

KNOWLEDGE, ATTITUDES & PRACTICE AROUND HEATWAVE IN KARACHI

FOLLOWING A FORECAST-BASED HEATWAVE MESSAGING PROJECT

DECEMBER 2020



Ministry of Foreign Affairs of the
Netherlands



START
NETWORK



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This project was led by a team which included Sarah Barr (Research and Learning adviser START Network), Dr. Sheikh Tanveer (CEO HANDS), Dr. Sarwat Mirza (CE Research & Health), Mr. Ghulam Mustafa Zaur (CE Services HANDS), Mr. Raheem Marri (HOD Social Mobilization & Disaster Management HANDS) and Mrs. Rubina Jaffery (HOD ME&R HANDS).

The report and survey was technically led and co-authored by Sarah Barr (Research and Learning adviser, START Network) and Dr. Rakhshinda Ambreen (Program Manager ME&R HANDS). HANDS Karachi Urban Office provided enumerators and key feedback during the preparation of the questionnaire and participated actively during the training and conduction of survey. Special thanks to Mrs. Shabana Rahu (District Executive Manager Karachi Urban HANDS), Mr. Parkash Malhi (Senior Manager ME&R HANDS) and Ms. Rizwana Turk (Project Manager Heatwave anticipatory response HANDS) for their feedback on the research proposal and questionnaire.

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INTRODUCTION

As temperatures rise globally, the deadly impact of extreme heat is becoming increasingly clear. Five of the warmest ever years have occurred since 2015, with nine of the ten hottest years having occurred since 2005.¹ This is having a significant impact in Pakistan. Densely populated areas with under resourced health services provide little respite in the summer months, for those vulnerable to the effects of extreme heat. In 2015, the humanitarian impact of heatwaves was acknowledged when around 1,300 Karachi residents died as a direct result of a June heatwave.²

Harm caused by extreme heat can be avoided by taking simple protective measures such as drinking water and avoiding the outdoors or hard physical work during the hottest point of the day. Providing citizens with warnings when extreme heat is forecast and advice about keeping cool and hydrated can save lives. The Start Network have been testing approaches to managing heatwaves since 2015. We have been seeking to link the best forecasts with the most efficient financing to enable frontline NGOs to reach communities with key messages to manage extreme heat before and during a heatwave.

In 2020, for the first time on heatwaves in Pakistan, the Start Network took a disaster risk financing approach to managing extreme heat. Disaster risk financings draws together a quantitative risk analysis, with pre-agreed finance and contingency planning. This enables humanitarians to create triggers for action when a risk threshold is met to release funds automatically for a forecasted crisis. In Pakistan, a heatwave model was created to release pre-agreed funds to implement heat contingency plans when a heatwave was imminent.

The model built on pioneering research by the London School of Economics and made use of Pakistan Meteorological Department forecasts. On May 22nd the model triggered, automatically triggering the release of £36,000 to HANDS, funding a six-week project to help the population of Karachi get ahead of extreme heat. It included awareness raising messages through FM radio, SMS and social media reaching over one million people. 70 printed umbrellas were also provided for the Provincial Disaster Management Authority and traffic police, providing shade alongside messages in congested public locations.

THIS PAPER PRESENTS THE RESULTS OF A KNOWLEDGE, AWARENESS AND PRACTICE (KAP) SURVEY CONDUCTED AFTER THE PROJECT. THE SURVEY AIMED TO IDENTIFY THE MOST EFFECTIVE CHANNELS FOR HEATWAVE MESSAGING AND UNDERSTAND THE EXTENT TO WHICH THE INTERVENTION CATALYZED CHANGES IN KNOWLEDGE OR BEHAVIOR AROUND HEATWAVE.

¹ NOAA, "2019 was the 2nd hottest year on record for Earth say NOAA", NASA.

<https://www.noaa.gov/news/2019-was-2nd-hottest-year-on-record-for-earth-say-noaa-nasa#:~:text=NASA%20also%20found%20that%202010,second%20warmest%20for%20the%20globe.>

² BBC, "Why did so many die in Karachi's heatwave?", <https://www.bbc.co.uk/news/world-asia-33358705>. Retrieved on 29 October 2020.

METHODOLOGY

RESEARCH QUESTIONS

- 01** What were the most and least effective channels for distributing heatwave messages?
- 02** Have the awareness messages through the mass media campaign proven effective in improving the knowledge and practices of heatstroke prevention study participants?
- 03** What are the populations attitudes to receiving further heatwave messages and protecting themselves from extreme heat?
- 04** Are participants reporting symptoms from extreme heat?
Were recipients who had high scores for measures they took against heat less likely to experience heatstroke?

RESEARCH PROCESS AND SAMPLING DESIGN

The survey was conducted by telephone in August 2020 following the conclusion of the project in July. The study population was those who had received messages through SMS. A quantitative survey tool was created, composed of 27 questions. The survey tool was co-developed by HANDS and the Start Network and tested on 50 respondents before being finalized.

A simple random sample of telephone numbers from the list of recipients was taken, giving a sample of 601. Respondents who were not based in Karachi or who did not recall receiving any messages were filtered out before the main survey questions were implemented. The surveys were recorded in hard copy and later entered into a secure excel file. The analysis was conducted in collaboration between HANDS and the Start Network.

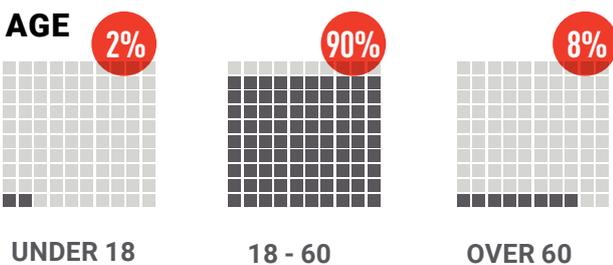
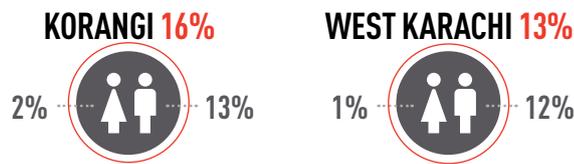
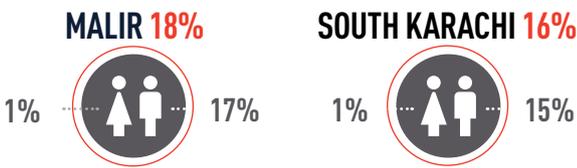
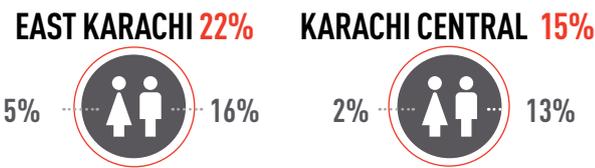
STUDY LIMITATIONS

We sampled from the list of phone numbers to which SMS heatwave warning messages were sent, the only data we had on these numbers was their Karachi location. Equally we were reliant on respondents agreeing to participate in the interview. This produce a balanced sample in terms of most demographic variables, but resulted in an 87% male sample.

