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Appraisal of The Performance of Institution Based Health Workers On the Management of Health Care Waste in A Tertiary Facility, Southwest, Nigeria

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Abstract:

Healthcare Waste (HCW) constitutes a special category of waste because they contain potentially harmful materials. In Nigeria, a major issue confronting the management of healthcare waste is perhaps the fact that it is generally viewed mainly from an environmental and less from a public health perspective. The problem of how to manage HCW has become one of critical concerns in developing countries; hence, the main objective of the study was to assess healthcare waste management (HCWM) practices of health workers in Abeokuta, Ogun State. This study was descriptive cross sectional in design and also a non-participatory observation method was employed. A total of 253 health workers in a tertiary healthcare institutions, including doctors and nurses were recruited in the study. Structured questionnaire and non-participatory observation were used to collect data to determine their knowledge and current practice with regards to HCWM. An evaluation of the status of the waste management practice in the health facility was carried out using the following criteria: waste management responsibility like segregation, collection, storage, waste transport; and final disposal. Findings revealed half of the respondents had good HCWM practice, however, majority of them were found to be highly knowledgeable as regards HCWM. Waste segregation was not adequately practiced

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and incineration was also not available in all the selected healthcare facilities, hence, this study highlighted the pitfalls of HCW management in Abeokuta, Ogun State, Nigeria; a developing country where resources are limited. The study concluded by recommending that Management should supply colour coded bags for proper segregation of healthcare waste, provides incinerator for disposal of healthcare waste and formulate policy to control the healthcare management.

Keywords: Healthcare Waste, Management, Knowledge, Practices, Health Workers,

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Introduction

In Nigeria where most healthcare facilities are located in the heart of the cities and healthcare waste that are not correctly managed can cause dangerous infection and potential threat to the environment, health workers, patients and community Nigeria, one of developing countries, have health issues that are competing for limited resources, it is not remarkable that healthcare waste management receives less attention and precedence it merits (Stephen, & Elijah, 2011). Therefore, this poses a serious challenge since there are no Institutional provision for healthcare waste management, Clinical waste are disposed openly in the dumpsite along with municipal waste and this practice make the members of the community gain access to it, which may lead to outbreak of Infectious disease. Cheng, et al (2009) noted that as small as healthcare waste is in proportion to the total community waste, its management is considered important issue worldwide. World Health Organization (2014) estimated that each year there are about 8 to 16 million new cases of Hepatitis B virus (HBV), 2.3 to 4.7 million cases of Hepatitis C virus (HCV) and 80,000 to 160,000 cases of human immune deficiency virus (HIV) due to unsafe injections and mostly due to very poor waste management systems. Across the globe, the risk associated with Healthcare Waste (HCW) and its management has gained tremendous attention from health practitioners and non-practitioners. If healthcare facility knows the types and quantities of clinical waste generated, it will help them in planning, budgeting, adequate revenue for the management of hazardous waste (Bongayi, 2013). A study conducted by Olubukola (2009) in two General hospitals at Lagos reported that due to lack of quantification of healthcare waste, there was no waste reduction plan in the hospitals.

This lack of plan for healthcare waste management eventually leads to inadequate waste segregation at point of use, collection, storage and final disposal. This poor healthcare waste management practice creates health hazards. Identified gaps like lack of colour code bags for segregation of healthcare waste at point of use, lack of guidelines on segregation and disposal for health workers lead to poor healthcare waste management in hospitals, where they are improperly disposed there by contaminating the soil, air and water. Healthcare facilities are supposed to protect the health of people in their environment not to be a creator of potential health hazard for them. Furthermore, increase in patient turned-out has increased the generation of healthcare waste which continues to present an array of challenges and concerns especially as economic situation of the country deepen daily.

