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Public Health and Health System's Responsiveness During the 2022 Floods in Pakistan: What Needs to Be Done?

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Original Research

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Abstract

Objective: In 2022, Pakistan witnessed unprecedented flooding, submerging one-third of the country under-water, ruining millions of houses, taking lives, afflicted injuries, and displacing scores of people. Our study documents not only the public health problems that have arisen due to this natural calamity but also the state of health systems' response.

Methods: We conducted a qualitative study asking key questions around prevalent health problems, health-care seeking, government's response, resource mobilization, and roadmap for the future. We purposively selected 16 key frontline health workers for in-depth interviews.

Results: Waterborne and infectious diseases were rampant posing huge public health challenges. Disaster mitigation efforts and relief operations were delayed and not at scale to cover the entire affected population. Moreover, a weak economy, poverty, and insufficient livelihoods compounded the tribulations of floods. Issues of leadership and governance at state level resulted in disorganized efforts and response.

Conclusions: Pakistan is famous for its philanthropy; however, lack of transparency and accountability, the actual benefits seldom reach the beneficiaries. Such climatic disasters necessitate a more holistic approach and a greater responsiveness of the health system. In addition to health services, the state must respond to financial, social, and infrastructural needs of the people suffering from the calamity.

Natural disasters have shaped human history, livelihoods, and the state of health and mental well-being.[1] These disasters occur at periodic intervals, yet they always surprise humankind with their extent and severity thresholds. Stories of floods and earthquakes have consistently challenged and inspired people. The stories of great floods in ancient Sumerian and Babylonian culture represent some of the earliest accounts of how humans have perceived natural disasters and how these disasters, in turn, have helped societies improve their resilience.[2] With the exponential increase in human populations, we have begun to inhabit regions and areas previously considered uninhabitable. This has significantly increased the potential for loss of life and property when faced with natural disasters. This risk has been further exacerbated by rapid climatic changes, increasing the likelihood of casualties and economic challenges.[3] Unfortunately, natural disasters have a disproportionate impact on various developing countries. A recent study documents that natural disasters cause more loss of life, economic damage, and opportunities in countries with fragile socio-economic levels and inadequate infrastructures.[4] Many countries' economies have been affected by disruptions to travel, tourism, and trade.[5]

The primary focus of the current study is to underscore the impact of natural disasters on countries with relatively weaker health systems. Since gaining independence in 1947, Pakistan has consistently grappled with natural calamities. In the past 2 decades alone, the country has endured more than 12 major floods, which have left a profound mark on the lives and health of its people. Between mid-June and September 2022, Pakistan experienced unprecedented flooding, resulting in the destruction of 2 million homes, 1600 fatalities, 12,850 injuries, and the displacement of 7.9 million people. Approximately 598,000 individuals are currently residing in relief camps, and 83,000 pregnant women, affected by the floods, are expected to give birth in the coming months. Moreover, the floods have devastated around 1460 health facilities.[6] Pakistan has faced similar circumstances in the past due to its location in a region adversely affected by climate change. Many lessons were learned during the floods in 2010. Public awareness of climate change is on the rise with each subsequent natural calamity, but institutional responsiveness continues to be characterized by an extremely reactionary approach. The central focus of this current study is to illuminate the aftermath of natural disasters in countries with relatively weaker health systems, and Pakistan is no exception. Therefore, this study is

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Table 1. Demographic details of study participants

Subject no.	Age (y)	Designation	Organization type	Years of experience	Days spent in the field	Region served
1.	25	Health Professional	Private /NGO	2	2	Khyber Pakhtunkhwa
2.	27	Health Professional	Private /NGO	3	7	Khyber Pakhtunkhwa
3.	35	Health Professional	Public sector	11	16	Punjab
4.	34	Health Professional	Volunteer	11	17	Khyber Pakhtunkhwa
5.	29	Logistics officer	Public Sector	5	12	Sindh
6.	54	Health Professional	Public Sector	28	15	Sindh
7.	31	Health Professional	Volunteer	6	54	Punjab
8.	27	Health Professional	Volunteer	3	15	Punjab
9.	28	Health Professional	Private sector/NGO	3	7	Punjab
10.	29	M&E officer	Private sector/NGO	5	14	Punjab
11.	28	Health Professional	Volunteer	3	7	Punjab
12.	29	Health Professional	Volunteer	4	15	Sindh
13.	40	Coordination officer	Private sector/NGO	16	28	Baluchistan
14.	39	Health Professional	Private sector/NGO	15	12	Baluchistan
15.	31	Health Professional	Public Sector	6	15	Baluchistan
16.	36	Procurement officer	Volunteer	11	19	Baluchistan

conducted to document not only the public health problems stemming from this natural calamity but also the response of the health system.

