


## Research Paper

## WASH FIT implementation in Rohingya camps in Cox's Bazar Bangladesh – results after 1 year

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### ABSTRACT

Water, sanitation, and healthcare waste management are essential services in healthcare facilities to ensure the quality of care and minimize infection risk. World Health Organization (WHO) Cox Bazar's sub-office supported the implementation of the Water and Sanitation for Health Facility Improvement Tool in 21 purposively selected HCFs in Rohingya refugee settlements. A total of 16 WASH FIT indicators from three of the seven WASH FIT domains (five on water, five on sanitation, and six on health care waste management) were monitored for 1 year employing a mixed method approach. After 1 year 67% of indicators in all three domains met minimum WASH FIT standards, indicating a significant ( $p \leq 0.01$ ) contribution to improved quality of care compared to 29% at the start in August 2018. By domain, 81% of water indicators (vs. 67% at the start), 76 vs. 24% for sanitation, and 48 vs. 33% for healthcare waste management met standards. Key informant interviews and focus group discussions affirm improvement in all three domains, including quality of care, staff satisfaction, and awareness of occupational risks and mitigation measures. Challenges remain, including limited budget, lack of leadership and absence of formal programs for improving water supply infrastructure, sanitation and health care waste management.

**Key words:** emergency, health care facility, healthcare waste management, Rohingya settlement, WASH FIT

### HIGHLIGHTS

- First successful implementation of WASH FIT in an emergency.
- Summarized key findings of changes in water, sanitation, and health care waste management domains.
- Challenges included inexperienced manpower, limitation of resources, absence of leadership, logistics, and high population density.
- Government incorporated WASH FIT 'Focal Person' and 'Facility Improvement Plan' in the 'Minimum Package of Essential Health Services'.

### ABBREVIATION

FDMN	Forcibly Displaced Myanmar Nationals
HCF	Health care facility
IPC	Infection prevention control
WASH	Water, sanitation, and hygiene
WASH FIT	Water and sanitation for health facility improvement tool
FGD	Focus group discussion
WHO	World Health Organization

## INTRODUCTION

In August 2017, more than 700,000 Rohingya refugees crossed the border from Myanmar into Bangladesh, increasing the area's refugee population to over 850,000 in July 2019 (ISCG 2019). Most of the Rohingya refugees settled in camps in Ukhiya and Teknaf Upazilas of Cox's Bazar, a district bordering Myanmar. Initially, the refugees faced various health hazards, including poor hygiene practices, overcrowding, malnutrition, low vaccination rates, and resulting outbreaks of communicable disease (OCHA Services 2019; WFP 2019). Following the influx, health sector partners in Rohingya camps constructed temporary health care facilities (HCF) in refugee settlements in response to the request for assistance from the Government of Bangladesh. Despite significant progress resulting from these efforts, public health risks persist in the area (Hsan *et al.* 2019; Ministry of Health and Family Welfare 2019).

Preliminary information collected from 140 HCFs by World Health Organization (WHO) local teams in early 2018 showed that the lack of sufficient water, sanitation, and waste management services posed a potential threat to the health of refugees and staff. These results matched previous findings that highlighted systemic inadequacies of WASH services (e.g., safe water supply, and hand washing stations at points of care with water and soap or alcohol-based hand rub), facilities and supplies in HCFs in Bangladesh (Ahmed *et al.* 2011; WHO 2015). Controlling the spread of disease and minimizing the number of healthcare-associated infections became a priority.

WHO/UNICEF Water and Sanitation for Health Facility Improvement Tool (WASH FIT) (WHO 2017) promotes a multi-step continuous development process designed to develop, monitor, and continuously improve WASH facilities and services in HCFs. WASH FIT is an adaptation of the water safety plan (WSP) approach, which is recommended in the WHO Guidelines for Drinking Water Quality as the most effective way of ensuring the continuous provision of safe drinking water (Chartier *et al.* 2014). WASH FIT extends beyond water quality and addresses other aspects of environmental health, facility management, and staff empowerment (Weber *et al.* 2018, 2019; Hirai *et al.* 2021). It also draws upon WHO's guidelines for infection prevention and control (IPC). WASH FIT provides a risk-based, continuous improvement framework that contains several ready-to-use tools to guide an improvement planning process within an HCF. WASH FIT is mainly aimed at small primary and in some instances secondary, HCFs in low-resource settings.

