Impact case study: Shaping the health response to extreme heat in Pakistan

With heatwaves expected to rise due to the climate crisis, there is increased need for locally informed, evidence-based interventions to manage their impacts on health and wellbeing. Johns Hopkins University led the study, the ‘HEAT (Heat Emergency Awareness and Treatment Bundle) Trial’, between 2016 and 2019. It developed and tested an intervention to reduce the impact of extreme heat.

The intervention and study engagements improved knowledge and care practices of emergency department staff in Karachi hospitals, as well as the ability of communities to protect themselves from heat-related illnesses. There were impacts on staff at the hospitals and at the Aman Foundation – which runs community programmes on protection from heat-related illness – and findings contributed to new evidence-based care strategies for both settings. These changes indirectly informed the new Karachi Heatwave Management Plan, published by the Commissioner of Karachi.

Impact from the study may be primarily short-term, recognising that driving behaviour change to improve health outcomes requires long-term focus. If the initial interest from national stakeholders in HEAT can be sustained, it has the potential to influence care practices in other cities in Pakistan, and in heat-affected cities worldwide.

Title: HEAT (Heat Emergency Awareness and Treatment Bundle) Trial

Location: Karachi, Pakistan

Study type: Cluster randomised controlled trial and pre- and post-intervention study

IMPACTS

- Informed the development of evidence-based care strategies for managing patients exposed to extreme heat in Korangi
- Provided evidence to a coalition of actors already advocating for improved responses to extreme heat in Karachi
- Strengthened capacity of staff at participating hospitals in Karachi

RESEARCH IMPACT LEARNING

- A strong partnership, and local positioning and expertise, can enable change
- Dedicated capacity for research uptake work is important
BACKGROUND

Extreme temperatures, primarily in the form of heatwaves, impact millions of people, with severe health outcomes for hundreds of thousands of people every year. They disproportionately affect those living in urban areas in low- and middle-income countries, and can have a devastating impact in low-resource settings due to poor emergency care systems and lack of knowledge about heat-related illnesses. Heatwaves are likely to increase due to the climate crisis, and, at present, there are limited locally-informed, evidence-based interventions to manage their impacts.

In Karachi, Pakistan’s most populous city, temperatures can reach above 40°C. In 2015 an extreme heatwave killed over 1,000 people, prompting public health experts, NGOs and policymakers in the city to improve their response. But with quality of care not scientifically proven or systematic, there was demand for knowledge.

THE STUDY

The study developed and tested an intervention aimed at reducing the impacts of extreme temperatures in Korangi, a low-income and densely populated district of Karachi, vulnerable to extreme heat. The intervention was the ‘Heat Emergency, Awareness and Treatment (HEAT) Bundle’.

The study consisted of two arms: a community arm and a hospital arm. The community arm involved a cluster randomised trial while the hospital arm was a pre- and post-intervention study. The aim was to understand how education and training in both settings can help to mitigate the impacts of extreme heat. In the short-term, the study also sought to increase risk awareness and improve treatment for heat-related illnesses.

In the hospital setting, this comprised education and guidance aimed at healthcare professionals on treatment in low-resource settings. The bundle, including a HEAT manual and simplified algorithm, was delivered to 200 doctors, nurses and paramedics in the emergency departments of four major hospitals in Korangi. The study measured how the bundle impacted knowledge, attitudes and care practices in the area, with the expectation that it would also reduce rates of illness and death associated with extreme heat.

In the community arm, the HEAT bundle was delivered to 16 clusters of 1,000 people each. It measured the knowledge and awareness of heat-related illness and prevention measures, as well as subsequent behaviour change.
FINDINGS

In the hospital setting, the majority of emergency department staff who received the bundle rated it as ‘good’ or ‘excellent’. Knowledge about heat-related illnesses and patient management increased by 36% among these staff following the intervention, and the correct diagnosis of heat-related illnesses rose from 3% to 7.5%. Improvements in care practices, including temperature monitoring, hydration and water sponging, were also reported.

In the community setting, the HEAT bundle significantly increased people’s ability to recognise heat-related illnesses and knowledge of the risk factors that cause it. The percentage of people experiencing symptoms that sought treatment within one hour increased from 17% to 65%. Otherwise, changes in the community showed mixed results – knowledge and understanding improved, but these didn’t necessarily lead to behaviour change.

Overall, the study reported a slight fall in death rates, but this trend was shown in both the intervention and control groups making it difficult to determine the study’s contribution to this change.
COMMUNICATIONS AND ENGAGEMENT

The study team developed an engagement strategy for the findings, identifying impact objectives and mapping key stakeholders. The strategy included speaking to the then Commissioner of Karachi and convening an advisory group with influential people including the Director of the Provincial Disaster Management Authority. Policymakers in the group facilitated a session on preparedness for heatwaves, attended by the National Disaster Management Authority and Senate Standing Committee on Climate Change.

National engagement focused on capacity building and awareness building on the HEAT bundle among practitioners in Karachi. In 2019 a dissemination seminar was conducted in Karachi including local community representatives, Pakistan Meteorological Department, urban engineering, Provincial Disaster Management Authority, academics, media and healthcare providers. The meeting was chaired by the Commissioner of the city of Karachi. A policy brief was distributed to the attendees.

HEAT team members from Johns Hopkins University and Aga Khan University (AKU) presented preliminary data on the hospital-arm of the study at the 2018 Society for Academic Emergency Medicine’s Annual Meeting.

