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Providing Health Care in Humanitarian Crises: A Field Report from an NGO's Response to the 2022 Pakistan Flooding

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Abstract

After Pakistan was hit with disastrous floods in 2022, health care needs and delivery were severely compromised. This prompted the Humanity Initiative, an organization of medical students from Karachi to conduct 15 medical camps, facilitating over 15 000 displaced individuals. The severity and extent of the natural disaster coupled with limited resources uncovered unique challenges. Assessment of interventions was based on objective evaluations and periodically conducted discussions, with essential findings focusing on flexibility, adaptability, active community involvement, and sustainable health goals. In conclusion, the response underscores the importance of coordinated action and emphasizes future disaster management strategies.

Specific Event Identifiers

- Event Type: Floods, Landslides
- Event Onset Date: June, 2022
- Location of Event: 23 districts in Sindh
- Geographic Coordinates: 25.8943° N, 68.5247° E
- Dates of Observation Reported: August 1, 2022-December 31, 2022
- Response Type: Public Health Response

In the summer of 2022, Pakistan faced one of the most catastrophic floods in the country's history, submerging nearly one-third of the country underwater. Nearly a million people were affected in various regions of Sindh and Balochistan provinces, incurring a loss of 30 billion dollars, destroying 200 000 homes and 10 000 schools, with 1000 documented deaths.[1] In Sindh, 23 districts were affected, resulting in 239 fatalities, while 263 fatalities were reported in Balochistan. Due to the massive destruction, an estimate suggests over half a million people were displaced in flood relief camps across the country.[2] With the unstable health care system and the people in dire need of help, it was the duty of the government, various NGOs, and the Pakistani community to step up and provide a relief effort.

In this field report, the inner workings of one such relief effort initiated by a group of medical students in Karachi, the Humanity Initiative, will be discussed.

The objective of this field report is to provide an overview of the health care response to the 2022 floods in Sindh, Pakistan, while exploring the medical camps established and utilized to deliver care for displaced populations in the aftermath of the disaster. Moreover, by sharing these experiences, this study will critically analyze the role of the health system in addressing extreme weather events and the challenges encountered while investigating the strategies implemented to overcome these challenges. It is pertinent to note that Pakistan is ranked eighth in the world in countries most vulnerable to long-term climate risk; thus, it is imperative to formulate a strategy on how to respond effectively to disasters and mobilize resources to help people in need. The study hopes to contribute to that discussion with this report.[3]

Narrative

From August 2022-December 2022, Humanity Initiative, in collaboration with local organizations and health care professionals, implemented a series of 15 medical camps in diverse flood-affected regions within the Sindh province. The team consisted of medical students, doctors, and nurses, who generously volunteered their time and expertise to staff these camps. The primary objective of these medical camps was to offer basic medical check-ups, dispense medications, and make referrals to specialized tertiary care hospitals if required. Additionally, menstrual hygiene products, clean water sources, nutritional supplements, and mosquito nets were mitigated to reduce the risk of disease transmission. Throughout the relief operations, over 10 000 individuals received medical supplies or treatment according to estimates.

The first medical camp was set up in response to a distress call from a local social worker in Naushero Feroze, a town at the heart of the flooded lands. Various health stations were established to provide comprehensive health coverage, including emergency services and referrals, patient registration and triage, wound care, pharmacy, and counseling. Doctors stationed at the basic health station conducted thorough histories and examinations using available equipment and documented their findings on the data collection sheet. They also formulated provisional diagnoses and treatment plans for each patient, after which patients were counseled appropriately and provided with the required medications. Figure 1 shows a detailed view of how the stations were set up during the camps.

By strategically organizing and managing these stations, the aim was to deliver holistic health care services during the emergency medical camps. The collaboration between medical professionals, students, and volunteers ensured the provision of timely and appropriate care to individuals affected by floods, fostering their well-being and recovery.

To address community health behavior and practices, active education and counseling were done alongside camps. A comprehensive approach was adopted to cater to the diverse needs of various members of the community, including essential food and water provision to the pediatric population, and menstrual products for females.

Data collection in emergency camps can be challenging due to the focus shifting towards health service delivery. However, gathering key data is crucial to maximize the impact of service provision, efficacy, and future responses. The data collection form captured key health indicators (Figure 2). These included demographic information, medical history, presenting symptoms, vital signs, and treatment plans. The supervising doctor finalized the provisional diagnosis and plan, which may include an intervention such as wound dressing, prescription of medications, as well as orders for investigations.