WASH FIT comprises a set of 'core indicators,' supplemented, where necessary, by 'additional indicators' across a set of relevant domains (water, sanitation, hygiene, health care waste management, environmental cleanliness, energy, and facility management) to enable a comprehensive WASH/IPC assessment. A facility-based committee is formed, and the members receive training on WASH FIT. The application of WASH FIT starts with the identification of deficiencies in WASH facilities and services in a HCF by assessing the core and additional indicators followed by the development of a facility improvement plan to address identified gaps in WASH FIT domains. The tool uses local expertise to give context-appropriate solutions. WASH FIT contributes to the strategic goals of Cox's Bazar health sector and relevant sustainable development goals by promoting well-being and sustainable management of water and sanitation services. WHO, in partnership with Hilfswerk der Evangelischen Kirchen Schweiz/Entraide Protestante Suisse (HEKS/EPER) piloted the WASH FIT at 21 HCFs in Cox's Bazar Rohingya Refugee settlements between August 2018 and October 2019, focusing on three priority domains as agreed by government and emergency partners.

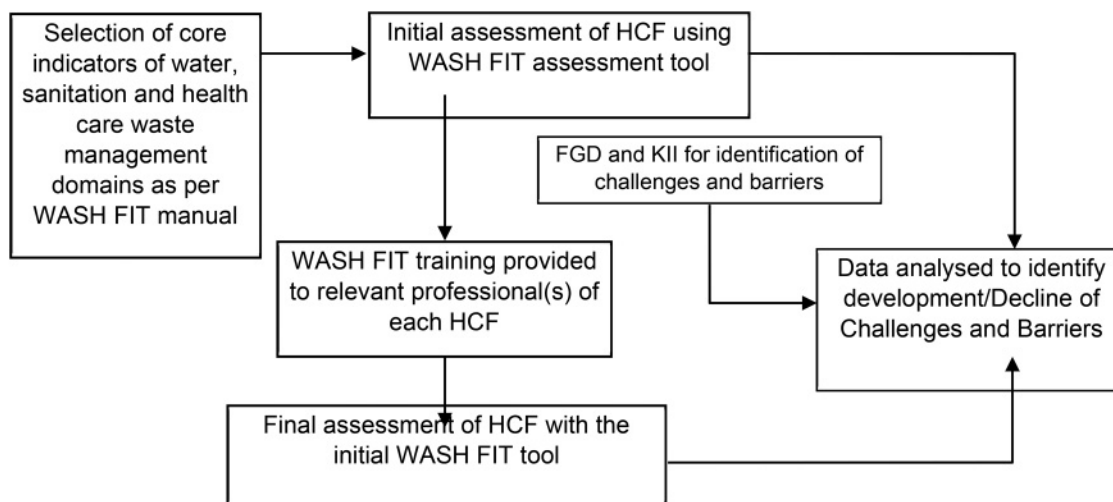
The aim of the study was to observe whether WASH FIT can be used to improve water, sanitation, and healthcare waste management in healthcare facilities in an emergency setting. This paper summarizes the key findings of the evaluation process and subsequent improvements across these three priority domains.

## METHODOLOGY

### Study design

A mixed method (Dawadi *et al.* 2021) approach of qualitative and quantitative data collection and analysis was applied. WASH FIT core indicators were used for quantitative data collection and key informant interviews and focus group discussions (FGD) were used as the qualitative component of the study. A sample of 21 healthcare facilities were purposively selected (Palys 2008) considering willingness to participate in WASH FIT implementation in Forcibly Displaced Myanmar National (FDMN) settlements in Cox's Bazar district. The study design is presented in Figure 1.

Figure 1 indicates that all selected healthcare facilities were assessed with the WASH FIT indicator checklist at baseline. This contained 16 core WASH FIT indicators across 3 domains: 5 on water, 5 on sanitation, and 6 on health care waste management, as per the WASH FIT manual. The study team conducted the quantitative assessment using the WASH FIT



**Figure 1** | Schematic presentation of the study design (number of healthcare = 21).

indicator list. The same assessment team conducted a face-to-face discussion with each facility's manager. Data collection took 1 month for all 21 HCFs.

After the baseline assessment, WASH FIT training was provided from a centralized location to at least two staff members (including the facility manager, physician, or the health care waste management focal point) from each of the selected HCFs in August 2018. The trainees formed a facility-based WASH FIT committee with three to five members, including the facility manager, medical doctor, and IPC/WASH focal person. Each WASH FIT committee conducted a detailed walk-through assessment of their own facility including patient care areas, water supply and storage infrastructure, sanitation facilities, and health care waste management facilities using common assessment indicators. The committee prepared improvement plans based on the results of the walk-through. No external funds were received for the implementation of these plans.

