Prevalence of PTSD Symptoms among Flood Affected Survivors: Access to Mental Health Services as Determinant

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ARTICLE INFO	ABSTRACT
  Corresponding Author: Fazle khaliq **Email:** fazlekhaliqpsychology@gmail.com OPEN ACCESS	**Background:** Flooding is one of the most common and devastating climate-related disasters in Pakistan, often resulting in negative psychological sequelae. One of the most prominent sequelae is post-traumatic stress disorder (PTSD), yet there is limited evidence documenting its prevalence after the floods of 2025, and especially in relation to access to mental health services. **Method:** A cross-sectional survey was conducted with 200 adult flood survivors (100 from Punjab, 100 from Khyber Pakhtunkhwa KPK). Participants completed the PTSD Checklist for DSM-5 (PCL-5), with a cut-off score of ≥33 indicating probable PTSD. Access to mental health services was explored among four domains: availability, accessibility, affordability, and acceptability. Data were analyzed using descriptive statistics, chi-square tests, and multivariable logistic regression. **Results:** The proportion of participants with probable PTSD symptoms was 38.0% (n=76/200), higher in KPK (42.0%) than Punjab (34.0%), but not statistically significant (χ^2 = 1.52, p = .217). Displaced participants were significantly more likely to screen positive for PTSD symptoms than non-displaced (45.7% compared to 20.0%; χ^2 = 12.41, p < .001). In logistic regression models, being displaced was a strong predictor of PTSD (AOR = 2.10, 95% CI [1.18–3.74], p = .012). Limited availability of services (AOR = 1.89, 95% CI [1.05–3.41], p = .032), poor accessibility (AOR = 2.24, 95% CI [1.22–4.10], p = .009), and high stigma (poor acceptability) (AOR = 2.42, 95% CI [1.32–4.45], p = .004) were each associated with PTSD symptoms. There were higher odds of males and province, but the findings were not statistically significant, while affordability was approaching significance (AOR = 1.71, 95% CI [0.96–3.05], p = .067). **Conclusion:** Among survivors of the Pakistan floods in 2025, PTSD symptoms were highly prevalent, with particularly strong associations with displacement and limited access to mental health services.

Introduction

Pakistan has suffered repeated and amplified flooding over the past two decades with climate change compounding the frequency and severity of these disasters (Ullah et al., 2025). In August 2025, unprecedented monsoon rains caused catastrophic flash flooding with widespread deaths, large-scale displacements of people, and destruction of infrastructure in areas largely in Khyber Pakhtunkhwa (Guardian News, 2025; Reuters, 2025). The flooding of August 2025 came on the heels of increased vulnerability due to climate change in general, in addition to recovering from previous climate-induced disastrous impacts such as the 2022 super floods that displaced millions and disclosed systemic failures to prepare and respond to the impacts of climate change flooding (Yousuf et al., 2023). Beyond the physical destruction flooding causes, there are deeper and often longer psychological impacts on the population being affected.

Among the mental health sequelae, PTSD is one of the most frequently reported outcomes after natural disasters, including floods (Neria et al., 2007). Meta-analyses show that the global prevalence of PTSD symptoms among flood victims is considerable, with pool prevalence estimates about 29%, although dependent on severity of exposure and time point of assessment (Golitaleb et al., 2022). Earlier studies in Pakistan following flooding events also reported high levels of PTSD, particularly among adolescents and young adults who had been directly exposed to trauma and were displaced (Yousuf et al., 2023). These findings indicate an urgent need to control the burden of PTSD symptoms among survivors of the 2025 floods.

These conditions, despite carrying a high risk for respective populations, have chronic limitations on effectively meeting needs in the mental health care system in Pakistan. The density of psychiatrists is still abysmally low (approximately 0.19 per 100,000 people), and the provision of mental health services is town-specific without integration of the approach into the health system (Dayani et al., 2024; Thompson et al., 2025). Certain innovative approaches such as task-sharing through Lady Health Workers and digital mental health interventions are being piloted (Rabbani et al., 2023; Rabbani et al., 2025), but the coverage is still insufficient for meeting the heightened needs invoked by disasters. In addition, there are barriers such as stigma, costs, transport woes, and damaged infrastructure that otherwise constrain survivors from accessing care in flood-impacted areas (Thompson et al., 2025).

