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Sanitary Landfill Practices and Public Health Outcomes in Southern Taraba, Nigeria

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Abstract

Improper management of solid waste, particularly from households and communities, presents significant health risks that can facilitate the spread of diseases. Unmanaged waste, especially in landfills, attracts vectors like flies and rats, which further endanger public health. This study examined sanitary landfill practices and their impact on the health status of residents in the Southern Senatorial District of Taraba State, Nigeria. Using a cross-sectional survey design and the Urban bias theory was employed as the theoretical framework. 1,200 respondents were sampled through Taro Yamane's formula. Data were collected using quantitative questionnaires. Findings revealed prevalent landfill practices as solid waste disposal method among the residents of Southern Taraba, which significantly contribute to adverse health outcomes. Statistical analysis demonstrated a significant relationship between these disposal practices and health status, with a P-value of 0.000, well below the alpha level of 0.05. The study recommends identifying and implementing effective solid waste disposal methods to mitigate health risks and enhance public health in Southern Taraba.

Keywords: Health status, Solid waste, Landfills, Southern Taraba, Nigeria

INTRODUCTION

In Africa, rising waste generation, both domestic and industrial parallels growing consumption, contribute to health risks associated with poor waste management practices [1] , [8]. In Sub-Saharan Africa, 69 percent of solid waste is openly dumped and often burned, disregarding the associated health hazards. Approximately 24 percent is disposed of in landfills, and only about 7 percent is recycled [2]. Open dumping is prevalent, exacerbating health problems for local populations. Regardless of socioeconomic status or location, all societies generate waste, including gas, liquid, and solid forms, daily [7].

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Although developing countries produce lower volumes of waste than developed nations, they often lack the resources to manage it effectively. Factors like poor public perception, limited funding, equipment failure, and insufficient waste management budgets contribute to inadequate waste collection and disposal (EGSSAA, 2009; Nyumah, Charles, Bamgboye, Aremu, & Eisah, 2021). This situation frequently leads to environmental contamination, with adverse effects on community health.

In Nigeria, inadequate waste disposal methods have serious health repercussions. Practices such as open dumping and unregulated incineration release pollutants into the air, leading to respiratory conditions among nearby residents. Exposure to particulate matter and harmful emissions from waste incineration can result in respiratory ailments, including asthma and infections (Adebola, 2017).

It is against this backdrop that this study seeks to explore sanitary landfill practices and public health in Southern Taraba, Nigeria.

THEORETICAL FRAMEWORK

Urban Bias Theory

The Urban Bias Theory, introduced by Michael Lipton in 1977, posits that the uneven distribution of resources between urban and rural areas reflects a systematic prioritization of urban interests, often at the expense of rural equity and efficiency. According to Lipton, this disproportionate resource allocation fails to yield high output in urban sectors, despite significant investment. He argued that the rural sector holds substantial growth potential, suggesting that redirecting resources to rural areas could drive broader, more inclusive development. This urban prioritization tends to channel higher income and resources toward urban areas, fostering growth there while slowing economic progress and welfare in rural regions, often leaving rural populations with fewer essential services and infrastructure.

In relation to landfills and the health of Southern Tarabans, Urban Bias Theory highlights how government policies and infrastructure development favor urban areas, resulting in better waste management resources and facilities in cities. In rural areas like the Southern Senatorial District of Taraba State, this urban-centric approach results in inadequate waste disposal facilities, poor transportation for waste collection, and a lack of structured landfill sites. As a consequence, rural communities are compelled to dispose of waste in unsanitary ways—such as open dumping—resulting in air pollution, groundwater contamination, and exposure to hazardous materials, all of which significantly impact health.

Improper waste disposal in rural areas leads to a host of health risks: exposure to pollutants from methane and other greenhouse gases contributes to respiratory illnesses and worsens climate impacts; contaminated soils can lead to heavy metal absorption in crops, endangering food safety; and improper disposal of medical waste heightens the risk of infectious diseases. Such risks would be mitigated if rural regions received adequate resources for waste management, including safe landfill facilities, waste collection containers, and transportation systems.

In essence, the Urban Bias Theory underscores a critical dimension of the waste management challenges in Southern Taraba: the uneven provision of resources, policy support, and infrastructure between urban and rural areas. Addressing these disparities could significantly enhance waste management practices in Southern Taraba, thereby improving public health outcomes and environmental safety for rural communities.

METHODOLOGY

This study employed a cross-sectional survey design, chosen for its efficiency in collecting relevant data within a short timeframe from a representative sample. This approach also facilitated the generalization of findings to the broader study population. Quanttitative method of data collection was employed for the study. A sample size of 1,200 was calculated for questionnaire distribution using Taro Yamane's formula, based on the study population of 1,068,367. Of the 1,200 questionnaires distributed, 1,090 were returned, yielding a response rate of 91.0%, which was considered sufficient for analysis.