So many studies have been conducted on healthcare waste management but little or no work has been done concerning segregation of clinical waste which is a vital aspect in healthcare waste management (Coker, et al, 2009). Segregation of waste is crucial in healthcare waste management because it is the first step in clinical waste management. Segregation of healthcare waste helps in reduction of the quantity of waste that is hazardous. Once healthcare waste are segregated, collection will be easy, proper storage will be done and disposal of infectious waste carried out in the way that it will not pose any harm to health workers, patients and the environment (WHO, 2014). Proper management of healthcare waste depends on good organization, sufficient funding and active participation of trained personnel. It was observed that healthcare facilities were not spending resources on clinical waste management Healthcare facility must allocate resources for colour coded bags

and training of generator of healthcare waste for proper segregation and disposal for its sustainability. The intention of this study is to appraise the performance of health workers on waste management (segregation) at Federal Medical Centre, Abeokuta Nigeria. This study specifically:

1. determined the knowledge of healthcare waste management; and
2. examined the practices of healthcare waste management;

Methodology

This research was a descriptive cross-sectional design. A non-participatory observation method was also employed. The setting was a tertiary hospital, Federal Medical Centre which is the only referral hospital in Abeokuta and its surrounding. The study participants were health workers which included nurses, doctors, pharmacists, medical laboratory scientists, radiographers and waste handlers. The overall population of health workers was 923 from which a sample of 253 was randomly selected. They were health workers that either generate or handle healthcare waste. A semi structured self-administered questionnaire was used to obtain information from respondents while observational checklist was used to collect data on the practice of health care waste segregation.

The questionnaire was used to collect data from respondents about their knowledge and practice concerning healthcare waste segregation and final disposal of healthcare facility waste. The close-ended questionnaires were administered to different categories of health workers: doctor, nurses, and radiographers, laboratory scientist, pharmacists and waste handlers. These healthcare professionals are the generators of Healthcare waste (HCW); they spend most of their time with patients in healthcare facilities thus increasing their risk of exposure to infections and injuries that are in healthcare facility environment. The purpose of this research was explained to the health workers. Respondent participated voluntarily. The researcher used non participatory observation where Healthcare waste management was observed as this prevents the researcher from influencing the behavior of the subject. The researcher observed the process from beginning to its end. Types of Healthcare waste (HCW) generated in units, the places where clinical waste was stored, waste at collection point and dumpsite was observed. Pictures of final disposal site were also taken.

Data was analyzed and summarized using descriptive statistics, frequency and percentage, and inferential statistics of correlation. All analysis was conducted using Statistical Package for Social Sciences (SPSS version 27.0) Level of significance was set at $p<0.01$.

Results

Table 1: Demographic Characteristics of Participants *(n=253)*

ITEM	FREQUENCY	PERCENTAGE (%)
GENDER		
Male	100	39.5
Female	153	60.5
AGE (YEARS)		
21 – 30	56	22.0
31 – 40	106	42.0

41 – 50	65	25.7
51 – 60	16	6.3
60 and above	10	4.0
OCCUPATION		
Doctor	78	31.0
Nurse	124	48.9
Waste Handler	5	2.0
Pharmacist	14	5.6
Others	32	12.5
YEARS OF EXPERIENCE		
1 – 5	104	41.0
6 – 10	63	25.0
11 – 15	58	23.0
18 and above	28	11.0

Table 1 shows the demographic characteristic of the respondents. It was observed that majorities (60.5%) of respondents were females and others (39.5%) were males. Nearly half of the respondents (42.0%) were between the age range of 31-40 years, (25.7%), (22.0%) were within the age range 41 -50 and 21 – 30 years respectively, (6.3%) were within the age range 51 – 60 years while a few (4.0%) of the respondents were 60 years and above. The commonest occupation of the respondents was nursing (48.9%), (31.0%) were Medical doctors, (5.6%) were pharmacists, (2.0%) were waste handlers; while others were (12.5%). Most of the respondents (41.0%) had been in their jobs for less than 5 years, (25.0%) of them for 6 – 10 years, (23.0%) for 11 – 15 years while only (11.2) had been in their jobs for more than 16 years.