Access to mental health services is thus an important determinant of PTSD outcomes in disaster settings. Global evidence indicates that timely and culturally appropriate mental health support diminishes the persistence of PTSD symptoms, whereas inability to access mental health services worsened psychological distress (Cohen et al., 2019). For Iraqi flood survivors, assessing access to the resources availability, affordability, and acceptability-geographic accessibility determining the burden of PTSD is crucial in informing disaster responses and a more integrated health system. Nonetheless, despite poignant cycles of flooding, there remains scant empirical evidence from Pakistan that puts a number on the prevalence of PTSD in the months following the last floods and includes access to mental health services as a causal factor. Such a lack of research hampers governments from efficient resource allocation and designing interventions based on the needs of disaster-affected communities.

Research Gap

While there is substantial global evidence demonstrating the connection between disasters, PTSD, and access to services, research from Pakistan is still limited. Most of the available literature is descriptive, pre-dates the most recent flooding, and does not synthesize access and its role in shaping mental health outcomes (Yousuf et al., 2023). In addition, Pakistan's healthcare system is

changing rapidly towards digital and task-sharing interventions and has not yet been evaluated considering the 2025 floods so it is very important to know about how access, or lack of access, determines PTSD symptoms among survivors so that we can inform disaster response and scale up interventions and determine policies going forward.

Aim of the Study

This study intends to:

1. Assess the prevalence of PTSD symptoms in survivors of the floods in Pakistan in 2025.
2. Examine access to mental health services (availability, accessibility, affordability, acceptability) as a determinant of the burden of PTSD symptoms.

Methodology

Research Design

This study used a cross-sectional survey design to estimate the prevalence of post-traumatic stress disorder (PTSD) symptoms of survivors of the 2025 floods in Pakistan and the relationship with access to mental health resources and PTSD symptom burden. The cross-sectional survey design was used in this study because it allows for the collection of data during the acute and early recovery phases of an impact of a disaster and identifies the determinants of psychological outcomes at the population level.

Study Setting

This study was conducted in Khyber Pakhtunkhwa (KPK) and Punjab; two of the most severely flood-affected provinces during the June-July 2025 monsoon floods. Khyber Pakhtunkhwa (KPK) experienced serious flash floods, especially in the Swat, Chitral and Dera Ismail Khan districts where significant levels of displacement and infrastructural damage were reported. Punjab had flooding predominantly in the Indus River belt, specifically in the districts of Rajanpur, Layyah and Dera Ghazi Khan, resulting in the destruction of most agricultural livelihoods. The provinces were selected jointly based on established displacing populations, and the disruption of health services described in the reports. Collectively, these two provinces presented a sample of both mountainous/flash flood contexts (KPK) and river inundation contexts (Punjab).

Study Population and Sampling

Sample Size

The minimum sample size required was estimated using a 95% confidence level, with a 5% margin of error, and using a PTSD prevalence of 30% based on earlier flood related studies (Golitaleb et al., 2022). We arrived at a minimum sample size of about 85 participants per province. This was rounded to 100 in KPK and 100 in Punjab, for a total sample size of 200 participants.

Sampling Technique

A multistage cluster sampling technique was used to select respondents for the study. The first stage involved the purposeful selection of the severely flood-affected districts from each province in Khyber Pakhtunkhwa (KPK), i.e., Swat, Chitral, and D.I. Khan, and Punjab, ie., Rajanpur, Layyah, and D.G. Khan. In the second stage, the flood relief camps and flood-affected villages in the selected districts were selected randomly. Finally, in the final stage, households in each selected location were contacted, and one eligible adult was recruited per household using a simple random sampling technique to ensure unbiased selection.

Inclusion Criteria

In this study, the participants were all adults (18 years & older). Participants were required to be residents of the disaster-affected areas, which could be either of the provinces of Khyber Pakhtunkhwa (KPK) or Punjab. Moreover, to ensure that the participants had first-hand and considerable experience with the disaster that was salient to the study purposes, only those survivors were considered who had required to evacuate, had sustained property losses in the floods, or had been themselves present at the time of the flood.

Exclusion Criteria

To protect the validity of responses and ensure adherence to ethical standards, certain individuals were excluded from participating. These individuals included those with severe cognitive impairments that would prevent their understanding of, or ability to read, a questionnaire, as well as those that refused to give adequate consent to participate in the survey.

