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Addressing Impact of Climate Change on Mental Health: *The mPareshan Case Study*

A case study featured on the Wellcome Trust #ConnectingClimateMinds Hub - an innovative digital platform designed to unite the fields of mental health & climate change

Brain & Mind Institute, Aga Khan University

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The Connecting Climate Minds Hub is a Wellcome Trust-funded innovative digital platform designed to unite the fields of mental health and climate change. It serves as a collaborative space for researchers, policymakers, educators, and community groups to share knowledge, resources, and experiences. Its aim is to foster understanding, encourage interdisciplinary collaboration, and drive impactful action, all while providing a supportive community for those dedicated to these critical global issues.

As part of this hub, mPareshan Project has been featured as one of the Case Studies from Central and Southern Asia region. Case studies showcase existing research, interventions, and policies with implications for the climate-mental health nexus.

Link to mPareshan Case Study on #ConnectingClimateMinds:
https://hub.connectingclimateminds.org/research-and-action/case-studies/14

Responding to mental health challenges of flood-affected communities through technology-driven local solutions in Pakistan: The mPareshan Project

Climate Hazards in Pakistan

In recent years, Pakistan has experienced both extreme heat and massive floods, with the risks projected to increase with the ongoing climate change [1]. Particularly in rural Pakistan (where around 62% of the population resides [2]), the effects of these climate-related events are compounded by extreme poverty, precarious subsistence agriculture, and other vulnerabilities [3]. In 2022, Pakistan faced catastrophic flooding which affected around 33 million and displaced about 10 million people, primarily from high-poverty rural areas [4,5]. Sindh (Pakistan's southern province) experienced an astounding 726% increase in rainfall – an effect attributable to climate change [6]. District Badin in Sindh (population of about 1.9 million [7]) was heavily impacted and has remained in the grip of natural disasters in one form or another. Cyclones, heavy rains, droughts, and floods have followed each other with short intervals [8]. Due to the geographical location and having an ineffective drainage and irrigation system, the 2022 rainfall caused overflow of floodwater from 50% of Sindh into this single District. Sindh Government reported displacement of about 52,000 people in Badin, with agricultural losses totalling 80% in the district [9,10].

Mental Health Landscape in District Badin

With only 2 psychiatrists per 1 million people in Pakistan, significant mental health treatment gaps persist, particularly in marginalized rural communities facing barriers in adapting to climate emergencies like extreme heat and flooding [11,12]. This rural population also faces a greater burden of psychiatric morbidity compared to urban areas while having low access to available quality mental healthcare [11,13[. Climate change events in District Badin have led to significant mental health distress, which has itself increased suicide risk (10 suicides were reported in the two months following Cyclone Biparjoy). A Badin native, who had to rebuild their house thrice due to flooding, narrates their climate-related distress, "*Rebuilding is meaningless if I have to do it over and over again*." [14]

People of Badin ***moving to seek shelter & transporting livestock during floods (Photo courtesy of AKU team & Dawn News).***

Badin's infrastructure comprises tarnished roads making travel difficult from one community to another. Living spaces are structured from cement but devoid of paint, and open ditches of stagnant waters are filled with heaps of litter. The recent floods and the consequent halting of economic activities in the district have added to people's misery. But despite events like these and their many tangents of anguish, residents continue to pull through their routines. People of Badin shared. "*The adverse weather conditions forced us to navigate through the rain, resulting in increased travel times and delays*."

Intervention Details

Set in this backdrop of flood-affected District Badin, the mPareshan intervention was a feasibility study conducted by Aga Khan University (2021-2023) to improve the mental health status of this vulnerable population. The app-based intervention was designed to be delivered by community frontline workers of the Lady Health Worker Programme (LHW-P). Lady Health Workers (LHWs) and Lady Health Supervisors (LHSs) together constitute the frontline workforce of the governments' primary health care. LHWs are local community residents and share a comfortable rapport in the communities they serve.

