# EXAMINATION OF THE MEDICAL WASTE MANAGEMENT PRACTICES AMONG THE HEALTHCARE WORKERS IN SELECTED HOSPITALS IN AWKA.

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**Abstract:** *The management of healthcare waste has been identified as a major problem confronting developing countries. The aim of this study is to examine the Medical Waste Management practices among healthcare personnel in selected health-care facilities in Awka, Anambra State. The objectives pursued were, to examine the current practices of managing medical waste among the healthcare workers in selected hospitals in Awka, and to identify the challenges faced by healthcare workers to engage in best practices of medical waste management. Survey design and a purposeful sampling technique were employed for the study, with a sample size of 300 gotten from Taro Yamane's formula. Questionnaires, interviews and field observation were instrument for data collection. Descriptive statistics were carried out to determine relative frequencies and means of variables. The findings were that Waste management practices in selected hospitals are public concern as there was low compliance with standard healthcare waste management. The study recommends that creation of awareness on the policies and legislative instruments that guide the handling, treatment, and final disposal of healthcare waste is imperative and that adoption of the NESREA/WHO standard colour coding for waste segregation/separation, storage and disposal is necessary.*

*The study concluded that there was low compliance with standard Healthcare Waste management and there is need for cooperation between the government, top management of the health care facilities, other healthcare workers, patients and all other users of the health centre to ensure that health hazards and environmental problems as a result of poor medical waste management are reduced in size*

**Keywords:** Medical waste, Practices, Healthcare workers and Hospitals

**Introduction:** The World Health Organization (WHO, 2002) defines medical waste as waste generated by health care activities, ranging from used needles and syringes to soiled dressings, body parts, diagnostic samples, blood, chemicals, pharmaceuticals, medical devices and radioactive materials.

Medical wastes include all infectious waste, hazardous waste that are generated from all types of healthcare institutions, including hospitals, clinics, doctor (dental and veterinary) offices, and medical research laboratories. Medical waste is infectious and it acts as an agent in the infections' transmission of diseases if not properly managed (US-EPA, 1986).

It is also becoming the most urgent and challenging environmental issue because improper manag ement leads to poor environmental conditions that may endanger public health and environmental quality. There are serious shortcomings in the handling of medical waste, and improper waste dep osition is becoming a potential risk to public health as well as an environmental burden.

Waste generation has resulted from increased urbanization, rising living standards, and rapid social and economic development linked to population growth. However, in most areas, these factors hav e not been matched by an increase in the relevant urban authorities' capacity to address this environ mental issue (NEMC, 1999).

Inadequate handling of medical waste results in contamination of the surrounding environment, an offensive odor, development and proliferation of insects, rats, and worms, and can potentially sprea d diseases such as cholera, hepatitis, and typhoid through punctures from sharp objects tainted with human blood.The management of the medical waste is an emerging issue that is magnified by lack of training, awareness, and financial resources to support solutions. The proper collection and disposal of this waste is of great importance as it can directly and indirectly impact the health risks to

both public health and the environment (Baraka, 2006 and Abdulla, 2008). Medical waste management is the continuous process that involves generation, storage, collection, transportation and disposal of medical wastes, therefore urban authorities have the responsibilities of ensuring safe, reliable and cost effective removal and disposal of medical waste which takes up a large proportion of their resources.

Healthcare waste can be safely disposed of in four stages: segregation, collection, and storage; treat ment; transport; and safe disposal (WHO, 2008), all of which require adherence to national laws.

Lack of knowledge of managing the medical waste can have serious health cost and major effects on the surroundings (Mathur, 2011). Managing medical waste involve the use of PPEs such as heavy gloves to avoid the cuts, pricks and heat, suggested masks to manage dust, smoke and powdered chemicals. Low level of understanding among healthcare workers on the risks associated with burning medical waste in open air particularly plastic and packaging materials, burying of medical waste without including prior-treatment (Hossain, (2011), cause hazard not only to the workers operating in the health centre but also to the society around that part. Awka in Anambra State offers a wide range of healthcare services, including both public and private institutions. These hospitals are medical facilities that offer lifesaving medical treatments as well as those that pr eserve and restore health.Nevertheless, throughout the course of their operations, waste is produced, a greater percentage of which puts people at risk for illnesses, accidents, exposure to chemicals or r adiation, and occasionally even death (Abor, 2012). They cause serious illness or pose a potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed (US-EPA, 1986).