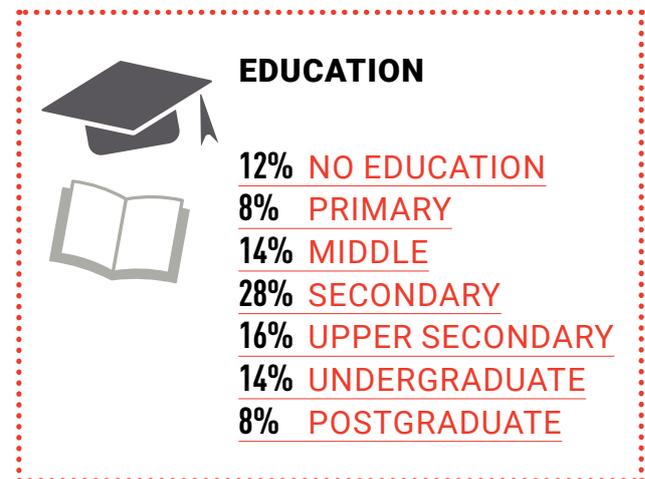
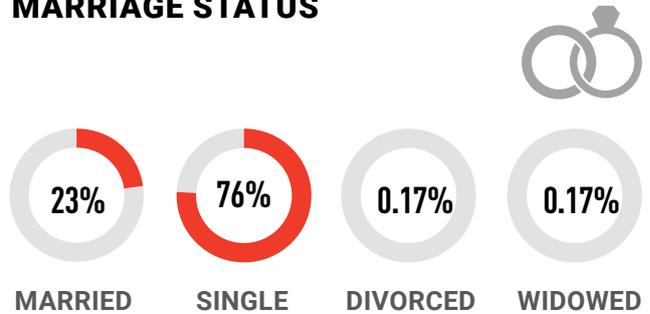
One research question was around whether or not respondents or their families had experienced symptoms due to extreme heat. As with the rest of the study, this may have suffered recall bias. Th most reported symptoms, such as headaches, are common symptoms which may result from a wide variety of health issues, as such this section should only be considered a very loose indication harm caused by extreme heat. Equally, heat stress can cause a range of indirect negative effects which could not be captured through this survey.

INTERVIEWEE CHARACTERISTICS

GENDER



MARRIAGE STATUS



19.1%
of respondents reported using air conditioning during the month of May.

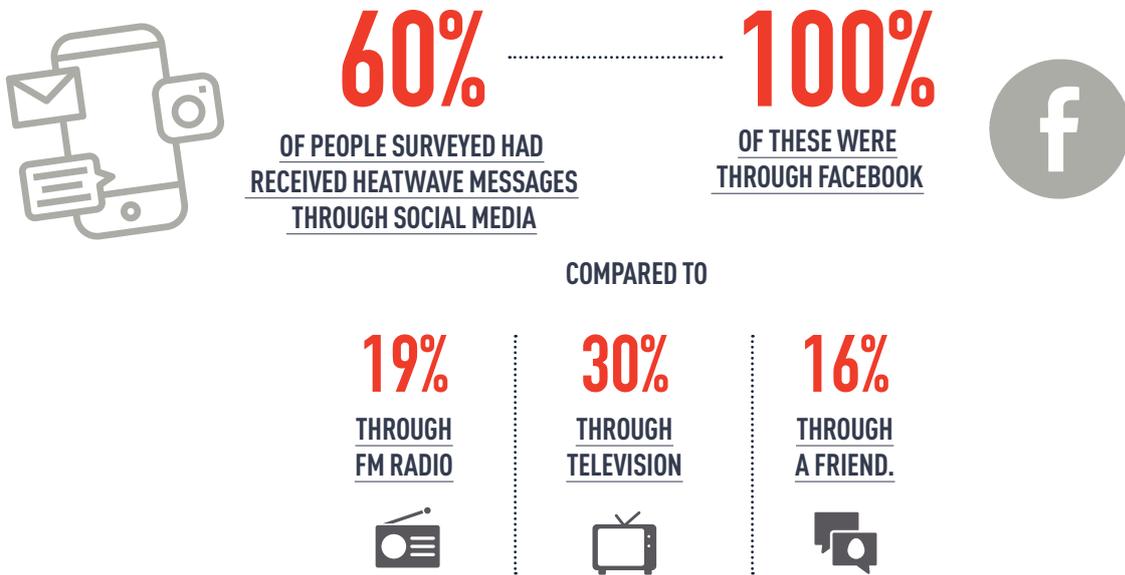


ETHICAL CONSIDERATIONS

A verbal informed consent was taken from the participants, who were given a right to refuse and exit the interview any time. The data will be kept in a locked cabinet and only the MER team and project managers had access to it, and soft copies were held in a password protected folder. Identities of the participants will not be disclosed. Unique Codes will be used to maintain confidentiality of the participants.

FINDINGS: **WHAT WERE THE MOST AND LEAST EFFECTIVE CHANNELS FOR TRANSMITTING HEATWAVE MESSAGES?**

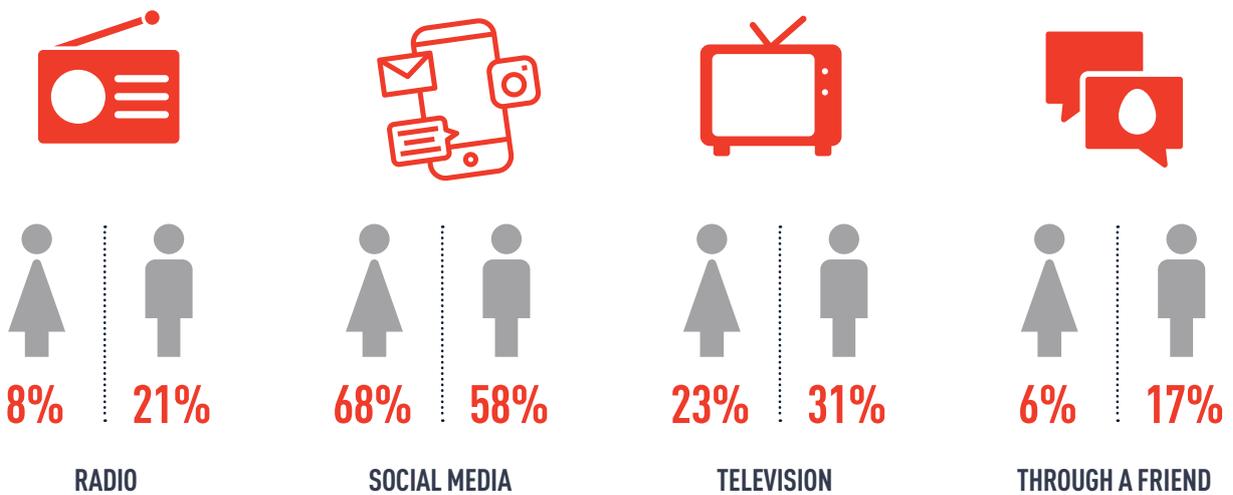
Social media, in particular Facebook, was the channel through which most respondents accessed the heatwave messaging.