The intervention involved two steps. The first step was to build the capacity of these LHWs and LHSs for creating awareness about mental health issues and improving their hands-on communication and counselling skills. This was done by developing a training curriculum adapted from WHO's mhGAP guide version 2.0 [15]. The second step of the intervention involved a task-technology shift by involving LHWs in delivering mental health services at community doorsteps. This was executed through a digital app (mPareshan) with features of psychoeducational counselling.

The mPareshan app was downloaded on Android tablets (provided to the LHWs by research team) and was accessible without internet. The app consisted of 3 segments: (i) tracking (ii) counselling, and (iii) referral. The tracking segment recorded information on participant recruitment, consent, and retention. The referral segment identified danger signs related to suicidal ideation, self-harm and harm to others and then suggested appropriate referrals to the nearest mental health facility. In the absence of danger signs, the LHW facilitated psychoeducation through audio and video features using the counselling segment of the app. The participants were involved in breathing exercises and skills to build resilience in the face of climate change and cope with anxiety and depression. The intervention was co-designed with the community, provincial policy makers, Department of Health, and LHW-P management.

Study Methodology

The research team also took qualitative insights from frontline health workers, policy makers and community participants before and after intervention to understand the acceptability, appropriateness, and adoption of technology to deliver an mHealth intervention at community doorsteps. A baseline survey using validated psychometric instruments (PHQ-9, GAD-7) assessed the burden of psychiatric morbidity (anxiety and depression) amongst 366 adult residents of District Badin. Those found to have mild and moderate anxiety and depression were considered screen positive (SPs) and eligible to receive mPareshan app-based counselling. Those with minimal anxiety and depression did not require any intervention [16]. Positive change in mental health status post-intervention was assessed using mean symptomatic scores of anxiety and depression. For scientific details of the project, please refer to the study protocol [17].

Implications and Lessons Learned

This is the first instance of utilizing frontline LHWs at the primary care level in Pakistan to promote mental well-being and climate change resiliency amongst vulnerable communities displaced by floods. Despite facing infrastructure issues and climate change challenges due to massive flooding, the intervention was executed successfully. In the n=366 sample population (above 18 years of age), 23% had mild and moderate anxiety and 24% had mild and moderate depression, equally distributed across men and women (Figure 1).

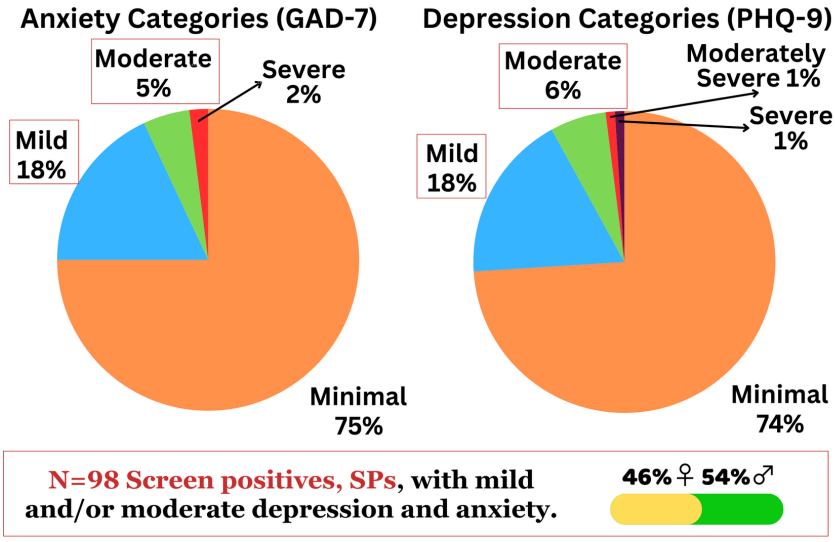

Figure 1: Anxiety and Depression Prevalence

98 individuals were eligible for the mPareshan app-based counselling. Paired pre- and post-intervention comparisons showed reduction in anxiety and depression scores (Table 1).