Methods

We conducted a qualitative study using a phenomenological theoretical framework, and conducted in-depth interviews with 16 key informants who had been working on the frontlines of the floods in Pakistan, during August and September 2022. We reached data saturation after 16 interviews. The respondents were selected by those with experience in disaster response (see Table 1 for details). Based on the lessons and experiences and lessons from previous disasters in Pakistan, and the exposure of the research team to similar situations in the past, this methodology seemed appropriate. COREQ guidelines were used to steward the research process. The Consolidated criteria for Reporting Qualitative (COREQ) guidelines, is a useful tool that uses 32 points to formulate qualitative research.[7] The research team comprised 2 public health academicians/practitioners and 2 medical officers

After informed consent, 12 interviews were conducted face to face, while 4 were held through telephone conversations due to travel and logistic issues. Each interview conducted in English language took around 30 to 45 min. All interviews were audio-recorded, and research team members also kept notes. Each recording was transcribed verbatim within 48 h of the initial interview. Complete privacy was ensured during these interviews, and no nonparticipants were present, allowing the participants to provide contextually appropriate and accurate information. The identity of all participants remained confidential, as indicated in Table 1, throughout this research, and only the research team had access to the study data.

We used an unstructured discussion guide comprising 13 questions. These questions pertained to public health issues (including infectious diseases, noncommunicable diseases, sexual and reproductive health) observed and encountered in the field, the flood-related damage, and the response of the health system (specifically, service delivery, workforce, supply chains, disaster mitigation, and overall system responsiveness).The initial version of the discussion guide underwent a pilot test with 5 colleagues who had recently returned from a 2-d medical camp conducted in a flood-affected area. Based on their feedback and suggestions, a final, more precise study tool was developed. Data analysis was carried out manually by reviewing the transcribed data. Thematic content analysis was used, and original interview excerpts were included to provide a contextually appropriate understanding of the prevailing situation.

Most of the respondents were health-care providers. It is important to note this limitation, as including more perspectives from health-care managers, could have enhanced the strength of the evidence generated. Nevertheless, we obtained a wealth of contextually appropriate information from our respondents.

Results

Researchers interviewed 16 professionals (men: 12; women: 4) providing preventive and curative services to the affected populations. The respondents included 12 doctors and allied health professionals, 1 monitoring and evaluation expert, 2 people with a logistics and procurement backgrounds, and 1 coordination and human resource officer. They were all in the age range of 25-55 y. The response rate was 100% and no refusals were faced. The following key themes were developed as a result of data analysis, and the detailed findings have been presented in the following thematic analysis: (1) Postflood health issues, (2) Health-care seeking behaviors, (3) Weak response of the government, (4) Resource mobilization but no accountability, and (5) Preparedness for any future disaster.

Postflood Health Issues

The health problems in the populations under study, were not only caused by the direct impact of flooding, but also by the disruption of health services, the spread of communicable diseases due to stagnant water and poor living conditions for the displaced communities. One respondent who had spent more than a month in the field told us:

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Table 2. Health problems in flood-affected communities, identified by the study respondents