The research team noted lockdown restrictions due to covid-19 may have limited the reach of FM radio messages, as usually people listen to the radio while out, for example driving.

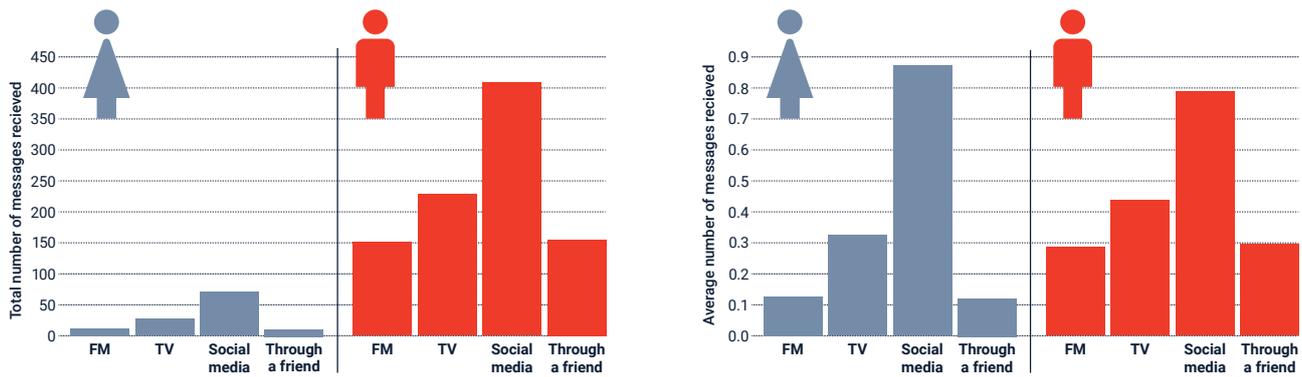
The success of social media in reaching many people with messaging was evident for both men and women, though female respondents were more likely to access messaging through social media and television, and less likely to access it through a friend or on the radio.

The graphic below shows the percentage of the sample who received messages through each channel. Some participants reported seeing or hearing messages through multiple channels.



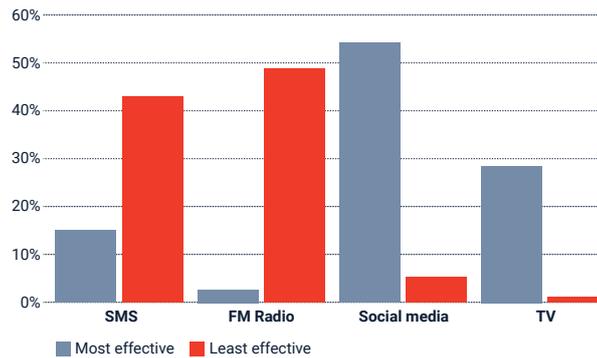
Participants were asked both about the channels through which they accessed messaging, and which they perceived to be most effective:

The below graphs show the total number of messages received for men and women. On the left, the total number of times each type of message was received is shown. On the right, the average number of messages received by men and women across the different channels is shown.

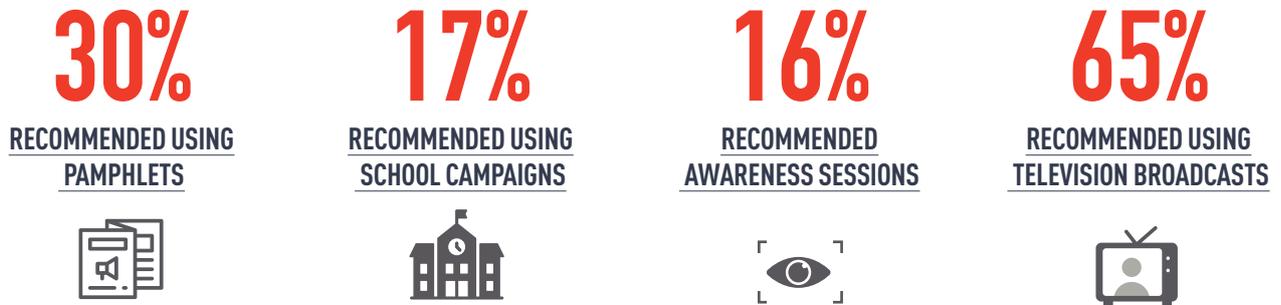


The below graph shows the channels perceived as most and least effective for transmitting heatwave.

WHAT ARE THE MOST AND LEAST EFFECTIVE CHANNELS FOR HEATWAVE MESSAGES?



Participants were asked to recommend any additional ways to share heatwave messages.

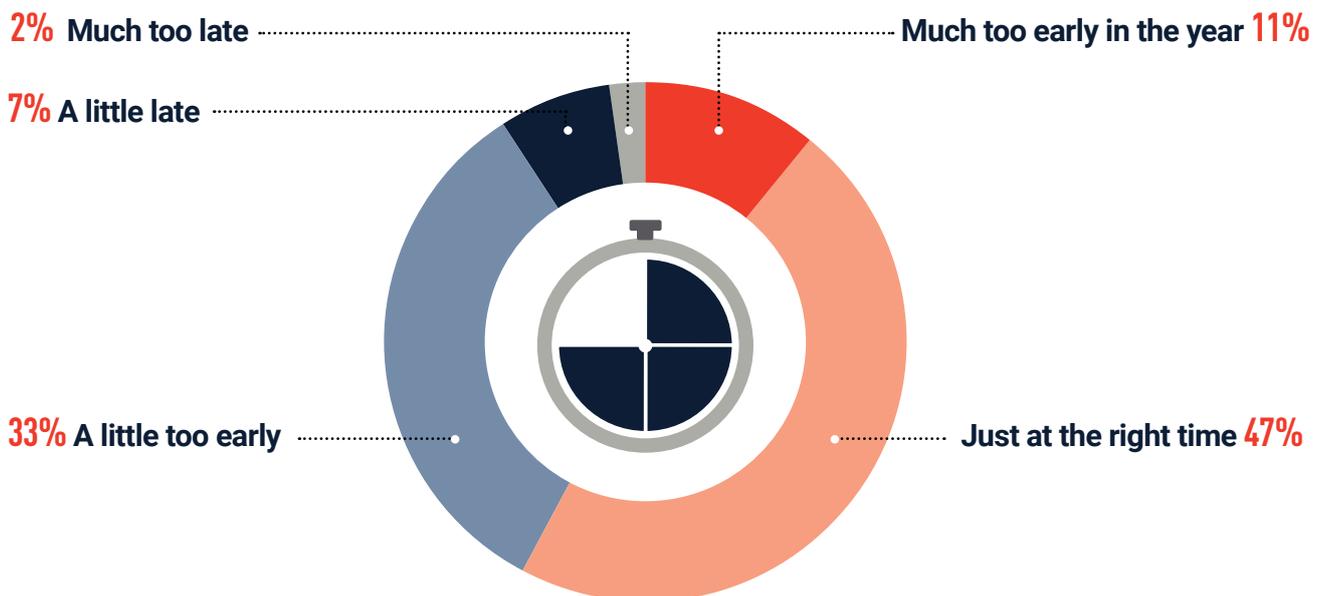


Smaller numbers suggested billboards, theatre and support groups.