	Pre-intervention	Post-intervention	Pre-post change in scores		
	Mean (SD)		Mean Difference (SD)	Test statistic, t (df)	p-value
GAD7 total score	6.6 (3.0)	2.1 (2.3)	4.5 (3.5)	12.2 (91)	< .001
PHQ9 total score	7.5 (3.1)	2.6 (2.2)	4.9 (3.4)	14.1 (91)	<.001

Table 1: Change in anxiety and depression scores before and after intervention (n=92)

Stakeholder perceptions collected through 8 focus group discussions and 18 in-depth interviews revealed considerable confidence in LHWs' ability to deliver counselling. Intervention was acceptable, and adoption of technology found viable. LHWs' are mandated to provide preventive and promotive maternal and child health services in their assigned catchment areas. Hence, their existing workload emerged as a challenge in delivering additional home-based mental health counselling services. Continued supportive supervision from LHSs however was reported to be a key facilitator in implementation roll out. Community participants found the video counselling most helpful – demonstrating the added benefit of using mHealth technology in these rural areas, where access to specialized mental health services is a dream. They shared:

> *"The video counselling was particularly helpful, guiding us on how to alleviate anxiety. It also educated us on methods to control our minds against worries."*

> *"We are completely satisfied with the app. It has effectively addressed mental health concerns within our community."*

The knowledge and skills of health workers improved following the mPareshan capacity-building training. As part of the project, a manual for mental health awareness raising was developed in three languages (English, Urdu, Sindhi) [18]. The manual was endorsed by Minister of Health and a scale-up training was conducted (after the project concluded) for 70 master trainers from 30 districts of Sindh province in June 2023.

Project mPareshan policy impact (All photos credited to AKU project team)

Advances in digital technologies have created unprecedented opportunities to assess and improve the climate change and mental health nexus. Evidence indicates that most of the world's population, including traditionally underserved populations and LMICs of Southern Asia have access to mobile technologies (phones, tablets, mobile devices) [19]. Leveraging this, our study has demonstrated that similar technology-assisted counselling approaches delivered by frontline workers can enable broader reach and scalability of evidence-based mental health and resilience-building interventions. These can be especially geared for addressing the growing burden of mental health disorders amidst challenges of climate change locally, regionally, and globally. Future comparative studies from more diverse settings of Central & Southern Asia can examine the advantages and disadvantages of mobile health technology in improving mental health status for vulnerable populations affected by climate change.

Project mPareshan demonstrated the feasibility of utilizing frontline community workers to screen for anxiety and depression and deliver peer-counselling and resilience-building skills at the household level in flood-affected communities of rural Sindh. Endorsed by the government, a province-wide scale-up has taken off, which can lead to transforming mental healthcare by integrating it within primary care. Psychoeducation through mPareshan has helped initiate conversations on mental health in the communities most affected by climate change. With the support of the health workers, people are on the trajectory to improve the quality of their lives and bounce back after climate emergencies. The consistent efforts to create local perspectives regarding mental health and climate resilience have begun to yield results with better outcomes in community engagement. This has further helped eliminate stigma. Communities in Badin are now empowered to believe that control over their mental well-being when faced with the changing climate is greater than it appeared to be. Project mPareshan has been a stepping-stone in catalysing change for people, devolving the undercurrents of their fear arising from their mental health conditions and climate anxiety into feelings of resilience and transformation. Future scale-up efforts are already underway.

Recommendations

Some specific recommendations that can be garnered from this case study are:

- Develop a specialized mental health app for frontline Community Health Workers (CHWs), which is easy to navigate and tailored to the specific context of climate change in Central and Southern Asia. The app should be culturally adapted and co-designed in collaboration with mental health, technology, and climate change experts along with local disaster management and healthcare authorities.
- In the absence of specialist mental health providers in Asia, foster periodic climate-relevant training for CHWs and community acceptance of CHWs as first responders.
- Involve local communities in app implementation and co-designing to consider their lived experiences, needs, and preferences to cope with mental health effects of climate change.

