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Emerging Risk of Cancer River in Western Uttar Pradesh (UP), India

Santosh Kumar Karn[1,2,*]

[1]Department of Biochemistry and Biotechnology, Sardar Bhagwan Singh Post Graduate Institute of Biomedical Science and Research, Dehradun (UK)
[2]National Institute of Technology, Raipur, India

[*]*Corresponding author*: Dr. Santosh Kumar Karn, Department of Biochemistry and Biotechnology, Sardar Bhagwan Singh Post Graduate Institute of Biomedical Science and Research, Dehradun (UK). Tel: +91-7415077443, Fax: 0135-2686286, E-mail: santoshkarn@gmail.com

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Abstract

Introduction: Western Uttar Prdesh (UP), in India, is reaching the category of the unhealthiest region, due to emerging risk of a cancer river. Here, soil and water have high concentration of multi-metals, especially, contaminant like Lead (Pb), Mercury (Hg), and (As), which is a major risk to the individuals; therefore, numerous health problems in many villages along the banks of the river have been observed. Individuals are using contaminated water for daily life purposes as well as for crop irrigation, thus, the metal deposited successively to different tropic level. Therefore, this area immediately required an exhaustive study by a governmental and non-governmental institute to undertake with this difficult position and find marvel solutions that can remove the metal from the soil and water. Here, people suffer on a daily basis due to the above reason.
Case Presentation: In this region, industry releasing its waste directly to the river without executing the proper treatment and disposal of the waste, results in water obtaining many hazardous compounds; therefore, river water becomes seriously polluted and turns to a cancer river. Major rivers running in this area are Yamuna, Kali Nadi (Krishna), Hindon, and Ganga, these rivers turn to a cancer river due to different industries that reside in this area, which are sugar industries, pulp and paper mills, as well as slaughter houses. The industrial wastewaters contain hazardous inorganic pollutants, mainly heavy metals like Mercury (Hg), Lead (Pb), and (As). Various types of cancer, bone deformities, and neurological disorders are few of them, which can be seen frequently in individuals in this region.
Conclusions: This area emerged as a hotspot of contaminant from river water, especially with metal contaminant, and turned to a cancer river. The number of affected individuals is increasing day by day in the recent year; therefore, cancer and death become a common phenomena in this particular area. Thus, this area needs great attention of governmental and non-governmental organizations to need systematic studies and find a miracle solution to help the villagers.

Keywords: Metals, Neurological Disorders, Water, Soil

1. Introduction

India is a vast country in terms of area, fast developing in South Asia, and 2nd largest population in the world. Uttar Pradesh (UP) is the 4th biggest province in terms of geography and largest populated province in India. It is categorized into East, West, North, and South. Western UP consists of six different divisions like Merrut, Saharanpur, Moradabad, Barelli, Agra, and Aligarh with the following districts Merrut, Bulandshashar, Gautam Buddh Nagar, Ghaziabad, Baghpat, Hapur Shaharanpur, Shamli, Muzaffarnagar Moradabad, Bijnor, Rampur, Amroha, Sambhal, Bareilly, Badaun, Frirozabad, Pilibhit, Shahjahanpur, Mainpuri, Mathura, Agra, Aligarh, Etah, Hathras, and Kasganj. Major cancer rivers running in this area are Yamuna, Kaali Nadi (Krishna), Hindon, and Ganga, these rivers turn to cancer rivers due to different industries that reside in this area, which are mainly sugar industries, pulp and paper mills, as well as slaughter houses. All these industries releasing its waste directly to the river results in the water obtaining many hazardous compounds; therefore river water becomes seriously polluted and turned to a cancer river. The industrial wastewaters contain hazardous inorganic chemicals, mainly heavy metals like Mercury (Hg) Lead (Pb) and (As). Continuing cumulative effects of heavy metals in the environment are harmful to the human health. Among heavy metals, Hg, Pb, and As are unneeded elements for biological metabolic functions, and are one of the most toxic contaminants or lethal to organisms even when absorbed in small amounts (1, 2). Thus, the accumulation of these metals in soils can create a threat to food safety and is a potential health risk. Next, we all know about As, and how it is a villainous metalloid and their effect to human beings worldwide, it exists commonly in two

