

## SOLID WASTE STORAGE, COLLECTION AND DISPOSAL PRACTICES IN PRIVATE HEALTH INSTITUTIONS IN IBADAN, NIGERIA

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### Abstract

Healthcare institutions are service-oriented establishments and they provide medical care comprising observational, diagnostic, research, therapeutic and rehabilitative services. This study investigated waste collection, storage and disposal practices in the selected private health institutions (PHIs) in Ibadan metropolis, Nigeria. Primary data were obtained through questionnaire administration and direct observation. A total of 100 questionnaire was administered to private health institutions in Ibadan metropolis of which 30 were not returned. Findings revealed that the prominent storage receptacle utilized by these health institutions was perforated covered refuse bin. This represented 29.3% in the selected health institutions. The next in importance was plastic drums without cover and handles (24.4%). The study also observed that, waste collection was done mainly by private waste collector which accounted for 75.7%. In most of the PHIs, waste were collected monthly (34.3%) and this waste littered the environment as waste collectors stay away for weeks without attending to the waste generated. The study identified twenty one waste disposal methods used by various health institutions in the study area. The study concluded that waste was disposed of by private waste collectors (77.1%). Thus, the study recommends that; a consistent public enlightenment and environmental sensitization for all the managers and waste management officers of the health institutions. To this end, storage containers should be of adequate size with side handles, tight-fitting covers, leak-proof, light in weight and easily cleanable. In conclusion, Enlightenment programme is recommended to educate the private health institution operators on the consequences of indiscriminate waste disposal.

**Keywords:** Health institutions, Solid waste collection, Storage, and Disposal.

### 1. INTRODUCTION

Urbanization and industrialization have swiftly elevated the pace of solid waste generation in many countries around the world. Solid waste is generated from different activity streams in any given society (Ojuolape and Afon 2016). These include; commercial, industrial, households and health institutions of varying sizes. Therefore, solid waste generated from various sources is a significant problem in most metropolitan areas in developed and developing nations (Zewdu and Birhan, 2014). Healthcare institutions (private and public) are service-oriented establishments that provide medical care comprising observational, diagnostic, research and therapeutic and rehabilitative services. The processes involved

in rendering these services often result in unwanted substances referred to as waste (Ojuolape and Afon 2015). Until recently, the management of waste generated in health institutions has received little attention despite their potential environmental hazards and public health risks. Although medical waste constitutes a small fraction of the municipal solid waste, the potential environmental and health hazards could be dangerous if not properly handled, the worst scenario being in developing countries (WHO, 1999). Waste storage in this study is defined as the keeping of waste in a receptacle or accumulation of waste within various health institutions. In this case, the waste is still the responsibility of the health institutions. Disposal of medical waste is a growing environmental concern in the developing world. The problem is growing with an ever-increasing number of hospitals, clinics, and diagnostic laboratories universally (Hassan et al., 2008). Past studies in Nigeria has shown that the problem of healthcare waste management stems from its improper methods of the disposal. Usually, the wastes generated by health care institutions poses danger when deposited in poor, uncontrolled illegal dumpsites and other methods of ineffective disposal (Ojemudia and Ojigi, 2006). This practice usually results in the contamination of ground water and the environment at large (Kawu and Shaibu, 2007). However, the waste produced by health institutions if not managed properly can pose an even greater threat than the original diseases themselves (Rao et al., 2004). This has led to the review of some attempts made in the past to manage waste from health institutions. In view of this, this study intends to explore on solid waste collection, storage and disposal practices in private health institutions in Ibadan metropolis. The study focused on materials used to store waste, frequency of disposal of the stored waste, collection methods and method of waste disposal.

## 2. METHODOLOGY

Primary data were obtained through questionnaire administration and direct observation. The questionnaire was designed to obtain information from the cleaners in private health institutions.

The sample frame for this study was all private health institutions in the five Local Government Areas (LGAs) of Ibadan metropolis. These LGAs were: Ibadan North, Ibadan North-East, Ibadan North-West, Ibadan South-East and Ibadan South-West. There were 443 private health institutions in the study area. Simple random sampling method was used to select 10% of the health institutions. Some of the questionnaire were not returned and these accounted for 30. Descriptive and inferential statistics was used to analyze data collected from the field. The raw data collected from the field were entered and compiled using excel spread sheet and SPSS (version 17).

### 3. RESEARCH FINDINGS

#### 3.1. Solid Waste Storage Receptacles Used by Health Institutions

The various storage receptacles for waste generated in the health institutions under study were as presented in Table 1. It was observed that, these storage receptacles were used for storing waste inside and outside the building premises. It was revealed that perforated covered refuse bin (Plate 1) was the mostly used in all the health institutions under study as it represented 29.3% of the storage receptacles used by the health institutions. This study posited that perforated covered waste bin was the most prominent waste receptacles been used by the private health institutions and its prominent use can be traced to the fact that it is cheap and readily available in the market. Second in importance among the receptacles was covered plastic drum without handle (Plate 2) and it represented 24.4% of all receptacles used in the health institutions. Bucket without cover (Plate 3) and covered metal drums without handle represented 10.4% respectively. It ranked as third mostly utilized storage receptacles. Uncovered metal drums without handle (Plate 4) accounted 14(8.54%). Other storage receptacle used for storing waste were metal drums with cover (10.4%), bucket with cover (7.31%), polythene bags (6.01%), uncovered waste bin (Plate 5) (3.66%), worn out jerry-can (3.05%) plastic drum without cover (0.61%), worn out metal bucket and paper carton and covered drum with cover were not used by these health institutions.

