described substantial barriers to care, including dependence on male relatives for permission and transport, restricted movement for residents of unregistered camps, frequent absence of medical staff, mistrust of formal services and reliance on informal providers such as drug sellers and traditional healers.[33] Our result probably reflects stated intention, social desirability and recruitment through community health workers rather than real access to care.

Implications

In summary, our findings agree with earlier work on the scale of mental distress, poor dietary diversity and the persistence of malaria, scabies, diarrheal disease and TB in the camps. They differ mainly where self-report is least reliable, namely diphtheria, HIV, cancer and CVD. The results support integrating NCD and mental health screening into primary care, strengthening WASH and vector control, supplementing diets with protein and micronutrient-rich foods, and providing simple multilingual health education that explains the causes and prevention of disease and not only its name.

Limitations

The cross-sectional design prevents causal inference, and purposive sampling may have caused selection bias. Data were self-reported and not clinically verified, so some conditions (for example HIV, diphtheria, cancer and CVD) are probably overestimated. Language barriers and low literacy may have affected some responses. The study was limited to Kutupalong camp, and the sample was mostly male (84.5%) and included adolescents, so the findings may not apply to other settlements, women or older adults.

CONCLUSION

The Rohingya community in Kutupalong camp bears a substantial and complicated double burden of communicable and non-communicable disease, aggravated by severe nutritional deficiency and considerable psychosocial morbidity. Awareness of COVID-19 and TB is relatively high, probably because of mass health campaigns, but important gaps remain in knowledge of diarrhea prevention, the classification of NCDs and the recognition of malnutrition. Integrated health promotion programs adapted to the language and culture of the community, wider NCD screening, nutritional supplementation and psychosocial support within camp health services are urgently needed to protect this highly vulnerable displaced population.

Recommendations

Multilingual health education on NCD prevention and waterborne disease control should be added to existing community health worker programs. Primary care services should routinely screen for hypertension, diabetes and anemia. Food assistance should prioritize

protein and micronutrient-rich foods, and mental health services should be expanded.

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