



Frontline heroes: Leveraging community health workers as first responders for climate-related digital mental health support

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ARTICLE INFO

Keywords:

Digital health
Mental health
Climate change
Community health workers
Resilience

ABSTRACT

Climate-related disasters are increasing in frequency and severity, placing immense psychosocial strain on individuals, communities, and health systems, particularly in low- and middle-income countries (LMICs). The health impacts of climate-related events are also increasingly becoming evident, especially affecting mental health outcomes. The 2022 floods in Pakistan affected over 33 million people and disrupted access to essential healthcare. This article highlights lessons learned from the *mPareshan* project, a digital mental health intervention implemented in District Badin, Sindh, during the 2022 floods. Amidst a critical shortage of mental health professionals in those geographies, the project leveraged Pakistan's Lady Health Worker (LHW) Programme to deliver a culturally adapted, app-based psychosocial support and counselling intervention for anxiety and depression. Despite widespread destruction caused by the floods, trained LHWs provided continued support using the *mPareshan* app, illustrating the feasibility of community-embedded, digitally enabled mental health care during crises. The project highlights the capacity of community health workers (CHWs) to sustain service delivery under climate adversity and emphasizes the importance of investing in their skills pertaining to psychosocial support and emotional resilience. Comparative experiences from other LMICs and a growing body of evidence suggest task-shifting to CHWs in resource-poor regions lacking professional health care providers as an alternative approach. However, the integration of digital health into psychosocial interventions led by CHWs remains underexplored. As climate emergencies escalate, scalable and context-sensitive digital mental health strategies, grounded in existing primary care, must be prioritized to promote and protect community well-being.

1. Introduction

The increasing frequency and severity of climate-related disasters pose significant challenges to healthcare systems worldwide, particularly in low-and-middle income countries (LMICs). Ranked among the top 10 countries most vulnerable to climate change, Pakistan is experiencing shifting weather patterns marked by temperature and precipitation extremes, melting glaciers, and intensifying climate-related disasters [1]. The 2022 climate-induced floods affected over 33 million people, resulting in widespread destruction and displacement of about 6 million people [2,3]. 10% of the national health facilities were damaged, disrupting access to essential care [2], making it one of the most devastating climate events in recent history. These disasters not only bring physical and economic catastrophes, but they also lead to conditions of acute psychological distress, particularly for those already living in poverty or precarious conditions [4]. Mental health consequences

related to climate disasters are now widely acknowledged by mental health workers, with terms like 'climate anxiety' highlighting the emerging patterns of climate distress [5]. Climate anxiety refers to heightened emotional, mental or physiological distress in response to dangerous climate change events. It is increasingly being reported in populations experiencing climate emergencies, especially among communities already facing socio-economic vulnerabilities [5]. In the face of such climate adversities, digital health interventions can play a vital role in extending the reach of mental health services and supporting affected communities. When embedded within local systems and delivered by trusted community-based health workers, digital tools can help bridge service gaps during and after climate disasters. The *mPareshan* project, a digital mental health intervention deployed by community health workers (CHWs) and implemented in Sindh, Pakistan, during the 2022 floods, provides valuable and timely lessons on the feasibility and effectiveness of digital interventions in adversity. Using Pakistan's existing cadre of Lady Health Workers (LHWs), *mPareshan* offered

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List of abbreviations

CHW	Community health worker
LHW	Lady health worker
LMIC	Low-and-middle income country
SP	Screen positive

psychosocial support to adults experiencing anxiety and depression. This commentary highlights the project's experiences and lessons learned during the floods, with particular focus on the role of LHWs, and the importance of investing in their psychosocial skills and climate resilience.

2. The *mPareshan* project

The *mPareshan* project was designed to provide low-intensity digital mental health support to adults over the age of 18 in District Badin in rural Sindh, Pakistan, who screened positive (SP) for mild and moderate depression and anxiety [6,7]. The low-intensity *mPareshan* intervention consisted of brief, structured psychosocial support counselling sessions (6 sessions delivered over the course of 6 months, each session lasting around 25–30 min) delivered by trained non-specialist LHWs.