TABLE 1: SOLID WASTE STORAGE RECEPTACLES USED IN THE STUDY AREA

Storage receptacles	Frequency	Rank
Polythene bags	10(6.01)	7
Uncovered metal drum with without handle	14(8.54)	5
Uncover Plastic drum without handle	1(0.61)	10
Worn out metal bucket	1(0.61)	10
Worn out jerry-can	5(3.05)	9
Paper carton	1(0.61)	10
Sack	5(3.05)	9
Bucket without cover	17(10.4)	3
Covered metal drum without cover	17(10.4)	3
Covered Plastic drum without handle	40(24.4)	2
Bucket with cover	12(7.31)	6
Covered Perforated refuse bin	48(29.3)	1
Traditional basket	0	11
Uncovered perforated waste bin	6(3.66)	8
Covered drums with handle	0	0
Colour coded waste bags	0	0

\*Note: This number exceeded the total questionnaire administered because respondents indicated more than one purpose.



Plate 2: Covered plastic drum



Plate 3: Bucket without cover

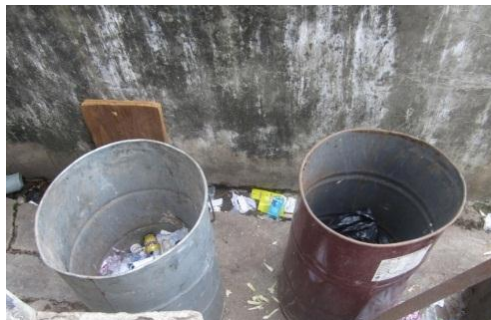


Plate 4: Uncovered metal drums without handle



Plate 5: Uncover perforated waste bin

### 3.2. Waste Collection for Disposal

Table 2 summarized how waste was collected for disposal in the health institutions in Ibadan metropolis. Private waste collector was the common means through which waste was collected. The use of private waste collector accounted for 77.1% of the entire collection system in all the health institutions in the study area. Similarly, waste collection through barrow pushers accounted for 4.29 % of waste collectors in all the health institutions. Waste collection by barrow pushers represented 5.7%. PHIs that adopted other means accounted for 18.6%. The study shows that most of the health institutions in the study relied on private waste collectors because they are readily available and it is convenient.

### 3.3. Period of Waste Collection

The period of waste collection is presented in Table 3 below. The most common period at which storage receptacles were emptied was monthly. Respondents also acknowledged that waste was being emptied fortnightly. This accounted for 21.4% in all the health institutions. The shortest period over which wastes were emptied was weekly basis. This accounted for 8.60% in all the health institutions. Investigation showed that, private health institutions that disposed waste daily practiced indiscriminate dumping especially by burning and dumping along river banks.

In most of the health institutions, waste were being collected monthly and this waste littered the environment as waste collectors stay away for weeks without attending to the waste generated (see Plate 6). Keeping waste for a period of one week will increase the grooming of flies, eye sore, rodents and of cause offensive odour.

TABLE 2 - WASTE COLLECTION FOR DISPOSAL MEANS IN THE STUDY AREA

Waste Collectors	Frequency (%)
Private waste collector	53(75.7)
Barrow pushers	4(5.71)
Other means	13(18.6)

Source: Author's Survey

TABLE 3 - PERIOD OF WASTE COLLECTION

Period of waste collection	Frequency (%)
Daily	10(14.3)
Fortnightly	15(21.4)
Weekly	6(8.6)
Monthly	24(34.3)
Others	15(21.4)

Source: Author's Survey

### 3.4. Waste Disposal Methods in the Health Institutions Surveyed

Investigation showed that there were no final disposal methods (incineration and landfilling among others) adopted by the various health institutions. However, there were other solid waste disposal methods and practices majorly employed by these health institutions.

This observation validates the work of Afon (2005); Odedokun (2006) and Faniran (2007), that there are other solid waste disposal methods and practices majorly employed in developing nation.

This method and practices include the use of designated and incidental open spaces, dumping of waste into drain during and after rainfall, on river banks, beside road as well as burning and burying. Others include the use of uncompleted building, vacant land, collection by Local Government refuse van, private waste managers and cart pushers.

