



## **WASTE DISPOSAL IN LOW-INCOME NEIGHBOURHOODS AND ITS IMPACT ON HEALTH: THE CASE OF PORT HARCOURT, NIGERIA**

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### **ABSTRACT**

Port Harcourt, the capital of Rivers State is one of the fastest growing urban centers in Nigeria. This growth is induced by population drift from rural areas in search for employment and greener pastures in the city. The result of this growth is the development of informal settlements along the water-fronts popularly known as "Watersides" to house these immigrants from the rural areas who are mostly low income earners. These waterside settlements lack basic amenities such as toilets, waste collection points, roads, and water supply. This paper aims at examining the health implications of households and human waste disposal systems in these neighbourhoods. Data for the study was obtained from two informal settlements and one formal settlement namely; Bundu Waterside, Marine Base Waterside and Mile One Diobu. A sample of two hundred and seven respondents was used. Descriptive statistics was used to analyze the data collected.

**Key words:** waste disposal, low income neighbourhoods, health.

### **INTRODUCTION**

Most city governments are facing mounting problems with the collection and disposal of solid wastes. In high income countries, the problems usually centre on the difficulties (and high costs of disposing of the large quantities of wastes generated by households and businesses. In lower-income countries, the problems are more to do with collection. In most cities, in LDCs, between a third and half of the of the solid wastes generated within urban centres remains uncollected and such waste generally accumulate on open spaces, wasteland and streets and bring with them serious health and environmental problems. Habitat (UNCHS, 1996:269). These problems are especially serious for the inhabitants of the larger and most densely populated informal or illegal settlements or tenement districts that have no regular garbage collection service since there is no-where close by where such wastes can be dumped. (UNCHS 1996:270).

According to habitat (UNCHS 1996:131) the health of the inhabitant has always depended on their ability to manage their environment. However, urban environmental management is concerned with the provision of a safe environment for people to live in through the provision of adequate water supply, sanitation, drainage and the regular collection and safe disposal of waste. Provision of water, sanitation, drainage and the safe disposal of wastes are obviously central to good housing and living conditions and to health.

The Oxford Advanced learner’s dictionary defined sanitation as the equipment and systems that keep places clean, especially by removing human waste.” It also defines sanitary as “connected with keeping places clean and healthy to live in, especially by removing human waste. Official statistics suggest that at least a third of the urban population in LDCS are unserved by sanitation and an even greater number lack adequate means to dispose of waste water. A sanitation system that minimizes the possibility of human contact with human excreta is lacking. Most toilet facilities have no running water (UNICEF, 1996). Most environmental problems that threaten lives and health occur within low-income households.

As cited in (Akinbamijo, 1996) a world Health Organization (WHO,1974) report affirms that over 10,000 deaths occur daily world wide, from home related accidents and diseases, shelter inadequacies and lack of access to basic facilities of water and sanitary disposal. Ugwuorah (2003) noted that solid waste in a city cause odour problems and health hazards if not properly collected and disposed of. Its pollution risks and effects cover fly breeding, strong odours, complex biological interactions which pollute streams or ground water and spread of disease among human beings and animals.

According to him the existing method in P/H of tipping wastes in creeks and water logged areas draining towards the estuary involves a substantial risk for surface and under ground water pollution is inimical to health. Sanitation is the arrangement for health, especially the removal of human, industrial and domestic waste. Indeed, basic sanitation should be a daily routine whereby man keeps his surroundings clean. The refuse generated should be well stored for easy collection and disposal by the appropriate authority concerned. Observation in the study area revealed that the waste generated is not properly stored, regularly collected and disposed off in the city in general and the low – income neighbourhoods in particular.

### **Aim and Objectives of the Paper**

The aim of this paper is to examine the health implications of household and human waste disposal systems in low-income neighbourhoods.

The objectives of the paper are:

- i. To identify the methods of household waste storage, collection and disposal in the low-income neighbourhoods.
- ii. To identify the methods of human waste disposal in the low – income neighbourhoods.

### **Description of the Study Area**

The Study was undertaken in Port Harcourt, the capital of Rivers State. Port Harcourt is situated in the Niger Delta region of Nigeria, the biggest African nation.

The population of Port Harcourt is presently over one million according to the State Statistical agency and comprises two local government areas Port Harcourt City Local Government Area (PHALGA) and Obio/Akpor Local Government Area. Port Harcourt is the centre of the oil industry in the country and occupies an important position in the national economy. As an industrial centre many people migrate to and from around the country and West Africa with consequential pressure on available resources. The study was based strictly on three low-income neighbourhoods viz: Bundu waterside, Marine-Base waterside and Diobu.