Instruments

PTSD Symptoms

Post-Traumatic Stress Disorder was taken using the Post-Traumatic Stress Disorder Checklist for DSM-5 (PCL-5). It is a 20-item validated tool assessing intrusion, avoidance, negative alterations in cognition/mood, and hyperarousal, with a cut-off score of 33 used to determine probable PTSD (Weathers et al. 2013).

Access to Mental Health Services

A structured questionnaire was collected using an adaptation of tools including the WHO's Assessment Instrument for Mental Health Systems (WHO-AIMS) and Penchansky & Thomas's access framework. This instrument was developed to capture the key dimensions of healthcare access, specifically: availability (are there mental health workers and facilities in the community?); accessibility (travel time and distance to get to those services); affordability (do participants have the ability to pay service/transport costs); and acceptability (what stigma and cultural attitudes exist towards accessing mental health care?).

Demographic Data

Age, gender, marital status, education, occupation, household income, displacement status, and prior mental health history.

Data Collection Process

Data collection was carried out over the course of two months (June and July 2025) to facilitate the investigation of the circumstances and service needs of the population about two months after the acute phase of flooding at the time of writing, and for sensitive and accurate data collection. The authors recruited a team of trained enumerators, each having a professional background in psychology, social science, or nursing. The professional team members were essential to rapport building and recognizing the complexity of respondents' experiences. Each enumerator conducted face-to-face interviews with participants in their language of choice (Urdu, Pashto, Punjabi) to remove language barriers that could affect both the quality of the interview, and the resulting quality of data provided by participants through interviews. Interviews were conducted at different locations in order to extend the reach to areas of use, including temporary flood relief camps, primary health care centers located in areas affected by flooding, and in the identified communities impacted by flooding overall.

Ethical Consideration

Ethical approval was acquired from the Institutional Review Board of University. Written informed consent was obtained from all participants. For participants who were illiterate, the verbal consent was documented with a witness signature. All participants who expressed severe levels of distress were referred to local NGOs and health services that provide psychological first aid.

Statistical Analysis

SPSS version 26.0 was used for the analysis of data. Descriptive statistics described the sample. The prevalence of probable PTSD (PCL-5 score ≥33) was calculated for each region and overall. To address the research questions regarding individual associations with access indicators, chi-square tests and t-tests were employed. A multivariable logistic regression model was used to analyze the relationship between access dimensions (availability, accessibility, affordability, and acceptability) with probable PTSD, while controlling for sociodemographic factors as reported here as adjusted odds ratios (AOR) with 95% confidence intervals (CIs).

Results

Table 1: Demographic Information of Participants (N=200)

Variable	Punjab (n = 100)	KPK (n = 100)	Total (N = 200)
Age (years)	35.2 ± 11.4	33.8 ± 10.9	34.5 ± 11.2
Gender			
Male	56 (56%)	60 (60%)	116 (58%)
Female	44 (44%)	40 (40%)	84 (42%)
Marital status			
Married	72 (72%)	70 (70%)	142 (71%)
Single/Widowed/Divorced	28 (28%)	30 (30%)	58 (29%)
Education level			
No formal education	32 (32%)	38 (38%)	70 (35%)
Primary–Secondary	45 (45%)	42 (42%)	87 (43.5%)
Higher (College/University)	23 (23%)	20 (20%)	43 (21.5%)
Occupation			
Agriculture/Labor	40 (40%)	45 (45%)	85 (42.5%)
Service/Skilled	30 (30%)	25 (25%)	55 (27.5%)
Unemployed/Household work	30 (30%)	30 (30%)	60 (30%)
Displacement status			
Displaced	68 (68%)	72 (72%)	140 (70%)
Nondisplaced	32 (32%)	28 (28%)	60 (30%)

Table 1 summarizes the demographic profile of study participants (N = 200). Overall, the mean age of participants was 34.5 years (SD = 11.2). Participants had a younger mean age in KPK (33.8 ± 10.9 years) than Punjab (35.2 ± 11.4 years). Males constituted 58% of the sample (56% from Punjab, 60% from KPK) and females 42%. Most respondents were married (71%) and similar proportions were married in both provinces. By education, 35% had no education, 43.5% had primary to secondary-level education, and 21.5% had higher education, with illiteracy more prevalent in KPK (38%) than Punjab (32%). By occupation, 42.5% were farmers or laborers, 27.5% were in service jobs or skilled jobs, and 30% were not working or were in housework. Most participants (70% overall) were displaced by floods, with more displaced in KPK (72%) than

Punjab (68%). These results demonstrate participants were predominately rural, low- to middle-income, and affected by floods.