Tens of kilograms of waste are produced every day by hospitals, care homes, and medical facilitie s during various healthcare activities, such as medical operations, pathological diagnosis, neurotic

symptomatic, laboratory analysis, and others. This waste includes sharps and non-sharps objects, cotton swabs and pads, catheters, blood, diagnostic samples, human body parts, chemicals, pharma ceuticals, medical devices, and radioactive materials.

The government, medical personnel and the general public do not pay adequate consideration to the risks inherent in handling medical wastes.

In the selected hospitals in Awka, the procedures for safe medical waste handling were not adhered to effectively, there are deficiencies in designation and identification of infectious wastes, segregation, packaging and storage, as well as in transportation. The non-segmentation of waste generated in the selected hospitals was one of the factors responsible for poor management of this waste (Ngwuluka, 2009).

Recent past research on medical waste management found that medical waste management and dis posal remained an issue that has not yet been identified and managed satisfactorily despite that medical waste issues demand comprehensive management because they pose serious threat to society.

According to Longe and Williams (2006) on medical waste management in Lagos metropolis, Nigeria, the observed MWM practices in the selected hospitals indicate absence of full compliance with the protocol for handling medical waste as stipulated in the relevant sections of the guidelines and standards for environmental pollution control in Nigeria.

A study by Hayleeyesus and Cherinete (2014) on assessment of health care waste generation rate and its management at Adama city health care facilities in Ethiopia revealed that most (75%) HCPs have knowledge of different categories of health care wastes, but only 37% knew color-coding system used for waste containers and 28% of HCPs knew the existence of HCWM guidelines. In addition, only 31% of HCPs had received training on safe HCWM practices. There was no

segregation of healthcare waste by type at the point of generation. The use of a color coding system for HCW containers was not practiced and there was no labelling practice for hazardous waste. Furthermore, there was a low level of awareness about safe healthcare waste management. Open pit burning and single chamber incinerators were the most utilized final treatment methods.

Abdul-Salam ((2009) study in Jenin District Hospitals on Assessment of Medical Waste Management in three (3) hospitals showed that there was no waste segregation of various types of healthcare wastes in all hospitals. All hospitals still use some of the unqualified staff for medical waste collection, and all of the hospitals do not have temporary storage areas. Additionally, it was found that healthcare waste was finally disposed in a centralized sanitary landfill that has been constructed for domestic solid waste disposal and is not specialized for healthcare waste disposal. Also there are no legislation and defined policy regarding this issue. The results also suggested that there is need for sustained cooperation among all key actors (government, hospitals and waste managers) in implementing a safe and reliable medical waste management strategy, not only in legislation and policy formation but also particularly in its monitoring and enforcement.

**Materials and Method:**

**The Study Area:** Awka is the administrative capital of the Anambra State. It is located absolutely between Latitude $6^0$ 06'N and $6^0$ 16'N, and Longitude $7^0$ 01'E and $7^0$ 10'E (Adeboboye, Ojiako, & Eze, 2012). Awka town according to Ezenwaji, Phil-EzeOtti, & Eduputa (2013), has an average elevation of 99m (AMSL). Meanwhile, Rivers that drain the area, Awka, are Haba, Obizi and Obibia Rivers in the South, Obizi Okpuna River in the North, Idemili River in the South and Mamu River in the East.

The study area lies within the tropical rainforest climate zone. The climate of Awka is a tropical wet and dry type according to Koppeen's classification system with a clear cycle of two seasons: rainy season and dry season.