Overall, the streamlined data collection process proved effective in gathering key data points while minimizing the burden on the volunteers and resources. These experiences highlight the importance of comprehensive data collection in emergency medical camps, which can inform future responses and improve health outcomes in disaster-affected populations (Table 1a and 1b).

This field report is based upon one primary data stream: the dissemination of health assessment forms and the examination of pertinent documents and reports.

A total of 451 completed forms were collected and digitized, helping provide an overview of the common complaints faced, demographics treated, and medicines dispensed. While more than 10 000 of those affected were cumulatively treated across 15 camps, data for all patients could not be digitized, as many forms were lost or incompletely filled. This was due to myriad reasons, such as flood water destruction, lack of manpower, overwhelming patient load, and time constraints. Only complete forms reporting all categories were included for the purposes of this study, providing an overview of patients across all 15 camps. Any incomplete or missing forms were not considered for this report.

Conducting impact assessments presented a significant challenge due to the urgent nature of flood relief camps. The priority was to provide essential care to the distressed public, which limited the ability to conduct comprehensive evaluations. However, it was imperative to employ methods that assessed the long-term impact and effectiveness of these efforts.

Three primary methods were utilized to assess the impact of the relief efforts:

1. Focus Group Discussions (FGDs):

   Following each camp, a small group discussion was held, consisting of 10-15 individuals from different families within the community. Specific inquiries were made regarding the general experience, the medications provided, the specialties covered, and the attitudes/expertise of the volunteers. Participant opinions were carefully recorded, and the data was meticulously reviewed and analyzed to make improvements for the next camp.

2. Objective Evaluation:

   Quantifying the impact using numerical values. For example, the number of malaria tests conducted and the percentage of positive test results for the parasite were recorded. A positive

		Stations									
		Anthropometry			Vitals			Systemic			
		Height	Weight	MUAC, FOC	BP	SpO2, Pulse	Temp	ENT + mouth + eye	CNS, Motor exam	CVS, Resp, abdomen exam	Hygiene
Age groups	Neonates, infants	Inch tape*	Neonatal Weighing scale	Inch tape	NA	Pulse oximeter	Digital and mercury Thermometer	Tongue depressor, Headlight, otoscope, ophthalmoscope	Reflex hammer, torch light	Paediatric Stethoscope	Sanitizers, Gloves, napkins, Masks, band aid, antiseptic liquids
	<5-year-old	Inch tape on a wall	Weighing scale	NA	Digital BP apparatus with different cuff size					Stethoscope with diaphragm and bell	
	Adolescents, teens <18										
	Adults (18-59)										
	Aged (60 and above)										

Figure 1. Station setup and equipment used for the medical camps.

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CNIC: _____ Name: _____
Age: _____ Gender: M / F Marital Status: Single / Married / Div/Sep/ Widowed
Occupation: Former source of income: _____ Village: _____
Facilities accessed: Ration / Medical facilities / Clothing / Shelter/Tent/ Other:_____
Losses: Property/Infrastructural Damage / Cattle / Crops/ Source of income / Life / _____
Number of Family members: _____ Children: _____ Female: _____ <5: _____
Childrens' Immunization: Complete in All / Complete in some / Incomplete / None

Anthropometry:
Height: (cm): _____ Weight (Kg): _____ Mean upper arm circumference (cm) _____

Vitals:
Respiratory rate: _____ BP: _____ Temperature: ___ C Pulse: _____ SpO_2_____

Wong-Baker FACES™ Pain Rating Scale

Pain: Y / N score: _____/10

Presenting complaints:
☐ Body aches/Generalized weakness ☐ Rash (Bacterial) ☐ Rash (Fungal) ☐ Rash (Scabies)
☐ Rash (could not determine) ☐ Fever: undocumented or documented
☐ Diarrhea ☐ Dysentery ☐ Abdominal pain ☐ Vomiting ☐ Otalgia ☐ Ear infection ☐ Chills
☐ Could not verbalize/Non-comprehendable/Fake symptoms ☐ _____

Details about problems: _____
_____
_____
_____
Past Medical History: _____
Past Surgical History: _____
Current Medications: _____
MP ICT: If done: Not done/ Positive / Negative
Last Menstrual Period: _____
Pregnancy: Yes / No / Not Sure Gravida _____ Para _____
Trimester:1st / 2nd / 3rd Expected Delivery Date: _____

Examination Findings: _____
_____
Assessment: _____
Treatment: _____

Figure 2. Data collection form used during the camps.

test indicated early detection of a potentially life-threatening disease; this outcome demonstrated the success of the testing efforts. The number of diagnosed diseases were classified based on their severity and the urgency of required treatment. Diseases with greater severity were assigned higher points, while those with higher urgency and likelihood of responding to treatment received more points. Overall camp scores were determined using this scoring system.