A key benefit of disaster risk financing for heatwaves is to enable a timely, preventative interventions to take place, before the onset of a hazard.

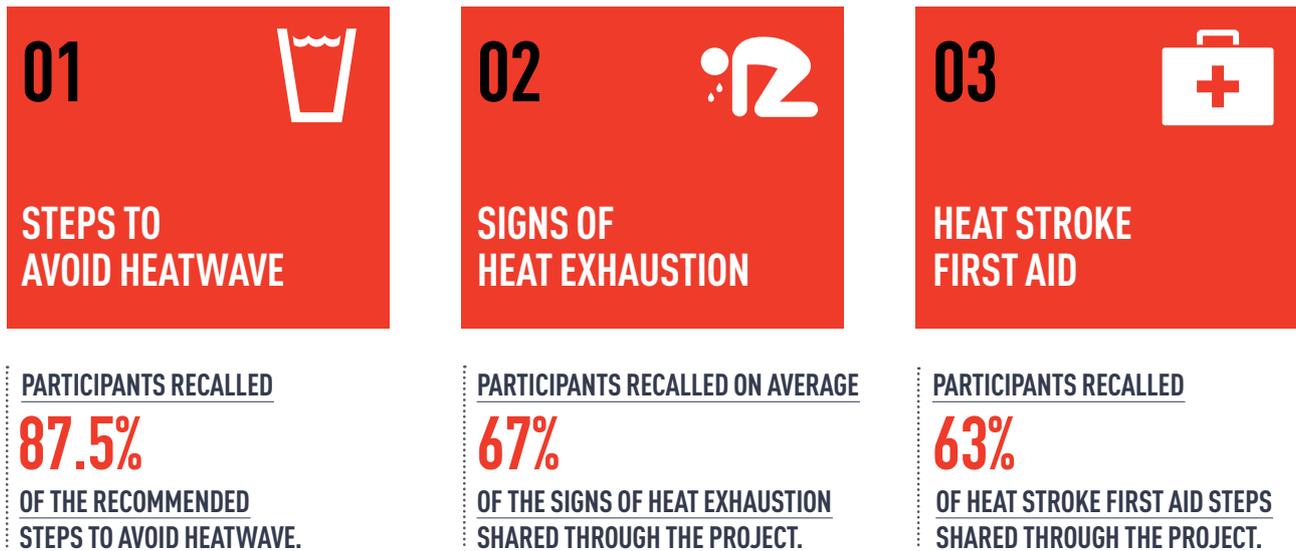
This project was activated on May 26th, with a ten-day lead time before the heatwave was forecast. The project initiation coincided with Eid-Al Fitr which caused some delays, although interestingly only 9% of respondents described the messaging as either 'late' or 'much too late'.

DID YOU RECIEVE THE MESSAGES AT A GOOD TIME OF YEAR?



HAS THE CAMPAIGN PROVEN EFFECTIVE IN IMPROVING KNOWLEDGE AND PRACTICE OF HEATSTROKE PREVENTION STUDY PARTICIPANTS?

The project sought to increase knowledge about heatwave in three areas:



The project was most successful in increasing knowledge of signs of heat exhaustion and least successful in improving heat stroke first aid, where the most gaps remain; 49% of all measures recalled for signs of heat exhaustion were reported as 'new', falling to 46% and 24% respectively for avoiding heatstroke and heat first aid.



The data shows the usefulness of continuing to share the most critical and basic steps around managing extreme heat, for example, 28% of respondents reported drinking water as new knowledge gained through the messages.



Across the three categories of knowledge around heatwave, recall is varied. Knowledge of key protective measures including drinking water (100% recalled) and avoiding hard physical work in the sun are very high (98% recalled).

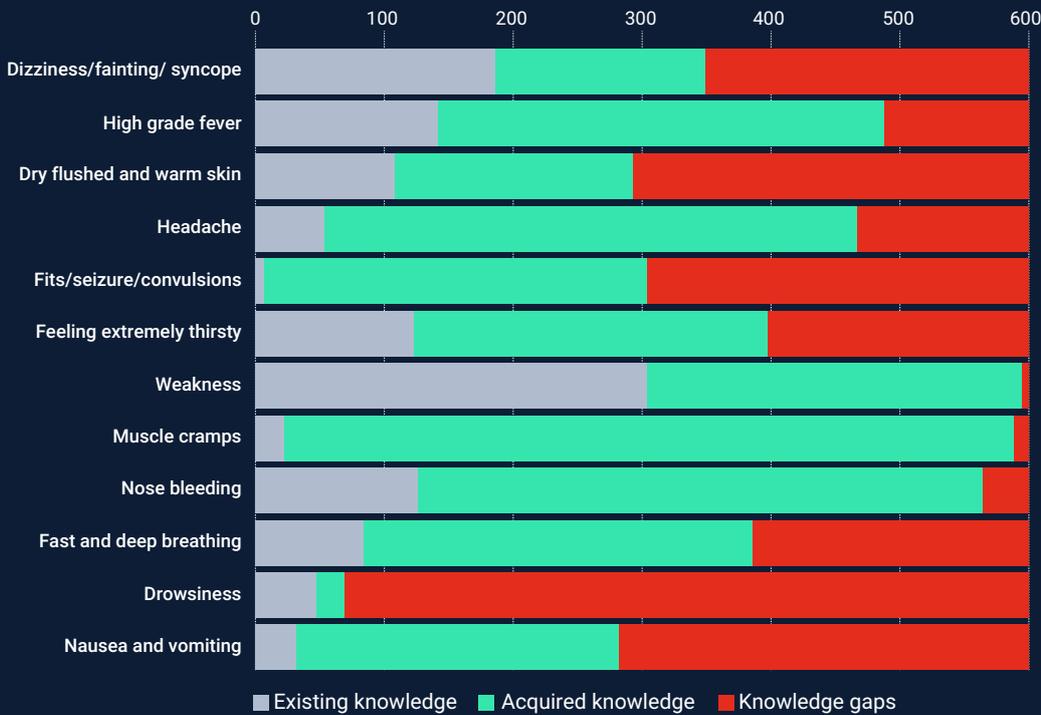


Heatwave first aid knowledge is much less consistent. While the patchiness of recall is regrettable, high retention of key ways to avoid heat stress is positive; knowledge is highest in the most critical areas. In future heatwave messaging campaigns, reducing the amount of advice to the more critical or impactful recommendations would likely support retention-