Subject no.	Thematic area	Main findings
1.	Problems at flood impact	• Drowning incidents • Trauma due to building collapse • Snake bites • Loss of shelter • Non-availability of clean drinking water and food supplies
2.	Infectious diseases	• Diarrheal illnesses • Acute gastroenteritis • Typhoid fever • Pediatric infections (Chickenpox, Measles, Mumps, Rubella) • Hepatitis A and E • Polio mellitus • Suspected Cholera • Scabies • Fungal and bacterial skin infections • Acute Respiratory Infections (Including COVID-19) • Urinary Tract Infections • Eye Infections • Arthropod-borne infections (Dengue fever and Malaria)
3.	Problems faced by patients of non-communicable diseases	• Disruption of Essential drug supplies • Discontinuation of health services and lack of health workforce due to damaged infrastructure • No system for monitoring and treating hypertensive, diabetic, and chronic heart and kidney diseases • Inaccessibility to health facilities due to damaged road networks • Reduced opportunities for diet control and physical activity, due to dependence on food donations • Loss of previous health records
4.	Problems faced by clients of sexual and reproductive health	• No special facilities for pregnant and laboring women • Destruction of infrastructure causing reduced opportunities for antenatal, natal and postnatal care • Disruption of family planning supplies • Increased risk of urinary tract and reproductive infections • Increased vulnerability to sexual assaults and violence • No privacy for maintaining couples' intimacy • Not enough female health providers available in flood-affected areas
5.	Issues of mental Health	• Acute stress syndrome and post traumatic stress disorder • Depression and Anxiety • No mental health professionals available in the flood-affected areas • No supplies of basic psychiatric medication • Suicides and self-harm • Lack of tolerance causing conflict situations • No room for conscious mental well-being in survival situations following disasters and calamities

> *"When we first visited the flood-affected areas of Sindh, we saw many cases of snake bites and injuries. Many people had drowned and efforts were made to locate their bodies. As the days went on, diarrhea, acute gastroenteritis and typhoid fever started to emerge. Next came the skin infections such as fungal lesions, scabies and rashes in children. These were followed by malaria and dengue fever. Due to overcrowding in the temporary settlements, respiratory infections were commonly seen."* [Health Provider-Sindh]

Another respondent shared:

> *"During our first visit, we were overwhelmed by the huge volume of patients with diarrheal diseases. We couldn't find enough dry land to set up a proper camp for administering intravenous fluids to those in need; we only had space and supplies for delivering outpatient services."* [Health Provider-Baluchistan]

Health problems identified by the respondents were divided into sub-themes including; problems at flood impact, infectious diseases, noncommunicable diseases, sexual and reproductive health (SRH), and mental health issues. The subtheme findings have been summarized in Table 2.

Health-Care Seeking Behaviors

The recent floods have given rise to numerous social issues for the affected populations, primarily residing in rural areas within a highly conservative cultural milieu. Many of these communities uphold strict gender segregation practices. However, due to the destruction and damage to their homes, they are compelled to internally migrate and reside in temporary settlements. Women have faced difficulties in accessing health-care services due to a shortage of female health professionals in the field. One of our respondents elaborated:

> *"After 2 weeks of the floods, we were the first team of doctors to reach the location with female doctors. The women had not received any health care during this duration. There was no proper place for female doctors to stay for longer periods. Hence, we could only provide services for 3 days. I saw many women crying as they requested us to stay with them; it broke my heart."* [Health Provider - Khyber Pakhtunkhwa]

There were also many issues involving sexual assaults, and other conditions adversely affecting SRH. One respondent shared:

> *"There was a lack of sanitary supplies for women, which they could not demand from the men involved in relief efforts; hence, they remained silent due to shame. Many women faced complications during pregnancy. Rural women are deprived of SRH; and these floods made it even worse."* [Coordination officer – Baluchistan]

Conservative cultural norms impact the health-care–seeking behaviors of women, making it challenging for them to seek care from male doctors. Furthermore, female doctors face significant hurdles in reaching and working in remote flood-affected areas due to inadequate infrastructure and the insecure hospital environment. One respondent narrated:

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"As a young female doctor, the most I could do was to participate in a 1-day free medical camp in the closest location to my city of residence. My family granted permission for 1 day only, and that too because we were accompanied by other doctors and colleagues. We saw more than 500 patients that day, most of whom were women and children. I was told by the community women that we were the only female doctors who had visited the village." [Health Provider - Khyber Pakhtunkhwa]

Weak Response of the Government

Several state agencies and departments are tasked with both responding to disasters and implementing systems for disaster mitigation and risk reduction. However, there is a prevailing perception that government institutions in Pakistan have historically adopted a reactive approach rather than a proactive one. One study participant elaborated:

"Disaster mitigation efforts were non-existent. The responsibility primarily lies with the local and provincial governments who were unable to assess the risks of floods and make appropriate arrangements. Their incompetence in timely planning and lack of execution of disaster mitigation efforts resulted in significant loss of infrastructure and lives. However, the local population is also responsible who had raised hotels and restaurants in areas obstructing the natural flow of river." [Health Provider - Khyber Pakhtunkhwa]

Owing to the impairment of transportation systems, road networks, and health-care infrastructure, timely service delivery to those most in need proved challenging. The government's response exhibited delay and intermittency, with a greater focus on the allure of fundraising. An evident dearth of capacity and political resolve was apparent. Conversely, the armed forces contributed wholeheartedly, engaging in rescue, relief, and rehabilitation efforts, as well as the collection of relief funds. Moreover, non-governmental organizations and other private entities made significant contributions to the relief operations.

