Case Report

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# Contaminated Water and its Effect on the Local People of District North Waziristan, Pakistan

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**ABSTRACT**

Water is the most important natural resource for human being. The rapid urbanization and demand of clean water supply create challenging issues for the people of District North Waziristan. The contaminated water affects the health such as skin, gastrointestinal diseases and imbalance of micro and macro ion exchange in our bodies. The poor water management, natural elements in the mountains and industrial efflux of hazardous badly contaminate the quality of water in District North Waziristan. This case report discusses the investigation of hazardous element and their direct or indirect impact on the health of women, children and men in the District North Waziristan.

**Keywords:** Organic Pollutant; Resorcinol; Health Risk; Water Contamination

**Abbreviations:** Ni: Nickel; Cr: Chromite; Cu: Copper; Cd: Cadmium; DNW: District North Waziristan; FCR: Frontier Crime Regulation

## Introduction

Water is the universal solvent. Water is tasteless, odorless, and appears colorless at room temperature, but it is a naturally blue color because of the absorption of visible light in the range of red wavelength. The positively-charged side of the water is linked with more electronegative oxygen. They can dissolve inorganic salts in a wide range of pH. Some organic compound also dissolves in water. Water is the most critical natural resource for human beings, animals, and plants. Water in a human body has multiple functions like homeostasis which regulate the body's internal and external temperature and also control brain cells. Water has a crucial role in Photosynthesis which helps to maintain the turgidity of the plants. But with the intensification in the industries, rapid population growth, emission of carbon dioxide, the release of abundant organic compounds, and hazardous gases which are responsible for water contamination (Naeem, et al. [1]). Chemical contamination of drinking water causes heinous diseases in humans a being as diarrhea, Cholera, Typhoid, and dysentery some elements also damage the brain cells, lungs, and liver. The contaminated water contains different chemical composition like Lead, Arsenic, copper, chromium, mercury, cyanides, and phenol derivatives. With the increase in global industrialization, there is a constant confrontation of contaminated natural resources like water. Water is significantly contaminated with fertilizer, pesticides, plastic, pharmaceuticals, and manufacturing process.

Organic pollutant like Phenols and its derivatives are some of the most widespread. It causes adverse ecological and human health effects. The skin readily absorbs the Phenols, which can disrupt the endocrine system. With the persistent nature of phenol in wastewater, different methods such as adsorption and biodegradation are not enough to remove phenols from the water source. Due to the attachment of a different functional group, phenol has many derivatives. Phenol may react to a variety of chlorinated compounds with increased toxicity. Water is also contaminated with dyes the class of colored chemicals used in leather, textile, paper, and plastic industries. Water-soluble organic dyes have an aromatic ring in their backbone. Other methods like Photocatalytic degradation,

Solvent extraction, and biodegradation are employing for the removal of different Organic compounds and dyes. The typical organic pollutant in water includes pharmaceutical products, endocrine disruptor, detergents, chlorophenols, and common industrial organic waste. Generally, three methods are used for the removal of organic pollutants from water; Adsorption method, Oxidation method, and Degradation method.

## Case Report

Historically, North Waziristan Agency came into being in 1893, a strip of an area 4,707 km2 (1,817 Sq miles) with Durand line Afghanistan. In 1903, Frontier Crime Regulation (FCR) was imposed by British colonialism during their Raj. The people of North Waziristan remained marginalized because of the geographical complication and tribal system. There are two major tribes in North Waziristan; Wazir and Dawar are inhabited with more than 12 lac of population as per national population consensus, and 99.8% people speak Pashto language. After the 25th amendment in 2018, these areas were merged into the district of Khyber Pakhtunkhwa. District North Waziristan (DNW) has three sub-divisions: Mir Ali, Razmak, and Miranshah. Miranshah is considered the headquarters of DNW, where administration and official work were done to facilitate the local population. In these three sub-divisions there are nine tehsils and villages which are densely populated. The sub-division Mir Ali has; Speenwam, Shewa, and Mir Ali tehsils. The Razmak sub-division contain; Dossali, Razmak, and Gharyum tehsils. Miranshah sub-division has; Datta Khel, Ghulam Khan and Miranshah tehsils. The geography of District North Waziristan remains a hot spot for the conflict after the 9/11 historical event. The people are marginalized and access to drinking water becomes a challenge, while considering the water crisis and mushroom growth population is a major problem of Pakistan.

The basic need to analyze the water sample from each tehsils District North Waziristan is the "Human health risk from heavy metal". To investigate the potential human health risks associated with the consumption of toxic heavy metals. For this purpose, fifty water samples were collected and analyzed for the heavy metals content. North Waziristan is famous for natural resources, small scale industries and anthropogenic activities is the main reason of water contamination. The results indicate that heavy metals such as lead (Pb), Nickel (Ni), Chromite (Cr), Copper (Cu), and Cadmium (Cd) caused the problems at some locations due to their elevated concentration as compared to the WHO's drinking water standards. In view of the known toxicity, accumulative, persistent characteristics and adverse environmental and health impact of the mentioned heavy metals, there are both short- and long-term diseases among children, pregnant women and young men and women. After interviewed medical profession (Doctors) with diverse specialties that the heavy metals cause multiple diseases like cholera, typhoid, dysentery, diarrheal death in kids, Hepatitis-C, trachoma (eyes infection), blood cancer, seizure of the kidney filtration and gastroenteritis. Blood cancer and kidney problems are the major and most reported cases in North Waziristan.