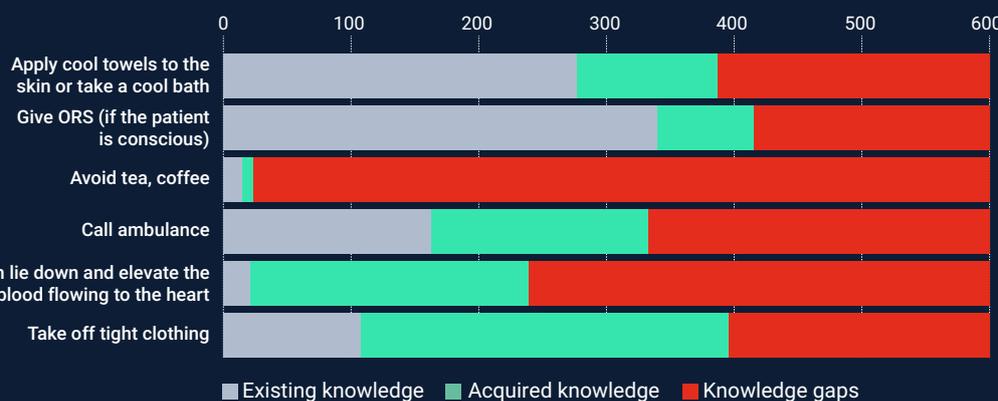
The five charts below show reported knowledge and practice around extreme heat. Participants were asked open ended questions, for example, 'What are the signs of heat exhaustion?' and enumerators ticked from their list, which corresponded with the original content of the messaging. For each response, participants were asked 'Did you know (or do) this before the messaging or is it new?'. As such, the graphs below show recall and measures taken, and which of this was 'new'. Light blue shows measures which were reported as already having been known or practiced, dark blue is 'new' so shows changes catalyzed by the project, and orange is remaining gaps.



RECALL OF STEPS TO AVOID HEATWAVE



RECALL OF SIGNS OF HEAT EXHAUSTION



RECALL OF HEAT EXHAUSTION FIRST AID



Knowledge scores were relatively high for both men and women, but participants struggled to put this into practice. Respondents reported taking on average 50% of the recommended measures between receiving the messages and the date of the survey. Frequent consumption of beverages and avoiding going outside or hard physical work in the middle of the day were the most reported steps.

Only 10% of all protective measures taken by participants were taken for the first time since the messaging campaign, meaning that most protective measures taken by the respondents cannot be attributed to this project.

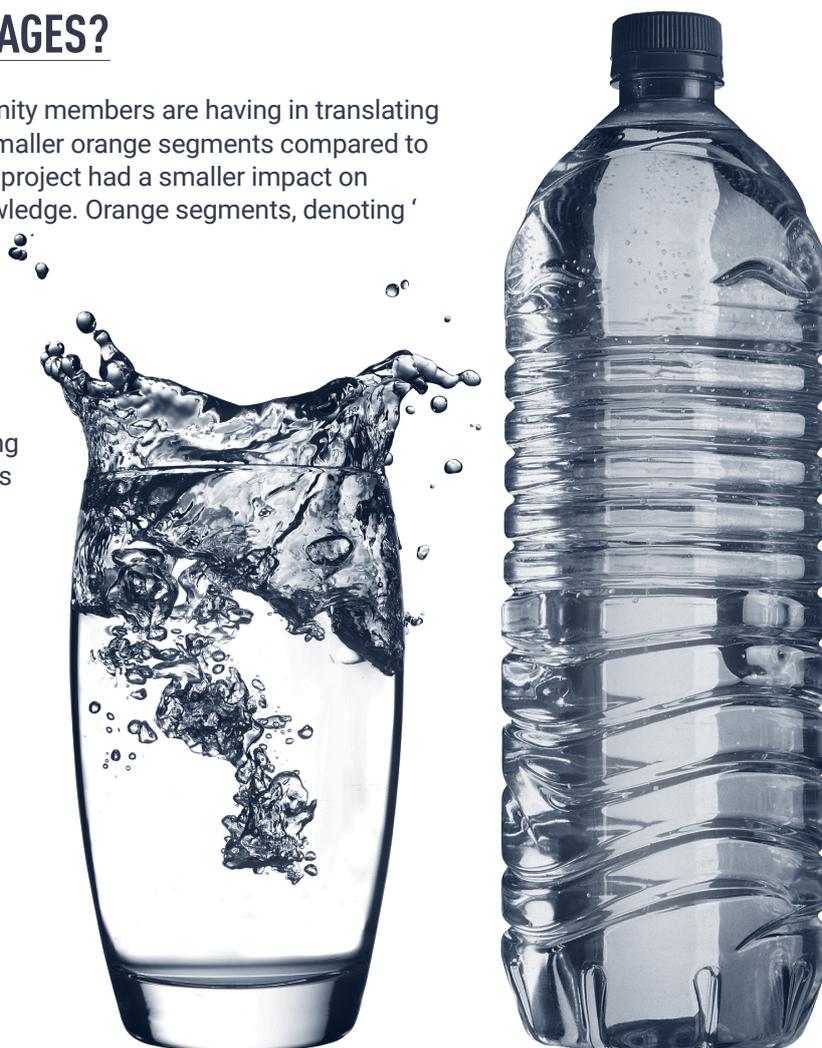
Respondents find it yet harder to support others protect themselves from extreme heat. Respondents supported or recommended others to take on average just 35% of the recommended measures. Consumption of beverages again being the most popular, 83% of participants supported someone else to do this.

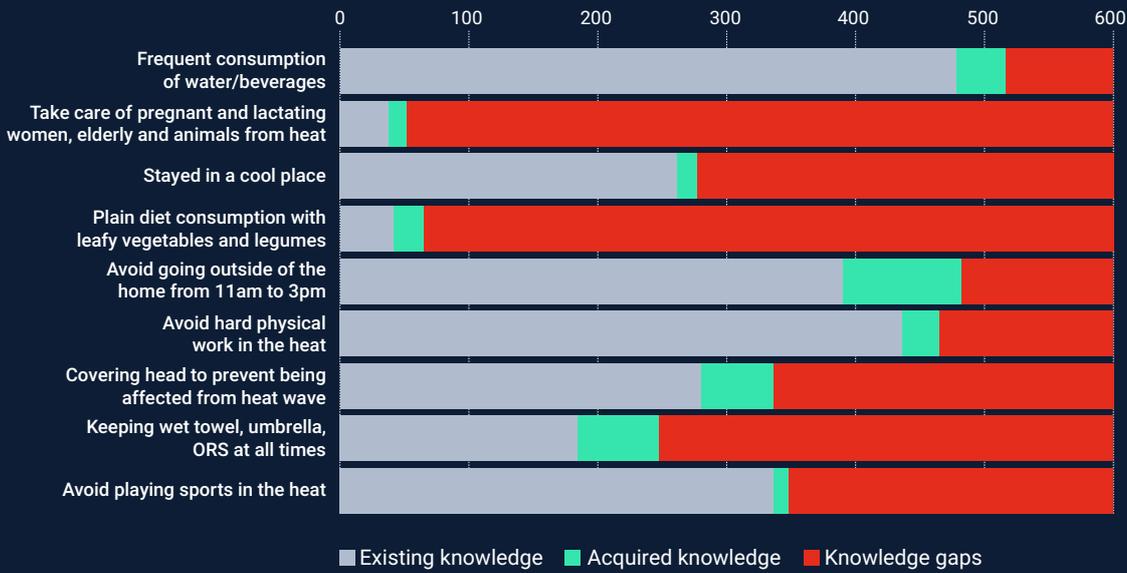
Overall, 41% of participants had medium total knowledge scores of 10-18 while 59% had high scores of between 19-27, no one had a score of nine or lower.

