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# The Neurological Consequences of Dehydration

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***Abstract:*** ***This article aims to explain and elaborate on the vast consequences that dehydration can have on the human brain. Deeply impactful problems, such as shrinkage of the brain, disruption of normal neuronal activity and attention lapses can be prevented by engaging in an activity that is perhaps arguably one of the most important for the survival of a human body: Drinking water. An adversely impacting shift is observed in the normal paradigm of activities of the human brain when the body is deprived of a sufficient amount of consumed water. Most of the problems that arise due to dehydration are observed as a series of small events, which come together to have chronic issues. In this article, the Science and the Statistics of such problems are comprehensively discussed, along with how there is much more to dehydration than meets the eye.***

## I. INTRODUCTION

Water is arguably one of the most important resources for human beings. If an environment can harbor or support water, it is understood that it can support life. This is one of the guiding principles of why human beings want to terraform Mars. Generally speaking, a healthy human being can survive without consuming water for merely three days. On average, 55-60% of an adult human's body is water, and a human brain is about 75-80% water. These facts clearly establish why water is such an important resource for human beings. It is imperative for human survival, and is of central importance in the implementation of numerous processes that the human body regularly performs. Even though water holds immense significance in the survival of human beings, problems related to insufficient consumption of water exist and tend to cause numerous other issues which are generally detrimental to the overall health of an individual. Every year, 3,575,000 people die from water related diseases.

## II. DEHYDRATION: WHAT IS IT?

Dehydration is a condition that occurs due to a dangerous or excessive loss of imperative body fluids, such as water. This can be caused by an insufficient intake of fluid or by losing more fluid than the amount that is taken in. The most common cause of dehydration in young children is severe diarrhea and vomiting (Mayo Clinic Staff). Statistically, dehydration is already a major problem.

According to an article by K. Taylor and Elizabeth B. Jones, 75% of Americans are chronically dehydrated. Dehydration is also common in elderly patients. It is estimated that dehydration has taken the lives of 760,000 children in developing countries, and is a frequent cause of hospital admission. Although there exist varying degrees of severity of dehydration, it one of the primary health problems of the 21st Century.

## III. THE NEUROLOGICAL CONSEQUENCES

The human brain is of central importance in the conversation involving dehydration. Low water levels adversely affect neuronal activity, which leads to cognitive problems. Interestingly, an observable increment in the activity of neurons occurs in the brains of dehydrated adults. Additionally, past research shows that water plays an imperative role in the maintenance of mental health in humans. In other words, dehydration may increase an individual's risk of problems such as anxiety and depression.

Dehydration tends to disrupt the normal paradigm of activities that the brain carries out. A 2% decrease in brain hydration can result in short term memory loss. If dehydration occurs for excessively long amounts of time, dehydration has been observed to affect brain volume. As stated in an article by Matthew J. Kempton and others, "It was recently observed that dehydration causes shrinkage of brain tissue and an associated increase in ventricular volume" (Source: NCBI). Additionally, in the experiment conducted by the same team of scientists, it was discovered that reduced water intake adversely impacts implementational functions of the brain, including planning and visuospatial processing. Additionally, according to an article by Healthline, hypovolemic shock occurs when an individual's body isn't able to make enough blood for the heart to pump adequate oxygen to vital organs. This can cause a drop in blood pressure and can lead to brain damage, and even death. Overall, the impact that dehydration is having on the neurological health of individuals is vast and negatively impacting the overall health of the population.

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## IV. DISCUSSION

The significance of water in contributing to the overall health of an individual is extremely understated. The immense prevalence of chronic dehydration in the populations of developed countries is perhaps the biggest line of evidence that supports the previously stated claim. However, a deeper issue that surrounds dehydration and other water related problems is that clean water still remains an inaccessible resource for a substantial amount of people. According to the Centers for Disease Control and Prevention, universal access to safe water and sanitation has the potential to prevent at least 9.1% of the global disease burden and 6.3% of all global deaths. According to David Winder, CEO of WaterAid America, "If governments committed to universal access to safe drinking water and improved sanitation they could save 2.5 million lives every year" (Source: WaterAid). Therefore, it can be safely stated that the neurological health of an individual depends greatly on whether they are able to consume sufficient amounts of fluids.