Table 2: Distribution of Types of Wastes Generated in Federal Medical Centre

Type of Waste	Frequency	Percentage
Sharps	128	50.6
Pathological waste	18	7.1
General Waste	92	36.4
Chemical Waste	11	4.3
Radioactive Waste	4	1.6

In Table 2, responses revealed that (50.6%) of health care waste generated were sharps, followed by General waste (36.4%) Pathological waste (7.1%), Chemical waste (4.3%), while Radioactive waste was (1.6%) only.

Table 3: Distribution of Participants Knowledge on Health Care Waste Management

Question	Frequency	Percentage
Knowledge of HCW management Process		
Correct	45	17.8
Wrong	208	82.2
Knowledge of Hazardous Waste		
Correct	236	93.3

Wrong	17	6-7
Knowledge of colour code HCW management		
Correct	205	81.0
Wrong	48	19.0
Knowledge of frequency of collection of HCW		
Correct	206	81.4
Wrong	47	18.6

Table 3 showed if respondents' knowledge of healthcare waste management was correct or wrong. Majority of respondents (82.2%) were wrong in answering the health care waste management process, while only (17.8 were correct, by mentioning waste generation, segregation, collection, storage, transportation, treatment and final disposal. In relation to the knowledge of hazardous waste almost all respondents (93.3%) were correct, mentioned sharps, all materials contaminated by body fluid, body fluids, body parts, chemicals, and radioactive wastes. and a few (6.7%) got it wrong.

As regards respondents' knowledge of the colour code for HCW segregation in Nigeria, majority (81.0%) were correct by mentioning black, red, yellow and brown and (19.0) were wrong. Finally the knowledge of how frequently HCW should be collected, most of the respondents (81.4%) were correct by mentioning every 24 hours, and (18.6%) were wrong.

Table 4: Respondents' Knowledge on Healthcare Waste Management Segregation *(n=253)*

Question	**Frequency**	**Percentage**
Knowledge of HCW Segregation		
Correct	45	17.8
Wrong	208	82.2
Knowledge of who should segregate HCW		
Correct	94	37.2
Wrong	159	62.8
Knowledge of colour bin for hazardous waste		
Correct	62	24.5
Wrong	191	75.5
Rating Institution on HCW segregation		
Excellent	5	2.0
Very Good	40	15.8
Good	136	53.8
Poor	72	28.4

Table 4.showed that most respondents (82.2%) lack the knowledge of HCW segregation while only (17.8%) of respondents defined segregation as separating wastes into sharps, hazardous and general and putting them into appropriate colour code bin at point of use. In contrast (62.8%) respondents wrongly identified who should segregate waste and about a third corrected answered that the generator of the waste should segregate at the point of use. Nearly three quarter of respondents could no correctly identify the colour codes

for hazardous waste, while the remaining one quarter (24.5%) correctly identified sharp box, red, yellow and brown bins for hazardous waste. In addition respondents rated the institution on waste segregation. The highest rating was good (53.8%), followed by poor (28.4%), very good (15.8%) and a few (2.0%) rated excellent.

Table 5: Observation of Health Care waste Management Practice at Federal Medical Centre

Segregate waste	Segregation process	Waste Equipment in use	Has Incinerator	Final Disposal
Partial Segregation	Separate sharps from other wastes	Waste Bin covered with black nylon bag	None	Open dumping by a private contractor
No segregation	Did not separate hazardous from general waste	Sharps Box		

Table 5 reveals the practices of segregation and disposal of healthcare waste in Federal Medical Centre. In some units there was partial segregation while other there was no segregation. There were waste bins of different colours sometimes covered with black nylon. The facility had sharp boxes. There was no incinerator and final disposal was at an open dump site by a contractor.