### **REVIEW OF RELEVANT LITERATURE**

The literature review is divided into four sub-sections which include: composition of household and human waste, waste storage, collection and disposal, methods of waste disposal and health implications of waste collection and disposal.

#### **Classification of Household and Human Waste**

Waste is any unavoidable material resulting from domestic activity or industrial operation for which there is no economic demand and which must be disposed of. (Tchobanoglous et al, 1977; Sridhar, 1996, cited in Uchehgbu, 2002). Waste is also conceived as any unwanted material. Waste is also defined as materials which though may no longer be needed here may become feed stock or raw material elsewhere. Wastes do not, therefore, altogether apply to worthless substances. Wastes are generally categorized into solid and liquid waste, which are materials discharged in household dustbins, flush – down toilets and chemical processing. Household wastes include: bottles, vegetable trimmings, cans, plastics, and the wastes from toilets (sludge and sewage). Uncheghu (2002) Domestic waste according to Gobo and Ubong, (2001) is classified into garbage, rubbish and large waste from homes. Isirimah, (2000) also classified residential waste into food wastes, paper, cardboard, plastics, textiles, leather, yard wastes, wood, glass,tins, cans, aluminum, rags, beddings, sweepings from buildings and old furniture.

Uchehgbu, (2002) classified solid waste into garbage and rubbish. Garbage according to him is putrefied waste from food such as meat, fish, fruit and vegetables. While rubbish is non-perishable waste that are either combustible or non-combustible such as paper, carton, wood, clothes, polythene, iron, glasses and ceramics.

From the above it is obvious that household waste is domestic waste and also include waste deposited in toilets, that is human waste (feces and urine).

## **Waste storage, Collection and Disposal**

According to Uchegbu, (2002) the waste generated should be well stored for easy collection and disposal by the appropriate authority concerned. On – site storage is of primary importance because of public health concerns and aesthetic consideration. Unsanitary makeshift containers and even open ground storage, both of which are undesirable and often seen at many residential and commercial sites. (Isirimah, 2000) In Port Harcourt refuse storage, while awaiting collection, is generally poor and observation shows it generally covers one side of the road (Gobo and Ubong, 2001) According to Isirimah(2002) it includes the gathering of solid wastes and recyclable materials, also transport of these materials, after collection to the location where the collection vehicle is emptied. The location may be a material processing facility, a transfer station or a landfill disposal site.

In many of the urban centres in the lowest – income countries, perhaps only 10-20 percent of the solid waste is collected. The results of uncollected garbage include smells, disease vectors, pests attracted by garbage (rats, mosquitoes, flies etc), overflowing drainage channels clogged with Garbage, leachate from decomposing and putrefying garbage can contaminate water sources (UNCHS, 1996:270).

Waste disposal is the final functional element in solid waste management systems. Today the disposal of Wastes by land filling or land spreading is the ultimate fate of all solid wastes, whether they are residential wastes collected and transported directly to a landfill site, residual materials from materials recovery facilities (MRFs) residue from the combustion of solid wastes, compost or other substances from various solid wastes – processing facilities.

### **Methods of Waste Disposal**

The waste disposal system includes the following: sanitary landfill, open dumping, incineration, animal feeding, composting, resource recovery and pyrolysis.

Sanitary landfill is a disposal method whereby refuse is placed in trenches, abandoned mines or quarry sites after the site has been properly designed. Deposited wastes are usually spread and covered with a required quantity of earth materials which are also spread and compacted after each day tips (Uchegbu, 2002).

Open dumping is the cheapest form of waste disposal but it is a source of number of public health and safety problems such as diseases, air, water pollution and fire. Incineration is a method of disposing waste by a controlled combustion of combustible wastes at a very high temperature. Resource recovery is the process of turning what has been considered as waste into product for use. In composting refuse is buried with or without light soil to produce humus that could be used as fertilizers, carbondioxide, water and heat. Pyrolysis is a technique of thermal decomposition of organic materials in the absence of oxygen and is seen as an alternative to incineration. Recycling of refuse is currently the most pursued method of waste disposal. (Uchegbu, 2002)

## Health Implications of Waste Collection and Disposal.

Where water supplies and provision for sanitation are inadequate for high proportions of the entire population, diarrhoeal diseases can remain one of the most serious health problems within city-wide averages. (UNCHS, 1996) Table 1 indicates the potential reductions in morbidity for different diseases, as a result of improvements in water and sanitation.