## V. CONCLUSION

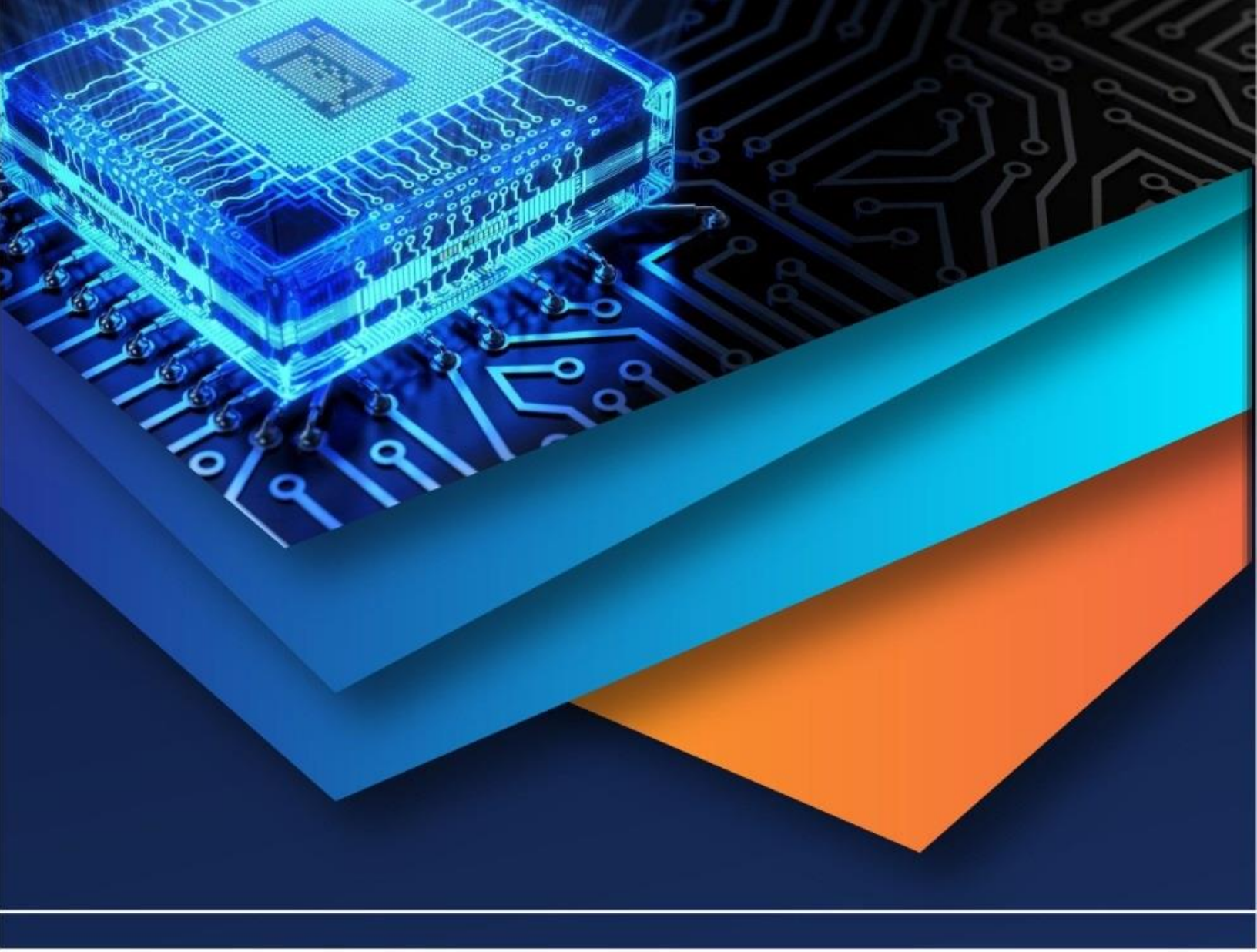
It becomes the responsibility of the world governments and leaders to make access to water that is safe for drinking universal. By doing so, a substantial disease burden can be removed from the shoulders of the Global Medicine Community. The Statistics and Science behind this intricately complex equation provide more than sufficient evidence that ensuring universal access to safe drinking water is nothing but a step in the right direction, perhaps in the direction of a healthier world. However, in a world where an equal access to safe drinking water cannot be provided for everyone, there remains a substantial room for health problems associated with this issue, which will perhaps be around for at least the next few years to come.

## VI. DECLARATIONS

Abhineet Maini, a student at Troy High School, is the sole contributor of this article's constitution. All necessary permissions were obtained before the relevant data from external studies was used.

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