Resource Mobilization but no Accountability

Soon after the floods, political parties, religious groups, philanthropic organizations, non-governmental organizations (NGOs), health-care establishments, and even public sector organizations started asking people for money, consumables, food items, medication, and clothing through donation collection outlets and kiosks. However, the absence of an accountability system resulted in scandals involving corrupt practices. According to a study participant:

"We saw many donation collection centers set up throughout the country, soon after the floods. However, we did not witness any cash transfers in the field. Unfortunately, there is no accountability for such philanthropic activities in Pakistan which should be a stewardship role of the government" [Health Provider - Baluchistan]

Communities most affected and in the greatest need of help were left stranded, while people from less affected localities reached the distribution sites and collected the aid being distributed. One participant shared his observation:

"Some populations were so severely stranded in water that it was impossible to reach them, and when the water receded, most of the resources had already been exhausted." [Health Provider - Sindh]

Preparedness for Any Future Disaster

The crux of recommendations put forth by the respondents goes beyond the health sector and envisages a holistic approach by the state to take on board all the stakeholders to mitigate the disaster resulting from floods and other natural catastrophes. State agencies must investigate the whole idea of disaster management holistically, including the domains such as building laws, public health engineering, food and agriculture, water and sanitation, health systems, transportation networks, disaster relief, rescue, response and reconstruction activities, and engagement of NGOs and other private entities.

A hazard becomes a disaster when it occurs in areas inhabited by people. Government must exercise its power and dominion over controlling the housing needs of the rapidly growing population. People acquire residences in disaster-prone areas, and the lack of implementation of building laws causes people to build and inhabit faulty building designs, which when faced with climatic disasters suffer from structural failures. According to 1 respondent:

"People had built hotels and markets right next to the river. They had been served eviction notices several times by the local governments but they refused to move, and now nature has perished everything they owned." [Health Provider – Khyber Pakhtunkhwa]

In specific regions, individuals were not forewarned promptly, leading to significant suffering in terms of loss of life, property, livestock, agriculture, and housing. In certain cases, a segment of residents did not give proper attention to the government's advisories. Furthermore, there were occasional instances where influential individuals manipulated the flow of water, allowing it to inundate already disadvantaged communities to protect their own lands and properties from the floods. Effective risk communication stands as the primary duty of the government to mitigate damages and destruction.

Health services, rescue and relief services, and transportation facilities should be strategically built, so that they can continue uninterrupted operations in all situations. There is also no formal training mechanism for health-care providers and relief workers. Most people working in the flood-affected areas, used their volunteerism, intellect, and trial and error to help the flood victims.

"Most of the primary health-care facilities submerged under water. Few doctors reached the hospitals by boat. If health facilities had been built in safer locations, we could have provided medical relief to the local population in a more professional manner." [Health Provider - Sindh]

Last, the government needs to develop strong systems of leadership and governance, so that all stakeholders can get together under the umbrella of the state and provide their services through professionalism, transparency, accountability, and equity.

Discussion

The destruction of property and infrastructure in areas affected by the floods was unparalleled, leading to physical injuries and psychological trauma among the affected population. Health-care providers we interviewed reported witnessing post-traumatic stress disorders, depression, and anxiety, which, in some cases, culminated in thoughts of suicide among the local residents. In 2016, floods had a similar effect, leaving behind enduring psychological repercussions alongside physical, financial, and social burdens.[8]

Public health issues have been of grave concern. Snake bites, skin diseases, and the spread of infectious diseases were seen to be escalating, in the postflood scenario. The transmission of arthropod-borne infections (malaria and dengue fever) also rose exponentially after the recent floods. According to research, Pakistan is the eighth country that has an insufficient water supply for its people.[9] The recent floods have affected natural as well as man-made reservoirs of water storage, instigating a complete