Table 2: Prevalence of PTSD Symptoms among Flood Survivors

Province	n	Probable PTSD (PCL-5 ≥ 33)	Prevalence (%)
Punjab	100	34	34.0%
KPK	100	42	42.0%
Total	200	76	38.0%

Probable PTSD symptoms in flood survivors are illustrated in Table 2 figure 1. Of the total participants (n = 200), 76 (38.0%) scored above the cut-off on the PCL-5, suggesting that these participants may have probable PTSD. The provincial-level data captured the following PTSD prevalence: Punjab 34.0% (n = 34 of 100) and KPK 42.0% (n = 42 of 100). These data indicate a significant psychological burden to the survivors of flooding, and notably, there is a higher prevalence of PTSD symptoms in KPK compared with Punjab.
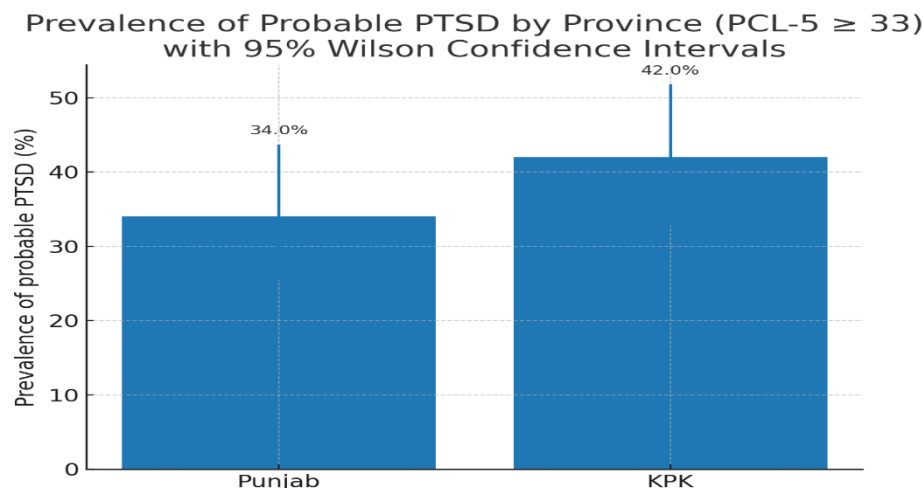
Figure 1:

Table 3: Access to Mental Health Services Among Participants

Access Dimension	Punjab (n = 100)	KPK (n = 100)	Total (N = 200)
Availability (any facility/worker nearby)	38 (38%)	30 (30%)	68 (34%)
Accessibility (<1 hr travel to facility)	42 (42%)	28 (28%)	70 (35%)
Affordability (services affordable)	50 (50%)	36 (36%)	86 (43%)
Acceptability (low stigma, culturally acceptable)	45 (45%)	33 (33%)	78 (39%)
Access Dimension	Punjab (n = 100)	KPK (n = 100)	Total (N = 200)

Access to mental health services among participants is summarized in Table 3 figure 2 . Access to mental health services is limited in both provinces. Only 34% of participants reported they had mental health facilities or workers in their community, slightly better in Punjab (38%) than KPK