Figure 1: Pictures of Health Care Waste Management Equipment in Federal Medical Centre

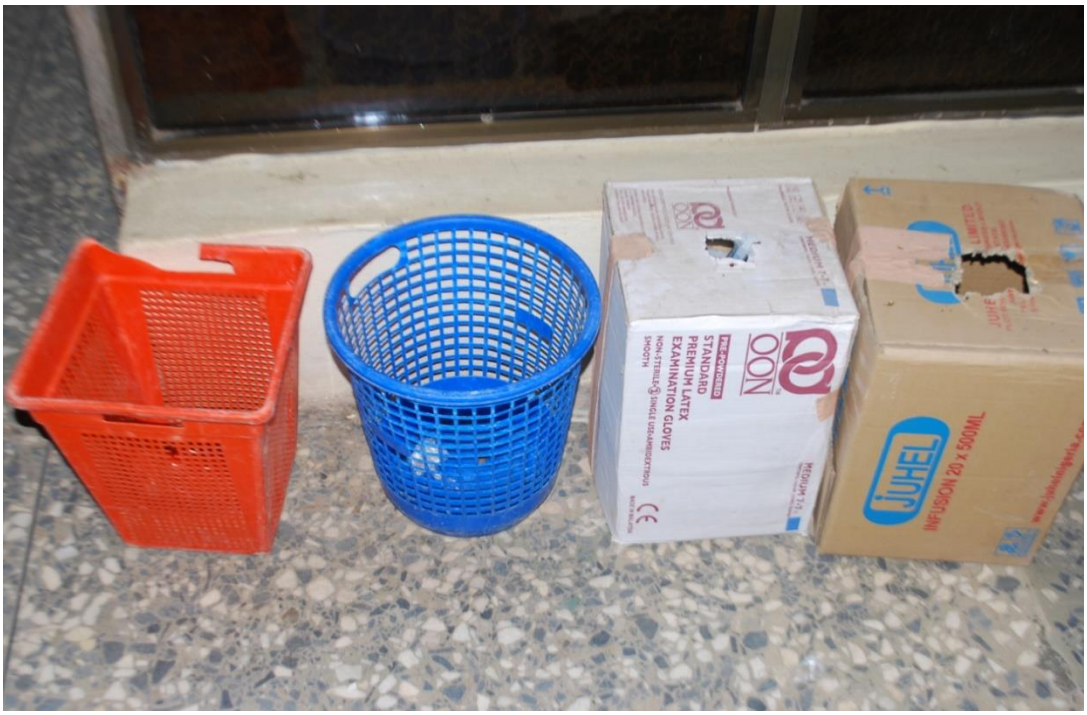

Figure 2: Equipment for Storage of Collected Health Care Waste at Federal Medical Centre