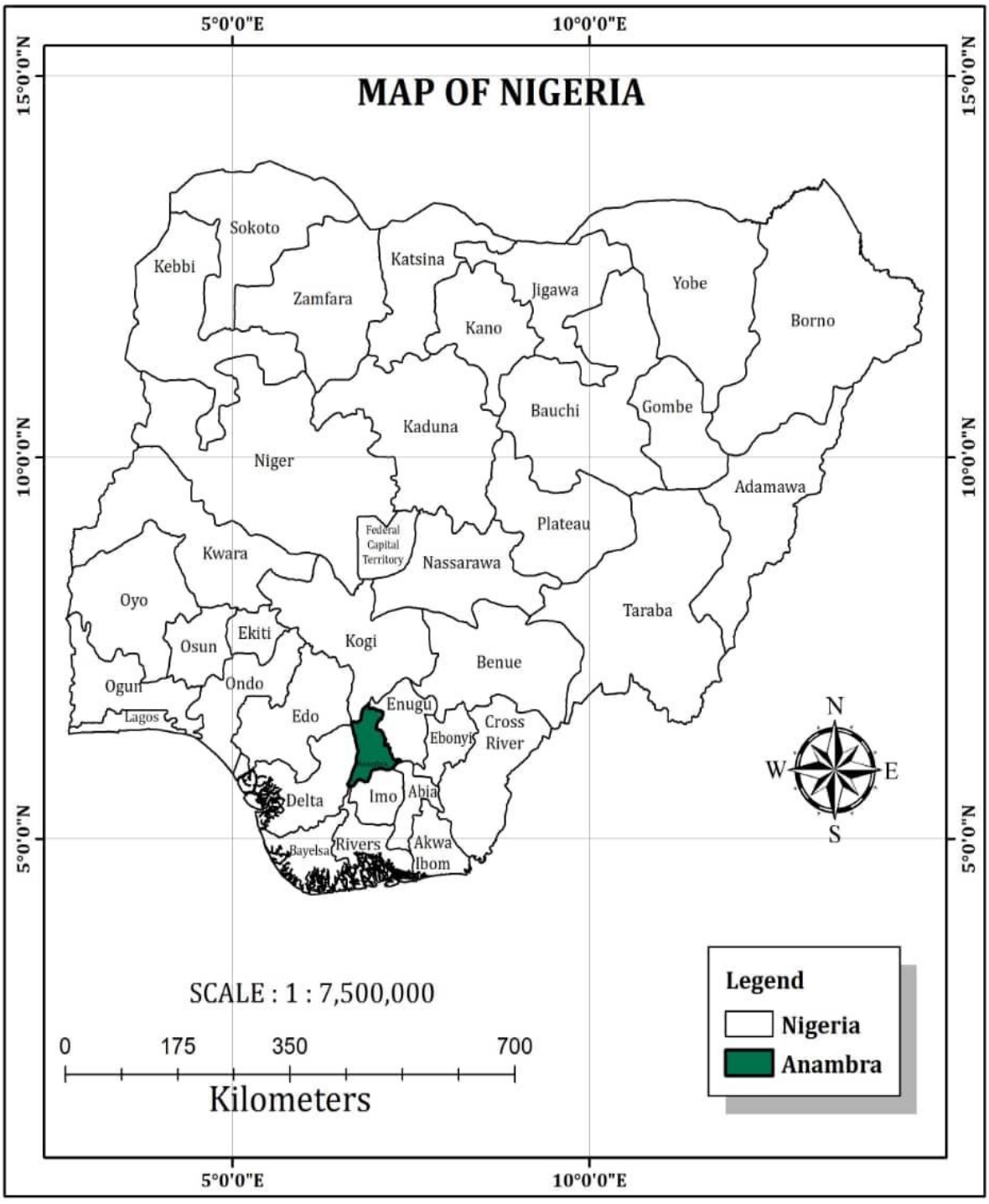

MAP OF NIGERIA
5°0'0"E
10°0'0"E
15°0'0"N
10°0'0"N
5°0'0"N
Sokoto
Kebbi
Zamfara
Katsina
Jigawa
Yobe
Borno
Kano
Bauchi
Gombe
Kaduna
Niger
Adamawa
Plateau
Federal Capital Territory
Nassarawa
Kwara
Taraba
Oyo
Ekiti
Osun
Kogi
Benue
Ogun
Ondo
Lagos
Edo
Enugu
Ebonyi
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E
S
SCALE : 1 : 7,500,000
0
175
350
700
Kilometers
Legend
Nigeria
Anambra

Fig. 1 Map of Nigeria Showing Anambra State.