(30%). In terms of geographic accessibility, just 35% of participants indicated that the services were within a one-hour travel distance, with significantly lower accessibility in KPK (28%) versus Punjab (42%), the geographic accessibility in KPK was still notably poorer than Punjab. In terms of affordability stated by 43% of participants overall, with half of respondents in Punjab (50%) reporting affordability and only just over one-third in KPK (36%), In terms of acceptability (which refers to cultural attitudes and stigma), 39% of survivors found services to be acceptable, here again Punjab (45%) was slightly better than KPK (33%). The results show an enormous barrier in availability, accessibility, affordability, and acceptability of mental health services, especially in KPK which had a more acute accessibility dilemma.
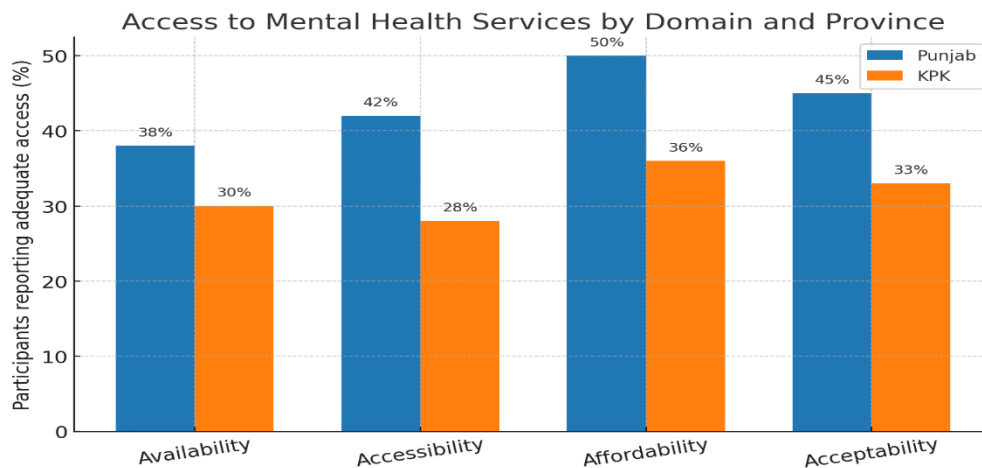
Figure 2:

Table 4: Multivariable Logistic Regression of Factors Associated with PTSD Symptoms (N = 200)

Predictor Variable	Adjusted OR (95% CI)	p-value
Province (KPK vs. Punjab)	1.42 (0.85–2.36)	0.176
Female gender	1.58 (0.92–2.70)	0.095
Displacement (Yes vs. No)	2.10 (1.18–3.74)	0.012*
Low availability of services	1.89 (1.05–3.41)	0.032*
Low accessibility	2.24 (1.22–4.10)	0.009*
Unaffordable services	1.71 (0.96–3.05)	0.067
High stigma (unacceptable)	2.42 (1.32–4.45)	0.004**

The multivariable logistic regression analysis (Table 4) of the sample examined the relationship among demographic, displacement, and service access factors and probable PTSD symptoms. Displacement status was predictive, with individuals who had been displaced being more than twice as likely to expect PTSD symptoms compared to non-displaced individuals (AOR = 2.10, p = .012). Restricted service access had strong associations with PTSD outcomes, where upon reporting low availability of services had almost two times the odds of PTSD (AOR = 1.89, p = .032) and with poor accessibility had more than double the odds (AOR = 2.24, p = .009). High stigma or low acceptability of services was the greatest predictor of reporting PTSD symptoms, with odds increasing over two and a half times the degree of acceptance of services (AOR = 2.42, p = .004). In contrast, province (KPK vs. Punjab) and gender both exhibited high non-significant odds with PTSD, while unaffordable services was approaching significance (AOR = 1.71, p

= .067). The overall results indicated that displacement and barriers to access mental health services were the most important predictors of PTSD symptoms for flood survivors.

Discussion

In this investigation, 38% of flood survivors met the criteria for probable PTSD symptoms. The estimates were higher for the Khyber Pakhtunkhwa (42%) region compared to Punjab (34%). These results are in accordance with global estimates that pooled PTSD among flood survivors (across true prevalence studies) resulted in a prevalence of the PTSD of approximately 29% (Golitaleb et al., 2022). The estimate of PTSD in this investigation is slightly higher likely due to the time of the data collection, and the scale of displacement experienced in the affected districts. Previous studies have shown that PTSD prevalence tends to peak in the initial weeks and months following disasters and will decline thereafter, if supports and services are offered (Neria et al., 2007). In the context of Pakistan, earlier studies examining the 2010 and 2022 floods also reported high burdens of PTSD symptoms among those who were displaced, particularly among adolescents and young adults (Yousuf et al., 2023). Our study confirmed the continuing risk for disaster related PTSD in Pakistan and a need for systematic mental health surveillance following disaster events.