forms, arsenite (As III) and arsenate (As V), both forms are toxic but arsenite (As III) is more mobile and toxic and its uptake is believed to occur passively through membrane aquaporins (3, 4). Maximum contaminant level for Pb in the water should contain less than 0.05 parts per million of Pb, which is the (5). Pb is also a poisonous element and is associated with several health hazards like anemia, reproductive effects (6, 7). Hg is a unique metal having no any biological function and the contaminant level was set at 2 parts per billion. Increased uptake of Hg causes several disorders like cardiovascular collapse, acute renal failure, and severe gastrointestinal damage nephritis, anuria, and hepatitis (8). Whereas, toxicity inactivate enzymes involved in DNA replication, DNA repair, nucleic acid, and phospholipid synthesis, and also inhibits energy flow (9, 10). Consumption of contaminated food and water causes various types of cancer as well as a neurological disorder (11-13). In the present time, the maximum contaminant level in drinking water is 10 μg/L set by USEPA (14). The above-discussed three metals are the major contaminant in these rivers. The necessity of this study is that thousand of nearby villagers have died in the last two years due to various types of cancers, mainly due to these metal contaminations. Therefore, it is needful to begin a systematic study and to investigate possible prevention and treatment measure.

2. Case Presentation and Discussion

Due to metal poisoning in this area, several thousands of villagers are affected to various degrees of bone deformities. Several cases have been reported for liver cancer, intestinal cancer, breast cancer, and throat cancer. Basically, these cancer rivers are Krishna, Kali, and Hindon, which traveled to Saharanpur, Shamli, Muzaffarnagar, Baghpat, and Meerut districts, and found frequent health problems in many villages along the banks at different stages of this disease. The river water has seeped in and contaminated the ground water in the surrounding areas. In district Baghpat, about 200 village's peoples are suffering with this dreaded problem. It is estimated that many hundreds of people are suffering from cancer at the level of second stages due to use of this seriously contaminated water in their daily life and while thousand (or higher) at the preliminary stages. In this area, the cancer number is increasing with unusual frequency. Recently Krishna river sample was analyzed and the results were very disturbing. The total suspended solids (TSS) were found to be 7,500 mg/L (acceptable limit 200 mg/L), sulfide was 285 mg/L (acceptable limit 2 mg/L), iron was 38 mg/L (acceptable limit 3 mg/L), and extremely high levels of Hg and Pb was observed (15). Hg and Pb were grouped as top 10 chemicals of health concern and were recognized as a possible carcinogen by the international agency for research on cancer (16). Over a dozen villages around Ganga tributaries and other rivers in Bijnor district are also prone to cancer, with many of the 100 victims being observed within the past five years. In western UP, even (As) contamination in groundwater has been detected in 20 districts, including Bijnor (17) and we know As is a powerful carcinogen. Here people are using the same contaminated water for daily life purpose and crop irrigation, therefore, it is directly entered into the food chain. In Bijnor and other 20 districts As concentration is 0.150 mg/L which is way higher than the permissible limit. As per the world health organization (WHO) the permissible limit of As in the water should be 0.01 mg/L. Here villagers are well aware of the contaminated water, however, they don't have another option to get the other source. Hand pump (source of ground water) many failed due to lack of underground water and some releasing the metals of contaminated water.

Therefore, in this area, people may have elevated concentrations of metal in the blood and tissue, which can be detected as a marker and also have the possibilities of gradual adaption, which can observe. Recently it was observed by Schlebusch et al. (18) that As contamination was found in Argentinians, observed As as dimethylated in urine, and also observed genetic adaptation. Therefore, this area needed immediate attention from the scientific community to examine details, observe the current condition, and make some efforts to contribute and change the villager's life by finding a wonder solution. Due to contaminated water, villagers are scarifying their life and many are worried about the next generation also facing an uncertain future with children being born with deformities or paralysis. Heavy metals prolonged consumption has a serious effect to the human body and cancer is very much one of them. These carcinogens even deplete platelet levels, damage bone marrow, kidney dysfunction, and affect the nervous system, especially in children (19). Here people become frustrated with the local Govt. due to no preventive measure taken and also try to hide the real condition. Therefore, in this particular area required immediate action by non-governmental organization and the central govt. is 1st for the industries to regulate the release treated water and the concentration of the metals should be below the contamination level. After that, it should also be required to develop treatment facilities and develop a rainwater harvesting system, use pond sand water filtration, domestic filtration etc. to make water up to drinkable levels. This is my current observation and analysis of this particular area from the last two years (2014 to 2016). We know many areas in the world that have problems like this by

natural or by human activities and we have lost many lives, therefore this area needs to take preventive care and develop certain technique to solve the problem and prevent people from potential risk.

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Footnote

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