After 12–14 months (October 2019), the WASH FIT committee reassessed the HCFs using the same WASH FIT indicator checklist. Facility managers were interviewed using a semi-structured interview questionnaire, and a focus group discussion was conducted with the WASH FIT committee in each of the selected HCFs to identify successes and barriers to making improvements.

### Characteristics of selected healthcare facilities

Hospitals ( $n = 3$ ), primary health care (PHC) centers ( $n = 8$ ), a specialized sexual and reproductive health care facility ( $n = 1$ ), and health posts (HP) ( $n = 9$ ) were chosen as indicative of the many types of HCFs in the camp. A range of national and international health sector partners were responsible for managing these facilities. Each of the HPs had an average of 100 consultations. The average daily attendance at PHC and hospitals was 180 and 250, respectively, according to facility patient databases. The HPs had an average of 11 medical and non-medical professionals, 3 support personnel, and 1 cleaner; PHCs had an average of 50–60 staff, with 10 medical doctors, 3 cleaners, and the remainder a mix of clinical and non-clinical staff. Service hours were limited for most facilities from 9 am to 4 pm because of the Government's security requirements for all persons from outside the settlement to leave before dark. Only the PHCs functioned 24/7.

### WASH FIT training

The training was based on the WASH FIT manual (Annex 4) and provided participants with information on the technical elements of water, sanitation, healthcare waste management and facility management, including how to achieve the minimum standards. A team of experts (WASH engineer, health care waste management expert, IPC specialist and management professionals) delivered the training. The 4-day training was comprised of classroom sessions for 2 days followed by practical orientation. A total of 42 persons received the training.

### WASH FIT assessment team and data collection

The WASH FIT assessment team was composed of a doctor, a healthcare waste management professional and a water supply engineer specialized in relevant WASH FIT domains. The WASH FIT assessment team members received an orientation on the WASH FIT indicator checklist (Annex 1), key informant interview questionnaire (Annex 2), and focus group discussion guidelines (Annex 3). Face-to-face discussions coupled with observations were used to collect information as per the WASH FIT indicator checklist (Appendix 1) for both the baseline and end-line assessment (conducted after a period of 12–14 months). The Facility Manager, Medical Officer and Medical Waste Management Focal at each HCF were interviewed. All assessments (baseline and end line), were completed within a 1-month timeframe. A member of the assessment team facilitated the FGD using the FGD guidelines. FGD participants were randomly selected from a mixed group of nurses, cleaners, patients, and members of the community present on the day of the facility visit. On average, FGDs took approximately 120 min.

Facility managers at each HCF ( $n = 21$ ) were interviewed at the end-line to determine whether they had observed any changes in water, sanitation, and healthcare waste management services. A semi-structured questionnaire involving a rating scale was used to measure participants' perceptions of facility improvements or setbacks. The degree of improvement or setbacks was captured using a single question: 'from your experience, how would you rate the improvement or setback made in your facility? No improvement, partially improved/needs improvement and improved.' To better understand improvements made over time, participants were asked to compare the situation between the baseline and end line.

### Data analysis

Each of the WASH FIT indicators ( $n = 16$ ) was scored using a 3-point scoring system: three points for meeting standards, two points for partially meeting standards, and one point for not meeting standards. Standards were based on WHO global guidance as defined in the WASH FIT manual. All WASH FIT indicators across the three domains (water, sanitation, and healthcare waste management) were equally weighted and an aggregated HCF score was determined. Improvements were defined as any indicator which scored 3 points at the end-line, having scored 1 or 2 at baseline. A Spearman's rho correlation analysis (Statistical Packages for Social Sciences, SPSS) was conducted with the baseline and end-line scores to interpret the significance of improvement.

The qualitative data and information gathered from key informant interviews were systematically organized by theme. Interviews were thoroughly reviewed multiple times. The transcripts were read and then text fragments were analyzed to be associated with relevant codes. Qualitative data gathered from key informant interviews and FGD were organized and input into an Excel database. Most relevant answers were taken into consideration for data interpretation.