These LHWs are part of Pakistan's national CHW initiative, which reaches around 85% of the rural population. LHWs are the frontline CHWs and outreach arm of the primary healthcare system in Pakistan, delivering essential maternal and child health services directly to communities. With an education level of 8 years and 15 months of training, these 115,000 workers typically provide basic primary care support within their assigned catchment areas. Their duties include maintaining health records, monitoring key indicators, and delivering services such as health promotion, immunization, family planning, and maternal and child healthcare, making them an integral part of Pakistan's healthcare system, particularly in rural areas where 60% of the population resides [6].

LHWs assigned to the study area in Badin were provided with a training to deliver the *mPareshan* intervention during their routine household visits. The training focused on LHWs' psychosocial counselling, communication, and digital literacy skills, enabling them to operate Android tablets installed with the *mPareshan* app [8]. These non-specialist LHWs served as the intervention delivery agents for the SPs, and were trained to deliver the intervention using the digital app that guided them through the counselling sessions in their local language. LHWs learned to navigate the app to facilitate guided counselling for SPs, record participant information and completion status of each session. Eligible participants for the intervention (SPs) were identified through baseline mental health screenings using standardized psychometric scales of Patient Health Questionnaire-9 [9] and Generalized Anxiety Disorder-7 [10], which are locally validated in Urdu and tested in Pakistan [11,12]. Sindhi (local language) translated versions of the questionnaires were used, and data was collected electronically on REDCap by independent data collectors [7]. Those experiencing severe symptoms were referred for specialized care by LHWs. The counselling content, culturally tailored to the local context, featured psychoeducation, breathing exercises, and behavioural strategies like problem-solving techniques suitable for low-resource community settings, as demonstrated in similar contextualized interventions like Problem Management + [13]. Further details of the *mPareshan* counselling content are available in other publications [6,7,14].

By placing mental health within the broader framework of primary healthcare and offering technology that can be used by LHWs, *mPareshan* aimed to make mental health support accessible in hard-to-reach communities, even during crises. When the 2022 floods hit District Badin in Sindh, the intervention was already in progress. While the

floods created significant disruptions to mobility, transportation, healthcare access and household stability, the digital nature of the project, combined with the existing presence of LHWs in their own communities, enabled the project to continue uninterrupted, despite significant operational challenges.

3. Lessons learned during the floods

The Sindh province (Pakistan's southern-most province bordering the Arabian Sea) experienced an eight-fold increase in its average rainfall during the 2022 monsoon season [15]; a phenomenon linked to climate change [1,16]. Badin, home to approximately 1.9 million residents, was among the worst affected. Due to its geographic vulnerability and inadequate water drainage and irrigation infrastructure, the floodwaters from nearly half of Sindh inundated Badin during the 2022 rainfall. According to the Sindh Government records, approximately 52,000 individuals were displaced and Badin sustained agricultural losses of about 80% [15,17]. The climate disaster also led to significant mental health issues and increased suicide risk [17]. Despite this widespread destruction, displacement, and mental health catastrophes, the *mPareshan* project continued to reach and support the community's mental health needs. LHWs adapted to the flood context by adjusting their session schedules and prioritizing areas with internally displaced households. Having experienced personal losses during the floods, LHWs could better relate to their clients, who trusted them as peer support workers. Through community networks and word of mouth, LHWs located their clients and continued providing digital counselling services. The *mPareshan* app's offline functionality, which allowed LHWs to access counselling materials and collect data even when internet connectivity was disrupted, enabled them to maintain continuity of mental healthcare despite unreliable mobile networks and power supply. This design feature ensured that LHWs could provide support to their clients in a safe and stigma-free space, even amidst massive floods.

Despite these positive experiences, some challenges were also observed. While the intervention was designed to provide LHW-led counselling to those with mild to moderate anxiety and depression, those with severe symptoms were referred to specialist-led care. During flood emergencies, these specialist facilities can become largely inaccessible in rural areas like Badin, therefore raising ethical concerns surrounding referral pathways despite being outside the scope of the feasibility study. LHWs and their supervisors also faced increased workload and emotional strain during this period, as many were themselves affected by displacement and loss while continuing to provide care. While the offline functionality of the *mPareshan* app helped with continued care, other practical constraints like disrupted electricity supply, device charging, inaccessible areas due to flooding did pose operational challenges, as described in a previous publication as well [14].

