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As Asian Scorchers Multiply, Records Fall and Attention Rises: A Case Study

Introduction

Remote areas of Pakistan experienced one of the hottest days on record in May of 2017 at 130 degrees Fahrenheit[1]. This sparked debate on whether this was truly a record-breaking temperature as the previously recorded highest temperature occurred in Death Valley, California at 134 degrees[1]. This event furthered the discussion on record heat events happening across Asia and highlighted rising awareness of climate change effects[1].

Facts of the Case

There have been reports of rising heat records across Asia with the hottest year globally in 2020, followed by 2016, with the last eight years being the hottest temperatures ever recorded[2]. India reported 2,400 heat related deaths during a 2015 heat wave, ranking as the 5th deadliest heat wave in history[1]. The majority of those dead were laborers and farm workers[1]. Another study in the 2017 Pakistan heat wave with a mortality rate of 1,220 showed that those with less education and lower income were at a higher risk of death due to heat related illness[3]. This trend in mortality can be seen across heat emergencies on a global scale, that low-income populations are at disproportionately higher risk[1]. Other reports in Southeast Asia of record high temperatures have resulted in food insecurity, rising energy costs, and social distress[4].

Event Epidemiology

An Asia climate change expert reports that the record high temperatures may be attributed in part to increased usage of concrete, diminishing lakes, and air conditioner energy expulsion[1]. Record keeping of temperatures arose globally in the late 19th century, but not until the 20th century in some developing counries[1]. Making a record high temperature can be difficult to prove without proper instrumentation and documented evidence[1].

Extreme temperatures are rare and only caused by unusual atmospheric conditions, though high temperatures are becoming more common with global warming as this case study shows[1]. One study correlated the high temperatures in Asia from 2015-2017 (specifically the months of April and May) to El Niño Southern Oscillation (ENSO) phenomenon using multivariate regression ($r=0.73$)[4]. ENSO is a periodic fluctuation in Pacific Ocean surface temperature and air pressure that can result in heat waves[4]. Temperature measurements were collected through satellite derived land and sea surface temperatures and surface air temperature climatology[4]. Further linkage was shown through histogram distribution analysis ($P<0.01$)[4]. There was no bias or threat to data validity listed in the study[4].

The 2017 Pakistan heat wave study correlated impacts of extreme heat on mortality rates[5]. During this time, residents were 17x more likely to die from a heat related illness compared to the previous year (RR=17.68; 95% CI, 13.87-22.53)[5]. The same study showed correlation between education level and income with these heat-related deaths (RD=0.03; 95% CI, 0.01-0.05)[5]. Bivariate analysis was used to determine these associations[5]. Data was limited in that mortality rate was underestimated due to deaths in the home and hospital death certificate surveillance in an overburdened health system without proper documentation[5].

Event Management

The Pakistani Meteorological Department was able to predict and track the 2017 heat wave event[6]. Since Pakistan had previously experienced a heat wave in 2015, they were able to learn from previous years and developed a Heat Action Plan that was in place for the 2017 heat emergency[6]. Heat Action Plans limit mortality and lessen social impacts[6]. Heat Action Plans take place on city, state, and national levels to bring together all stakeholders to predict and respond in heat emergencies[6]. Unfortunately, these Heat Action Plans have limited reach in remote areas of Pakistan where water and electricity services are unreliable and there is limited healthcare access[6]. In respect to this geographic access issue, Pakistan could learn from neighboring India in Heat Action Plans that are decentralized to district-specific needs for resource allocation and mobilization, where those most at risk are prioritized[6].

Event Communication

Public Heat Health Warning Systems are an important part of heat emergency response and Action Plans implemented by National Meteorological Services[6]. The National Disaster Management Authority mobilizes disaster response agencies and regional leaders to increase public awareness of Heat Wave “Dos and Don’ts”[6]. Civil society groups play a large part in communication and response in vulnerable, hard to reach communities[6]. A stronger emphasis should be put towards civil society group efforts that focus on low income and uneducated populations that are unaware or don’t have access to care in heat emergencies[6]. The South Asia Heat Health Information Network works in capacity building for emergency preparedness and response[6]. There have been many open access publications on climate change since the 2017 heat wave in Pakistan to highlight this rising need on a global scale[6].

Summary

The key take-away of this event is that heat emergencies are only becoming more common and widespread as global warming progresses. Everyone should be prepared and educated on what to expect, what to do, and how to access resources in a heat emergency. The impacts of a heat emergency are far reaching because it’s not just loss of life - it affects food and water security, energy supply, and results in lasting economic damage. Early warning systems and well implemented action plans can save the most vulnerable populations.

References

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