**Source: Department of Surveying and Geo-Informatics, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria.**

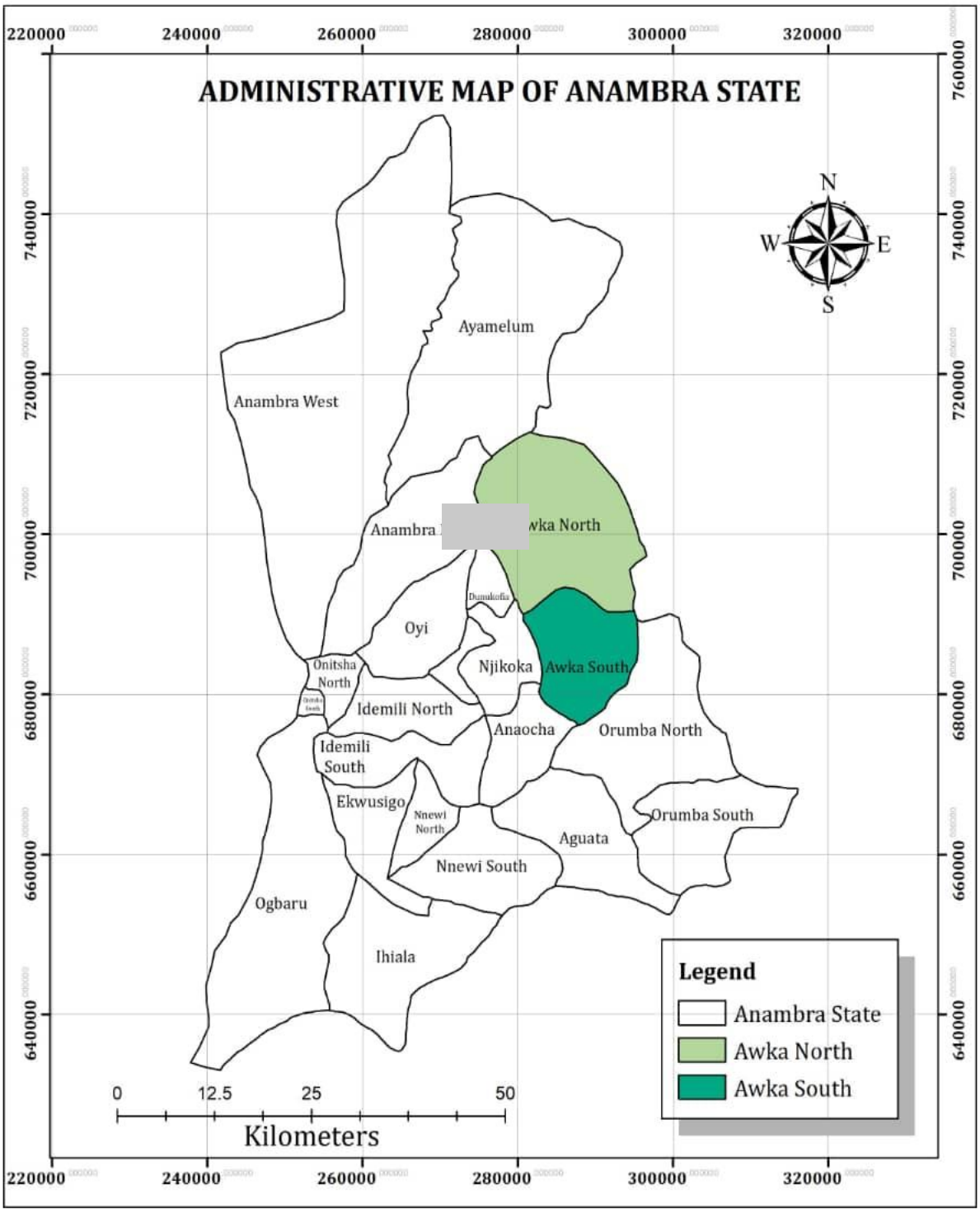



**Fig 2 Map of Anambra Showing Awka South**

**Source: Department of Surveying and Geo-Informatics, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria**

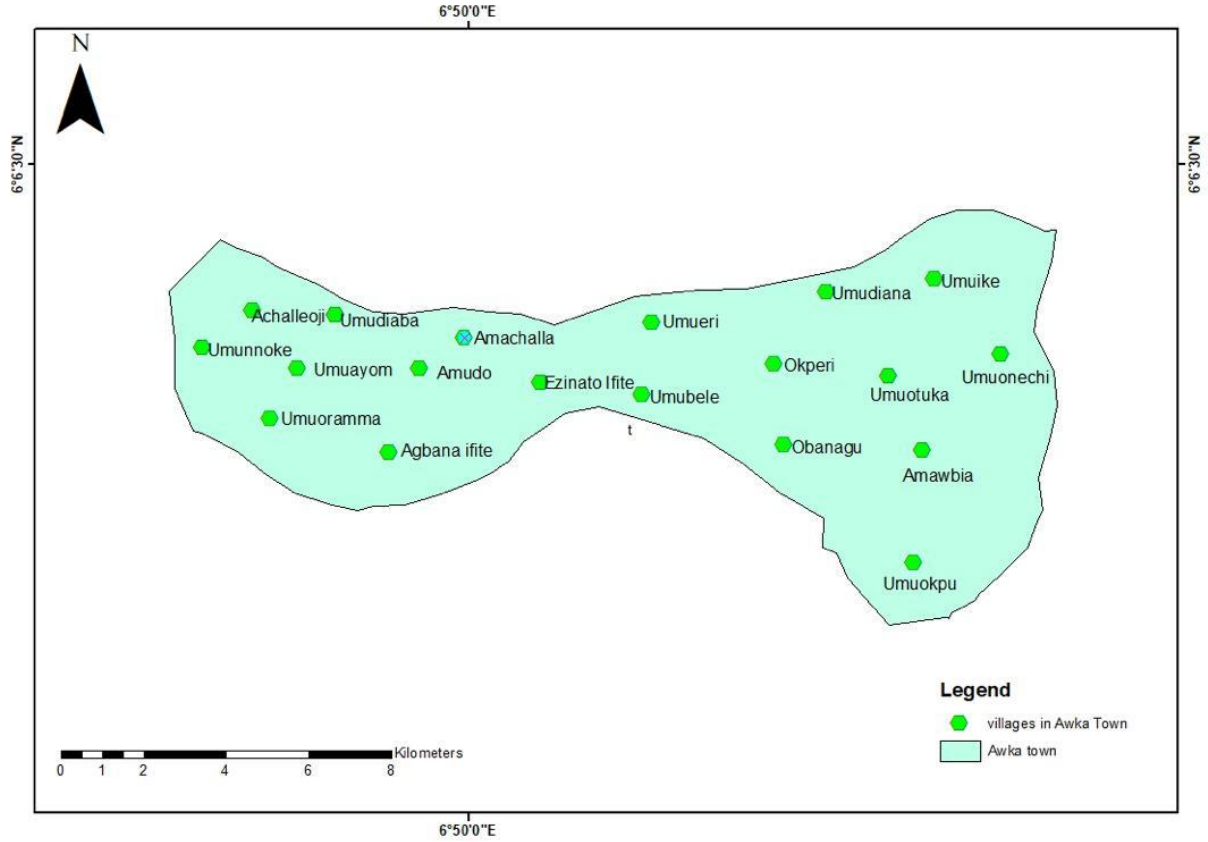



**Fig 3 Map of the Study Area**

**Source: Department of Surveying and Geo-Informatics, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria**

The study sampled the only state/public hospital and two other private hospitals in Awka. For the sake of confidentiality, the public hospital was referred to as Hospital A while the private hospitals were also referred to as Hospital B and Hospital C.

