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UNDERSTANDING PUBLIC HEALTH AND HEALTH SYSTEM RESPONSIVENESS DURING THE 2022 FLOODS IN SINDH: LIVED EXPERIENCES, CHALLENGES, AND THE WAY FORWARD

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Abstract

With Sindh Province suffering unequal public health effects, the 2022 floods in Pakistan set off a statewide humanitarian disaster. This qualitative study investigates the response of public health services during the floods via the lived experiences of affected populations and frontline health workers in Khairpur (Faiz Gunj, Thari Mirwah, Kotdiji) and Naushehro Feroz districts. Forty people—including displaced people, lady health professionals, civil society responders, and local healthcare administrators—were purposefully sampled and interviewed in depth. The intricate interaction between disaster impact and health system responsiveness was captured by thematically analysing data.

Results show structural and operational weaknesses such as rundown rural health facilities, insufficient mobile health units, severe lack of clean drinking water, medications, and qualified staff members, and postponed emergency response systems. Participants noted major waterborne illness epidemics including diarrhoea, malaria, and skin infections. Marginalised groups—especially women, children, and the elderly—were disproportionately impacted; women lacked reproductive health services during displacement. Consistent disparities in government, infrastructure, and inter-agency cooperation showed themselves despite NGO efforts and community resiliency.

It is recommended that the pressing need to localize health governance changes and institutionalize disaster preparedness inside Sindh's public health system to reduce next climate-induced disasters.

INTRODUCTION

One of the most terrible climate-induced catastrophes in its recent history, Pakistan had in summer 2022. Unprecedented monsoon rains—nearly three times the national 30-year average—triggered catastrophic floods across the country, with Sindh Province absorbing over 55% of the total damage (NDMA, 2022; UN OCHA, 2022). The World Bank Post-Disaster Needs Assessment (PDNA) estimates that almost 33 million people were impacted, more than 2 million homes demolished or damaged, and 1,700 deaths recorded all around the country. Of the national total, Sindh reported 746 deaths, more than 7.9 million people displaced, and 1,173 health facilities destroyed (Government of Pakistan, 2022; WHO, 2023). The effect on public health was quick and significant one. More than 8 million people in flood-affected areas needed quick health care, as underlined in WHO Situation Reports and UNICEF evaluations. Especially among displaced people without adequate

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water, sanitation, and housing, outbreaks of waterborne diseases (such as diarrhoea, cholera), vector-borne diseases (malaria, dengue), and acute respiratory infections rose. Just two months after the flood, Sindh recorded more than 134,000 diarrhoea cases, 44,000 malaria cases, and 101,000 skin diseases (Health Department Sindh, 2022). Especially in distant areas like Khairpur and Naushehro Feroz, where rural health centres were inundated, understaffed, and under-equipped, health services were greatly limited.

With the southern state of Sindh suffering the most widespread destruction, Pakistan confronted one of the most disastrous floods in its history in mid-2022. National Disaster Management Authority (NDMA, 2022) estimates that more than 33 million people nationwide were impacted, with more than 1,500 fatalities and significant damage to health systems, agriculture, and infrastructure. Sindh alone recorded around 750 deaths and the displacement of more than 7 million people, mostly in rural areas such Khairpur and Naushehro Feroz. Apart from upsetting lives, these floods really stressed an already underfunded public health system. Such environmental calamities have significant health effects. Displaced people suffer more than only physical injuries; they also run greater risk of infectious infections, mental health decline, reproductive health neglect, and hunger. Dawn and The News (2022) stated that throughout the crisis rural health centres were either inundated, understaffed, or non-functional. Social media accounts from community activists and flood survivors highlighted even more obvious deficiencies in health system responsiveness, from postponed medical relief to the lack of gender-sensitive care in temporary shelters.

Problem Statement

Although natural catastrophes are unexpected, the 2022 floods exposed systematic flaws in Sindh's rural healthcare system caused by lack of preparation and inadequate public health system response. Though there is a vital need to know the lived experiences of people immediately impacted and those front-line responders, existing studies mostly record the quantitative effects.

Research Questions

1. During the 2022 floods, how did flood-affected populations in Khairpur and Naushehro Feroz experience public health service?
2. What were the main difficulties for local health systems in reacting to the catastrophe?
3. What do frontline health professionals and community members see as required actions to enhance public health catastrophe responsiveness?