**Table 1.: Potential reduction in morbidity for different diseases, as a result of improvements in water and sanitation.**

Diseases	Projected Reduction in Morbidity (%)
Cholera, typhoid, leptospirosis, Scabies, guinea worm infection	80 ÷ 100
Trachoma, Conjunctivitis, yaws, schistosomiasis	60 ÷ 70
Tularaemia, Paratyphoid, bacillary dysentery, amoebic dysentery, gastro-enteritis, lice-borne diseases, diarrhoeal diseases, ascariasis, skin infections	40 ÷ 50

Source; UNCHS, 1996.

Table 1. shows that many health problems can be combated from proper waste collection and disposal practices.

## RESEARCH METHODOLOGY

Data were collected through structured questionnaires and observation. The questionnaires were administered in 207 households in Mile 1 Diobu, Bundu, and Marine – Base, 110 households in Mile 1, Diobu, 45 households in Bundu and 52 in Marine – Base. In each of the households, the data were obtained from either the head of the household or an adult in the household. The Data were analysed with tables and photographs. Data were also obtained from Rivers State Environmental Sanitation Authority (RSESA). The Data for Marine-base was obtained from an undergraduate project supervised by the main author in 2004.

## RESULTS AND DISCUSSION OF FINDINGS

This section is divided into four sub sections viz; methods of household waste collection and Disposal, methods of human waste Disposal, Water supply in the low-income settlements, and Health impact of Waste collection and Disposal.

### Methods of Household Waste Collection and Disposal.

Table 2. shows that 31% of the respondents in the low-income neighbourhoods dispose their refuse by private arrangement. It also shows that almost half of the respondents in these neighbourhoods dispose their waste anywhere that is into creeks, roads, and drains. See figures 1, 2 and 3. Only 19.80% dump refuse at collection points for the collection by Government contractors and subsequent disposal at final disposal sites which is open dumping. The study revealed that the ratio of households which dump refuse anywhere are more in the informal low-come settlements like Bundu and Marine base than informal low-income settlements like Diobu. This is as a result of minimal government involvement in refuse collection and lack of physical infrastructure such as roads in these neighbourhoods. Most of the respondents affirm that the method of refuse collection and disposal in the city and in their neighborhoods is poor.

**Table 2.:** Method of Household Refuse Disposal.

Methods	Bundu		Mile 1, Diobu		Marine Base		Row Total	
	No.	%	No.	%	No.	%	No	%
Collected by Govt. Agency			2	1.8	–	–	2	1.00
Private Arrangement	–	–	64	58.2	–	–	64	31.00
Buried	–	–	1	0.9	–	–	1	0.50
Dumped anywhere (Drains, creeks, road)	35	77.8	12	10.9	52	100	99	47.70
Burnt	–	–	–	–	–	–	–	–
Dumped at collection point	10	22.2	31	28.2	–	–	41	19.80
Others	–	–	–	–	–	–	–	–
Non Response	–	–	–	–	–	–	–	–
Column Total	45	100	110	100	52	100	207	100

Source: Wokekoro, 2005 and George, 2004

### Methods of Human Waste Disposal

The study revealed that slightly above a third of the respondents dispose off their excreta (feaces) & urine into creeks and this is predominant in Bundu and marine base watersides which are informal low-income settlements. (See table 3. and figure 3.). Human and household waste disposal into creeks are known sources of water pollution. The data also revealed a 50% disposal of human waste in water closet in the study area. This is prevalent in Mile 1, Diobu which is a formal low-income neighbourhood. The study shows that water supply is inadequate in mile 1, Diobu. The study also revealed that the provision of water

and Sanitation are inadequate. Bartlett, (2003) highlighted the implication of inadequate provision of water and sanitation to the health and development of children. According to Mafonmnwan (2000) pit latrine and open detached bathrooms do pollute the environment and can cause serious diseases such as cholera.

**Table 3.:** Methods of Human Waste Disposal.

Methods	Bundu		Mile1, Diobu		Marine Base		Row Total	
	No.	%	No.	%	No.	%	No	%
Water closet (WC)	–	–	105	95.5	–	–	105	50.7
Pit	4	8.9	4	3.6	–	–	8	3.81
Pail	13	28.9	–	–	–	–	13	6.31
Peir/bush / creek	17	37.8	–	–	49	94.2	66	31.91
No. Toilet	11	24.4	1	0.9	3	5.8	15	7.31
Non Response	–	–	–	–	–	–	–	–
Column Total	45	100.0	110	100.00	52	100.00	207	100.00

Source: Wokekoro, 2005 and George, 2004

### Sources of Water Supply

Table 4. shows that borehole is a major source of water supply in these neighborhoods with 67.6%. This is closely followed by pipe borne water with a percentage of 14.5. Another Source of water supply is well with 12.1%. The study further revealed an inadequacy of water supply in the neighbourhoods. Waterborne diseases such as intestinal worms, guinea worms (dracunculiasis) and filariasis, eye and skin diseases are associated with inadequate provision of water and sanitation (UNCHS, 1996)

