



Impact of Indiscriminate Solid Waste Disposal on Human Health in Akungba-Akoko, Ondo State, Nigeria

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Abstract

The generation and disposal of solid waste is an intrinsic part of any developing society. Generation of waste in large volume does not constitute a problem but inability to dispose them off on time and properly by individuals and governments. This study examine the impact of indiscriminate solid waste disposal on human health in Akungba-Akoko. Information on impact of indiscriminate solid waste disposal was obtained using a total of 250 copies of questionnaire administered to residents using random sampling technique. Descriptive statistics were used to present and analyse the data while chi-square was used to test the hypothesis. The study revealed that there are various methods used in disposing solid waste such as open dumpsite, in drains and streets, into streams and river channels, nearby bush, burning and excavation by waste management. The study also revealed that there are various health issues resulting from improper disposal and poor management of solid waste in Akungba-Akoko such as infectious diseases among people, air-borne diseases, breeding place for disease vectors and contamination of food and water. This paper recommends that as means of improving solid waste management, environmental education and public participation in environmental sanitation exercise should be encourage and waste management agencies should established more waste disposal points so as to overcome the problem of waste disposal points to resident's home.

Keywords: Indiscriminate; solid waste; Health hazard; Dumpsite; Impacts.

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1. Introduction

Wastes are materials considered to have no useful economic value and demand, which in some cases are harmful to man and must be disposed. According to the authors in [1], indiscriminate solid waste are regarded as discarded materials arising from operational activities taken place in different land use such as residential, commercial and industrial. Waste can be classified into domestic, commercial and industrial waste. The author in [2] categorized waste based on its composition such as organic and biodegradable waste, non-biodegradable waste, solid waste, liquid waste, gaseous waste and regulated medical waste. Domestic or residential wastes are those that are collected from dwelling places on a regular basis. Such waste include organic matter resulting from preparation and consumption of food, rags, nylon and ashes that remains after various cooking and heating process. According to the authors in [3], there is a growing domestic waste disposal problem in most developing countries, which is gradually approaching crisis level. This trend has gone unchecked for so many years that now, the situation appears to be intractable.

Solid waste disposal sites are found both within and on the outskirts of developing cities. With increase in the global population and the rising demand for food and other essentials, there has been a rise in the amount of waste being generated daily by each household [4]. This waste is usually thrown into disposal sites and due to poor and ineffective management, the dumpsites turn to sources of environmental and health hazards to people living in the vicinity of such dumps. In Nigeria, the domestic waste disposal problem is typified by overflowing domestic mountains of open refuse dumps at virtually every street corner, with their attendant problems and existence of improperly operated landfills which are often rodent infested with potentials for surface and ground water pollution. The commercial waste are those that arise from shops, supermarkets, shopping malls, market and others; they include paper carton, polythene bags and nylon. The industrial wastes are those waste materials that arise from industries; these could be solid, liquid, or emotive little attached to them like toxic, hazardous and special waste. The industrial waste include metals, scraps and chips from machines, ships, sawdust, paper pieces and glass [5].

Indiscriminate dumping refers to unlawful disposal of waste in undesignated spaces such as open or vacant land, sources of water and other areas [6; 7; 8]. The volumes of these wastes are increasing rapidly because of the constant desire of consumers to discard the old and acquire new items, completely disregarding the concept of recycling and this is a big problem to disposal management [3]. Two separate studies conducted in Nigeria and Ghana came to the same conclusions that approximately 80% of solid waste in African countries was disposed off through indiscriminate dumping [9; 10]. The problem of solid waste dates back to the time when urbanization started and since then there has been an increasing rate of refuse generation in Nigerian cities.

According to the authors in [11], many cities in developing countries face serious environmental degradation and health risks due to the weakly developed municipal solid waste management system. Inappropriately disposed solid wastes have a lot of negative effects such as accidents, flood occurrences which usually lead to loss of life and properties, health deterioration and environmental pressures. In developing nations especially Nigeria, a great proportion of solid waste generated are dumped either in controlled landfills or open dumps which constitute sources of health risks to surrounding residents. The use of sanitary landfills is not feasible for

many waste management authorities of most countries due to cost constraints. The author in [12] concurred that open dumpsites rather than sanitary landfills are more in number for waste disposal and this constitutes great health hazards to the residents. According to the authors in [13], exposure to hazardous waste in dumpsites can affect human health, children being the most vulnerable to these pollutants. Direct exposure can lead to diseases through chemical exposure as the release of chemical waste into the environment leads to chemical poisoning. Also, the dumpsite has smelly and unsightly conditions. These conditions are worse when there is extreme temperature, which speed up the rate of bacteris action on biodegradable organic material. Disposal sites can also create health hazards for the neighbourhood [14; 4].