## RESULTS AND DISCUSSION

### Comparison of WASH FIT scores over time

This paper tracked improvements conservatively; only indicators which met standards (scoring 3) were counted as an improvement. Partial improvements (from 1 to 2) were not included. The scores (1, 2, or 3 points) of all indicators in all HCF (21) were summed and divided by the maximum total possible score, 48 (15 for water = 5 indicators multiplied by 3 points, 15 for sanitation = 5 indicators multiplied by 3 points, and 18 for health care waste management = 6 indicators multiplied by 3 points), of baseline and end line. The difference between the baseline and end-line scores represented the overall improvement and were presented as a percentile. Overall, indicators across all three domains improved from 29% (6 HCFs out of 21 scored 3 points across all indicators) at baseline to 67% (14 HCFs out of 21) at end-line. The improvement is statistically significant (Spearman's rho correlation coefficient was  $r = 0.54$ , significant at the 0.01 (95%) level (two-tailed)). The results of baseline and end-line assessment of WASH FIT indicators are presented in Table 1.

Water indicators improved from 67% (at baseline) to 81% (at end-line) (Table 1). The Spearman's rho correlation analysis at baseline and end line illustrated that the improvement is statistically significant ( $r = 0.532$ ) at the 0.01 (95%) level (two-tailed). Improvements made in the water domain were mainly structural, with 43% (9 out of 21) of HCFs with unprotected boreholes/tube wells at baseline to 71% (15 out of 21) with protected boreholes equipped with motorized pumps at the end line. All HCFs increased water storage capacity to meet the needs of the facility for 2 days, and reliable drinking water stations (accessible for all staff, patients, and caretakers at all times and in all locations/wards) were provided, improving from 62% of HCFs (13 out of 21) at baseline to 76% (16 out of 21) at the end-line. The water storage capacity increased from 38% of HCFs at baseline (8 out of 21) to 90% at the end-line (19 out of 21).

**Table 1** | WASH FIT indicator's baseline and end line results scoring three points for adhering to WASH FIT standards

No	Domain	WASH FIT indicators	Number of healthcare facilities meeting WASH FIT standards (n = 21)	
			August 2018 (number)	October 2019 (number)
1	Water	Improved water supply piped into the facility or on premises, and available	9	15
2		Water services available at all times and of sufficient quantity for all uses	11	17
3		A reliable drinking water station is present and accessible for staff, patients, and careers at all times and in all locations/wards	13	16
4		Drinking water is safely stored in a clean bucket/tank with cover and tap	16	20
5		Water storage is sufficient to meet the needs of the facility for 2 days	8	19
6	Sanitation	Number of available and usable toilets or improved latrines for patients	11	13
7		Toilets or improved latrines clearly separated for male and female (both patient and service provider)	5	16
8		At least one toilet or improved latrine provides the means to manage menstrual hygiene needs	5	16
9		At least one toilet meets the needs of people with reduced mobility	7	8
10		Functioning hand hygiene stations within 5 m of latrines	14	19
11		Health care waste management	A trained person is responsible for the management of health care waste in the health care facility	9
12	Functional waste collection containers in close proximity to all waste generation points for: non-infectious (general) waste, infectious waste and sharps waste		11	20
13	Waste correctly segregated at all waste generation points		8	19
14	Functional burial pit/fenced waste dump or municipal pick-up available for disposal of non-infectious (non-hazardous/general) waste		12	14
15	Incinerator or alternative treatment technology for the treatment of infectious and sharp waste is functional and of a sufficient capacity		4	9
16		Sufficient energy available for incineration or alternative treatment technology	6	7

**Q11**

The findings show that water service provision improved to a variable degree across the five target indicators. Similar results of the implementation of WASH FIT have been reported elsewhere (Subramaniam & Selvavinayagam 2018). All 21 HCFs improved the type of water source, plumbing system, storage capacity, and accessibility of water to staff and patients. Most of the health facilities reported that they do not suffer from water shortages throughout the year, however, some HCFs reported that they suffer severe seasonal water shortages, particularly those facilities which are positioned on the top of a hill with lower water tables in the summer. In order to guarantee the safety of drinking water supplied, routine water quality checks are of utmost importance.