The experience of the *mPareshan* project during the floods highlights the potential of digital interventions delivered by frontline workers to reach and support communities in adversity. It also demonstrates that when digital tools are embedded in local health systems and used by trusted frontline workers, they can enhance service continuity during disasters when other modes of healthcare provision are limited. Second, prior training in psychosocial and digital skills is essential for LHWs to confidently respond during crisis. As previously argued [18], the inclusion of mental health in the LHW curriculum is crucial for enhancing their capacity to address the holistic needs of their communities. In the context of climate-related disasters, this training takes on added significance, enabling LHWs to provide critical psychosocial support when external resources are limited. Finally, a flexible, community-embedded approach to digital health delivery, one that allows for both online and offline adaptation, can ensure resilience in adverse conditions.

4. Anecdotal evidence

Anecdotal accounts from both LHWs and community members illustrated the human impact of the intervention. One LHW reported:

“I was able to reach out to my clients even when the floods had destroyed their homes. The training and digital platform enabled me to provide support and counselling services, which helped them cope with the trauma.”

When LHWs went to conduct a counselling session in the field after floods, one of the community members shared:

“Your presence, especially during moments marked by anxiety and depression, brings a great sense of comfort. Engaging in such open conversations and sharing our thoughts genuinely helps us feel lighter and more supported. I feel more resilient and better equipped to face future challenges.”

The counselling also provided respite to people during their experience of displacement, as shared by a community member:

“The counselling sessions came when we were most in need to talk to someone who understood what we were going through and how it feels to be homeless.”

These testimonials provide valuable insights into the effectiveness of the *mPareshan* intervention during floods, as illustrated in Fig. 1.

5. Building resilience in community health workers

The experience of the *mPareshan* project highlights the importance of building climate resilience in CHWs, which is often over-looked. CHWs are often the first point of contact for community members, and their ability to respond to disasters is critical. Providing them with training on

disaster preparedness and psychosocial counselling can enhance their capacity to support displaced households at their doorsteps during disasters [19].

The *mPareshan* project demonstrates the potential of digital interventions to build resilience in LHWs. The training model used in the project emphasized digital psychosocial skills and continued counselling for those with mild and moderate anxiety and depression. This approach strengthened the technical capacity, emotional preparedness, and climate resilience of frontline workers to respond in crisis. By providing LHWs with these digital psychosocial skills and training, the project enabled them to adapt to the challenges posed by the floods and to continue delivering routine services and allaying climate anxiety experienced by the affected communities.

Utilizing CHWs to improve community response to natural disasters has been used in other countries like Madagascar before [20]. Apart from specific disaster-related mitigation activities, CHWs have also been instrumental in improving healthcare delivery for individuals facing chronic illnesses during climate emergencies in the Caribbean [21]. CHWs have also been proposed to provide mental health and psychosocial support to individuals affected by flood emergencies in other LMICs like Bangladesh [22]. Similarly, in Haiti, lay mental health workers have provided integrated mental health and disaster preparedness intervention in communities most affected by earthquake and floods, and showed a significant improvement in mental health outcomes as well as increased disaster preparedness and help-seeking behaviour [23]. A recent scoping review highlights a growing range of interventions such as psychotherapy, resilience training, nature-based activities and community strengthening networks to address the mental health impacts of climate adversity in various low- and high-income settings [24]. More recently, Artificial Intelligence tools are being used to enhance access to mental health support as part of climate disaster response in countries like United States of America [25].



Fig. 1. Effectiveness of frontline community health workers in bridging the mental health service gap during climate adversity.

Nevertheless, utilizing digital platforms to deliver mental health interventions in climate-affected communities, by integrating it into CHW-led delivery, remains largely unexplored.

