



Assessing Waste Management Practices and Public Health Impacts in Koko Community, Delta State, Nigeria

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Abstract This study investigated the association between waste management practices and public health in Koko, a community situated within Warri North Local Government Area of Delta State, Nigeria. Using Taro Yamane's formula, a sample of 400 residents was selected from a population of 211,100. Data collection involved administering questionnaires, and analysis employed descriptive statistics (frequency distribution, percentages) presented in tables and figures (refer to Chapter Four). The study revealed that improper waste disposal significantly contributes to environmental pollution, posing health risks to the community. Findings indicated that waste management practices expose residents to health hazards and facilitate the spread of hazardous materials. The research suggests addressing these issues through public health education campaigns focused on proper waste disposal practices. Furthermore, the study proposes solutions to mitigate improper waste disposal, including community awareness programs highlighting the negative consequences and advocating for improved waste management infrastructure. Additionally, government intervention is crucial to establish designated waste disposal sites, implement effective waste collection systems, and promote waste recycling initiatives.

Keywords Public health, waste management, environmental pollution, and statistical tool.

Introduction

Wastes are product or substance which is no longer in use, it is an unwanted and unusable material which is to be disposed or required to be disposed by the national law (Basel Convention, 2019).

According to Basel Convention, (2019) the export of hazardous wastes to developing countries gathered world attention in 1988 after a series of well publicized "garbage barges" laden with wastes sailed around the world seeking disposal sites. In one of the most widely discussed cases, 3,800 tons of toxic wastes were dumped in a dirt lot in Koko, Nigeria between August 1987, and May 1988. In a deal arranged by an Italian waste trader. Authorities discovered wastes in June 1988 after receiving reports of local residents falling ill. Between August 1987 and May 1988, five ships transported 3,800 tons of hazardous wastes, collected from various European countries and the United States, to Koko in the then Bendel State now Delta State, Nigeria, under an agreement in which Italian waste trader Gianfranco Rafaelli persuaded a retired lumber worker, Sunday Nana to store the wastes in a dirt lot near his home for \$100 a month, Nigerian authorities did not learn of the scheme until June 2, 1988, after some Nigerian



students in Italy sent copies of the articles to their home country. On June 13, Nigerian health officials reported three workers had suffered from severe chemical burns while moving the wastes. Until the end of July, in the months following the discovery, reports surfaced of premature deaths, dock workers becoming paralyzed or suffering severe chemical burns, and nineteen deaths from contaminated rice. However, many workers were hospitalized for chemical burns, nausea, vomiting blood, and partial paralysis.

In February 2017 residents of Koko, a small community in Delta State raised the alarm about the dumping of toxic waste in the community. Last year's incident which came about 30 years after toxic waste was dumped in the same community by an Italian company (Akaruese, 2018). The 1988 incident which occurred in the old Bendel State generated global condemnation, The attendant media and public outcry prompted the government to react swiftly and it succeeded in making the Italian government and the company responsible for the incident, to take the waste out of Nigeria (Akaruese, 2018).

Statement of the Problem

Waste has become an issue in Nigeria; managing waste disposal has become a major concern despite several attempts by successive governments and private organizations in that direction. That is why it is a common sight across the country today to see heaps of festering waste dumps in almost every nooks and crannies (Alemma 2017). Since the Koko incident occurred in 1998, there ought to be a periodic health examination of the inhabitants, animals, plants and water bodies of Koko village, where this nuclear waste was deposited to ascertain the current state of the biodiversity to the public health impacts of the radioactive waste deposits over the years.

This research is designed to examine the current health status of the persons living around Koko especially the area where wastes was deposited.

A. Significance of the Study

Proper waste removal helps improve air and water quality as well as reduces greenhouse gas emissions. It helps in minimising the extraction of resources along with reducing pollution and energy consumption which is associated with manufacturing new materials. Reducing, reusing and recycling your waste is important for the environment, but it can also be profitable. It decreases the amount of waste for disposal, saves space in landfills, and conserves natural resources which are also important for public health (Ronnie Salonga 2019).

B. Aims and Objectives

The aim of this study is to investigate waste and its impact among dwellers of Koko community.

The specific Objectives of this study are;

- [1]. Investigate if there is proper waste handling management, with respect to the new enacted laws.
- [2]. To ascertain if the dwellers of Koko community are still showing signs or having the health impact of the nuclear waste.
- [3]. To investigate if the dwellers of Koko community still pollute the water bodies, since after the incident.
- [4]. To investigate how people living around the areas where the toxic waste was deposited adapt.

C. Research Questions

- [1]. How do the people living in the community manage waste with respect to enacted laws?
- [2]. Are the dwellers of Koko waste still showing the impact of nuclear waste?
- [3]. How do the people in the community dispose waste to avoid contamination of the community and water bodies?
- [4]. How do the people living around the areas where toxic wastes were deposited adapt?