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dearth of clean drinking water, and as a result, people have no choice but to drink impure water.[10] Water and sanitation systems gave been completely shattered. Gastroenteritis, typhoid fever, and diarrhea were seen as rampant. International literature suggests a stepwise approach toward providing clean drinking water to disaster victims, none of which were being practiced in our field of observation.[11]

The challenges of maternal and child health, SRH, and family planning are well known in Pakistan.[12] The recent floods have aggravated the situation even more, and that too in the most underprivileged regions. Pregnant women and children are certainly at a higher risk of facing health problems. There is a scarcity of food, medical care, and secure shelters for marginalized groups, and the associated cultural sensitivities make things even more complicated. Recent research alluded to the fact that flood-affected areas lack female medical staff due to which women of reproductive age and expecting mothers are suffering.[13] Women's menstrual hygiene is also suffered due to a lack of sanitary pads.[14] It is also well-documented that women in flooded areas are not only deprived of basic health care but they are also suffering from gender violence.[15,16]

In addition to health concerns, the education of children is profoundly impacted due to the destruction of school buildings, resulting in emotional distress for the innocent generation. The recent floods have not only inflicted harm on lives and assets but have also exacerbated the dearth of opportunities for the affected population, particularly in the realm of education. Addressing the educational crisis requires a commensurate level of attention at the state level. The ensuing financial crisis will also curtail future educational and vocational prospects for the children of these marginalized communities.[17] The floods have wrought damage upon agriculturally productive regions and livelihoods, and thus, the repercussions are expected to be widespread, with an imminent food crisis on the horizon.[18]

Many organizations and foreign funding agencies have donated a lot of money for the recovery and rehabilitation phase in flooded areas. Unfortunately, these donations and financial inputs both local and international have been clouded by corruption and a lack of transparency.[19] In addition to improving the mechanism of financial pooling, allocation, and distribution, stronger accountability measures need to be employed.[20]

Because this research is based on a small sample size of respondents, therefore, their views and opinions may not be generalizable to the entire population affected by the floods. Researchers' bias cannot be ruled out as far selection of the respondents is concerned, as well as during the interpretation of data and transcription of the interviews.

The recent floods in Pakistan have had significant public health implications and policy implications, which are as follows.

Water-borne diseases: The floods caused the contamination of water sources, which could potentially lead to outbreaks of waterborne diseases such as cholera, typhoid fever, and hepatitis A. It is essential to ensure that the drinking water sources are safe and that the public has access to clean water.

Vector-borne diseases: The stagnant water left by the floods can become a breeding ground for mosquitoes, leading to the spread of diseases such as malaria, dengue fever and other vector-borne diseases. This could increase the risk of epidemics in the affected areas, and public health officials must take measures to prevent such outbreaks.

Women's health: Care of women for their health needs during the disaster times and the presence of female physicians/teams in disaster operations and responses is another important point that needs attention of the policy-makers.

Displacement of populations: The floods forced many people to leave their homes and live in overcrowded conditions in temporary shelters. This phenomenon has increased the risk of communicable diseases, such as respiratory infections, as well as mental health problems due to the stress and trauma of displacement.

Food insecurity: The floods led to crop loss on a large scale, which has resulted in food insecurity for affected communities. This can eventually lead to malnutrition, especially among children and pregnant women.

Policy Implications

The floods emphasize the imperative for disaster preparedness and response strategies. Provincial governments, disaster management agencies, development partners, and other stakeholders ought to collaborate to devise comprehensive plans designed to avert or alleviate the repercussions of future floods. Furthermore, it is incumbent upon policy-makers to institute measures ensuring that impacted communities maintain uninterrupted access to health care, safe drinking water, and sustenance. In conclusion, the recent floods in Pakistan have brought forth noteworthy public health and policy implications. These exigencies demand a unified and meticulously coordinated planning effort to enhance the preparedness of all institutions, enabling them to efficaciously respond and shield afflicted communities from the devastation wrought by natural calamities.

Pakistan is situated in a region highly impacted by climate change, and it is imperative that more vigorous, multi-sectoral, and collaborative endeavors be undertaken to shield the nation from such catastrophes in the future. The current requirement is for a comprehensive approach that considers all facets of the issue. Political instability often results in indifference and the absence of coherent policies for numerous national challenges. Nevertheless, with a more robust and adaptable system firmly established, one can anticipate a more effective response during emergencies of such magnitude.

Data availability statement. Primary data are available with authors and can be accessed on request.

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