6. Conclusion

As the world grapples with the escalating health emergency of climate change, it is imperative to prioritize the strengthening of health systems, particularly at the primary care level in LMICs. The most vulnerable populations, including rural communities and those displaced by floods, require targeted support to mitigate the physical and mental health impacts of climate change. Given the susceptibility of fragile health infrastructure to climate-related stressors, frontline workers (*the unsung heroes*) emerge as crucial first responders, capable of providing psychosocial counselling, promoting mental well-being, and fostering resilient communities. With appropriate training, which can include integration of digital health platforms to help service continuity, frontline workers can play an important role in supporting vulnerable populations. By investing in these workers and leveraging their potential, we can build a more robust and responsive health system that addresses the complex physical and mental health needs of communities in the face of climate change.

CRedit authorship contribution statement

Fauziah Rabbani: Writing – review & editing, Writing – original draft, Conceptualization. **Amna Siddiqui:** Writing – review & editing, Writing – original draft. **Abdullah Umer:** Writing – original draft. **Zul Merali:** Writing – review & editing, Conceptualization.

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

Not applicable.

Funding

No funding was required to write this article, which is a commentary on lessons learned from a previous research project. The mPareshan research project was supported by a grant from the Brain & Mind Institute (BMI), Aga Khan University (Grant Brain & Mind-FR-11E-mPareshan App 83000).

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

Dr. Hafiza Nabi is acknowledged for giving input in the first draft. We used ChatGPT (OpenAI, GPT-5.1) to assist in generating preliminary drafts for selected sections of this manuscript. All text was reviewed, refined, and finalized by the authors.

Data availability

No data was used for the research described in the article.