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

Sanitary landfill/burying as solid waste disposal method among the respondents of Southern Taraba, Nigeria

Findings on the table below showed that most of the people in Southern Taraba practiced landfill as solid waste disposal method, and majority of the respondents rated landfill as the best way of solid waste disposal while some rated it has been harmful to human's health because of the unpleasant odour it produces. Most of the respondents rated landfill as contributing to the contamination of surface and ground water, while a majority of the respondents rated it as capable of attracting harmful insects, most of the respondents maintained that people living within the landfill areas suffer from certain health problems, despite all these, most of the respondents rated that this method as the best means of solid waste disposal, many of the respondents insisted that this method was not good for the health of the people. Similarly, it was found that landfill method is harmless to the soil itself. However, a majority of the respondents were of the view that this method was relatively hygienic in nature and that it was relatively inexpensive to practice, only few people among the respondents were of the view that they burry their waste under the ground. The findings were presented in Table 4.1 below:

Table 4.1 Respondents Ratings of Sanitary landfill/burying as solid waste disposal method

Statements	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Mean	STDV
1. I practice landfill as solid waste disposal method in my area	473	547	11	19	40	4.28	0.876
2. Landfill produces unpleasant odours that are harmful to human's health	478	549	5	18	40	4.29	0.868
3. Landfill attract harmful insects/flies	340	535	122	85	8	4.03	0.887
4. Landfill contributes to the contamination of surface and ground water	349	521	11	188	21	3.91	1.086
5. People living closer to landfill sites suffer from certain medical conditions	404	367	93	142	84	3.79	1.277
6. I normally burry my waste under the ground	450	307	21	299	13	3.81	1.266
7. I see this as the best way of waste disposal	592	194	27	275	2	4.01	1.260
8. This method is not good for the people	452	562	18	19	39	4.26	0.868
9. This method is capable to contaminate the water sources	462	565	5	18	40	4.28	0.864
10. Burying of waste under the soil has no harm	323	555	121	84	8	4.01	0.886
11. This method is hygienic	329	536	16	189	20	3.89	1.075
12. The method is relatively inexpensive	407	369	92	143	79	3.81	1.075

Source: Field Work, 2024, **Note: STDV= Standard Deviation**

From the findings on the Table above, all the statements had mean score that were above 3.50 which indicated strong consensus. The standard deviation values ranged from 0.87 to 1.85, indicating the proximity of these values to the mean. This implied that the responses of the respondents are almost the same.

DISCUSSION OF FINDINGS

The findings of the study revealed that, most of the people in Southern Taraba practiced landfill as solid waste disposal method, a majority of them also revealed that however, landfill produces unpleasant odours that are harmful to human's health, most of the respondents also reported that landfill attracted harmful insects/flies in the study area, most of the respondents were of the view that landfill contributes to the contamination of surface and ground water, majority of the respondents were of the opinion that people living within the landfill areas suffer from certain health problems, despite all these, a majority of the respondents were of the view that they burry their waste under the ground. Most of the respondents reported that they see this method as the best way of solid waste disposal, also, many of the respondents insisted that this method is not good for the health of the people. Similarly, it was found that landfill method is harmless to the soil itself. Majority of the respondents were of the view that this methods is relatively hygienic in nature and that it was relatively inexpensive to practice.

The findings above were in line with [3], who found that open dumps are unsanitary, unsightly and generally smelly, with foul odour as they attract rats, insects, flies, snakes, etc. a landfill site also referred to as a tip, dump, rubbish dump, garbage dump, or dumping ground, is a site for the disposal of waste materials. The findings also agreed with Sakawi et al. (2011), who found that landfill operation is often associated with contamination of surface water and groundwater by leachate from the landfill. Palmiotto et al. (2014), corroborated that residents living close to landfill sites have shown concern due to several hazardous pollutants emanating from landfill operations. Some of the other pollutants associated with deposition of waste on landfills include litter, dust, excess rodents, and unexpected landfill fires (Njoku et al., 2018). People living closer to landfill sites suffer from medical conditions such as asthma, cuts, diarrhea, stomach pain, reoccurring flu, cholera, malaria, cough, skin irritation, and tuberculosis more than the people living far away from landfill sites. What causes the health challenges are the continuous exposure to chemicals, inhalation of toxic fumes and dust from the landfill sites (Thada, 2012).