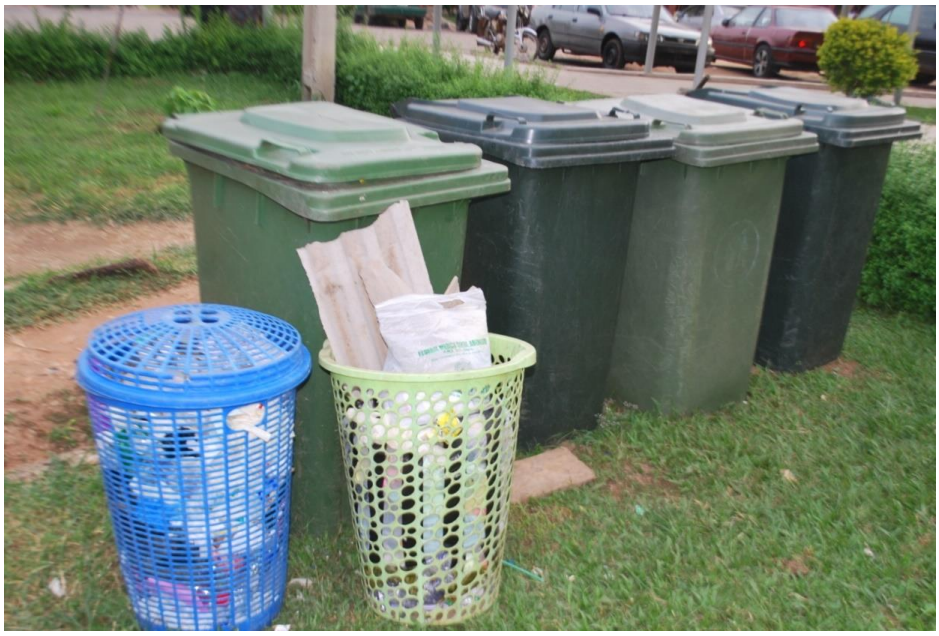

Figure 3: Open Dumping of Health Care Waste at Dumping Site and Scavengers

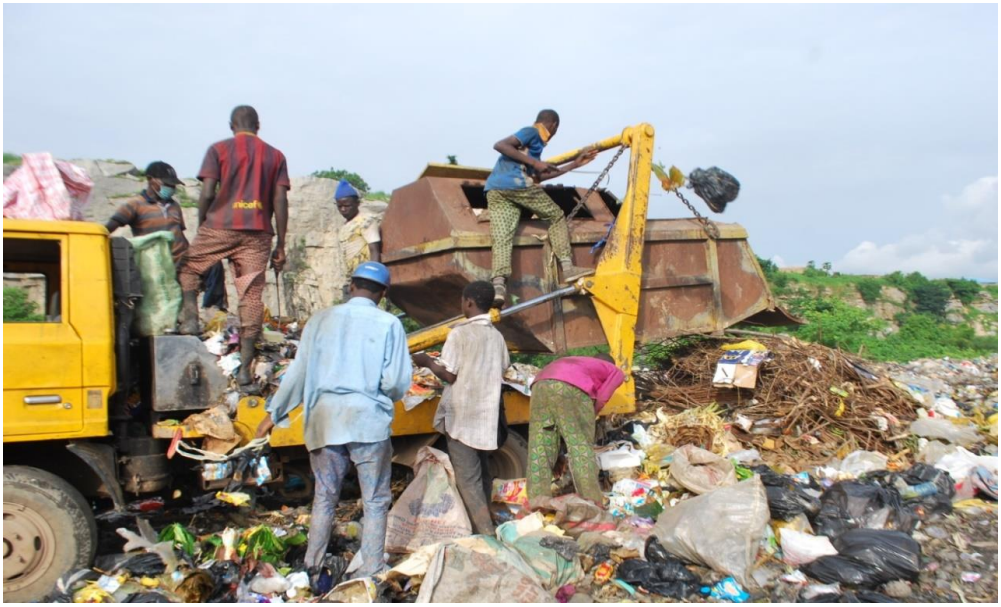

Figure 4: Health Care waste Littered at Dump Site

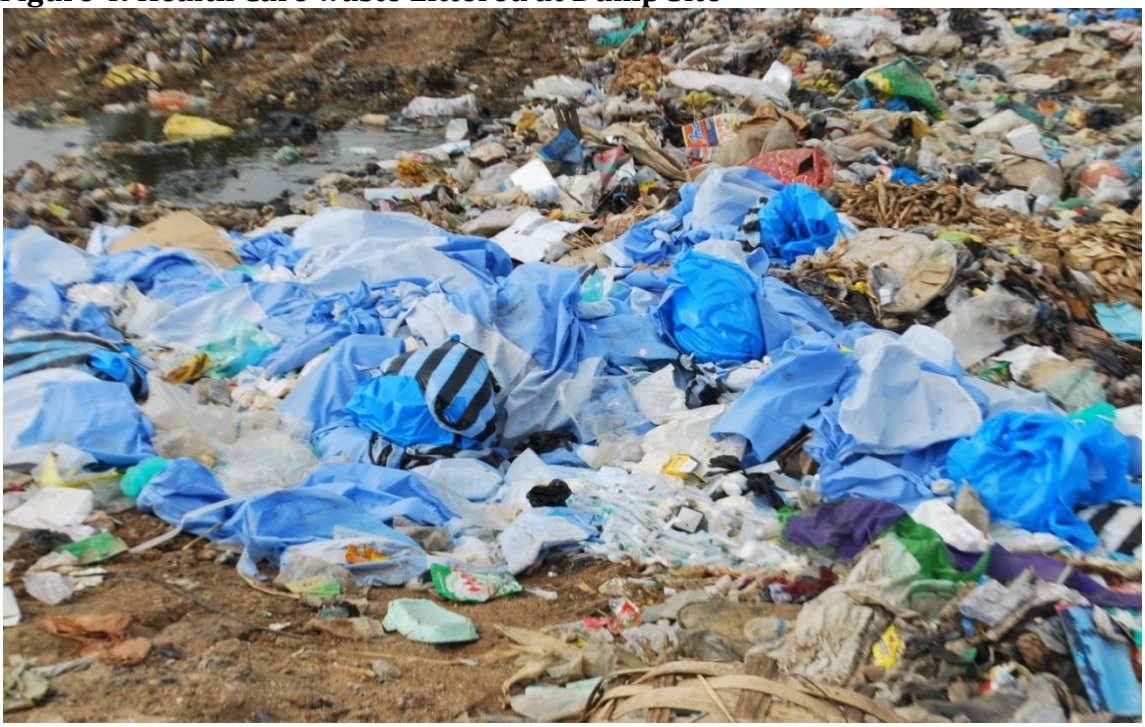

Table 5: Respondents' Recommended Solutions for improvement of HCWM at FMC

Item	Frequency	Percentage
HCW Policy	187	74.0
Adequate Equipment	37	14.6
Employ more staff	29	11.4

In table 5, Majority of respondents (74.0%) recommended putting HCW management policy in place, (14.6%) provision of adequate equipment and (11.4%) to employ more staff.

Discussion

Most of the respondents were females in the present study which disagrees with Azuike et al., (2015) who reported that below average of their respondents were females. Below average of the respondents had been in their jobs for less than 5 years while a few had been in their jobs for more than 16 years it is however in accordance with Azuike et al., (2015) who reported that 38.1% of the respondents have worked for the hospital for 2-4 years. In the present study, we have more nurses participated in the study than the medical doctors however it is not in consonance with Azuike et al., (2015) who reported that medical doctors responded more than the nurses in a similar study.

Knowledge on healthcare waste management

The present study presents that majority of the respondents had adequate knowledge of healthcare waste management which is similar to Azuike et al. (2015) findings who reported that the knowledge of the respondents on hazards of healthcare waste was high and it further agrees with the findings of a study done in India which reported that 91.7% of the health workers had high