## Hazardous Health Effect

The client requirements are different from area to area. The Tochi valley where Dawar tribes are inhabited have access to water but the smell, color change because of contamination of hazardous elements. So, they require a filter machine in public places which has a collective benefit to the locals. Secondly, they need water testing and treatment products and safe water filters. While the Wazir tribes are inhabited in both plain and mountain areas, where they face problems like water supply from mountains to village, solar electric power installation (because electricity is the main problem) water tank for storage of the mountain water and safe water filter for drinking and household use. The client strongly demands collective benefits and places such as (Schools, College, Mosques, Hujra, Hospitals, and local dispensaries etc.) Water turns into wastewater once it is utilized. Domestic wastewater, such as that from toilets, sinks, and showers, as well as commercial, agricultural, and industrial waste are all examples of wastewater. Rainwater that flushes chemicals, oil, grease, road salt, debris, or other waste into rivers is also referred to as wastewater. A serious environmental problem, water pollution can be brought on by a variety of substances. Polluted water can have an impact on human health if consumed, used for swimming, or washed in. There may be disparities in the degree to which water pollution affects human health depending on area, age, gender, and other factors. Diarrhea, which is most frequently brought on by water pollution, is mostly spread by enter viruses in the aquatic environment.

The most typical illness brought on by water pollution is diarrhea, which is a common indication of gastrointestinal disorders. In low-income nations, diarrhea is a major cause of sickness and mortality in young children. In District North Waziristan, diarrheal infections cause 32% of all annual fatalities in children under the age of five. For instance, a research in the mountain part of North Waziristan discovered that factors such as a lack of plumbing, a lack of flush toilets, poor housing conditions, and crowded homes were strongly linked to an elevated risk of mortality from diarrhea. Infant deaths from diarrhea were 4.8 times more likely to occur in households without access to piped water than in those who did. According to a study conducted in District North Waziristan, certain water sources were contaminated with coliform. The primary sources of drinking water pollution are improper sewage and solid waste disposal, excessive pesticide and fertilizer use, and deteriorating pipeline networks. The primary cause of water-borne illnesses in this region, including gastroenteritis, dysentery, diarrhea, and viral hepatitis, is coliform bacterial contamination. Furthermore, people' health is directly impacted by the amount of arsenic in their drinking water, and skin disease is the most prevalent clinical manifestation of arsenic poisoning. Arsenic levels in biological samples (hair and blood) from people with skin conditions and consumption of arsenic-contaminated drinking water are related (Figure 1).

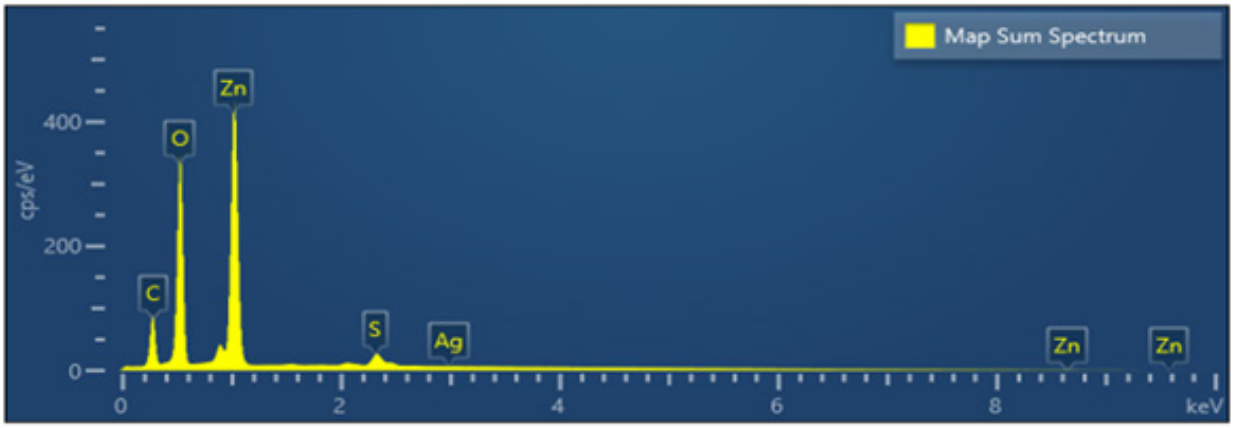


**Figure 1:** EDX of Water.

## Conclusion

This report elucidates the connection between water pollution and human health, specifically the association between water pollution and diarrhea, its mechanism of action, and the meta-analysis study scenario the connections between pathogenic variables, meta-analysis studies, and water pollution in relation to skin diseases; forms of cancer, variables that cause cancer, and the connection between water pollution and cancer; the link between water contamination and child health, as well as the main disorders that it causes. To conclude that water contamination is a serious threat to human beings particularly in the less developed nations. Therefore, they need a priority-based solution to provide clean water for the people of District North Waziristan.

## Author Contribution

Conceptualization H.M.Tofil, Validation Aiman Azam, Investigation and resources Muhammad Shoaib, Data Curation H.M.T and A.A, Writing original draft visualization, H.M.Tofil.

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## Conflict of Interest

The authors declare no conflict of interest.

## References

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