In sum, our main finding was the importance of service access on the outcomes of PTSD. Participants who reported low service availability and accessibility as well as high mental health service stigma were significantly more likely to report PTSD symptoms. Low accessibility increased the odds of developing PTSD symptoms (AOR= 2.24, p=.009) more than two times, while stigma nearly tripled it (AOR = 2.42, p=.004). These results correlate with the larger disaster psychiatry literature that identified access to timely and culturally relevant services as a prior determinant of recovery outcomes (Cohen et al. 2019; U.S. Department of Veterans Affairs, n.d.). In flash flooding conditions, degraded infrastructure, financial hardship, and housing instability contribute to service access barriers and creates the affordances for PTSD symptoms to remain untreated or deteriorate. Our study also suggests that even the presence of services, social acceptability, which was influenced primarily by stigma and cultural norms, represents a prominent barrier to attending services. This is particularly important in Pakistan where mental health stigma widespread and barriers to seeking care are potent (Thompson et al., 2025).

Displacement was a powerful predictor of PTSD; displaced participants were twice as likely to develop symptoms compared to those who had not been displaced. This finding is consistent with global evidence that links forced displacement, losing one's home, and social disintegration to higher levels of psychological distress (Neria et al., 2007). Displacement due to floods tends to disrupt social networks, displace livelihoods, and reduce access to health services (Ullah et al., 2025). Gender had a trending effect on the likelihood of PTSD for women, but it did not reach statistical significance in this sample. Earlier literature shows that women, especially in patriarchal contexts, are also more vulnerable to PTSD due to a greater caregiving burden, experiencing gender-based violence in relief camps, and having lower autonomy to seek care (Rabbani et al., 2023). This may indicate that larger studies would demonstrate more robust gendered patterns of PTSD prevalence.

The higher prevalence of PTSD identified in KPK (42%) as compared to the lower incidence in Punjab (34%) may be due to contextual differences. For example, in KPK, districts like Swat and Chitral, had experienced flash flooding quickly across mountainous terrain, making evacuation difficult and there were few options for healthcare (Guardian News, 2025). While the response to flooding in Punjab was still chaotic, it was anticipated in a riverine flooding form (and likely allows for some preparation prior). These contextual differences and experiences are

considerations of geography as well as disaster type on mental health outcomes that warrant further exploration in future studies.

Practical Implications

The findings of this study highlight several implications for Pakistan's mental health system and disaster response strategies:

1) The study demonstrates that lack of nearby services significantly increases PTSD risk. There is a need to integrate mental health into primary health care and disaster response frameworks, ensuring rapid deployment of mental health professionals and trained community workers to flood-affected areas.
2) Pakistan's Lady Health Worker (LHW) program and recent digital counseling pilots (Rabbani et al., 2025) present scalable solutions to expand access in rural and disaster-prone regions. Embedding mental health into LHW services during emergencies could reduce treatment gaps.
3) High stigma was one of the strongest predictors of PTSD in this study. Public awareness campaigns, community dialogues, and involvement of religious/community leaders are essential to normalize mental health care, particularly in conservative areas.
4) Given the elevated risk among displaced households, interventions should prioritize relief camps and temporary shelters, offering psychological first aid and referral pathways to specialized services.
5) The differences observed between Punjab and KPK suggest that context-specific strategies are required. Mountainous districts need rapid response teams, while riverine districts need sustained recovery support to prevent long-term psychological sequelae.

Strength and Limitations

This study adds important evidence to the already limited evidence base of flood related PTSD in Pakistan, by explicitly analyzing both its prevalence, and the important factors that determine whether someone is accessing care. The methodology is solid as validated tools such as the PCL-5 are used, and a structured access framework is followed. However, there are several important limitations. First, since the current study was cross sectional, we cannot make causal conclusions, and the self-reported nature of the data introduces recall or social desirability bias. The current study also has a modest sample size (N=200), which limits any statistical power, particularly for more specific subgroup analyses. Importantly, data collection occurred only 2 months flood, meaning most PTSD symptoms are likely at their peak, and prevalence may not reflect longer term utilization. As such, longitudinal studies that assess PTSD symptom trajectories, and have baseline and follow-up measures of mental health service interventions in disaster contexts, are much needed.

Conclusion

In this study, researchers found that over one-third of flood survivors in Pakistan displayed probable PTSD symptoms about the 2025 floods (higher occurrence in KPK than Punjab). The availability, accessibility, and stigma (warnings) of mental health services were determining factors for PTSD outcomes after the floods had settled. We highlighted the urgent need to strengthen Pakistan's mental health system in the context of disaster response, longing for the expansion of task-sharing and digital interventions for mental health services, and the need to combat stigma through community involvement. It is essential to implement targeted, context-specific policies to

lessen the mental health burden of climate change-related disasters and to help build resilience in vulnerable groups.

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