

Special Article: Pollution Control

Is Cognitive Capability Hampered By Heat Waves?

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Abstract

These concise perspective overviews the potential risk posed by heat-waves in the context of cognitive ability. The findings are correlated with the causative effects and related consequences.

Introduction

Our physical and emotional well-being is greatly impacted by heat waves. Emergency rooms rapidly overflow with patients experiencing dehydration, disorientation, and fainting, a condition that most doctors fear. According to recent studies, on days when temperatures rise to or over the upper 5% of the typical range for a particular place, there may be a minimum of a 10% increase in hospital emergency room visits.

Elevated temperatures have the potential to exacerbate symptoms in individuals with mental health disorders. Heat waves have been associated, along with other weather-related catastrophes like floods and fires, with an increase in depressed symptoms in individuals with depression and an increase in anxiety symptoms in those with generalized anxiety disorder, a condition in which sufferers experience constant anxiety.

The fact that heat might decrease the efficacy of crucial medications used to treat mental illness presents further issues. We are aware that a number of medications raise the risk of heat-related mortality. Antipsychotics, for instance, have the ability to suppress thirst, leaving users parched. Some medicines, like lithium, a very strong and popular mood stabilizer that is often recommended for persons with bipolar disorder, will act differently based on the patient's body temperature and degree of dehydration [1,2]. This manuscript briefly overviews the impact of heat waves on human being in the context of a case study report as well as offers vital aspects related to escalating rise in heat waves

A Case Study

Heat waves affect the health and work productivity of general population [3-6]. In a recent study, researchers followed 44 university students for a period of twelve days. The subjects were divided into two categories. Half of them were kept in

dorms with air conditioning facility while remaining half were placed in general rooms without air conditioning facility. During heat waves, researchers conducted a series of tests to assess their cognitive performance.

As a measure of cognitive test, the subjects were asked to appear for a test right after waking up. Some interesting things popped up through this test. Students who were deprived of air conditioning revealed ~14% longer reaction times. Apart from that, their scores were ~14% lower as compared to other students having been placed in air conditioning facility. The poor performance of the students with air conditioning facility can be ascribed to the fact that the brain part responsible for deep level thinking gets diverted to tackle the rise in skin temperature. The heat also reduces sleep which hampers thinking process. With every one degree rise in temperature, the subjects were found to lose sleep by three minutes [2-5].

Heat waves are becoming frequent around the world due to change in climate. Alarmingly, 30% populations of world are subjected to twenty days per year of heat and humidity that are linked to heat-waves. To be precise, this number account to one in every three people. This number can become worst amounting to three people out of every four by 2100; provided the green house emission continues to rise at the current rate [6].

When data from 783 local heat waves across thirty-six countries are taken into account, it results in a common site-specific heat threshold above which it will become fatal. As it is referred as site specific, hence, the threshold may vary from place to place. For instance, people may die from a mere temperature of 296 K which may appear as a room temperature for many. The main culprit in heat wave is humidity. During extreme humid conditions, body sweat does not evaporate. As a result, heat ac-

accumulates in the body. Consequently, people may suffer toxicity induced by heat which is like sunburn on the inside of one's body. To balance, blood flows to the region having high temperature to maintain cooling effect, thereby depriving of other vital organs.

In a recent study, there was an increase in the number of mental health-related visits to emergency rooms between 2010 and 2019. As per report, there had been more footfalls in increased summertime temperatures leading to emergency department visits. The main reasons include mental health cause, as well as for specific outcomes, including mood disorders, anxiety and stress disorders, schizophrenia, substance use disorders, and self-harm. Eventually, heat waves could even be lethal for those who suffer from specific mental health issues. According to an older study that was published in the journal *Psychiatric Services*; the chance of passing away during a heat wave was double for patients in state mental hospitals in New York City as compared to the city's general population.

It's important to note that months with very high temperatures have greater suicide rates. According to a study published in August 2018 in the journal *Nature Climate Change*, suicide rates rose by 0.7 percent in the United States and by 2.1 percent in Mexico for every degree Celsius (almost 34 degrees Fahrenheit) that average monthly temperatures rose. Without taking effort to address it, the researchers predicted that by 2050, there might be 9,000–40,000 more suicides in the United States and Mexico.

Final Remark

Excessive heat is the most lethal of all climatic events in the developed as well as developing nations, and it can have negative health effects on the general population. The world's temperatures are rising, and the recent years set record for warmth over the past two centuries. Given that copious individuals spend 90% of their time indoors, it's critical to comprehend the impacts of indoor temperature variations.

Any temperature above forty degrees can lead to heat stroke which is a medical emergency. It has to be handled with care. In severe cases, it can cause death too. In the last two decades,

the deaths from heatstroke are mounting world-wide. Looking at the severity of this, it is imperative that there must be effective measures for curbing heat-waves. There must be synergistic modus operandi from policy makers and researcher so that efficient plans can be laid out to handle this growing concern. The increasing green emissions should be brought to control through very strict stringent measures. The foul players should be subjected to severe punitive measures. However, all these can be realized if there is active co-operation from all stake holders.

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