HEATWAVE PRACTICE – WHAT MEASURES HAVE YOU TAKEN TO COPE WITH EXTREME HEAT SINCE YOU RECEIVED THE MESSAGES?

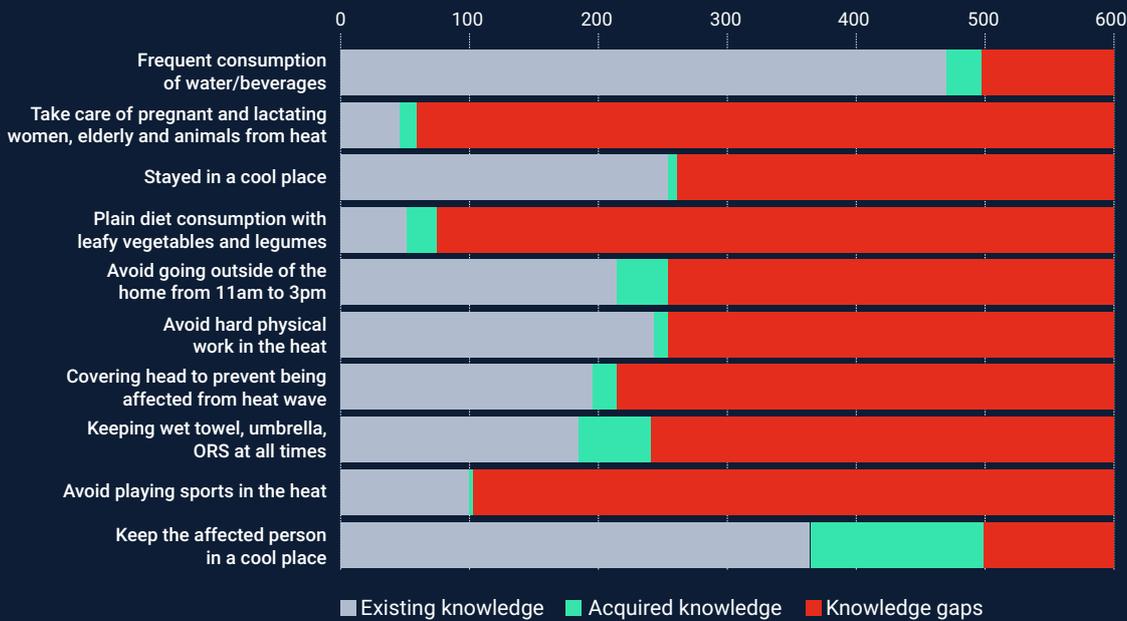
The data shows the difficulty community members are having in translating knowledge into practice. The much smaller orange segments compared to the data on knowledge show that the project had a smaller impact on improving practice than it did on knowledge. Orange segments, denoting 'new' practices constitute only 5% of the table for individual practice and 6% for supporting others. (See graphs on following page)

While the practice scores are less consistent, drinking water and avoiding the hard physical work or the outdoors are shown to be very common. These measures alone are likely to have a significant impact on an individuals likelihood of experiencing negative effects of extreme heat.





MEASURES TAKEN TO PROTECT FROM HEAT



PRACTICE: SUPPORTING OTHERS



Participants were asked if they shared the information with anyone else, 57% of men and 51% of women shared the messages with other people. Respondents were more likely to share with a relative (43% of the sample) than with a friend (26% of the sample).

HAVE YOU SHARED HEATWAVE MESSAGES WITH ANYONE ELSE?



SEEKING HELP

6.3%

OF RESPONDENTS

said that a family member had sought medical treatment due to symptoms of extreme heat since receiving the messages.