knowledge. Tejas et al. (2009) and also with the findings of another Saini et al. (2015) in India which reported a high knowledge (86%) among the health workers however on the contrary, a study done in Egypt reported a poor knowledge of the healthcare workers regarding healthcare waste management (Mostafa et al. 2009).The findings could be as result of a good number of them having received training on HCWM at an earlier time.

Practices on healthcare waste management

The type of HCW generated by selected healthcare facilities were mostly sharps, followed by general, pathological, chemical and radioactive wastes even based on observation, hazardous wastes were not properly collected, segregated and disposed and in fact open dumping was commonly used by all the examined facilities and it is similar to Anozie et al., (2017). With the exposure condition of the hazardous wastes, it is detrimental to the health of the workers and even the community at large. Moreover based on these findings, it is stated according to WHO, 2002 that improper disposal of hazardous HCW (like syringes and needles in the absence of sterilization) can cause infections of Hepatitis B, C and HIV and poses indirect risks to humans through direct environmental effects by contaminating soil. (Abah & Ohimain, 2011) even reported that this observation is consistent with several studies (Echegaray et al., 2002; Ndidi et al., 2009; Ogbonna, 2011). It could possibly lead to the contamination of ground-water as reported by (Ogbonna et al., 2007) that it is orchestrated by the fact that when untreated wastes are beaten by rain, they are washed into the drainages, rivers, streams and other waters thus endangering human and aquatic lives.