References

1. Waqas, M. A. Pakistan's floods flow from climate injustice. Science (1979) 378, 482–482 (2022).
2. World Bank. Rural Population Pakistan (% of total population). World Development Indicators Rural population (% of total population) - Pakistan | Data (worldbank.org) (2023).
3. Ali, S. et al. Climate Change and Its Impact on the Yield of Major Food Crops: Evidence from Pakistan. Foods 6, 39 (2017).
4. Climate change in Pakistan and devastating floods. British Red Cross https://www.redcross.org.uk/stories/disasters-and-emergencies/world/climate-change-and-pakistan-flooding-affecting-millions (2023).
5. Nihan Rafique, Ahsan Tehsin & Farah Yamin Khan. Rising from the Waters: Sindh Navigates Recovery after the 2022 Floods. World Bank Pakistan https://www.worldbank.org/en/news/feature/2023/06/28/rising-from-the-waters-sindh-navigates-recovery-after-the-2022-floods (2023).
6. Qamer, F. M. et al. The 2022 Pakistan floods: Assessment of crop losses in Sindh Province using satellite data. (2022) doi:10.53055/ICIMOD.1015
7. Census 2017 District Wise Sindh (Badin). Pakistan Bureau of Statistics. Available from https://www.pbs.gov.pk/census-2017-district-wise/results/083
8. Zulfiquar Rao & Irfan Maqbool. Climate Change Risks and Vulnerabilities of Badin District in Sindh Province, Pakistan. Asian Disaster Preparedness Center and Oxfam Novib. Available from https://www.adpc.net/igo/category/ID792/doc/2015-typ0SF-ADPC-Study_on_coastal_hazards_in_Pakistan.pdf (2014)
9. Hunain Ameen & Areesha Rehan. LBOD: A development disaster that haunts Badin, two decades after its inception. Dawn.com. Available from https://www.dawn.com/news/1737278 (2023)
10. Benazir Raz. 2022 floods, a living nightmare. Dawn.com Available from https://www.dawn.com/news/1710561 (2022)
11. Javed A, Khan MS, Nasar A, Rasheed A. Mental healthcare in Pakistan. Taiwanese Journal of Psychiatry [Internet]. 2020 Jan 1;34(1):6. Available from: http://www.e-tjp.org/article.asp?issn=1028-3684
12. WHO. WHO Pakistan celebrates World Mental Health Day [Internet]. 2017. Available from: https://www.emro.who.int/pak/pakistan-news/who-pakistan-celebrates-world-mental-health-day.html#:~:text=In.
13. Hussain, S. S., Khan, M., Gul, R. & Asad, N. Integration of mental health into primary healthcare: Perceptions of stakeholders in Pakistan. Eastern Mediterranean Health Journal 24, 146–153 (2018).
14. Maha Akbar. Over a year after Pakistan floods, survivors battle climate anxiety (Photo essay). Al Jazeera. Available from https://www.aljazeera.com/gallery/2023/10/24/photos-over-a-year-after-pakistan-floods-survivors-battle-climate-anxiety (2023)
15. World Health Organization. (2017). mhGAP training manuals for the mhGAP Intervention Guide for mental, neurological and substance use disorders in non-specialized health settings version 2.0 (for field testing). https://apps.who.int/iris/bitstream/handle/10665/259161/WHO-MSD-MER-17.6-eng.pdf
16. Patient Health Questionnaire-9 (PHQ-9) - Mental Health Screening - National HIV Curriculum (uw.edu). Available from https://www.hiv.uw.edu/page/mental-health-screening/phq-2
17. Rabbani F, Nafis J, Akhtar S, Shahid Khan M, Sayani S, Siddiqui A, et al. Feasibility trial of a low-intensity preventive intervention delivered at community doorsteps by frontline workers in rural Pakistan: mPareshan Study protocol (Preprint). JMIR Preprints [Internet]. 2023; Available from: https://doi.org/10.2196/preprints.54272
18. mPareshan App | Brain and Mind Institute | Aga Khan University [Internet]. aku.edu. Available from https://www.aku.edu/bmi/research/Pages/mpareshan-app.aspx
19. Braun, R., Catalani, C., Wimbush, J. & Israelski, D. Community Health Workers and Mobile Technology: A Systematic Review of the Literature. PLoS One 8, (2013).

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For futher information on mPareshan, please visit the website:
https://www.aku.edu/bmi/research/Pages/mpareshan-app.aspx
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