D. Scope of Study

For decades, waste management involves simple disposal of waste materials to landfills or other designated areas which has created sustainable negative impacts on the environment in Koko village (Sydney 2018).

Basically waste management procedures after the Koko incident and how it has kept them safe after then; thereby positively affect the overall public health of the dwellers. This research is to investigate the health impact on humans living in and around the area where the toxic nuclear wastes were deposited in Koko.

E. Limitations

- [1]. Financing the project was pretty difficult, the cost was huge and the funding was personal as there was no grants.
- [2]. At the time of this research community entry to administer questionnaires was difficult too as there were youth reactivity in the community.
- [3]. The persons I administered questionnaires were reluctant to give correct information, they were having the impression that it is political motivated.



[4]. Illiteracy and language understanding amongst the indigenes of koko was a barrier too.

Methodology

A. Materials and Methods

Data was collected from primary and secondary sources. Questionnaires were administered, and visitation of medical facilities with semi structured focus group interview conducted also by observation of the inhabitants of the community. Existing project works was reviewed, online libraries, magazines, journals, articles and publications and book written renowned scholars and documentaries on this subject was employed as reference materials.

B. Study Area

The research was carried out in Koko in Warri North Local Government Area of Delta State.

C. Study Design

According to (Baridan, 1990) research design is how a study is constructed, this study was waste management and its impact on public health of the community dwellers of Koko waste dumpsite in Delta State.

D. Study Population

The questionnaires administered were 500 people, in which 448 were retrieved, and 400 was randomly selected and analysed to get the sample size. The entire survey was directed to the inhabitant of the koko community and they were grouped from aged 0-5, 6-18, 19-40 and 41 and above years. Semi structured focus group interview was carried out and directly physical observation from members of the inhabitants of the Koko community and senior and junior staffs of the medical facilities in the koko community visited.

E. Sample Size

The sample size is therefore determined using Taro Yamane's Formula. the mathematical method is given as;

$$n = \frac{N}{1 + N(e)^2}$$

1. RESULTS AND DISCUSSION

This chapter revealed the result of data analysis on Waste Management and its Impact on Public Health of the Community Dwellers of Koko Waste Dump Site in Delta State. 500 Questionnaires were distributed, 448 was retrieved and 400 questionnaires was randomly selected during the survey of the analysis to get the sample size N= 400 of the population. The basic results of the study were presented from descriptive statistics.

Therefore, in this chapter, data were gathered from the data collection activity using frequency distribution tables. Using frequency (400) and percentages (%)

A. Demographic information

The background information of participants includes, age, gender, occupation, religion, professional qualification, years of dwelling.

B. Analysis of Demographic characteristic

Table 1: Demographic Characteristics of Respondents on age

Age	Frequency	Percentage
0-5years	5	1%
6-18years	51	13%
19-41 years	185	46%
50years above	162	40%
Total	400	100%

Source: Field Survey 2022

Table 2: Demographic Characteristics of Respondents on gender

Gender	Frequency	Percentage
Female	247	54%
Male	183	46%
Total	400	100%

Source: Field Survey 2022



Table 3: Demographic Characteristics of Respondents on occupation

Occupation	Frequency	Percentage
Farmer	63	16
Fisherman	27	7
Business	113	28
Working class	92	22
Others	105	26%
Total	400	100%

Source: Field Survey 2022

Table 4: Demographic Characteristics of Respondents on religion

Religion	Frequency	Percentage
Christian	334	83%
Muslim	46	12%
Traditional worshippers	20	5%
Total	400	100%

Source: Field Survey 2022

Table 5: Demographic Characteristics of Respondents on professional qualification

Professional qualifications	Frequency	Percentage
First School Leaving Certificate	102	26%
SSCE	90	22%
BSc	80	20%
Master's	28	7%
PHD Degree	5	1%
No qualification	95	24%
Total	400	100%

Source: Field Survey 2022

Table 6: Demographic Characteristics of Respondents on Years of dwelling

Years of dwelling	Frequency	Percentage
1-5 years	60	15%
6-10 years	74	18%
11-15 years	112	28%
16 years and above	154	39%
Total	400	100%

Source: Field Survey 2022

The demographic characteristics of respondents on Table 1-6 above showed the demographic details of the participants, it revealed that majority 185(46%) of the respondents were within the age range of 19-41 years while the least 5(1%) respondents were within 0-5 years. Majority were female 217 (54%) majority were doing business 113(28%). However, most were Christian 334(83%), majority had first school leaving certificate 102(26%). While the years of dwelling revealed that majority were 16years and above 154(39%).