8.3%

OF PARTICIPANTS

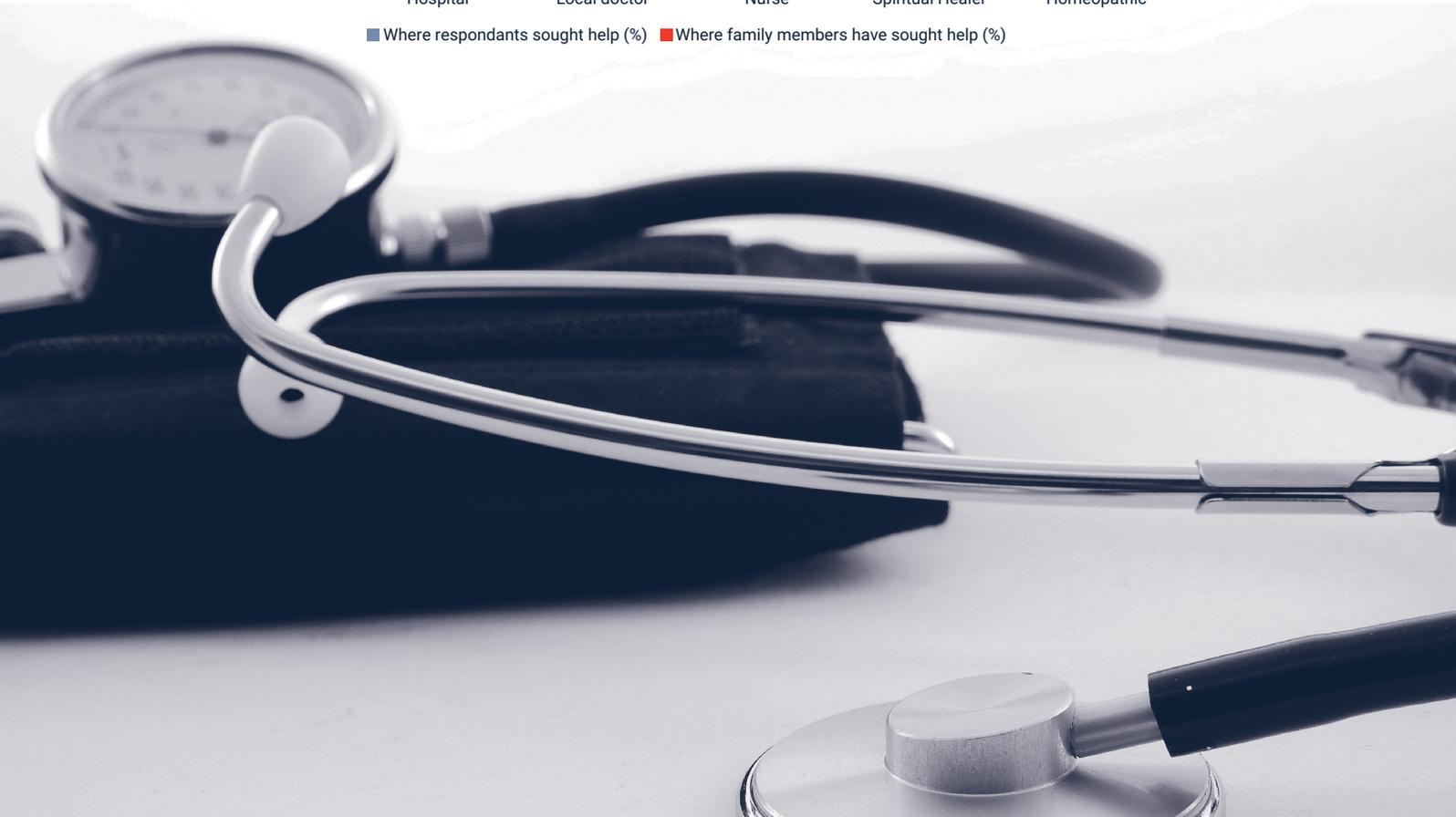
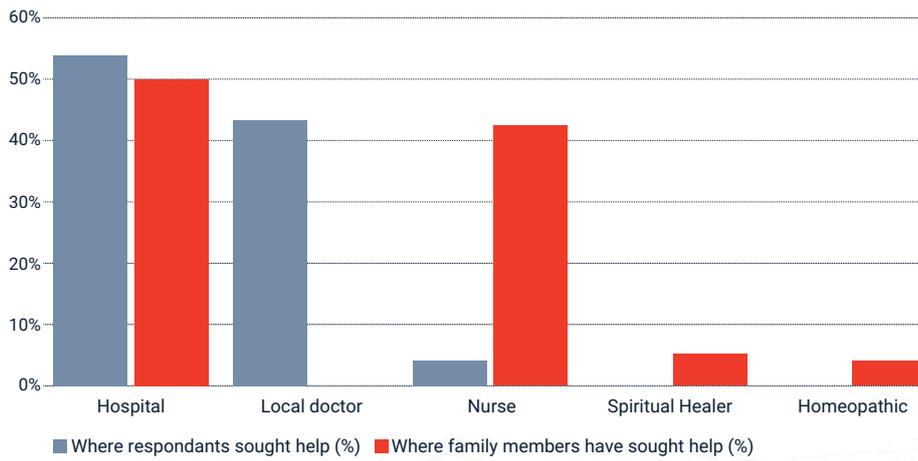
reported having experienced heat stroke in previous years

of whom

56%

SOUGHT MEDICAL TREATMENT

WHERE DID YOU OR YOUR FAMILY MEMBER SEEK HELP?

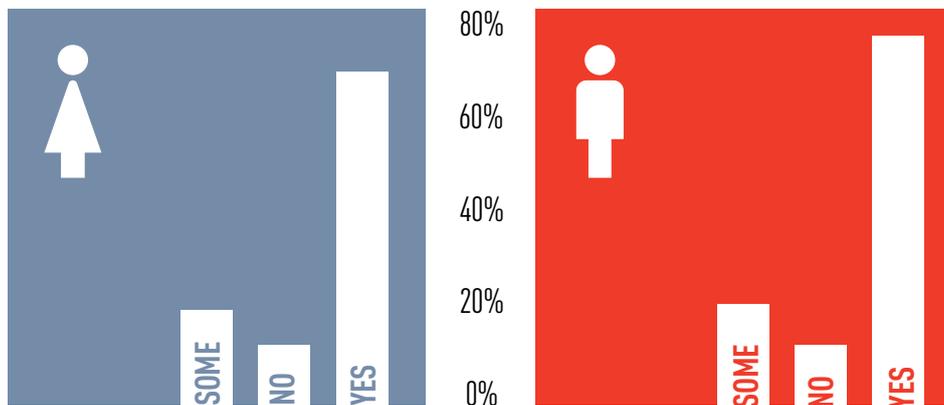


WHAT ARE ATTITUDES TO RECEIVING FURTHER HEATWAVE MESSAGES AND PROTECTING THEMSELVES FROM EXTREME HEAT?

The majority of both men and women are open to receiving further heatwave messages and 90% of respondents said they would follow all or some instructions provided.

The findings make a strong case for targeted messaging ahead of a heatwave. 84% of study participants would be either 'somewhat' or 'much more' likely to follow heat related advice if it also contained a warning of extreme heat.

WILL YOU FOLLOW ANOTHER HEATWAVE MESSAGE IF YOU RECEIVE ONE?



Those who said they would not follow instructions were asked why not. Responses fell broadly into two categories; resources and retention of advice. Of the 59 people who said they would not follow more instructions, half replied this was due to resource or time constraints or that they were too busy, the other half said they may forget or one message was not enough to change their behavior.

IF MESSAGING CONTAINED A WARNING OF EXTREME HEAT, WOULD YOU BE MORE LIKELY TO FOLLOW IT?



ARE PARTICIPANTS REPORTING SYMPTOMS FROM EXTREME HEAT? WERE RECIPIENT WHO TOOK MORE PROTECTIVE MEASURES LESS LIKELY TO REPORT SYMPTOMS?

7%

OF RESPONDENTS

**reported suffering symptoms
due to extreme heat since seeing
of hearing the messages**

8.3%

OF THE SAMPLE

**said they had
experienced heatstroke
in previous years.**

Both for reporting their own symptoms and those of family members, headaches, dizziness or confusion were the most reported symptoms. Without clinical data, it is not possible to reliably attribute these symptoms to extreme heat. They provide an indication of the extent of heat related symptoms and the perception of the danger of extreme heat.

A thorough analysis was conducted to look for connections between the likelihood of reporting experiencing symptoms of extreme heat since the messaging and other demographic information collected. No statistically significant relationships were identified, the following factors were tested using chi square:

- **GENDER,**
- **DISTRICT**
- **USE OF AIR CONDITIONING AT HOME**
- **MARITAL STATUS**

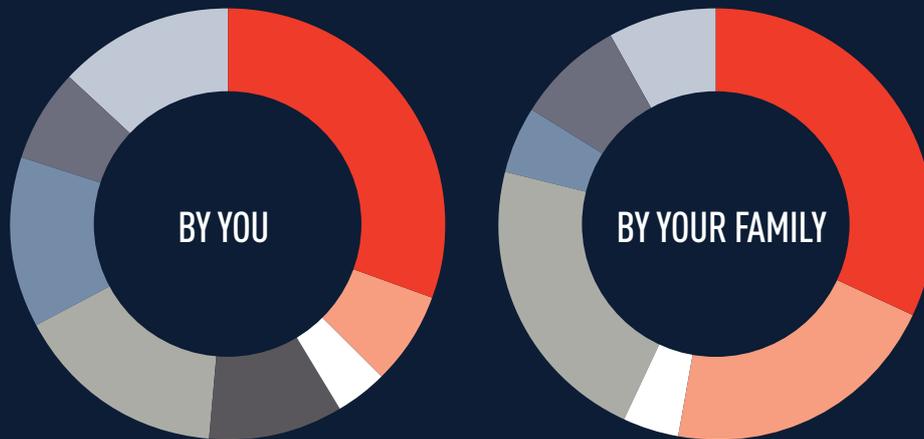
- **EDUCATION LEVEL,**
- **FORMAL EMPLOYMENT,**
- **PRESENCE OF DISABLED HOUSEHOLD MEMBERS,
LACTATING WOMEN, CHILDREN UNDER FIVE & PEOPLE OVER 60**

Those reporting symptoms also had similar average knowledge of protective measure against heat.

