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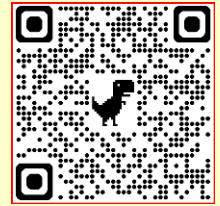
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## Household Waste Management: Practice and Their Environmental Impact

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### ABSTRACT

*This community service project aims to address the issue of Escherichia coli contamination in well water and the associated increase in diarrhea cases in settlements around the Bakung Final Waste Disposal Site in Bandar Lampung. The project involved educational outreach, water quality testing, and community engagement to raise awareness and implement health interventions. The results showed a significant correlation between well water contamination and the prevalence of gastrointestinal diseases, particularly diarrhea. The project concluded with recommendations for improving sanitation and health education in the affected areas.*

**KEY WORDS:** Escherichia coli, well water, diarrhea, community outreach, public health, Bakung Final Waste Disposal Site.

### Introduction

Access to clean and safe drinking water is critical for preventing waterborne diseases, particularly in developing countries with inadequate sanitation infrastructure. Escherichia coli (E. coli) contamination is a major indicator of fecal contamination in water, which can lead to serious gastrointestinal diseases such as diarrhoea. E. coli in well water is a significant public health concern, as it is commonly associated with outbreaks of diarrheal diseases (Guzmán et al., 2015; Mills et al., 2023). In many urban and rural areas, including Bandar Lampung, the contamination of groundwater sources is linked to improper waste disposal, particularly around waste disposal sites, where contamination from human and animal waste is prevalent (Asefa et al., 2021). In such areas, unsafe water is a leading cause of preventable diseases, disproportionately affecting children and vulnerable populations (Muth et al., 2019).

The Bakung Final Waste Disposal Site in Bandar Lampung is

situated near several settlements, where improper waste management has led to contamination of nearby water sources. Studies have shown that waste disposal sites, especially open dumps, are hotspots for E. coli and other pathogens, which leach into the groundwater, contaminating well water (Nala et al., 2003). These conditions have contributed to a rise in diarrhea and other waterborne diseases in local communities. Given the growing prevalence of these health concerns, this community outreach project aims to raise awareness about the risks of water contamination and promote health interventions to reduce the spread of diarrhea (Viaroli et al., 2022).

This project focuses on educating the community about the dangers of E. coli contamination, testing well water for the presence of E. coli, and assessing the correlation between water quality and the incidence of diarrheal diseases. Educational outreach is a key component of public health strategies to mitigate waterborne diseases, as raising awareness can lead to behaviour changes that

reduce exposure to contaminated water (Zisko et al., 2015). By addressing the root causes of contamination and providing practical solutions, the project aims to reduce the burden of waterborne diseases in the affected communities and promote sustainable health practices (Kombo Mpindou et al., 2021).

## Objective

The primary objective of this outreach program was to raise awareness about the risks of *E. coli* contamination in well water and to educate the community on safe water practices and hygiene. Additionally, the program aimed to assess the correlation between well water contamination and the prevalence of diarrhea in local households. Finally, it provided recommendations for improving sanitation and water safety in the affected settlements to promote better health outcomes.

## Methods

The community service project encompassed several essential activities aimed at enhancing public health and safety. Educational outreach was conducted through informative sessions to teach residents about the risks of *E. coli* and waterborne diseases, supported by pamphlets, posters, and practical demonstrations on water treatment and sanitation. Water testing involved collecting and analyzing well water samples from various households to detect *E. coli* contamination and identify potential sources. Health surveys were carried out to document the incidence of diarrhea and gastrointestinal illnesses among residents, allowing for a comparative analysis with water test findings to uncover any direct correlations. Additionally, the project engaged local health workers and community leaders to broaden the reach of information and promote sustainable health practices within the community.

## Results

Water quality tests conducted during the outreach revealed alarming levels of *E. coli* contamination in several wells, with contamination levels exceeding the acceptable limits for safe drinking water (Asefa et al., 2021; Muchiri and Choi, 2021). These findings are consistent with studies that show that groundwater sources near waste disposal sites are frequently contaminated with fecal bacteria, posing significant health risks (Nala et al., 2003). In the communities surrounding the Bakung Final Waste Disposal Site, a strong correlation was observed between the presence of *E. coli* in well water and the reported incidence of diarrhea. Households with contaminated water sources reported higher rates of gastrointestinal illnesses, particularly diarrhea, compared to those using cleaner water sources (de Souza Evangelista et al., 2021; Faber et al., 2022).