The objective of this paper is to examine the impact of indiscriminate solid waste disposal on human health in Akungba-Akoko and also to test the hypothesis that indiscriminate solid waste disposal has no significant effect on human health.

1.1 Concept of Solid Waste

Waste is a material discharged and discarded from each stage of daily human life activities which leads to adverse impacts on human health and the environment [15] whereas, solid waste refers to the leaves, food remnants, paper/carton, textile materials, bones, ash/dust/stones, dead animals, human and animal excreta, construction and demolishing debris, biomedical appliances, furniture [16,17].

Indiscriminate dumping is a common and prevalent though risky practice, especially among developed and developing communities. The author in [18] asserted that the impact of indiscriminate disposal of refuse has been a worrisome health issue for some time. Environmental health risks are made complex by the lack of classification of indiscriminately dumped waste. The authors in [19,20] noted that a number of criteria are employed to classify wastes into types, including their sources, physical state, material composition and the level of risks associated with waste substances. Indiscriminate dumping is a major environmental and public health hazard prevalent in most developing countries as this practice is still rife [21,22]. The formalization of households into high density settlements, together with inefficient refuse removal services, compound the indiscriminate dumping problem in most developing communities.

2. Materials and Methods

2.1 Study area

Akungba-Akoko is located North-East of Ondo State and South-West of Nigeria. The region lies within Latitude $7^{\circ}28'N$ and longitude $5^{\circ}44'E$. The study are covers an areal extent of about $2465.6km^2$. The area is situated at an altitude between 270m and 2750m above sea level. Most parts of the area have undulating terrain, which in many cases are almost completely encircled by high rugged rock outcrops, rising to a height of over 2750m in some places.

Geologically, the area is a physiographic region characterized by two major

crystalline basement rocks of the main African Precambrian shield. These are magmatite and granite gneiss, with quartz and pegmatite veins. These rocks belong to the migmatite gneiss sub-classification of the basement complex of Nigeria. Akungba-Akoko is located within the humid tropical climate of the forest region, which experiences two climatic seasons namely the rainy season (April-October) and the dry season (November-March).

2.2 Research Design

Data for this study was collected from both primary and secondary sources. A simple random sampling technique was used in collecting 250 samples from the study area. The instrument used in this study was questionnaire which contains variables to draw out response on the impact of solid waste disposal on human health. The questionnaire was developed by the researcher using the likert scale of Strongly Agreed (SA), Agreed (A), Disagreed (D) and Strongly Disagreed (SD). The secondary data were derived from documentaries, journals, magazine, internets, theses, books, government reports, workshops and conferences. Data collected were analysed using frequency distribution tables and simple percentage technique. Chi-square (X^2) statistical tool were used in testing the hypothesis in order to achieve the objectives.

3. Results

3.1 Methods of Waste Disposal in Akungba-Akoko

The disposal methods of solid waste used by the respondents in the study area were very unsatisfactory. The method of solid waste disposal employed by the respondents is indicated in Table 1. The study identified open dumpsite with 29.6% forming the highest way by which people in the area dispose their wastes making the area breeding place for disease vector, cause diseases and make the place dirty [Figure 1] while 22.8% of the respondents dispose their waste into drains and streets [Figure 2 and 3]. This acts usually cause flooding, unhygienic environment, environmental degradation and depletion as well as outbreak of disease. 18% of the respondents asserted that they disposed their waste in nearby bush within their neighbourhood and this could degrade the environment and hinder environmental livability. 12.8% of the respondents usually dump their waste into streams and river channels. This usually leads to contamination of water while 10% burn their wastes [Figure 4] and this could lead to environmental pollution as well as the depletion of the ozone layer which in turn leads to climate change. 6.8% of the respondents make use of the waste management agent to dispose their waste.

Table 1: Disposal method

Method	Frequency	Percentage
Open dumpsite	74	29.6
Bury and burn in pits	25	10
In drains and streets	57	22.8
Dumping in nearby bush	45	18
In stream/river channels	32	12.8
Excavation by Waste Management	17	6.8
Total	250	100

Source: Field Survey, 2021



Figure 1: Open Dumpsite



Figure 2: Refuse dump inside drain



Figure 3: Refuse Dump inside drain



Figure 4: Refuse burnt at the entrance of a compound

3.2 Testing of Hypothesis

Chi-square was used to test the hypothesis that indiscriminate solid waste disposal has no significant effect on human health.

