

ASSESSING THE ECOLOGICAL AND HEALTH RISKS OF INADEQUATE PHARMACEUTICAL WASTE MANAGEMENT IN ABA, NIGERIA

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Abstract

Improper disposal of pharmaceutical waste in public health centers poses significant environmental and public health threats. This study investigates the methods, implications, and level of awareness surrounding drug disposal in public health facilities in Aba Metropolitan, Nigeria. Data were collected through structured questionnaires, interviews, and environmental sampling. Findings reveal that improper disposal practices, including flushing, open dumping, and burning of expired or unused drugs, contribute to soil and water contamination, antimicrobial resistance, and community health risks. The study recommends institutionalizing sustainable pharmaceutical waste management protocols and public education to mitigate adverse outcomes.

Keywords: Drug disposal, pharmaceutical waste, environmental health, public health centers, Aba, Nigeria

1. Introduction

The disposal of expired or unused pharmaceuticals has become a critical environmental and public health concern, particularly in low- and middle-income countries like Nigeria. In urban centers such as Aba Metropolitan, where healthcare infrastructure is under pressure, poor waste management systems have led to alarming levels of environmental degradation and health risks associated with pharmaceutical contamination.

Pharmaceutical waste includes expired drugs, unused prescriptions, and contaminated packaging. When improperly disposed of—through flushing, open-air burning, or dumping in general waste streams—these substances can leach into soil, water bodies, and the broader ecosystem, thereby affecting both wildlife and human populations. This study explores the prevailing practices of pharmaceutical disposal in public health centers across Aba and examines their ecological and health consequences.

2. Objectives of the Study

- To identify the common methods used in drug disposal at public health centers in Aba Metropolitan
- To assess the environmental consequences of improper pharmaceutical waste disposal
- To evaluate the health risks associated with exposure to pharmaceutical waste
- To recommend sustainable drug disposal practices and policy interventions

3. Literature Review

3.1 Drug Disposal Practices

Globally, best practices advocate take-back programs, incineration, and secure landfilling for pharmaceutical disposal (WHO, 2019). In contrast, Nigerian health centers often lack structured protocols, leading to hazardous disposal methods.

3.2 Environmental Impact

Research has shown that pharmaceutical residues in soil and water can disrupt microbial ecosystems and contribute to antibiotic resistance (Kümmerer, 2009). Contaminants such as analgesics, hormones, and antibiotics have been detected in rivers and groundwater around poorly managed waste disposal sites.

3.3 Health Implications

Direct contact with improperly disposed drugs may cause poisoning, allergic reactions, and hormonal disruptions, particularly among children and scavengers. Long-term exposure has been linked to endocrine disorders and increased antimicrobial resistance (Boxall et al., 2012).

4. Methodology

4.1 Study Area

The study was conducted in public health centers across Aba North and Aba South LGAs, representing the urban health care structure of Abia State.

4.2 Data Collection

- Questionnaires were distributed to 120 health workers (nurses, pharmacists, cleaners). - In-depth interviews were conducted with 15 facility managers and environmental officers. - Environmental sampling involved collecting water and soil samples from 10 disposal sites.

4.3 Data Analysis

Quantitative data were analyzed using SPSS 25.0, while qualitative data underwent thematic analysis. Environmental samples were tested for pharmaceutical residues using High-Performance Liquid Chromatography (HPLC).

5. Results

5.1 Drug Disposal Practices

- Burning in open pits – 47%
- Dumping in general waste bins – 28%
- Flushing down the toilet or sink – 15%
- Proper incineration – 10%

5.2 Awareness Levels

Only 26% of health workers were aware of standard pharmaceutical disposal guidelines by WHO or NAFDAC.

5.3 Environmental Contamination

- Water samples from nearby streams contained traces of Ibuprofen, Paracetamol, and Tetracycline.
- Soil samples showed elevated pH and chemical oxygen demand (COD), indicating contamination.

5.4 Health Risks Reported

- 38% of facility cleaners reported symptoms like skin rashes, nausea, or dizziness after exposure to pharmaceutical waste.
- Community residents complained of unpleasant odors and increased incidence of unexplained ailments.

6. Discussion

The study confirms that improper drug disposal practices are prevalent in public health centers across Aba. Open burning and flushing drugs into the drainage system contribute to widespread environmental degradation and health risks. Poor training and lack of waste management infrastructure further compound the problem. The detection of pharmaceutical residues in environmental samples underscores the urgency for immediate intervention.

7. Conclusion

The improper disposal of pharmaceuticals in public health centers in Aba Metropolitan has farreaching environmental and health implications. The absence of regulated protocols, combined with low awareness among health workers, exacerbates the issue. Sustainable waste management practices and educational campaigns are urgently needed.

8. Recommendations

1. Establish drug take-back programs in partnership with regulatory agencies.
2. Train healthcare workers on pharmaceutical waste handling and environmental health.
3. Implement eco-friendly incineration and hazardous waste segregation at health facilities.
4. Adopt community awareness campaigns to discourage self-medication and unsafe disposal at home.
5. Strengthen regulatory enforcement by agencies like NAFDAC and NESREA.

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