The researcher collected primary data through various methods, oral interviews from various respondents, personal observations from sites, questionnaire administration; focused group interviews and live pictures were taken on site. While Secondary data were sourced from materials obtained from publications in text books, journals, conference papers and workshops regarding the topic of discussion.

The research work adopted survey design in collecting data for the study. The survey method involves the use of questionnaire structured to reflect the bio-data of the respondents, the level of awareness and current practices of managing medical wastes among the healthcare workers.

300 copies of questionnaires were administered to healthcare staff comprising of 120 Nurses, 60 Doctors, 20 Laboratory technologist and 80 sanitary staff. The questionnaires were administered by the researcher and it consists of questions of waste handling, segregation, colour coding, waste treatment and disposal. Out of the three hundred (300) that were distributed, two hundred and eighty (280) questionnaires were retrieved while twenty (20) were not retrieved.

For the analysis, the researcher made use of the number of questionnaire returned (280).

**Method of Data Analysis**

Data gathered from the questionnaires were tabulated and grouped as listed in the questionnaires. The data in the table were interpreted while deductions and generation made.

Mean rating were used to deduce the respondent perception on current practices of medical waste management.

**Result and Discussion:**

**Table 1: Mean Ratings of Respondents on current practices of managing medical waste in selected hospitals in Awka? (n=280)**

| S/N | Item Statement | $\bar{X}$ | SD | Remark |
|---|---|---|---|---|
| 1. | Are there containers for biomedical waste generated in the hospital? | 3.24 | .82 | Agree |
| 2. | Is temporary storage large enough to handle waste generated in the facility? | 3.31 | .72 | Agree |
| 3. | Is there routine schedule for the collection of biomedical waste in the facility? | 3.20 | .79 | Agree |
| 4. | Special equipment for sharp waste handling are provided in the facility. | 2.28 | .66 | Disagree |
| 5. | Most wastes generated in the facility are managed through burning. | 2.11 | .73 | Disagree |
| 6. | Sorting of wastes are carried out effectively throughout the chain (from waste production to storage) | 2.19 | .78 | Disagree |
| 7. | Each type of waste generated daily in the hospitals is clearly identified by a colour code and symbol as indicated by NESREA/WHO. | 2.19 | .89 | Disagree |
| 8. | Personal hygiene facilities available at the hospital. | 2.94 | .63 | Agree |
| 9. | Waste handlers always wear Personal Protective Equipment during waste management. | 2.29 | .82 | Disagree |
| 10. | There is a waste treatment facility at the hospital. | 2.27 | .86 | Disagree |
| 11. | Incinerators are provided at the hospital. | 2.20 | .90 | Disagree |
| 12. | There is a staff that is responsible for waste management. | 3.10 | .76 | Agree |
| 13. | There is a waste management plan in the facility. | 3.40 | .63 | Agree |

| | | | |
|---|---|---|---|
| 14. There is a landfill where wastes are dumped in the vicinity of the hospital. | 2.07 | .96 | Disagree |
| 15. Waste management training has been set up for the hospital staff | 2.57 | .91 | Agree |

As shown in the above Table 1, the respondents agree to 7 of the 15 items as the current practices of managing medical waste among healthcare workers in selected hospitals in Awka having mean rating between 2.50 and 3.49. They include: provision of containers for biomedical waste generated in the hospital, temporary storage large enough to handle waste generated in the facility, routine schedule for the collection of biomedical waste in the facility, availability of personal hygiene facilities, dedicated staff who is responsible for waste management and provision of waste management plan in the facility and waste management training being set up for hospital staff. The respondents however, disagreed with the remaining six items as part of the current practices of medical waste management having mean rating between 1.50 and 2.49. They include not having special equipment for sharp waste handling in the facility, each type of waste generated daily in the hospitals were not clearly identified by a colour code and symbol as indicated by NESREA/WHO, Waste handlers do not always wear Personal Protective Equipment during waste management, there were no waste treatment facility at the hospitals, Incinerators were not provided at the hospital and there were no landfill where waste were dumped in the vicinity of the hospital.

