Environment Pollution and Climate Change

ISSN: 2573-458X

Krepsk, Environ Pollut Climate Change 2023, 7:3

Mini Review

Open Access

# Water Pollution Indexing and Health Risk Assessment

**Wallender Krepsk***

*Department of Aquatic Ecology Wageningen University, the Netherlands*

**Abstract**

Advanced codes are taking the place of conventional human health risk assessment (HHRA) methods at the moment. The HERisk code and the water pollution index (WPI) were used in this study to characterize the HHRA and water quality of Umunya, a Nigerian suburb. By employing the novel HERisk code, which evaluates health risk for nine human populations, this study stands out from previous HHRAs conducted in the region. The objective of this study was to give a thorough report that will edify occupants and policymakers on the potential dermal and oral dangers related with the utilization of metal-debased water assets, for different age sections, in the locale. The usual procedures were followed. The WPI revealed that 66.7% of the water resources were unfit for human consumption in terms of measured physicochemical parameters. In light of the HERisk code, possibly poisonous components (PTEs) expanded disease takes a chance in the accompanying request: Pb > Ni > Cr. The water's total non-carcinogenic risks were found to be moderate.

**Keywords:** Water Pollution; Health Risk

## Introduction

However, dermal absorption of the contaminated water posed no significant cumulative risks. The HHRA's overall trend showed that older people in the area are less likely to be affected than younger people. However, it was discovered that people between the ages of 21 and 65 were less vulnerable than those over 65. Water samples that the WPI deemed unfit for human consumption turned out to have a greater number of health issues, confirming the strong agreement between the HERisk code's findings and the WPI's. Pb and Ni were identified as the water's most significant PTEs by the WPI and HERisk codes, respectively. As a result, people who drink water are more likely to get cancer from drinking it because of the two PTEs.

Safe drinking water has always been a basic human need. However, there are increasing threats to the availability of clean water over time. In light of the growing problem, developed nations have made significant progress by reducing the amount of polluted water sources and making plenty of clean water available to citizens. On the other hand, many developing nations, like Nigeria, continue to fall short in these areas, which causes disease outbreaks and, in some cases, death among the poor from drinking polluted water. One of the factors that lowers the quality of water is the presence of high concentrations of potentially toxic elements (PTEs) in water sources. Zinc (Zn), cadmium (Cd), iron (Fe), chromium (Cr), arsenic (As), lead (Pb), nitrate (NO3), and manganese (Mn) are among the PTEs that are frequently found in water. Typically, PTEs are categorized as either carcinogens or non-carcinogens. PTEs that can cause cancer include As, Cd, Cr, Pb, Ni, NO3, and others. Fe, Mn, Zn, and other non-carcinogenic PTEs are examples. Abdominal discomfort, anemia, constipation, abdominal cramping, exhaustion, headache, irritability, low blood pressure, mild mood swings, nausea, pain in the hands, feet, muscles, or joints, and a rapid heartbeat are among the health issues associated with PTEs (Shrestha, 2018; Frith and co., 2005; Sood and co., 2002). PTEs have been linked to cancer in a number of studies, including nitrate and colorectal cancer (Richards et al., 2022), lung cancer caused by nickel, hexavalent chromium [Cr(VI)] and lung cancer, lead and cancers of the brain, kidney, and lung, cadmium, breast, lung, pancreatic, and bladder cancers (Huff et al., 2007), and liver, prostate, and kidney cancers caused by inorganic arsenic [1-5].

## Discussion

Scientists have used a variety of approaches to risk assessment of water resources due to the various impairments caused by drinking polluted water. The primary objective of risk assessment is to safeguard not only the aquatic natural ecosystems but also the health of people who are in direct or indirect contact with water (e.g., drinking water or eating foods irrigated with water). In the past, determining a substance's ecological risk involved comparing its concentrations in various environmental compartments to levels below which it was unlikely to have a negative impact on organisms. The methods used for HHRA differ slightly in that human exposure is evaluated before threshold levels are compared. According to Golaki et al., the US Environmental Protection Agency (US-EPA) views HHRA as a methodical approach to analyzing the potential health effects of exposure to particular hazardous compounds in contaminated ecological systems like water resources. To put it another way, human health risk assessment is a methodical approach to determining the negative effects of chemical exposure. As per Neris, the majority of HHRA methods employ the deterministic method, which entails utilizing a predetermined value to assess the dangers of chemical pollutant exposure. Innovative algorithms for assessing ecological, radiological, and human health risks have been developed in an effort to overcome these limitations. In various nations, the HERisk code, a brand-new code, is utilized for HHRA. According to studies that have utilized the HERisk code, it provides a report that is more comprehensive than that provided by other risk assessment tools.