The health surveys conducted as part of the project further corroborated this finding. Among the households with *E. coli*-contaminated well water, nearly 40% reported at least one case of diarrhea within the past month, with a noticeable increase in the incidence during the rainy season when runoff from the waste disposal site likely exacerbates contamination levels (Bourli et al., 2023). This seasonal variation highlights the vulnerability of communities to waterborne diseases, especially when waste management systems are inadequate, and water sources are easily contaminated (Jha et al., 2020; Viaroli et al., 2022).

Moreover, the project found that a significant proportion of community members lacked awareness about the risks of using untreated well water and were unaware of basic water purification methods (Awofeso and Aldabk, 2018; Upfold et al., 2021). This knowledge gap contributes to the continued spread of diarrheal diseases in the area. The survey also indicated that many households

did not have access to proper sanitation facilities, further exacerbating the risks of waterborne diseases (Iqbal A, 2015; Mensah et al., 2023). These findings underscore the importance of public health interventions that not only address water quality but also promote better sanitation and hygiene practices.

## Discussion

The results of this project support the growing body of evidence that highlights the link between *E. coli* contamination and waterborne diseases, particularly diarrhea (Hassanain et al., 2013). The presence of *E. coli* in drinking water serves as a clear indicator of fecal contamination, which is a primary pathway for the transmission of gastrointestinal pathogens (Asefa et al., 2021; Muchiri and Choi, 2021). In the case of Bandar Lampung, the proximity of settlements to the Bakung Final Waste Disposal Site and the lack of effective waste management have created an environment where both groundwater and surface water are contaminated, leading to increased health risks for residents (Nala et al., 2003).

One of the key findings of this project is the significant role of sanitation practices in the prevention of waterborne diseases. Communities with inadequate sanitation facilities are more likely to experience frequent outbreaks of diarrhea, especially when water sources are contaminated by waste (Adugna, 2023). Despite the effectiveness of educational outreach in raising awareness about waterborne disease prevention, there is a critical need for long-term interventions that focus on improving waste management systems and providing access to safe water sources. As *E. coli* contamination is an easily preventable risk, addressing sanitation and water infrastructure is crucial in reducing the burden of gastrointestinal diseases in these communities (Carlson et al., 2020; Kombo Mpindou et al., 2021).

Additionally, the seasonal fluctuations in contamination levels observed during this study suggest that climate change and changing weather patterns may further exacerbate the challenges faced by communities relying on groundwater sources for drinking water (Song et al., 2021; Upfold et al., 2021). Heavy rains can increase runoff from waste disposal sites, which may further contaminate wells and increase the incidence of waterborne diseases. Therefore, it is important to consider both the environmental and infrastructural factors that contribute to water contamination when designing public health interventions (Iqbal A, 2015; Mensah et al., 2023).

## Conclusion

This community service project has successfully highlighted the critical link between *E. coli* contamination in well water and the high incidence of diarrhea in the settlements surrounding the Bakung Final Waste Disposal Site. The findings underscore the importance of improving water quality through effective waste management practices and community education. As *E. coli* contamination is a significant public health risk, the project's results suggest that addressing sanitation and water infrastructure issues is essential for reducing the burden of waterborne diseases in the area.

The educational outreach component of this project was successful in raising awareness about waterborne diseases and safe water practices; however, more comprehensive strategies are needed to ensure long-term health improvements. These include enhancing waste management systems, promoting water treatment technologies, and ensuring access to safe drinking water for all community members. The project also highlighted the need for greater community engagement in addressing water quality and sanitation issues, as local involvement is crucial for sustaining

public health interventions.

In conclusion, future efforts should focus on improving water infrastructure, promoting proper sanitation, and fostering continued public education on waterborne disease prevention. By implementing these changes, the community will be better equipped to manage and prevent waterborne diseases, leading to improved public health outcomes. Further research is needed to explore the effectiveness of these interventions in the long term and to monitor the impact of climate change on water quality and public health in similar settings.

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