Review of Literature

Environmental catastrophes like floods pose a major danger to public health infrastructure, especially in resource-limited environments like rural Sindh. Described by the United Nations as "climate carnage," the 2022 floods in Pakistan (UN Secretary-General, 2022) mostly devastated Sindh, which saw over 466% more rain than the 30-year average during the monsoon season (Pakistan Meteorological Department, 2022). In Sindh alone, the flooding impacted about 7.9 million people; substantial damage was reported in rural areas including Khairpur and Naushehro Feroz (NDMA, 2022; UN OCHA, 2022).

Disruptions in the Health System In times of calamity

Research show time and again that calamities aggravate current flaws in public health systems, especially in rural and underprivileged areas. Large portions of the population were left without quick access to necessary health services since 1,173 health facilities were either partially or totally damaged in Sindh, according to the World Health Organisation (WHO, 2023). In District Khairpur and Naushehro Feroz, where floodwaters rendered basic health units (BHUs) and rural health centres (RHCs) inaccessible, some totally flooded others functioning without power, personnel, or medications, this situation was especially severe (Health Department Sindh, 2022).

Although quantitative statistics from WHO and the Ministry of Health offer vital macro-level insights, little research has looked at the micro-level reality of impacted communities. Our study sample, taken from the talukas of Faiz Gunj, Thari Mirwah, and Kotdiji in Khairpur, and rural areas in Naushehro Feroz, enables us to concentrate on community-level

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stories where individuals suffered long-term displacement, waterborne diseases, food insecurity, and disturbance in maternal and child health services.

Public Health Threats and Disease Burden

Surveillance post-flood by the Sindh Health Department and gathered in the illness Early Warning System (DEWS) showed an increase in illness outbreaks. Between August and October 2022, more over 18,000 instances of severe diarrhoea, 7,200 probable malaria cases, and 12,000 respiratory infections were documented in Khairpur alone (Health Department Sindh, 2022). Field reports from Médecins Sans Frontières (MSF) and the Aga Khan Health Service show that these figures match significant clean water and hygiene supply shortages, which they say are main causes of illness spread.

Women and children were especially exposed. The UNFPA estimates that floods throughout Pakistan harmed about 650,000 pregnant women, including about 70,000 in Sindh who were in dire need of maternal health services (UNFPA, 2022). Mobile health teams, on the other hand, barely reached 30 to 35% of impacted areas in Khairpur and Naushehro Feroz because of logistical and infrastructural difficulties (UN OCHA SitRep, 2022). Several social media sites like Twitter and Facebook, as well as video recordings by local journalists (Sindh TV News, 2022), drew attention to pregnant women giving birth in temporary camps lacking medical supervision.

Institutional Gaps and Community Resilience Development

Although the community demonstrated great resilience via informal support networks, mutual help, and grassroots mobilization, these initiatives fell short of closing the gap left by institutional delays. Studies on disaster response in Pakistan often highlight governance-related problems—bureaucratic delays, politicization of assistance, and inadequate government department coordination (Bhatti et al., 2021; Rehman et al., 2022). Local NGOs like the Indus Development Society and Pakistan Red Crescent Society created health camps in Khairpur, but they too reported delays in reaching flood zones caused by road damage and security clearance concerns.

Many displaced families in rural talukas such Faiz Gunj and Kotdiji were housed in schools or open fields and were without proper water, sanitation, and medications for weeks. This corresponds to UN OCHA (2022) results showing that 57% of temporary shelters in Sindh lacked latrines and just one-third had viable healthcare connections. Qualitative narratives from flood survivors shared on local social media platforms recorded the lack of female medical professionals in relief operations, hence highlighting important issues with gendered health disparities.

Literature Gap

Very few studies methodically record actual experiences and on-ground issues in particular areas such Khairpur and Naushehro Feroz in spite of government evaluations, humanitarian reports, and illness surveillance data. Even less common are studies on the viewpoints of district supervisors, vaccinators, lady health workers, and other frontline health professionals who suffered the brunt of emergency response. Aiming to highlight the intricate interaction of infrastructural, cultural, and systematic elements that formed the public health response, our study seeks to close this gap by interacting directly with 40 purposively chosen individuals from these regions.