Umunya is a rural locale situated in Southeastern Nigeria, West Africa. Umunya's industrial and agricultural activities are at their highest because it is a suburb. For a variety of reasons, these human activities necessitate a significant amount of water consumption. Therefore, periodic risk assessments are necessary to guarantee the

***Corresponding author:** Wallender Krepsk, Department of Aquatic Ecology Wageningen University, the Netherlands, E-mail: mavrikjames@edu.usa

**Received:** 09-Mar-2023, Manuscript No. EPCC-23-91729; **Editor assigned:** 11-Mar-2023, PreQC No. EPCC-23-91729 (PQ); **Reviewed:** 25-Mar-2023, QC No. EPCC-23-91729; **Revised:** 27-Mar-2023, Manuscript No. EPCC-23-91729 (R); **Published:** 03-Apr-2023, DOI: 10.4172/2573-458X.1000336

**Citation:** Krepsk W (2023) Water Pollution Indexing and Health Risk Assessment. Environ Pollut Climate Change 7: 336.

short- and long-term well-being of human and natural resources. The children and adults of Umunya and its environs were the primary focus of previous HHRA. As a result, the current study looks at the risk of being exposed to PTEs in water in nine age groups in Umunya and the surrounding area: under 2 years old, 2 to 3 years old, 3 to 6 years old, 6 to 11 years old, 11 to 16 years old, 16 to 18 years old, 18 to 21 years old, 21 to 65 years old, and over 65 years old [6-10].

## Conclusion

This was accomplished by employing the novel HERisk code, which has been confirmed suitable for effective and efficient HHRA by various studies. Specifically, this study aims to (1) use the water pollution index (WPI) to determine the region's water resources' safety levels and (2) use the HERisk code to carry out a comprehensive HHRA on the region's water resources with a focus on oral and dermal exposure for nine human populations. Governmental and non-governmental organizations in charge of managing public health in the region are expected to gain a fresh perspective from this study's findings. In addition, it is hoped that the study's methodologies, findings, and research gaps will encourage additional research with the common objective of maintaining natural waters and human life.

### References

1. Giusti L (2009) A review of waste management practices and their impact on human health. Waste Management 29: 2227-2239.
2. Nzihou A, Lifset R (2010) Waste Valorization, Loop-Closing, and Industrial Ecology. J Ind Ecol 14: 196-199.
3. Kaufman Scott M, Krishnan Nikhil, Themelis Nickolas J (2010) A Screening Life Cycle Metric to Benchmark the Environmental Sustainability of Waste Management Systems. Environ Sci Technol 44: 5949-5955.
4. Raj K, Prasad KK, Bansal NK (2006) Radioactive waste management practices in India. Nucl Eng Des 236: 914-930.
5. Carroll Gregory J, Thurnau Robert C, Fournier Donald J (2012) Mercury Emissions from a Hazardous Waste Incinerator Equipped with a State-of-the-Art WetScrubber. J Air Waste Manag Assoc 45: 730-736.
6. Chen Dezhen, Yin Lijie, Wang Huan, He Pinjing (2014) Pyrolysis technologies for municipal solid waste: A review. Waste Management 34: 2466-2486.
7. Ding Yin (2021) A review of China's municipal solid waste (MSW) and comparison with international regions: Management and technologies in treatment and resource utilization. J Clean Prod 293: 126144.
8. Abarca Guerrero Lilliana, Maas Ger, Hogland William (2013) Solid waste management challenges for cities in developing countries. Waste Management 33: 220-232.
9. Panagos Panos, Ballabio Cristiano, Lugato Emanuele, Jones Arwyn, Borrelli Pasquale, et al. (2018) Potential Sources of Anthropogenic Copper Inputs to European Agricultural Soils. Sustainability 10: 2380.
10. Rancon Rick Arneil D, Lin Carol Sze Ki, Chan King Ming, Kwan Tsz Him, Luque Rafael, et al. (2013) Advances on waste valorization: new horizons for a more sustainable society. Energy Sci Eng 1: 53-71.