TABLE 4 - METHODS OF WASTE DISPOSAL USED IN THE STUDY AREA, ARRANGED IN DESCENDING ORDER OF IMPORTANCE

Disposal methods	Frequency%	Rank
Private solid waste collector	54(77.1)	1
Local Government refuse can	8(11.4)	2
Barrow/cart pushers	5(7.14)	3
Designated disposal site	3(4.28)	5
Burning	4(5.71)	4
Nearby bush	4(5.71)	4
Vacant plots of land	3(4.28)	5
Municipal waste drums	2(2.86)	6
Along Stream / River banks	1(1.43)	7
Hospital waste collection van	0	8
Incineration	0	8
Dilapidated building	0	8
Road junction	0	8
Dump in drains during rainfall	0	8
Lunatic	0	8
On the road	0	8
Use of uncompleted building	0	8
Burying	0	8
Open space	0	8
Composting	0	8
Sanitary landfill	0	8

\*Note: This number exceeded the total questionnaire administered because respondents indicated more than one purpose

The study identified twenty one waste disposal methods used by various health institutions. As presented in Table 4; the private waste collector was the most important means through which waste stored was disposed. The second important means is through local government waste can (Plate 9), and it accounted

for 9.52%. Barrows pushers (17.14%) were also patronized by some of the private health institutions. The burning and dumping of waste in nearby bush accounted for 5.71%. Another method used was the dumping of waste on vacant plot of land.

This accounted for 3.57% in all the selected private health institutions. Furthermore, the use of municipal waste drums accounted for 2.38% of all the health institutions. The least important means of disposing waste is dumping along stream/river banks (Plate 7 and 8).

This represented 1.19% in all the selected private health institutions and was only utilized by hospital and maternity clinics. It accounted for 2.1% in hospitals and maternity. This indicates that few of the hospital disposes off their waste along stream/river and this is as a result of their nearness to streams.

These methods of dumping waste in streams and river banks, nearby bush, open spaces/vacant plot, use of barrow pushers, burning and use of municipal waste drums among others may constitute a nuisance, an aesthetically displeasing odour and also served as suitable and conducive for the culture of microorganisms which more often than not have proved to be hazardous, causing water pollution especially during the rainy season. It could also serve as breeding ground for rodents.



Plate 6: Typical Poor Solid Waste Storage Receptacle in one of the Surveyed Private Health Institutions: It is evident that the collection rate and period is poor.



Plate 7 and 8: Stream used as a means of waste disposal



Plate 9: Local government waste can.

#### 4. CONCLUSIONS

The most important storage receptacle utilized by the health institutions was the perforated covered refuse bin. This represented 29.3% of the storage receptacles used in the selected health institutions. The study observed that this waste bin was usually placed inside the private health institutions. The reason for its usage is because it is readily available in the market and cheap.

The study further established that 34.3% of storage receptacles placed in the health institutions were emptied once a month while 8.6% of them were emptied weekly. In most of the health institutions, waste was collected by private waste collectors (77.1%). The private operators visited the health institutions once in a month for collection. The waste littered the environment as waste collectors often for weeks leave the waste generated unattended to. Investigations showed that waste kept for a month increased the grooming of flies, rodents and caused bad odour before it was emptied. This popularly adopted practice of emptying waste receptacle is not environment-friendly because keeping waste for a period of one week would have a detrimental effect on the environment and human health. The study established that there was no provision for final disposal of waste in any of the health institutions premises. The study identified twenty one different waste disposal methods utilized by the health institutions. The most prominent method was the use of private waste collectors (77.1%). The use of local government waste cans ranked second in importance representing 11.4% while barrows pushers ranked third and accounted for 7.14%. The other methods of disposal included burning (5.71%), dumping in nearby bush (5.71%), dumping on vacant plot of land (44.28%) and dumping on river banks (1.43%). This method of dumping of waste in streams and river banks, government waste can, nearby bush, open spaces/vacant plot, use of barrow pushers and burning does not support environmental ethics.

#### 5. RECOMMENDATIONS

This study the identified problems from the survey and recommendations were made to ameliorate the problems. The identified problems are simultaneously discussed briefly below.



**Poor solid waste storage receptacles:** The storage receptacles used were not environment-friendly. Solid waste should be stored in such a manner that flies, mosquitoes and rats do not have access to it. To this end, storage containers should be of adequate size with side handles, tight-fitting covers, leak-proof, light in weight and easily cleanable. It is recommended that yellow plastic bags/containers should be used for storing waste components like sharps and pathological waste. While brown plastic bags/containers should be the storage for pharmaceutical waste. Similarly black plastic bags/ containers should be used to store food, paper, nylon and plastic waste. Labeling of waste receptacles has been recommended to indicate the type of waste, site of generation, name of generating facility. This will allow the waste to be traced from the point of generation to the disposal site. The appropriate waste receptacle (bags, bins) should be available in each medical and other waste-producing area (kitchen, toilet among others) in the health institutions. This will ensure the segregation of waste at the point of generation. Posters showing the type of waste that should be disposed of in each receptacle should be posted on walls for guidance.

**Poor solid waste collection system:** To evolve effective waste collection, it is recommended that solid waste collection by waste managers should be done every day in order to avoid accumulation of waste.

**Poor disposal method:** The improper disposal of waste through burning, dumping on vacant plot/open space and river banks create public health hazard, and it can be washed into drainage channel by run-off water. Enlightenment programme is recommended to educate the private health institution operators on the consequences of indiscriminate waste disposal. Owing to the importance of this study, further work is recommended to be carried out to assess the impacts of the current solid waste management practice by health institutions on the immediate environment.

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