Methodology

This paper used a qualitative research approach to investigate the lived experiences of flood-affected people and frontline health workers in the rural districts of Khairpur and Naushehro Feroz in Sindh, Pakistan. The emphasis was on recording the subtle difficulties and views of public health system responsiveness during the 2022 floods. A qualitative method was selected to permit in-depth interaction with participants' personal stories, institutional dynamics, and socio-cultural elements usually ignored in statistical evaluations.

Four rural talukas—Faiz Gunj, Thari Mirwah, and Kotdiji in District Khairpur, and chosen flood-hit union councils in District Naushehro Feroz—were used to gather data. Three main reasons guided selection of these locations: Three main factors

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guided the selection of these areas: (i) high degrees of flood-induced displacement and infrastructure damage (NDMA, 2022), (ii) incidence of disease outbreaks post-flood (Health Department Sindh, 2022), and (iii) insufficient prior documenting of public health experiences in these particular sites. Field inspections verified that every chosen location had at least 3–4 weeks of continuous floodwater, with health services either non-functional or very constrained.

Participants and Sample

Forty people who could offer rich, first-hand knowledge of the study topics were chosen using a purposive sample approach. The sample was made up of:

The sample consisted of: 20 community members (including displaced families, women carers, elderly persons, and youth volunteers); 10 frontline health workers (Lady Health Workers, vaccinators, rural dispensary staff, mobile medical teams); 5 representatives from local NGOs and civil society organisations involved in relief operations; 5 local government or health department officials at the union council or district level. Particularly for women who faced unique difficulties connected to maternal and reproductive health, special emphasis was placed on ensuring gender representation and inclusion of underprivileged voices.

Data Collection

The study employed qualitative approach to gather data from December 2022 to March 2023: Forty in-depth semi-structured interviews were conducted in Sindhi, each interview lasted 20 to 30 minutes and was audio-recorded with participant consent. To record health infrastructure conditions, service delivery patterns, and local coping mechanisms, site visits to health facilities, relief camps, and impacted areas were accompanied by observational notes.

Data was triangulated and results contextualized by means of local media stories, social media material—including Facebook community pages and WhatsApp group messages—and NGO response briefs.

Designed to investigate participants' experiences during the floods, views on the health system's responsiveness, coping strategies, and suggestions for future preparedness, interview guidelines were A local institutional ethics review board granted ethical approval; all subjects provided informed consent.

Data Analysis

Where required, all interviews were translated into English and transcribed verbatim. Recurring patterns and themes across the data were identified using a thematic analysis approach (Braun & Clarke, 2006). The five-step coding procedure was: (1) data familiarisation, (2) first code creation, (3) theme identification, (4) theme refinement, and (5) reporting.

The data was organised and managed well by taking care of protocols. Codes were created both inductively from the data and deductively from prior research on disaster response, public health, and community resilience. To investigate both similarities and differences in viewpoints, themes were examined across stakeholder groups—e.g., community people vs. health personnel.

Demographic Description

Table 1: Demographic Profile of Participants (N = 40)

Participant Category	Number (n)	Gender (M/F)	Age Range	Location	Additional Details
Community Members	20	9M / 11F	18–65 yrs	Khairpur & Naushehro Feroz	Displaced flood victims, daily wage workers, farmers
Frontline Health Workers	10	2M / 8F	24–55 yrs	Rural BHUs and mobile units	LHWs, vaccinators, dispensary staff
NGO / Civil Society Workers	5	4M / 1F	30–50 yrs	Local NGOs (IDS, PRCS, village orgs)	Relief and health camp organizers

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Participant Category	Number (n)	Gender (M/F)	Age Range	Location	Additional Details
Local Health Officials	5	5M / 0F	35–58 yrs	Union Council and District Levels	EDO Health, Supervisors, District Medical Officers
Total	40	20M / 20F	18–65 yrs		

Forty purposively chosen individuals from flood-affected rural areas in District Khairpur (Faiz Gunj, Thari Mirwah, and Kotdiji) and District Naushehro Feroz formed a varied group included in this study. The sampling sought to mirror a variety of life experiences, institutional viewpoints, and community reactions to the 2022 floods.

Community Members (n = twenty) This category comprised people immediately impacted by the floods—mostly small-scale farmers, informal labourers, and housewives who had suffered displacement, loss of livelihood, and public health disturbances. A gender-sensitive strategy guaranteed that 11 of the 20 participants—many of whom had maternal health issues and caregiving responsibilities—were women.