**Table 4.:** Sources of Water Supply.

Sources	Bundu		Mile, Diobu		Marine Base		Row Total	
	No.	%	No.	%	No.	%	No	%
Pipe borne water	1	2.2	15	13.6	14	26.9	30	14.50
Well	12	26.7	4	3.6	9	17.3	25	12.10
Creek	6	13.3	–	–	–	–	6	2.90
Borehole	21	46.7	90	81.8	29	55.8	140	67.60
Non Response	5	11.1	1	1.0	-	-	6	2.90
Column Total	45	100.0	110	100.00	52	100.00	207	100.00

Source: Wokekoro, 2005 and George, 2004

## **Impact of Poor Disposal Of Refuse on Human Health**

The importance of health to man can never be over emphasized. No man can function beyond the state of his health. Whatever is capable of affecting the health of man adversely should be adequately addressed. One of such problems is improper refuse disposal. Man can never be disassociated from refuse generation. Refuse emanates from the activities of man. It therefore becomes necessary to educate man on proper disposal of these refuse. Improper disposal of refuse constitutes a threat to human health.

Poor disposal of refuse is a public health problem and thus impacts negatively on human health. Heaps of improperly disposed refuse enhances the breeding of rodents, vectors and emission of bad odours which are transmitters of various forms of diseases. Where refuse are not properly stored and disposed, insects, rodents and bad odours abound. A nuisance condition becomes the outcome. Components of refuse include empty tins, bottles, tyres, plastic containers and even drums. All these are capable of holding water thus serve as a very good breeding ground for mosquitoes. Where drains are turned into dumping grounds for refuse, it also becomes a very good breeding ground for mosquitoes. The outcome of this is human infestation with malarial parasites. Vectors include flies which are implicated in the transmission of feco-oral diseases, culex mosquitoes transmit microfilaria and aedes mosquitoes transmit dengue and yellow fever.

Rodents are capable of transmitting various forms of diseases such as plague, salmonella and leptospirosis (Lucas and Gilles, 2003). Rodents also attract snakes whose bite can even kill especially where immediate intervention with anti-snake venom is not easy to come by. The air also becomes polluted giving rise to diseases like tuberculosis and other forms of respiratory tract infections. Surface or underground water is capable of being contaminated through the washing of the refuse by storms and floodwater into these sources of water. Water becomes contaminated and unfit for human consumption. Unfortunately in a place like Port Harcourt due to insufficient water supply people will still consume this water and thereby become susceptible to one form of water borne disease or the other. Those that live in the water -side empty their human waste into the same water that they use for drinking and cooking. The end result of this ignorant act is water borne diseases. Typhoid fever has become like a household name in this city. Water borne diseases include cholera, dysentery, and typhoid fever and as well as guinea worm infestations (Williams, 1997).

The aesthetic aspect of poor refuse disposal cannot be missed out. The improperly disposed refuse might be further scattered and littered all over the area by animals and birds thereby producing an ugly sight. The odour from the decomposed stuff depending on the components of the refuse pollutes the air around the area making it unhealthy for inhalation. Inhaling this polluted air which is inevitable tantamounts to inhaling various forms of micro-organisms which cause different types of diseases. In this instance it is the poor that will be affected most. This so because in the developing countries, the poor live in the slums, polluted and congested areas. The poor, the undernourished, the very young, the very old and those with pre-existing respiratory tract diseases and other illnesses are more vulnerable to the health effect of air pollution (Mishra, 2003).



Heaps of improperly disposed refuse further narrows roads, increases traffic congestion, blocks the views of drivers and predisposes to road carnages. This further puts human lives at risk.

## CONCLUSION

The study examined the health implications of household and human waste disposal systems in low – income neighbourhoods in Port Harcourt. The study showed that human and household wastes are disposed on the roads, drains, and creeks, which create Odour and water pollution problems. The study also revealed inadequacy of water supply in these neighbourhoods.

Bartlett (2003) highlighted the implication of inadequate provision of water and sanitation to the health and development of children. As stated in the preceding section poor disposal of refuse is a public health problem and thus impacts negatively on human health.

To improve health and environmental sanitation, adequate planning is necessary for the regular collection and disposal of waste in the city. This cannot be done by the government alones but public-private partnership should be encouraged to achieve this goal.

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**Figure 1.:** Creek refuse dump. A source of water pollution



**Figure 2.:** Drain exposed and blocked with refuse.apart from odour problem, it is a health hazard



**Figure 3.:** Creek (pier) toilet system a source of water pollution