Those with higher scores for practice were more likely to report experiencing symptoms. This unexpected finding potentially reflects the fact that people who are more conscious of extreme heat take more protective measures and are more likely to notice when it impacts their health. It could equally suggest those more susceptible to heat take more protective measures but are not always successful.

This underlines why access to clinical data around extreme heat in Pakistan could enable a step change in measures to limit its impact. Learning more about those experiencing heat stroke could enable more targeted and effective assistance.

WHAT SYMPTOMS WERE EXPERIENCED?



31% Headache ●	Headache 32%
7% Loss of appetite or feeling sick ●	Loss of appetite or feeling sick 21%
4% Cramps in arms or legs ●	Cramps in arms or legs 4%
10% High body temperature ●	High body temperature 0%
16% Dizziness or confusion ●	Dizziness or confusion 22%
13% Excessive sweating, pale, clammy skin ●	Excessive sweating, pale, clammy skin 5%
7% Fast breathing or pulse ●	Fast breathing or pulse 8%
13% Extreme thirst ●	Extreme thirst 8%

KNOWLEDGE AND PRACTICE SCORES

Reported symptoms?	Measure	Heat stroke/exhaustion knowledge			Protective measures take	
		Avoiding heat stroke	Symptoms of heatstroke	Heat stroke first aid	For self	Helped others
Without symptoms (n = 556)	Average	7.2/8	7.8/12	3.5/6	4.6/9	2.4/9
	Standard deviation	0.6	1.4	1.2	1.0	1.5
With symptoms (n = 45)	Average	7.1/8	7.9/12	3.8/6	5.3/9	3.7/9
	Standard deviation	0.4	1.3	1.0	1.2	1.5
	P value	.406	.289	.407	.0001	.022

RECOMMENDATIONS FOR FUTURE HEATWAVE PROJECTS

01

84%

OF RESPONDENTS

reported that they would be 'somewhat' or 'much more' likely to follow instructions if they contain a warning of extreme heat. **Disaster risk financing interventions should be implemented before the onset of the event and contain a weather warning with any other messaging.**

02

SOCIAL MEDIA REACHED THE MOST PEOPLE WITH THE HIGHEST AVERAGE NUMBER OF MESSAGES AND SHOULD BE PRIORITIZED.



03



FM Radio effectiveness to be tested again following the next heatwave project. While effectiveness was low in 2020 this was likely impacted by covid-19. FM Radio is thought to be more accessible to low income groups who may have access to social media.

04

DURING HIGH RISK PERIODS, MESSAGING SHOULD BE INTENSIVE, WITH MULTIPLE MESSAGES ON EACH CHANNEL TO SUPPORT UPTAKE.



05



Retention and uptake could be improved by **reducing the amount of information transmitted** and focusing on critical protective and first aid steps to managing extreme heat.

06

TRANSLATING KNOWLEDGE INTO PRACTICE WAS SHOWN TO BE A CHALLENGE, MORE WORK SHOULD BE DONE TO UNDERSTAND BARRIERS TO TAKING PROTECTIVE MEASURES.



07



Participants should be encouraged to share the information on heat widely and supporting others to protect themselves, given that scores were low for supporting others to protect themselves.



51%

SHARED THE MESSAGES

57%

08



The medium for information dissemination should be scaled up and should be broadcasted on television as well as visual aids such as banner, poster should be put on display so that a person captures information quickly.

09

MORE VERBAL FACE TO FACE MESSAGES SHOULD BE CONSIDERED IN FURTHER HEATWAVE CAMPAIGNS.

Approaches such as school campaigns, awareness raising sessions and theatres were suggested over 220 times.



10



Liaison with hospital and local doctors administration should be established to access heat stroke patient information.

Learning more about those who find themselves seeking medical help for heat exhaustion could help targeting and message design.

ANNEX 1:

TESTING FOR CORRELATIONS BETWEEN DEMOGRAPHIC FACTORS AND LIKELIHOOD TO REPORT EXPERIENCING SYMPTOMS OF EXTREME HEAT

7% of the 601 people sampled in this study reported experiencing symptoms due to extreme heat. The below table presents the results of chi squared tests to assess for relationships between different demographic factors and likelihood to report experiencing symptoms. Significant results are highlighted in red.

Categorical variables, tested using Chi Square

VARIABLES	CHI SQUARE	DEGREES OF FREEDOM	SIGNIFICANCE
Age (split into five bands) and reporting symptoms	1.51	4	.823
Gender and reporting symptoms	0.157	1	.692
Marital status and reporting symptoms	0.116	1	.733
Education level and reporting symptoms	7.31	6	.294
Formal employment and reporting symptoms	0.736	1	.391
Number of disabled household members and reporting symptoms	4.61	3	.203
Number of PLW in household and reporting symptoms	2.58	4	.631
Number of under 5s in household and reporting symptoms	2.80	7	.903
Number of over 60s in household and reporting symptoms	7.86	4	.097
Number of household members sick for over 6 months and reporting symptoms	2.67	3	.445
District and reporting symptoms	3.63	5	.603
Airconditioning at home and reporting symptoms	0.302	2	.860

Numeric variables, tested with a one sample, two tailed T-Test

VARIABLE	NO SYMPTOMS (N=554)			SYMPTOMS (N=47)			SIGNIFICANCE
	MEAN	STANDARD DEVIATION	RANGE	MEAN	STANDARD DEVIATION	RANGE	
Age	35	11.57	15-80	37	11.44	18-65	.174
Knowledge scores: Avoiding heat (max 8)	7.21	.63	6-8	7.21	.49	6-8	.406
Knowledge scores: Symptoms of heat stress (max 12)	7.83	1.42	5-12	7.91	1.34	6-12	.289
Knowledge score: First of for heat (max 7)	3.57	1.26	1-7	3.87	1.21	1-7	.407
Practice score: Self (max 9)	4.67	1.08	3-9	5.37	1.24	4-9	.0001
Practice score: helping others (max 9)	2.41	1.37	0-9	3.72	1.21	1-9	.022



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