

Risk of Water-Borne Diseases Outbreak amidst Heatwave in Karachi, Pakistan

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ABSTRACT

At least 450 people have died and several others have been hospitalized over four days (22-26 June, 2024) due to the terrible heatwaves that Karachi, Pakistan, is experiencing, with temperatures surpassing 40°C. The Sindh government responded by setting up 77 camps to provide vital hydration during heatwaves. However, these attempts are hampered by Pakistan's severe drinking water problem, a major problem due to the water's high concentration of harmful substances and bacteria. 33% of deaths and 20-40% of all diseases, including cholera and typhoid, are caused by contaminated water. Research shows that there is considerable pollution present even in filtered water, with a high proportion of contaminated samples in Karachi, Rawalpindi, and Islamabad. During this prolonged heat crisis, the quality of the water in relief camps must be immediately assessed to minimize further health risks and possible disease outbreaks. There is an immediate need for improved water management and safety measures.

Keywords: Heatwave mortality, Karachi heat crisis, waterborne diseases, water quality assessment, heat relief camps.

INTRODUCTION

Pakistan's port city of Karachi has been suffering heatwaves for a few days. The extreme heatwave (over 40 degrees Celsius) has caused many fatalities as well as a significant number of hospital admissions. Some news websites have also reported on this regrettable and severe consequence of the current climate situation, including the intense heatwave that has hit Karachi has resulted in at least 20 fatalities in the previous 48 hours in Pakistan's biggest city, along with numerous heatstroke cases. After ten bodies were taken to the morgue on June 24, rescue personnel said on 25th June that ten more dead had been discovered on the streets of Karachi and other locations [1]. The Chief Meteorologist of Pakistan made a clear prediction on another website that Karachi, the country's southern port city, would experience heatwave-like conditions on June 24 and 25, 2024, as the city continues to withstand the intense heat that has seen temperatures soar to over 40 degrees Celsius this week. The Chief Meteorologist of the nation reports that on June 24, 2024, a temperature of 41 degrees Celsius (105.8 degrees Fahrenheit) was recorded in Karachi. In Pakistan's southern province of Sindh, temperatures last month surpassed 52.2 degrees Celsius (125.6 degrees Fahrenheit), the highest reading of the summer and nearly as high as the record for the nation [2]. On June 24, 2024, 120 patients with heatstroke were treated by the emergency ward chief of the state-run Civil Hospital in Karachi, according to information provided to the Associated Press. Later,

he stated, eight of the individuals passed away. Local media reported that over 1,500 heatstroke patients received treatment at various municipal hospitals on the same day [3]. Heatwaves killed at least 450 individuals in the Karachi region in total during the last four days, from June 22 to June 26, 2024 [4].

The Sindh government has established 77 heatwave relief camps and facilities in various Karachi districts to mitigate the effects of the heatwave [5, 6]. Water to drink is provided at these camps, making it simple for individuals to stay hydrated.

COMMENTARY

Climate variability, which includes variations in temperature, precipitation, and rainfall patterns, is getting worse and has a significant influence on diseases associated with water, water resources, and ultimately human health, which depends on clean water [7]. The largest threat to Pakistan's national security at the moment is the lack of clean drinking water [8]. Whether it's surface or groundwater, Pakistan's drinking water is frequently contaminated with bacteria, pesticides, hazardous substances like arsenic (As), iron (Fe), nickel (Ni), chloride (Cl⁻), fluoride (F⁻), and mercury (Hg) [9]. Climate change trends have an impact on waterborne diseases like cholera and typhoid, and as a result, the risks associated with these diseases are rising. There have been numerous empirical studies on Pakistan's water quality problems, but a few significant studies on biological and chemical water quality carried out in various cities across all of the country's provinces, have reported on the country's declining water quality and highlighted a rise in waterborne bacterial infections and other related illnesses [7].