Sanitation indicators showed similar improvements, improving from 24% (5 out of 21) meeting standards at baseline to 76% (16 out of 21) at the end-line, as presented in Table 1. The Spearman's rho correlation analysis of sanitation indicators at baseline and end line revealed that the improvement was statistically significant ( $r = 0.449$ ) at the 0.01 (95%) level (two-tailed). Separation of toilets for male–female and staff–patient increased from 24% (5 out of 21) at baseline to 76% (16 out of 21) at end line. Results showed that 62% (13 out of 21) of facilities offered twin pit offset toilets and septic tanks for fecal waste management. More than two-thirds of facilities (14 out of 21) constructed appropriate drainage systems to divert wastewater away, without harming nearby households. Notable improvements were found in the management of grey-water (drainage systems to divert rainwater or wash water away from households to prevent contamination), separation of latrines for staff and patients by gender, and hand washing stations with soap outside toilets and at points of care.



Unfortunately, no improvements were made to the accessibility of latrine facilities for disabled people. Further efforts are needed to address this gap.

Overall, health care waste management indicators improved from 33% at baseline (7 out of 21) to 48% at end-line (10 out of 21) (Table 1). The Spearman's rho correlation analysis of health care waste management indicators at baseline and end-line was  $r = 0.630$  at the 0.01 (95%) level (two-tailed). Forty-three percent (9 out of 21) of HCFs had a staff member trained in health care waste management at baseline compared to 76% (16 out of 21) at the end-line. Fifty-seven percent (12 out of 21) of HCF had a burial pit or fenced waste dump area compared to 67% (14 out of 21) at the end-line. Only 43% (9 out of 21) of HCFs followed the correct waste disposal methods at the end-line while at baseline it was 19% (4 HCFs out of 21).

Healthcare waste is not only hazardous to human, but also to all living organisms and the environment if not properly handled and disposed of (Subramaniam & Selvavinayagam 2018; Weber *et al.* 2018), especially in an emergency settlement such as Cox's Bazar where population density is very high. Our results indicate that this domain was least improved after the application of WASH FIT, with the lowest percentage of indicators meeting WASH FIT standards. Although facilities developed improvement plans for waste management, improvements were limited due to a lack of resources for necessary treatment technologies and logistics and the absence of a standard operating protocol (SOP) for segregation, collection, and disposal. Insufficient awareness of the need for adequate healthcare waste management was observed. Half of the HCFs practiced open burning or other unsafe practices (e.g., landfill without burning, discarding in an open environment) to dispose of sharps as well as infectious waste. Such disposal practices can cause severe adverse health and environmental impacts including unintended release of chemical or biological hazards into the natural environment (Khobragade 2019). This practice may lead to the transmission of diseases.

### Findings from key informant interviews

Prior to the implementation of WASH FIT, about two-thirds of interviewed participants reported that either their HCF's water source was located at an unsafe distance from an unsealed latrine (<10 m as per the national standard) or the tube-well platform was broken before implementing WASH FIT. Drinking water was not treated in most of the HCFs, increasing the risk of infection. In half of the HCFs, latrines did not have a septic tank and wastewater was directly discharged to adjacent communities. Two-thirds of the respondents said there were no incinerators, and infectious waste was either burned in containers or open pits or sent to landfill within the facility premises. Participants reported a range of short and long-term health problems related to these practices. During the implementation of WASH FIT, each of the 21 facility managers was trained in WASH protocols and on the risks and hazards associated with inadequate WASH services. All participants ( $n = 21$ ) acknowledged that HCFs which did not meet the standards of WASH FIT posed a serious health risk to patients and staff.

Facility managers said that the implementation of WASH FIT improved water, sanitation, and healthcare waste management infrastructure and services to varying degrees. Measures taken between the baseline and end line as a part of WASH FIT improvement plans included upgrading unprotected tube wells to protected boreholes with a motorized pump and installing improved drinking water stations at all locations that ensured staff and patients access to safe drinking water. Additionally, services such as regular water quality testing, and regular maintenance of WASH facilities assured that water was safe to use. Latrines with septic tanks and gender-segregated sanitation facilities are now available in 16 of out 21 HCFs. Likewise, functional hand hygiene stations (with water and soap) have been installed at all key locations (entry points, triage area, patient waiting area, all consultation points). Two-thirds of HCFs built incinerators and reported treating infectious waste in incinerators, making the HCF environment safer than before. Upgrades were funded by HCF's internal resource reallocation and rearrangement. Overall, two-thirds of the managers said implementing WASH FIT had made substantial improvements in their HCFs, while the remaining portion reported minor improvements.