C. Discussion of Findings

The main aim of study was to assess waste management and its impact on public health of the community dwellers of Koko waste dump site in Delta state. The findings was discussed based on research questions, the following observations were made with respect to objective set for the study and findings from related literatures.

[1]. Research Question One; how people living in the community manage waste with respect to enacted laws?

It revealed that majority 165(41%) dispose their wastes in drums, 118 (30%) dispose their wastes in waste bags, 165 (41%) dispose their wastes in buckets, and only 65(16%) dispose their wastes in waste bin. 198(49%) dispose their waste finally using waste management board, 170(43%) dispose their waste on the roadside, minority 32(8%) dispose their waste in the river, majority 187(47%) dispose their wastes weekly, 166(41%) dispose monthly, 35(9%) dispose daily while 12(3%) never disposes their packaged waste at all. 318(80%) generated non-hazardous waste, 64(16%) generate toxic waste while 18(4%) generates hazardous waste. 119(30%) dwellers of the community dispose wastes on the general waste sites, 104(26%) dispose wastes in gutters, 97(24%) on roadside, while minority 80(20%) of dwellers on the community dispose their wastes in rivers. 197(49%) respondents believes waste management can be improved through recycling, 162 (41%) believes it can be improved by landfills, while minority feels 41(10%) can be improved by composting.



[2]. **Research Question Two;** Details of the kind of waste the dwellers of Koko community generates?

It revealed that 318(80%) generated non-hazardous waste, 64(16%) generate toxic waste while 18(4%) generates hazardous waste.

[3]. **Research Question three;** the dwellers of Koko community generates?

It revealed that majority 382 (95%) of the respondents have knowledge of hazardous waste, while minority 18(5%) doesn't. 376(94%) have heard about the Koko waste dump while 24(6%) do not. 218(55%) respondents knows about the hazards of waste, while 182(45%) do not. 202(51%) said the Koko incident didn't affect animals, marine life, cultivation and other things or activities in the area while 198(49%) claimed it did affect.

[4]. **Research Question Four;** how the people in the community dispose waste to avoid contamination of the community and water bodies?

It revealed that 285(71%) respondents said they can do something to prevent the effect of waste dumping in the community, while minority 115(29%) said they do not have idea on how to prevent the effect of waste dumping in the community, 217(54%) respondents said the consequences of improper waste dump is air pollution, 115(29%) said it causes soil pollution, while minority 68(17%) said it can lead to water pollution. Majority 381(95%) of the respondents agreed that improper waste dumping can lead to harmful diseases while minority 19(5%) said no. 388(97%) said there are still signs of spillover effects in the area where the hazards took place, while minority 12(3%) said there are no effects around those areas. 376(94%) said there are no toxic odour in the environment where the hazards took place, while minority 24(6%) said yes, 287(72%) said the toxic waste affected the soil, while 113(28%) said it did not. Majority 334(83%) agreed it did not pollute the community water bodies while minority 66(17%) said it polluted the water bodies. 219(55%) respondents said that people have not fully recovered from the incident and it's spillover effects while 181(45%) said they have fully recovered.

Conclusion

As the population is increasing, consumption trends are changing. Along with the improvement in lifestyle, it has posed alarming threats to the environment. If waste is not managed properly it can cause serious problems to human health and the environment. So, it is necessary for people and businesses to know the importance of waste management, the handling and disposing of liquid and solid waste, its treatment, and recycling for further use falls under waste management. Centuries ago, people used to dispose of their waste by digging a hole into a far-off land area. This waste disposal technique was meant to be efficient because of less population around that time. Waste production was less due to low population which made waste management easy. But now, due to the growing number of people, waste production has drastically increased making disposal difficult, the waste produced nowadays includes non-biodegradable and inorganic elements. If this waste is disposed off in landfills, it will decompose unnaturally and will take a lot of time. Waste management allows users to efficiently and properly dispose off all kinds of waste, Waste management is not only the responsibility of government organizations but as a responsible citizen, it is our responsibility to play our role in managing waste.

Recommendations

Arising from the results of this study the following recommendations are made for further study

- [1]. Mismanagement of waste can cause water contamination, soil erosion and air contamination. We therefore recommend that waste should be recycled if collected and managed efficiently.
- [2]. Chemical composition on liquid waste should be perform experimentally for optimal waste management system
- [3]. The Nigerian government followed this action by organizing the formulation of a national policy on the environment, consequently, the Federal Environmental Protection Agency 1988 (FEPA) was created and charged with the administration and enforcement of the environmental law.
- [4]. The government enacted the Harmful Waste (Special Criminal Provisions) Act, 1988, to deal specifically with illegal dumping of harmful waste to help manage waste in the region.

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