**Waste Separation/Segregation**

Medical waste separation/segregation is very important in minimizing the volume of hazardous waste by making it easy to assess the composition of generated waste.

The findings indicates that Hospitals A use color coding system for identifying and segregating infectious waste and non-infectious waste while they use safety box for sharps. Despite the existence of some level of segregation of waste at Hospital A, results of the study revealed that segregation principles were not so much adhered to by the collectors contracted for off-site waste disposal at the dumpsites. This poses health risk to the general public. None of the private hospitals surveyed practices waste segregation at source.

**Waste collection and storage**

All the three hospitals (both public and private) confirmed there were defined procedures for the collection and storing of waste from specified units. The study showed that both public and private hospitals have internal storage facilities for temporarily storing the waste before they were finally disposed off-site. Such internal storage area must be well sanitized and secured in such a way that it should be accessible only to only authorized persons (Pru¨ss et al., 2012). Nevertheless, the findings revealed that both public and private hospitals have well secured but poorly sanitized temporary storage area. The hospitals usually have daily collection and storage of waste within the facilities done by sanitary staff. In both public and private hospitals, waste collections from the waste production points within the hospitals were to a large extent regular, but collections from the internal storage area by external waste collectors were irregular.

**Transportation**

Transportation and disposal of medical waste must be tracked, inspected and monitored by appropriate regulatory bodies to assist in the evaluation of any potential harm to the environment and human health.

Transportation of healthcare waste was done both on-site and off-site. On-site transportation involves transporting the waste in the temporary storage area within the hospital. On-site transportation in the three hospitals surveyed was done by using covered bins with wheels. Off-site transportation of healthcare waste on public roads must be carried out by trained staff in a dedicated vehicle with closed containers (Johannessen et al., 2017). In Hospitals A, off-site transport of the hospital waste was undertaken by Anambra State Waste Management Authority (ASHAMA) in an uncovered trucks. Off-site transportation, for Hospital B and C was done by private waste contractors.

**Treatment and final disposal**

The common treatment and disposal methods used in the management of infectious medical waste in developing countries include autoclaves; microwave disinfection systems; chemical disinfections; incineration; and disposal on land (dump site, landfill, pits and sanitary landfill) (Diaz et al., 2015).

In Hospital A, amputations, placentas, still birth and other body parts are disposed off in a dedicated pit. While at Hospital B and Hospital C, placentas, still born and other body parts are taken by patient's relatives for burial.

In all the hospitals, non-infectious waste and infectious were disposed off at the final disposal site using the municipal landfill.

There were no incinerators in all the surveyed hospitals for medical waste management.

**Recommendation/Conclusions**

The study revealed that the waste management practice in selected hospitals are public concern as there was low compliance with standard healthcare waste management.

The study recommended that the creation of awareness on the policies and legislative instruments that guide the handling, treatment, and final disposal of healthcare wastes is imperative and that the adoption of NESREA/WHO standard colour coding for waste segregation/separation, storage and disposal is mandatory. More so, the disposal of medical waste must be tracked, inspected and monitored by appropriate regulatory bodies to assist in the evaluation of any potential harm to the environment and human health.

The study concluded that there was low compliance with standard Healthcare Waste management and there is need for cooperation between the government, top management of the health care facilities, other healthcare workers, patients and all other users of the health centre to ensure that health hazards and environmental problems as a result of poor medical waste management are reduced if not totally eradicated

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Plate 1 Temporary Storage Area at one of the hospitals



Plate 2 Colour coded bins at one of the hospitals




Plate 3 Waste disposal vehicle at one of the hospitals




Plate 4 Safety box for sharp storage