In November 2018, a special session was organised at the AKU National Health Research Symposium on the project, and preliminary data was presented. The event was part of the 21st National Health Sciences Research Symposium. The session was attended by over a hundred participants from various medical colleges and hospitals.

Via local partners with pre-existing relationships with Karachi press outlets, the study team engaged with the media and generated extensive press coverage. Social media was used, including a Facebook video viewed 28,000 times.

The Aman Foundation, having delivered health programmes in Korangi since 2011, was critical for building community trust. Community-focused communications were produced in several local languages with pictorial depictions of heat illness and responses. Engagement and dissemination were conducted via locally respected figures such as imams, and both male and female outreach workers were hired to build trust among different audiences.

Beyond Karachi, the study team conducted physician workshops in Islamabad, Lahore and Peshawar, and shared the training manual and protocols with members of the Pakistan Society of Emergency Medicine. Several global engagements and conferences were undertaken including two presentations to World Health Organization stakeholders, and a presentation at the 2018 Society for Academic Emergency Medicine’s Annual Meeting.
UPTAKE AND IMPACT

The study had meaningful short-term impacts in Karachi hospitals, among programmes and practitioner staff at the Aman Foundation, and the Korangi community.

It had a significant impact on the knowledge and care practices of emergency department staff in the four participating hospitals in Karachi, specifically on the capacity to diagnose and manage heat-related illnesses, although impacts on health outcomes are yet to be observed. Findings informed the development of evidence-based care strategies for managing patients exposed to extreme heat, and research has generated ongoing interest from hospitals in Karachi to continue the HEAT training.

“[Clinical staff at Indus Hospital] are now better prepared to systematically identify heat-related illness... which helps us manage patients” – Key Informant Interview, Indus Hospital

The study influenced a coalition of actors already advocating for improved responses to extreme heat in Karachi, including LEAD Pakistan, the Climate and Development Knowledge Network (CDKN) Asia, and the Aman Foundation. Uptake was enabled by growing public and political attention to this issue – Junaid Razzak, the study lead, was frequently quoted in the media. There was an indirect influence of the study on the Karachi Heatwave Management Plan, published by the Karachi Commissioner and CDKN Asia, which refers to the Aman Foundation programmes informed by the study.

During an event hosting these actors, the then Commissioner of Karachi expressed interest in expanding the HEAT training to all hospitals in the city, and subsequent training was provided to 28 staff from 14 hospitals.

The findings informed the development of evidence-based extreme heat strategies by the Aman Foundation. Community programmes run by the foundation in Korangi have reportedly increased their staff capacity to help community members understand how to better protect themselves from heat-related illness or hospital treatment. Twelve community health workers were trained using the HEAT bundle, reaching 2,800 households and 16,000 people. A link between the study’s community arm and health outcomes is inferred, with admissions in the four participating hospitals falling significantly between baseline and intervention.

“Keeping in mind the current climate situation of the world, it is extremely important to become as aware of the severity of the situation as possible, in order to find relevant situations for our region. This [study] is an important step in collaboration with AKU and Johns Hopkins, and we are hopeful that this would prove to be beneficial for the community” – Mujahid Khan, CEO of the Aman Foundation

Despite positive short-term results, it is premature to assess the longer-term impacts and the extent to which the findings have been incorporated into routine service provision during the hot season in Karachi. There is potential for influencing care practice in other cities in Pakistan prone to extreme heat, and the national engagement exercises mentioned above demonstrate potential for uptake in other heat-affected cities in Pakistan. Further engagement and capacity building on the HEAT package among communities, health providers and policymakers, and political will and resources, would be essential to ensure lasting change.
RESEARCH IMPACT LEARNING

STUDY TEAM COMPRISED OF MULTI-DISCIPLINARY EXPERTS

A strong multi-disciplinary partnership made up of experts with both research and practice experience, as well as existing stakeholder relationships in Karachi. The study team was well positioned to tackle this critical issue and devise effective research and solutions responsive to local priorities and systems.

LIMITED GLOBAL IMPACT

The study’s global impact was more limited, which may reflect the amount of time the study team had for knowledge translation and engagement with global audiences, as well as the limited capacity for research uptake/research communications activities on the study team. Since that study, Research Uptake Focal Points have become a standard requirement on R2HC research teams. Such a role could perhaps have assisted. This study indicates that a single short research project (2–3 years) is limited in its ability to deliver lasting change or embed new health innovations and practices. To tackle the emerging challenges brought by the climate crisis, researchers and health providers should consider longer programmes of work, funding for research-to-scale agendas.

PARTNERS

Johns Hopkins University School of Medicine; Aga Khan University; Aman Foundation

ABOUT ELRHA

Elrha is a global organisation that finds solutions to complex humanitarian problems through research and innovation. This study was funded by Elrha’s Research for Health in Humanitarian Crises (R2HC) Programme which aims to improve health outcomes by strengthening the evidence base for public health interventions in humanitarian crises. R2HC is funded by the UK Foreign Commonwealth and Development Office (FCDO), Wellcome, and the Department of Health and Social Care (DHSC) through the National Institute of Health Research (NIHR). R2HC captures detailed case studies through a process that triangulates and validates evidence on uptake and impact. The case study methodology and full version of this summary case study including references are available on request.