3. Referrals:

Referral numbers and successful management rates were recorded to assess camp effectiveness.

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While this paper presents the initial quantitative results of these camps, future studies will focus on impact assessments of these camps.

Results

The total number of patients was (n = 451, 100%), including 227 (50.3%) pediatric and 224 (49.7%) adult patients. The female-to-male ratio was higher in both groups, with 64.8% females in pediatrics and 83.0% females in adults. The mean weight of the pediatric patients was reported to be 17.3 Kg (11.7-24.9) while the mean weight in adults was reported to be 42.5 Kg [24.3-49.3]. The complete demographics and results are provided in Table 1 (1a and 1b). Constitutional symptoms (fever, body-ache, and fatigue) were the most reported symptoms, occurring in 43.68% of patients (n = 196). Gastrointestinal (n = 85), multisystemic (n = 53), and dermatological (n = 49) were other commonly reported complaints (Table 2).

Table 2. Classification of presenting complaints into major categories for the entire population

Presenting complaint category	N = 451 n (%)
Pulmonary	24 (5.32)
Gastrointestinal	85 (18.84)
Dermatology	49 (10.86)
ENT	12 (2.66)
MSK	17 (3.76)
Constitutional*	196 (43.68)
Nephrology	15 (3.32)
Multisystemic**	53 (11.75)

Key:
*Defined as generalized symptoms of fever, body aches, and fatigue which are primarily associated with infectious diseases such as dengue and malaria.
**Defined as more than 1 presenting complaint falling under 2 or more systems/categories.

Discussion

Among the massive debris of the floods, Pakistan's already crippling healthcare system took a massive toll, with approximately 888 health care facilities damaged. With only 0.6 beds available for every 1000 people, the health care system struggled to meet the medical needs of flood victims.[4] Due to unsanitary conditions, outbreaks of vector- and waterborne diseases like malaria and typhoid grew exponentially, and rising food insecurity levels caused Pakistan to be classified as a "hotspot with very high concern."[5]

The long-term socioeconomic impact of the floods was also detrimental, disproportionately affecting women and children.[6] A rapid assessment conducted after the 2022 floods reported that 69% of girls were unable to continue their education, and 77% of women were unable to access adequate reproductive and sexual health care services.[7] Moreover, due to various cultural and societal norms of certain ethnic groups in the region, women's health-seeking behavior is often overlooked, impacting their general health. A study conducted in rural Sindh identified various barriers to seeking medical health for females including limited female autonomy in financial decisions, restrictions on independent travel, lower prioritization of women's health care spending and shortage of female health care providers. Keeping this in mind, women in disaster-stricken areas may have multiple undiagnosed comorbidities that make them susceptible to infections, leading to poor health outcomes.[8]

On the contrary, our data suggested that more females than males were treated during these relief efforts, which helped alleviate the burden of health care for this underserved population. The decision to include more female health care workers in the camp personnel may well have served instrumental in achieving this feat. Not only does this signify that the floods may have disproportionately affected women, it also underscores the critical role of targeted relief efforts in bridging health care access gaps for vulnerable populations, particularly in disaster-stricken regions.

Moreover, there was a significant exacerbation in the transmission of various infectious diseases, including cholera, dysentery, dengue fever, malaria, polio, and skin infections, creating a public health crisis that overwhelmed health care resources.[9] The constitutional symptoms (fever, body-ache, and fatigue) recorded in almost 44% of patients aligned with symptoms of dengue and malaria, 2 deadly vector-borne diseases that surged as a consequence of the floods.[10,11] Large expanses of stagnant flood waters have shown to serve as ideal breeding grounds for mosquitos, leading to a dramatic increase in dengue and malaria cases in 2022. The number of confirmed malaria cases in Sindh province were up more than 3 times to 69 123 in August 2022 as compared to 19 826 in August 2021.[12] This sharp rise in vector-borne diseases highlights the urgent need for integrated vector control strategies and enhanced surveillance for future outbreaks in flood-affected regions.