References

- [1] Ministry of Planning Development & Special Initiatives. Pakistan floods 2022: post-disaster needs assessment [internet]. <https://thedocs.worldbank.org/en/doc/4a0114eb7d1cecbbf2f65c5ce0789db-0310012022/original/Pakistan-Floods-2022-PDNA-Main-Report.pdf>. [Accessed 29 July 2025].
- [2] World Health Organization. WHO emergency appeal health crisis in flood-affected Pakistan. 2022. Available here: <https://www.who.int/publications/m/item/who-emergency-appeal-health-crisis-in-flood-affected-pakistan>.
- [3] Rafique Nihan, Tehsin Ahsan, Yamin Khan Farah Rising from the waters: Sindh navigates recovery after the 2022 floods [internet]. Pakistan: World Bank; 2023. [cited 2023 Oct 2] <https://www.worldbank.org/en/news/feature/2023/06/28/rising-from-the-waters-sindh-navigates-recovery-after-the-2022-floods>. [Accessed 2 October 2023].
- [4] Yousuf J, Mehmood H, Aquil S, Rijja A, Syeda Rahmat Z, Malikzai A. Effects of floods on the mental health of Pakistanis: a commentary. *Ann Med Surg* 2023;85: 2253–5. <https://doi.org/10.1097/MS9.0000000000000590>.
- [5] Dodds J. The psychology of climate anxiety. *BJPsych Bull* 2021;45:222–6. <https://doi.org/10.1192/bjb.2021.18>.
- [6] Rabbani F, Nafis J, Akhtar S, Khan MS, Sayani S, Siddiqui A, et al. Technology-assisted mental health intervention delivered by frontline workers at community doorsteps for reducing anxiety and depression in rural Pakistan: protocol for the mPareshan mixed methods implementation trial. *JMIR Res Protoc* [Internet] 2024; 13:e54272. <https://doi.org/10.2196/54272>.
- [7] Rabbani F, Nafis J, Akhtar S, Siddiqui A, Merali Z. Home-based digital counselling by frontline community workers for anxiety and depression symptoms in rural Sindh, Pakistan: the mPareshan intervention. *BMC Public Health* 2025;25:2712. <https://doi.org/10.1186/s12889-025-23665-5> [cited 2025 Jul 25].
- [8] Akhtar S, Rabbani F, Nafis J, Merali Z. Where there is no specialist – improving mental health literacy of frontline community health workers in a rural district of Pakistan: the mPareshan project (preprint). *Res Sq* [Internet] 2024. <https://doi.org/10.21203/rs.3.rs-5571403/v1> [cited 2025 Jul 29].
- [9] Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med* 2001;16. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>.
- [10] Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med* 2006;166. <https://doi.org/10.1001/archinte.166.10.1092>.
- [11] Ahmad S, Hussain S, Akhtar F, Shah FS. Urdu translation and validation of PHQ-9, a reliable identification, severity and treatment outcome tool for depression. *J Pakistan Med Assoc* 2018;68:1166–70.
- [12] Ahmad S, Hussain S, Shah FS, Akhtar F. Urdu translation and validation of GAD-7: a screening and rating tool for anxiety symptoms in primary health care. *J Pakistan Med Assoc* 2017;67:1536–40.
- [13] Hamdani SU, Huma Z, Masood A, Zhou K, Ahmed Z, Nazir H, et al. Effect of adding a psychological intervention to routine care of common mental disorders in a specialized mental healthcare facility in Pakistan: a randomized controlled trial. *Int J Ment Health Syst* 2021;15:11. <https://doi.org/10.1186/s13033-020-00434-y>.
- [14] Akhtar S, Rabbani F, Nafis J, Siddiqui A, Merali Z. A qualitative study assessing acceptability and appropriateness of a technology-assisted mental health intervention by community frontline workers: mPareshan implementation research in rural Pakistan. *BMC Psychiatry* 2025;25:16. <https://doi.org/10.1186/s12888-024-06459-8>.
- [15] Qamer FM, Ahmad B, Hussain A, Salman A, Muhammad S, Nawaz M, et al. The 2022 Pakistan floods: assessment of crop losses in Sindh province using satellite data [Internet]. Kathmandu, Nepal, <https://doi.org/10.53055/ICIMOD.1015>; 2022 Sep.
- [16] Waqas MA. Pakistan's floods flow from climate injustice. *Science* 1979;378:481–2. <https://doi.org/10.1126/science.ade8490> [Internet]. 2022.
- [17] Rabbani F, Siddiqui A, Merali Z. Responding to mental health challenges of flood-affected communities through technology-driven local solutions in Pakistan: the mPareshan project. *Connecting Climate Minds* 2024 [cited 2025 Jul 18], <https://hub.connectingclimateminds.org/research-and-action/case-studies/14>. [Accessed 18 July 2025].
- [18] Rabbani F, Akhtar S, Nafis J, Khan S, Siddiqui A, Merali Z. Addition of mental health to the lady health worker curriculum in Pakistan: now or never. *Hum Resour Health* 2023;21:29. <https://doi.org/10.1186/s12960-023-00814-8>.
- [19] Domingo A, Little M, Beggs B, Brubacher LJ, Lau LL, Dodd W. Examining the role of community health workers amid extreme weather events in low- and middle-income countries: a scoping review. *Public Health* 2024;236:133–43. <https://doi.org/10.1016/j.puhe.2024.07.023>.
- [20] Mohan V, Hardee K, Savitzky C. Building community resilience to climate change: the role of a population-health-environment programme in supporting the community response to cyclone haruna in Madagascar. *Jamba: Journal of Disaster Risk Studies* 2020;12. <https://doi.org/10.4102/jamba.v12i1.730>.
- [21] Cordero J. Climate change in the Caribbean: transforming vulnerabilities into resiliency. *ISEE conference abstracts*. 2022.
- [22] Nahar N, Blomstedt Y, Wu B, Kandarina I, Trisnantoro L, Kinsman J. Increasing the provision of mental health care for vulnerable, disaster-affected people in Bangladesh. *BMC Public Health* 2014;14:708. <https://doi.org/10.1186/1471-2458-14-708>.
- [23] James LE, Welton-Mitchell C, Noel JR, James AS. Integrating mental health and disaster preparedness in intervention: a randomized controlled trial with

- earthquake and flood-affected communities in Haiti. *Psychol Med* 2020;50:342–52. <https://doi.org/10.1017/S0033291719000163>.
- [24] Xue S, Massazza A, Akhter-Khan SC, Wray B, Husain MI, Lawrance EL. Mental health and psychosocial interventions in the context of climate change: a scoping review. *npj Mental Health Research* 2024;3:10. <https://doi.org/10.1038/s44184-024-00054-1>.
- [25] Batra M, Erbas B. Extreme weather, vulnerable populations, and mental health: the timely role of AI interventions. *Int J Environ Res Publ Health* 2025;22:602. <https://doi.org/10.3390/ijerph22040602>.