Also, none of the examined health facilities practiced incineration and this is contrary to studies which reported that even though incineration is recognized as a standard and effective means of biomedical waste disposal, it was practiced by only one facility (1.9%) in a study by (Njoroge et al., 2011). Furthermore, Segregation of HCWs was clearly understood by the respondents, however, the details of the segregation was variable among respondents. Hospital waste segregation is an important step in reducing the volume of hazardous waste as its offers the ability to make accurate assessment of composition using labelled bags. Results from the research revealed that a few of the hospital surveyed segregated only sharps. This is in congruence with the study conducted by (WHO, 2010).

It was further revealed that wastes were hardly segregated into marked or colour-coded containers for the different waste streams in the present study as physical visits to various category hospitals confirmed a heterogeneous mixture of wastes in the same waste bin kept at a considerable distance from waste generation source. Non-separation of hospital wastes endangers scavengers and waste handlers needle prick, infections, in addition to the exposure of wild animals such as birds, flies and rodents that facilitate the spreading of germs from infectious medical wastes to nearby environments. This is confirmed by the findings of the study in Lagos by Olatoye (2009) that HCW management practices is marred by poor

waste segregation practices as well as lack of instructive posters on waste segregation and disposal of general wastes. Segregation of wastes according to Ndidi et al. (2009) and Abah and Ohimain (2011) would result in a clean solid waste stream which could be easily, safely and cost effectively managed through recycling, composting and land filling.

Therefore good segregation practice will ensure a reduction in the quantity medical waste which is more expensive to manage. The absence of waste segregation according to Abah and Ohimain (2011) imply that the estimates of the various waste categories may not be precise; nonetheless it provides a useful guide for the assessment of the different waste streams generated by many of which are hazardous in nature requiring special handling to avoid health consequences.

Conclusion

Healthcare services are aimed at preventing potential human health risks and environmental hazards as well as improving wellbeing. In the process, however, wastes that are potentially harmful are generated and poor management of these healthcare wastes (HCW) exposes the health workers, patients, patient's visitor, waste handlers and the general public to health risks. The current management practices for healthcare wastes generated at the health facility studied is unsustainable and cannot be relied upon to protect human health and environmental integrity. There is no existing policy or plan and no systems in place for sustainable management of HCW. There is thus urgent need to take practical steps aimed at ensuring the 'duty of care' and safeguarding the environment for current and future generations.

Recommendations

Based on the findings of this study, following recommendations are proffered to the management of the hospitals and such others of the same performance level in order achieve a better healthcare waste management:

1. Improvements in healthcare waste management that will rely on the following key elements: building a comprehensive system, addressing responsibilities, resource allocation, handling and disposal. This is a long-term process, sustained by gradual improvements; raising awareness of the risks related to healthcare waste, and of safe and sound practices; selecting safe and environmentally-friendly management options, to protect people from hazards when collecting, handling, storing, transporting, treating or disposing of healthcare waste.
2. The management of the hospitals should increase attention and diligence to avoid the substantial disease burden associated with poor practice, including exposure to infectious agents and toxic substances and enhanced the use of incinerators that provide an interim solution especially since the options for waste disposal such as autoclave, shredder or microwave are limited.
3. Whatever the technology used, best practice must be promoted to ensure optimal operation of the system. To reduce exposure to toxic pollutants associated with the combustion process such as dioxins, furans, co-planar PCBs, nitrogen and sulphur.

4. Enhanced training and management, possibly promoted by certification and inspection programmes for operators, the availability of an operating and maintenance manual, management oversight, and maintenance programmes.

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