### Focus group discussion findings

During the FGD, all participants highlighted practical challenges to providing WASH services. These included inadequate budgets, lack of infrastructure, and absence of support and leadership from senior management. Availability of budgets for WASH services varied by organization but was consistently reported as one of the major barriers to WASH FIT implementation. Staff found that even after receiving WASH FIT training, they were not able to improve WASH services due to insufficient allocation of funds.

Participants reported difficulties in meeting WASH standards due to the suboptimal layout (foundation plan) of HCF. Some modifications to the layout of HCFs were possible, e.g., reconstruction of tube wells sufficiently far from the latrine within the

HCF premises and reconstruction of wastewater drainage. Some points of care were provided with functional hand hygiene stations but participants reported that many points of care were still to be modified. On leadership, participants noted insufficient leadership or commitment to enhance WASH in HCFs from senior management. Senior management of Local Government, and the Health Sector Coordination committee. They also reported experiencing a hierarchical organizational work culture and centralized decision-making process which reduced staff autonomy to make improvements, thus delaying progress. Some of the participants noted limited availability of personnel and time to perform the improvement activities (WASH FIT committee meetings, supervision and monitoring, and environmental cleaning) and an increased workload that was imposed on staff. Moreover, in one-third of the cases, staff reported that waste management focal persons were not trained sufficiently.

The WASH FIT framework is highly dependent on the functionality of facility-based committees. In almost all cases committees were found functional after the end line. Most of the facilities have a designated waste management focal person; however, they felt that the number of cleaning staff was insufficient. Facility managers of each of the study HCFs highlighted the issue of collective planning, and systematic design of improvement plans, and appreciated engaging all staff and community in the WASH FIT process. Based on experiences from the use of WASH FIT, health sector partners, under the leadership of the Government of Bangladesh, have included having a WASH FIT focal person and facility improvement plan as a component of the 'Minimum Package of Essential Health Services for Primary Healthcare Facilities in the FDMN/Rohingya Refugee Camps'.

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## CONCLUSION

To date, WASH FIT implementation in healthcare facilities in emergency settings is not widely documented. It should be noted that there are very few publications on WASH FIT implementation because the approach is still relatively new. WASH FIT is an effective intervention for improving the quality of health care services in an emergency setting. It allows healthcare facilities to undertake a process of continuous assessment, development and implementation of an improvement plan, motivate healthcare facility professionals to apply resource reallocation rearrangement, and provides technical guidance for managing and improving water supply, sanitation and waste management infrastructure. The implementation of WASH FIT created an enabling environment among the staff of healthcare facilities for the improvement of the quality of healthcare. Staff noted that it also motivated them to provide better services. Despite the observed improvement after the WASH FIT training, significant challenges and barriers remain for all HCFs. These include a lack of resource allocation, leadership, and attitudes of senior management towards WASH FIT implementation. The challenges observed in this protracted emergency are quite similar to a non-emergency setting. This challenge can be overcome by partnering with organizations working in the field of water supply, sanitation, hygiene and waste management in the Rohingya refugee camp and through the provision of staff training, awareness raising, additional financial resources and technical expertise. To sustain improvements over time, adequate funding and leadership from senior management is essential.

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## LIMITATIONS

Some of the limitations of the study were (i) the study considered the total improvement of indicators of the water supply, sanitation, and healthcare waste management domain of the HCF, but it did not capture partial improvements, (ii) the duration of the study was short, (iii) sample size was small and (iv) only a subset of the full WASH FIT indicators was assessed.

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## PARTICIPANT'S CONSENT

Each participant who attended an event gave their verbal consent, and their presence was recorded in the participant's attendance register. Since the study was carried out in an emergency and featured no direct involvement of human elements,

there was no need for ethics approval. The Health Coordinator of Refugee Relief and Repatriation Commissioner, Cox's Bazar, Bangladesh approved the manuscript.

## AUTHORS CONTRIBUTION

A.K. and E.E. provided necessary input in the study design, analysis, interpretation of data, drafted, edited, and reviewed the article critically and provided input where necessary. M.S.M. supported for acquisition of data, analysis, interpretation and drafting of the article. W.B.A. supported the preparation of the study design, analysis, interpretation of data. H.M.A., B.A.T.M.R.H. and A.H. provided input where necessary.

## DISCLAIMER

The authors alone are responsible for the views expressed in this article, and they do not necessarily represent the views, decisions, and policies of the institution with which they are affiliated.

## DATA AVAILABILITY STATEMENT

All relevant data are included in the paper or its Supplementary Information.

## CONFLICT OF INTEREST

The authors declare there is no conflict.

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