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Received: June 27, 2024; Revised: September 28, 2024; Accepted: October 10, 2024

DOI: <https://doi.org/10.37184/lnjpc.2707-3521.7.23>

Concern remains about the fact that around 33% of deaths are attributable to waterborne illnesses, which are brought on by a lack of access to clean drinking water. Additionally, it has been stated that inadequate water quality in Pakistan is the cause of 20% to 40% of all infections [7]. The important results of a study by Ishaque W show that, given Pakistan's 40% death rate from contaminated water intake, 50% of diseases in the nation spread through contaminated water, which also serves as the best medium for the transfer of various bacterial and viral infections from humans to humans or animals to humans [8].

Another major concern is that drinking filtered water in Pakistan is dangerous, in addition to surface and groundwater. According to a study conducted in Islamabad and Rawalpindi, of the 53 monitored filtration plants in Rawalpindi, 38 were found to provide unsafe drinking water because of the prevalence of bacterial contamination, 10 were found to be unsafe because of excessive nitrate levels above the allowable limit, and 8 plants simultaneously displayed chemical and bacterial contamination. Out of the 53 facilities in Rawalpindi that were under observation, 40 were deemed to produce dangerous drinking water overall. Due to poor water quality (water quality index > 100), 26 out of 32 water samples from filtration plants in Islamabad were determined to be unsuitable for consumption [10]. Karachi is experiencing the same circumstances as well. Even though there haven't been any recent developments in determining Karachi's water quality index, a previous study indicated that 60% of the city's drinking water samples were found to be highly contaminated, with three of the six main filtration plants being particularly contaminated [11]. According to a recent 2020 study, samples from Karachi's water supply included 20%, 43%, and 23% of human adenovirus, human enterovirus, and genotype A rotavirus, respectively. This indicates that the city's water quality is severely lacking [12].

THE WAY FORWARD

A large portion of the population, including children and pregnant women, is benefiting from these heatwave relief camps; any breach in the water's safety could expose them to serious health risks and increase the likelihood of a water-borne disease outbreak in Karachi. Therefore, it is imperative to conduct a quality assessment of the water provided in these camps and ensure water safety. Adopting water management techniques and preventative measures is also urgently required to address the unsanitary drinking water supply in these heat relief camps and facilities. To mitigate the immediate health risks posed by contaminated water in heatwave relief camps, chlorination should be prioritized as an essential step to kill infectious agents. Additionally, implementing basic filtration systems can help remove some chemical contaminants, further ensuring the safety of drinking water. While these measures are achievable, maintaining consistent water quality standards will

require ongoing monitoring and commitment from local authorities. By adopting thorough preparation procedures, tertiary care facilities are essential in averting outbreaks under harsh weather conditions like heatwaves. In the current situation, healthcare facilities should ensure strong infection control protocols, including routine water quality testing, which is essential to prevent waterborne diseases, in addition to setting up specialized heatstroke management units and providing ongoing training for staff on identifying and treating heat-related illnesses. To stabilize patients, hospitals need to keep well-stocked cooling rooms and IV fluids, electrolytes, and antibiotics on hand. Communities can be made more resilient and outbreak risks decreased by working together with local health officials to monitor epidemiological trends and take part in public health education initiatives.

CONCLUSION

The recurrent heatwaves in Karachi have exposed the city's vulnerabilities, highlighting a critical intersection of climate extremes and public health crises. The fatalities and hospitalizations underscore the urgent need for effective mitigation strategies, particularly in the realm of water safety and quality. As temperatures soar, the imperative for reliable clean water becomes paramount, especially for those seeking refuge in heatwave relief camps. The compounded effects of climate change, such as increased temperatures and altered precipitation patterns, exacerbate the water crisis in Pakistan, leading to the proliferation of waterborne diseases. This commentary underscores that addressing the immediate health impacts of heatwaves must go hand in hand with ensuring water safety to prevent a secondary wave of illnesses. Future resilience hinges on a multi-faceted approach: improving water quality through rigorous testing and management, enhancing healthcare readiness with specialized treatment protocols, and fostering community awareness and education. By integrating these strategies, Karachi can better safeguard its population against the dual threats of heatwaves and waterborne diseases, paving the way for a more resilient and healthier future.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

Declared none.

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