

REVIEW ARTICLE

The impact of water pollution on environmental health in the context of household waste

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Abstract

Water pollution is one of the environmental problems that is increasingly urgent to be addressed, especially those caused by household waste. This waste, if not managed properly, can contain various hazardous chemicals and microorganisms that contaminate water sources. Descriptive analysis to describe the pollution phenomenon in depth through narrative analysis of community experiences and the socio-economic impacts of pollution. Results: Water pollution caused by household waste is a serious problem that affects environmental and human health. Polluted water can contain bacteria and parasites that cause diarrhea, dehydration, and malnutrition. Household waste can cause ecosystem damage, the life of aquatic biota is disrupted due to decreased water quality. Water pollution due to household waste has a broad impact on human health and the environment. Good waste management efforts are essential to prevent further pollution and protect public health and ecosystems.

Keywords: Water Pollution, Household Waste.

INTRODUCTION

Water pollution is one of the environmental problems that is increasingly urgent to be addressed, especially those caused by household waste. This waste, if not managed properly, can contain various hazardous chemicals and microorganisms that pollute water sources, threatening human health and ecosystems (Pratama and Hidayatullah, 2023). Household waste generally consists of organic materials, detergents, pesticides, and cleaning products that are disposed of carelessly.

When this household waste enters waters without proper treatment, it can pollute the water with heavy metals and other hazardous substances (Ashar et al., 2020). Data shows that around 68% of river water conditions in Indonesia are classified as heavily polluted. Water pollution due to household waste can cause various health problems, including diarrhea, cholera, and dysentery (Elysia, 2018). Infections caused by bacteria and parasites in contaminated water can cause skin infections and other

infectious diseases, such as cholera caused by the bacteria *Vibrio cholerae* which is spread through contaminated water (Pasaribu, 2020).

Long-term exposure to heavy metals such as lead and arsenic through drinking water can cause organ damage, neurological disorders, and increase the risk of cancer, developmental disorders in children and increased risk of chronic diseases in adults (Putra et al., 2024). Water pollution due to household waste not only damages water quality but also threatens public health as a whole. Therefore, effective waste management is essential to prevent further pollution and protect the health of the environment and the public.

MATERIALS AND METHODS

This study uses descriptive analysis to describe pollution phenomena in depth through narrative analysis of community experiences and the socio-economic impacts of pollution. Collecting stories from the community about the changes they have experienced due to pollution, as well as the efforts that have been made to overcome the problem.

RESULTS AND DISCUSSION

Water pollution caused by household waste is a serious problem that affects environmental and human health. This waste often contains hazardous chemicals, heavy metals, and pathogenic microorganisms that can contaminate water sources and reduce environmental quality (Abduh, 2018). Poorly managed household waste, such as detergents, food waste, and chemicals, is often dumped directly into drains or water bodies without adequate treatment.

Household waste contains a variety of chemical contents that can be classified into organic, inorganic, and hazardous toxic materials (B3) (Sitepu, 2024). Organic waste consists of proteins, carbohydrates, fats, and nucleic acids. Meanwhile, inorganic waste includes metals such as iron and aluminum, glass, and inorganic fertilizers containing nitrogen and phosphorus. In addition, household waste also has the potential to contain hazardous chemicals such as detergents, pesticides, and pharmaceuticals (Hasibuan et al., 2023).

Household wastewater contains microorganisms that decompose organic matter, including coliform bacteria such as *Escherichia coli*, *Klebsiella*, *Enterobacter*, and *Citrobacter*. Bacteria such as *Pseudomonas* sp. and *Bacillus* sp. have the ability to produce enzymes that degrade proteins in household effluents. Detergents found in household waste contain surfactants and phosphates (Handayani, 2020), which can cause environmental damage.

Inorganic wastes, such as plastic, glass, aluminum, and cans, can pollute the soil because they are difficult to decompose (Hasibuan et al., 2023). Meanwhile, chemical waste from laundry, which contains detergents, can affect soil characteristics due to its acidity (pH). Fertile soil has a pH between 6.5–7.5, and a pH outside this range indicates poor soil conditions. In addition, household waste can contain harmful chemicals such as detergents, pesticides and pharmaceuticals. Heavy metals such as lead, mercury and cadmium can also be found in domestic waste, potentially contaminating soil and groundwater.

Hazardous substances in this waste can seep into the soil and contaminate groundwater sources (Al Kholif, 2020). Water pollution due to household waste can cause various health problems, including diarrhea, which is the most common impact of water pollution, especially in children (Ritiau, 2021). Contaminated water can contain bacteria and parasites that cause diarrhea, dehydration, and malnutrition. For example, cholera, caused by the bacterium *Vibrio cholerae*, is spread through contaminated water. Symptoms include severe diarrhea and dehydration (Anggraini and Kumala, 2022).

Long-term exposure to hazardous chemicals such as arsenic in drinking water can increase the risk of stomach, kidney, and colon cancer. Contamination by heavy metals such as lead can damage

kidney function (Irianti, Nuranto, et al., 2021). Children who are exposed to toxic substances from polluted water are at risk of experiencing physical and mental development disorders (Mahanani, 2020). The environmental impact of water pollution not only affects human health but also aquatic ecosystems.

Household waste can cause ecosystem damage. The life of aquatic biota is disrupted due to a decrease in water quality (Aprilia and Zunggal, 2019). Hazardous substances reduce the oxygen levels in the water which are needed for the survival of fish and other organisms. Waste that pollutes the soil can reduce soil fertility and affect plant growth (Abduh, 2018).

CONCLUSIONS

Water pollution from household waste has a wide impact on human health and the environment by various types of substances, including organic, inorganic, and chemical materials. Good waste management efforts are essential to prevent further pollution and protect public health and ecosystems. The public needs to raise awareness of the importance of maintaining the cleanliness of water sources and managing waste properly to prevent these negative impacts.

Author contributions

Nabilah Aminah Lutpi, Ahmad Jazuly Nabil: Conceptualization, analysis, draft writing, and editing.

Conflict of Interest

There is no conflict of interest in this study.

Acknowledgment

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Data availability

Data related to the findings of this study are available at the corresponding author.

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