Frontline Health Workers—10 in number This group, which comprised Lady Health Workers (LHWs), vaccinators, and RHC/BHU officials, was the operational arm of the public health system. Reflecting the gendered character of community health care in Pakistan, most were women. During the flood situation, they offered analysis on health service deficiencies, community outreach, and logistical issues.

These individuals were connected to village-level grassroots networks as well as Indus Development Society (IDS) and Pakistan Red Crescent Society (PRCS). During the crisis, they were instrumental in community mobilisation and emergency response.

Local Health Officials (n = five): Representing the governance and policy interface, this group comprised Union Council supervisors, Executive District Officers (EDOs), and District Health Officers (DHOs). Their points of view helped clarify administrative obstacles in public health delivery during the floods, coordinating systems, and institutional constraints.

This participant mix helped to bridge both lived experience and institutional function, hence enabling a multi-stakeholder awareness of health system responsiveness. The equal gender representation also permitted more in-depth investigation of gender-specific issues and equity disparities in disaster health control.

Results

Deterioration of Infrastructure and Primary Healthcare Services

Many participants noted the breakdown of fundamental health services during and following the floods. Inundation or structural damage rendered most Basic Health Units (BHUs) and Rural Health Centres (RHCs) in Faiz Gunj, Kotdiji, and Thari Mirwah unreachable.

Our closest BHU was under water for twenty days. Another dispensary, which was congested and short on medications, was hours away on foot.

Female respondent, 34, Thari Mirwah.

Health personnel said they were operating without safety kits or protective gear; major obstacles were shortage of transportation, fuel, and medical supplies. WHO estimates that more than 1,400 health facilities in Sindh were damaged or destroyed during the floods, a condition reflected in participant stories.

Delayed Response and Widespread Disease Outbreaks

Flood-affected populations suffered outbreaks of vector-borne and waterborne diseases including malaria, gastroenteritis, skin infections, and respiratory disorders. Post-flood, Lady Health Workers (LHWs) reported a disturbing increase in dengue disease cases.

Children developed rashes all over their bodies and fever. People bathed and cooked using floodwater; there was no clean drinking water.

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Faiz Gunj, LHW

Compared to pre-flood levels, the Health Department Sindh (2022) DEWS records revealed a 400% rise in diarrhoeal cases in rural Khairpur and Naushehro Feroz. Still, medical camps were established weeks following the peak emergency, causing avoidable deaths and misery.

Neglect of Reproductive Health and Gendered Vulnerabilities

Women and girls struggled especially with privacy, menstrual control, and reproductive health care. Lack of access to maternal health treatments disproportionately affected pregnant women, which led to dangerous deliveries and maternal problems.

I gave birth in a tent with no assistance. There was no lady doctor, no clean linens, and no privacy.

Female respondent, 27, Naushehro Feroz

UNFPA (2022) estimates that nationwide over 650,000 pregnant women were affected, about 200,000 of them in Sindh. Participants also mentioned psychological stress, particularly among adolescent females as a result of school closures and lack of menstrual hygiene tools.

Systemic Disconnect, NGO Interventions, and Community Coping

Participants acknowledged how local NGOs and community volunteers helped to close gaps in public health response. Grassroots projects included hygiene kits, clean water tanks, and mobile clinics. These initiatives, meanwhile, were frequently haphazard and fleeting.

NGOs arrived and assisted us for two weeks; after that, they departed. Officials of government came once and never came back.

Male respondent, 45, Kotdiji

Citing bureaucratic delays and centralised decision-making, local health officials acknowledged unpreparedness and inadequate resource allocation. Local communities were also quite uninvolved in response plans.

We were advised to wait for district-level orders. Most individuals had either moved or healed on their own by the time medication came.

District health supervisor

This topic emphasised the importance of participatory planning and local leadership in future reactions by showing a gap between top-down emergency policies and community-grounded reality.