Similar to the findings above, Abdhalah, Tilahun and Mberu (2016), stated that in many African cities, solid waste dump sites are located on the outskirts of the city which are also home to a huge urban poor population often living in slums with no proper means of livelihood. Dumpsites emit obnoxious odours and smoke that cause illness to people living in, around them. In the views of Medina (2002), pollution is seen as a major environmental effect of dumpsites, which is not directly transferred from land to people, except in the case of dusts and direct contact with toxic materials. Pollutants deposited on land usually enter the human body via the medium of contaminated crops, animals, food products, or water. In addition to the aforesaid, the dumpsites also have smelly conditions. These conditions are worse in the summer because of extreme temperatures, which speed up the rate of bacterial action on biodegradable organic material. With the numerous aforementioned consequences of improper disposal of solid waste in Nigeria, it is crystal clear to note that we have no other reason(s) for not adhering to the proper disposal of solid waste and management in order to avert the aftermath of the improper disposal of residential, industrial, commercial, agricultural, and institutional solid wastes.

The environment closer to landfills where solid wastes are disposed allows the accumulation of metals in edible vegetables such as waterleaf, thus posing communities that collect these vegetables to environmental health risks. In a study conducted in Nigeria and Ghana, waterleaf plants were found to have very high concentration levels of lead, cadmium and zinc (Rim-Rukeh 2012). The study found that much of the toxic metal such as lead and cadmium enters the human body by direct ingestion of vegetables or other plants that absorb the metals from contaminated soils (Loboka et al. 2013; Olayinka and Adedeji 2014). Al-Jassir, Shaker, and Khaliq (2005), and Ali et al. (2014), concluded that these chemicals are very harmful because of their non-biodegradable nature and potential to accumulate in different body parts. Therefore, environmental health risks posed by solid waste dumping can have immediate as well as delayed effects on both human health and the environment.

Palfreman (2014), conducted a research in a study of several unplanned settlements in low-income areas of Dares Salaam, Tanzania, the ministry of health reported 7000 cases of cholera between 1998 and 2005 which were associated with solid waste disposal. In Ghana, attempts made at controlling cholera outbreaks were not successful because no long-term approaches to proper solid waste disposal and provision of potable water have been implemented (Ashitey, 2014). Improper solid waste management does not only have a negative impact on human health; it can also cause economic loss in the form of ill-health of citizens as a result of the outbreak of diseases. One important example of municipal solid waste is plastic bags, which form a large component of such waste. At times they are burnt as a means of disposal or removal from the environment, and this result in the release of toxic heavy metals and the emission of greenhouse gases like dioxins and furans; these gases cause air pollution and contribute to global warming (Mangizvo, 2012). Furthermore, plastics are capable of holding rain water for several days, thereby providing breeding habitats for mosquitoes. In some developing countries in Africa, such conditions have been blamed for the increasing incidence of malaria (Aziegbe 2007; Muchangos, Liu, & Li, 2014).

CONCLUSION AND RECOMMENDATIONS

This study highlights that solid waste disposal practices in the Southern Senatorial District of Taraba State, Nigeria, present a significant public health concern. Inadequate management of solid waste, including prevalent landfill, poses ongoing health risks to residents. The findings indicate that the lack of effective waste management infrastructure, low levels of public awareness, and limited governmental oversight contribute to improper waste disposal practices, adversely affecting the environment and health outcomes. Respiratory issues and other health complications among residents underscore the urgent need for targeted interventions to improve waste management practices and promote public health in the region.
Based on the study findings, the following recommendations were made:

1. (a). Enhance Waste Management Infrastructure: The government and relevant agencies should invest in establishing waste collection and disposal facilities, particularly in high-density areas. Constructing more landfills and waste processing facilities that adhere to environmental health standards would mitigate the hazards associated with open dumping and waste burning.

(b). Promote Public Awareness and Education: Community awareness programs should be introduced to educate the public on the importance of proper waste disposal and its impact on health. Partnerships with local schools, community leaders, and media outlets can amplify educational efforts, encouraging more responsible waste management behaviours.

(c). Strengthen Regulatory Framework and Enforcement: Effective legislation and enforcement are essential for sustainable waste management. Policies aimed at regulating waste disposal practices should be reviewed and strengthened, with strict penalties for non-compliance. A monitoring system should also be established to ensure compliance with waste disposal regulations.

(d). Encourage Community Participation: Local authorities should actively involve communities in waste management initiatives, including recycling and composting programs. Incentives, such as community recognition programs or financial rewards, could be introduced to encourage active participation in sustainable waste practices.

(e). Implement Health Surveillance Programs: The government should establish health monitoring systems to track and address the health impacts associated with waste management issues. By tracking health data, officials can identify patterns and respond proactively to emerging public health threats related to waste management practices.

(f). Foster Partnerships for Sustainable Waste Solutions: Collaboration between government agencies, non-governmental organizations, and private sector players should be pursued to create sustainable waste management solutions. These partnerships could include funding for innovative waste disposal technology, pilot projects for waste reduction, and capacity-building programs.

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