The degree of freedom (df) or critical value were calculated as follows:

Df = (R-1) (C-1). Where R = number of rows = 5

C = number of column = 2

= (5-1) (4-1)

4×3 = 12

Df = 12

For this study, 95% of level of confidence and 5% level of significance were used, the degree of freedom (df) at 12 = 21.026 which is approximately equal to 21.03.

Table 2: Impact of indiscriminate disposal of solid waste on human health

Variables	A	SA	D	SD
Infectious diseases among people	35	200	10	5
Air-borne diseases caused by pollution of the atmosphere	65	137.5	30	17.5
Breeding place for disease vectors which transmit diseases	50	162.5	27.5	10
Contamination of food and water	82.5	150	12.5	5
Outbreak of cholera and dysentery	70	162.5	12.5	5
	302.5	812.5	92.5	42.5

Table 3: Result of the Hypothesis

Hypothesis	O	E	O-E	(O-E) ²	$\frac{(O-E)^2}{E}$	$\sum \frac{(O-E)^2}{E}$	Df	Critical value
1	35	50	-15	225	4.5	527	12	21.03
	200		150	22,500	450			
	10		-40	1600	32			
	5		-45	2025	40.5			
2	65	50	15	225	4.5	186.75	12	21.03
	137.5		87.5	7656.25	153.125			
	30		-20	400	8			
3	50	50	0	0	0	295.25	12	21.03
	162.5		112.5	12,656.25	253.125			
	27.5		-22.5	506.25	10.125			
4	82.5	50	32.5	1056.25	21.125	289.75	12	21.03
	150		100	10,000	200			
	12.5		-37.5	1406.25	28.125			
	5		-45	2025	40.5			
5	70	50	20	400	8	329.75	12	21.03
	162.5		112.5	12,656.25	253.125			
	12.5		-37.5	1406.25	28.125			
	5		-45	2025	40.5			

From Table 2 and 3, the calculated chi-square (X^2) values are 527, 186.75, 295.25, 289.75 and 329.75 on human health which indicates a degree of freedom of 12. The calculated value of chi-square (X^2) is greater than the critical value of 21.03. Since the calculated X^2 of 527, 186.75, 295.25, 289.75 and 329.75 was greater than the table value of 21.03, the null hypothesis was rejected. This shows that indiscriminate dumping of solid waste had significant effect on the health of the people in Akungba-Akoko.

3.3 Impact of Indiscriminate Solid Waste Disposal

Indiscriminate refuse disposal can cause mild to moderate illness and at times severe illness that can lead to death. It can also give rise to offensive odour which can lead to choking of the lungs and breathing difficulty especially in asthmatic patients. There could also be outbreak of diseases like cholera, typhoid fever, and other diseases. The authors in [23] noted that serious and devastating outbreak of diseases and epidemic had been recorded owing to indiscriminate dumping of refuse.

If solid wastes are not managed properly and promptly, decomposition and putrefaction may take place causing water and land pollution when the waste products infiltrate down into the groundwater resources. The authors in [24] noted that indiscriminate dumping of refuse hinders free flow of erosion and floods when it rain causing blockage of drainages, diversion of flood to various places which results in destruction of lives and properties. (Plate 3 and 4). Children and adults could receive injuries from filthy materials such as broken bottles and heaps of hazardous things and if not quickly attended to can lead to tetanus infection which in turn can kill the host.

Water-borne disease such as cholera, typhoid fever, diarrhoea, worm infestation and hepatitis can also spread where there is indiscriminate disposal of refuse and also where refuse dumping sites are close to streams and rivers that are being used for domestic purposes like cooking, washing and drinking.

4. Conclusion

The study area is developing rapidly in terms of infrastructures as well as the influx of population which implies there would be increase wastes generation. When the wastes are not properly managed usually leads to outbreak of diseases. To prevent this, dumpsite should be properly located and managed to minimize its impacts on human health. Also, government and all agencies concerned with waste management put proper institutional framework in place in the area for waste management.

5. Recommendation

In order to curb indiscriminate disposal of solid waste, some preventive measures should be put in place. As a means of improving solid waste management, environmental education and public participation in environmental sanitation exercise should be encourage. Waste management agencies should also established more waste disposal points so as to overcome the problem of waste disposal points to residents' home. Action is also needed to increase the people awareness of the importance of disposing wastes properly and promptly through public enlightenment. This will help to foster positive attitude towards methods of solid waste disposal.

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