Summary Table: Emergent Themes and Key Findings

Theme	Key Issues Identified	Supporting Sources
Breakdown of Healthcare Infrastructure	BHU inaccessibility, staff shortages, lack of transport/medicines	WHO (2023), Interview Data
Disease Outbreaks and Delayed Response	Malaria, diarrhea, dengue outbreaks; delayed medical camps	Health Dept Sindh (2022), LHW testimonies
Gendered Health and Reproductive Gaps	Unsafe childbirth, lack of menstrual care, increased psychosocial stress among women	UNFPA (2022), Female respondents' narratives
Community Coping and Institutional Gaps	NGOs' short-term relief, poor state coordination, local resilience	Sindh TV News (2022), NGO interviews, field notes

Discussion

Particularly in the districts of Khairpur and Naushehro Feroz, the results of this qualitative research show significant shortcomings in the public health system's reaction during the 2022 floods in rural Sindh. The thematic study underlined the systematic breakdown of health infrastructure, epidemic disease outbreaks, gender-specific vulnerabilities, and the gap between community reality and top-down health governance.

The collapse of primary health care seen after the floods corresponds with past evaluations characterising Pakistan's rural health infrastructure as under-resourced and badly kept (Bhatti, Awan, & Raza, 2021). The inaccessibility of BHUs and RHCs, compounded by the lack of mobile units, protective

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gear, and trained emergency personnel, underscores the absence of climate-resilient infrastructure in disaster-prone areas. The Health Department of Sindh (2022) and NDMA (2022) reports show no pre-disaster planning or structural strengthening of health facilities, particularly in distant areas like Faiz Gunj and Thari Mirwah, despite ongoing monsoon crises over the last decade.

Consistent with WHO (2023) and UNOCHA (2022) results, the second theme—massive epidemics of malaria, diarrhoeal illnesses, and skin infections—reflects more than 8 million people in flood-affected areas who were exposed to tainted water and lacked access to medical help. Accounts of participants show how the time lapse in sending medical camps let preventable diseases develop, especially impacting children and older people. This delay in service delivery exposes not just a logistical failing but also a governance gap, because emergency response stayed reactive instead of anticipatory.

Especially for pregnant women, the unequal negative effect on women and girls reflects systematic gender invisibility in disaster preparedness and public health strategy. Though our participants claimed no access to experienced birth attendants, sanitary supplies, or gender-sensitive services in camps, UNFPA (2022) had already predicted more than 650,000 pregnant women were at danger across flood zones. This supports the study by Rehman, Shahid, and Ahmed (2022), who contended that Pakistan's disaster response system ignores gendered public health concerns. Women who are forced to give birth in tents or live without menstrual hygiene suffer greatly, which underlines the pressing need to include SRHR (Sexual and Reproductive Health and Rights) into disaster risk reduction strategies.

One important finding of this study was the disparity between institutional collapse and community resilience. Although local NGOs and volunteers acted swiftly, their efforts lacked formal backing and long-term viability. Participants saw a lack of coordination between non-state actors and district health offices, reflecting issues in earlier studies on the centralised and bureaucratic character of Pakistan's disaster response systems (Government of Pakistan & World Bank, 2022). The emphasis on short-term solutions over developing local health capabilities reveals that community-based disaster management is still not ingrained in the provincial response plan.

This paper contributes to an increasing body of qualitative research highlighting how marginalised rural communities suffer stacked vulnerabilities during environmental catastrophes. The voices from Khairpur and Naushehro Feroz underline the need of moving from crisis-driven response strategies to integrated, inclusive, and anticipatory public health governance. Policymakers have to understand the significance of lived experiences—especially those of women, frontline health workers, and local volunteers—in creating future catastrophe risk reduction and climate adaption plans.

Conclusion

Focusing on rural areas in Khairpur and Naushehro Feroz, this paper investigated the lived experiences of flood-affected people and the public health system's response during the disastrous 2022 Sindh floods. The results showed important gaps in health infrastructure, late medical responses, broad illness outbreaks, and gender-specific health concerns—especially with reproductive and mental health. Though local NGOs and health workers worked hard, the government's institutional reaction was mostly reactive and badly organised, hence marginalising groups already at danger. The study emphasises the pressing need for inclusive and locally based disaster preparedness plans that prioritise the views of frontline players, particularly women and community health workers.

Given these results, the report advocates integrating sexual and reproductive health services into disaster response plans, enhancing district-level emergency preparedness units, and building climate-resilient health infrastructure. A coordinated and fair response also depends on governments, civil society, and local communities working together more closely. Particularly for vulnerable populations, future studies should use longitudinal and participative methods to evaluate the long-term effects of environmental disasters on public health. Building sustainable, fair, and inclusive health systems in disaster-prone areas of Pakistan will depend on a study of the interaction of climate change, gender equity, and health governance.

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