The significant incidence of gastrointestinal disorders is consistent with numerous studies, indicating a rise in waterborne diseases in flood-impacted areas, primarily due to contaminated water supplies and inadequate sanitation.[13] This environmental contamination fostered conditions conducive to the fecal-oral transmission of pathogens, especially among displaced populations residing in temporary shelters with limited access to clean water. According to the Provincial Disaster Management Authority report, more than 5 million people lacked access to safe

Table 1a. Demographics of sample population pediatrics (<18)

Variable	N = 227 n (%), median [IQR]
Age (years)	6.5 [4–11]
Males	80 (35.2)
Females	147 (64.8)
Weight (kg)	17.3 [11.7–24.9]
Height (cm)	109 [81–130]

Table 1b. Demographics of sample population Adults (>18)

Variable	N = 224 n (%), median [IQR]
Age (years)	40 [25–55]
Males	38 (16.9)
Females	186 (83.0)
Weight (kg)	42.5 [24.3–49.3]
Height (cm)	126 [118–144]

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drinking water, coupled with 7 million children and women needing immediate nutrition assistance and from June 2022-September 2022; 149 551 cases of diarrheal disease were reported.[14] These findings emphasize the critical need for rapid deployment of hygiene interventions to prevent future outbreaks in disaster-affected populations.

Furthermore, the multisystemic health cases (11.75%) likely reflect complex interactions involving malnutrition, concurrent infections, and pre-existing chronic health vulnerabilities, aggravated by the flooding. Food insecurity impacted approximately 8.62 million individuals in the affected regions, with over 1 in 9 children under 5 experiencing severe acute malnutrition in Sindh and Balochistan, increasing their susceptibility to various diseases.[13]

The NGO demonstrated adaptability by responding to the evolving needs of affected populations and integrating lessons learned from each camp and visit. For instance, after observing a high prevalence of constitutional symptoms such as fever, the organization increased the supply of antipyretics in its pharmacy. Similarly, in response to widespread skin infections in flood-affected areas, additional topical antifungal and antibiotic creams were procured. By the tenth medical camp, the number of rapid malaria and dengue testing kits was doubled to meet the rising demand. Additionally, the surge in mosquito-borne infections led to the inclusion of essential preventive measures, such as mosquito nets and repellents, in relief efforts. This approach exemplifies feedback-driven action, which is crucial for effective public health response during crises.

These medical camps aimed to provide free health care to flood-affected rural communities. With the provision of complementary health care, an overall improvement in health outcomes was observed. From relieving illness burdens to faster recovery and better management of chronic illnesses, the medical camps filled the gap in health care service delivery by bringing health care services directly to inaccessible rural areas, providing essential care. At the camps, transition efforts included referrals to nearby secondary or tertiary health care facilities and counseling the public on self-preventive measures. However, the feasibility of the referral process remained a challenge due to a lack of government funding. Key strategies to improve the transition include partnering with government facilities and establishing strong referral networks.

Moving forward, technology through telemedicine, broadcasting services, and remote diagnostics can be an integral tool to deliver quality health care to various disaster-stricken regions. Deploying early warning systems to help evacuate communities and establishing continuity of care in remote or damaged areas can assist in health care delivery. However, limited or absent internet connectivity in rural areas – further exacerbated in the aftermath of natural disasters – would pose significant barriers to the implementation of such technology. A study conducted in the remote areas of the Balochistan province recounted how collapse of the already frail telecom infrastructure posed extreme difficulties in the implementation of telemedicine facilities.[15]

Organizing these large-scale camps[16] presented with their own set of pertinent challenges and limitations. Firstly, the data collected was a cumulative of 15 medical camps and was not a complete representation of the response conducted in the entire province of Sindh. Owing to constrained resources and manpower, the data collected does not represent the entirety of the catchment population that was helped via these relief camps – which was far more than the reported number ($n = 451$). Moreover, social, cultural, and language barriers influenced health care delivery, impacting patient comfort and the examination process. This highlighted the importance of effective coordination, cultural sensitivity, and safe practices.

Conclusion

The Humanity Initiative's response to the 2022 flooding in Pakistan serves as an educational model, emphasizing the significance of meticulous planning, coordination, and collaboration in health care delivery during humanitarian crises. By sharing these experiences, the organization aims to contribute to the improvement of disaster response, especially in resource-constrained settings.

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Data availability. The data that support the findings of this study are available from the corresponding author, SMA, upon reasonable request.

Author contribution. SMA, AN, MSQ, FAK, MI contributed to the writing the manuscript; SMA, MSQ, FAK, MI reviewed the manuscript; SMA, AN formulated the figures; SMA did literature review; The authors declare that data supporting the findings of this study are available within the article; The article is the author(s) original work; The article has not received prior publication and is not under consideration for publication elsewhere; All the authors have seen and approved the manuscript being submitted; The author(s) abide by the copyright terms and conditions of publishing journal.

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