

A Comparative Analysis of Biomedical Waste Management in Yenagoa Metropolis, Yenagoa Local Government Area of Bayelsa State

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Abstract

Biomedical waste management involves the identification, segregation, packaging, treatment, disposal and other processes of hospital waste handling has been of growing interest in recent times; owing to their hazardous nature, the potential risk to humans and the environment especially in the hospitals settings, and the spread of dreaded diseases to humans and other living organisms. To that end, a comparatively analyse of biomedical wastes was carried out to ascertain the management practices in seven hospitals and three Primary health centres in Yenegoa Metropolis, Bayelsa State, Nigeria. The selected health facilities were categorised into Tertiary, Secondary and Primary health institutions and grouped into Public and Private owned facilities. The study adopted the purposive sampling technique in the selection of the healthcare facilities for the survey; this is a non-probability sampling method where the researcher chose a sample with the purpose to include a predetermined category of healthcare facility of interest. However, the number of healthcare workers considered as population for the study was collected from the administrative unit of the sample healthcare facilities and the population in each facility was purposively selected to make the sample size of the study as 297 as shown in table 2.1 bellow. Data collection involved the use of about 297 questionnaire, focus group discussions, secondary data, physical observations and photographs. The results indicate that all facilities apart from one (that treat and incinerate their wastes), are involved in disposing their generated waste into municipal dumpsites, and are involved in open burning without any form of treatment. Again, it is observed that there is no proper training and retraining of staff on biomedical waste management leading to environmental dis-aesthetic, spread of diseases around the health institutions leading to the unhealthy exposure of patients, health professionals and affecting the general well-being of the public. It is hereby recommended that there is need for the urgency for education and awareness of the harmful effects and danger of improper BWM and more importantly, the strategies for effective waste management should be prioritized.

Keywords: *Biomedical waste identification, segregation, packaging treatment, disposal s, health institutions, incinerator, segregation.*

Introduction

Living organisms mostly humans by their nature and activities produce a lot of wastes; and waste can be defined as unwanted materials after it has been used from its original state, or any substance which is discarded after its primary use. The Basel convention (2009), defines waste as any activity or process which exhibits any hazardous characteristic. For the purpose of trans-boundary movement of waste, Nigeria defines waste as any substance or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of the laws of Federal Republic of Nigeria. Also, Biomedical Waste can be defined as materials, chemical, substances, that have been used by health practitioners in the hospital, in the process of or after rendering medical service that are no longer useful. The World Health Organization defines biomedical waste as “Waste generated by healthcare activities ranging from discard needles, used syringe, remains of body part after surgery, diagnosis samples, blood bags, chemicals, pharmaceutical expired drugs etc. Again, Agbalabi, (2009) defines Biomedical Waste as a heterogeneous mixture that sometime contain a level of chlorine and heavy metals like cyto-toxic, radioactive diagnosis materials which are produces in the hospital. Biomedical waste account for between 75% and 90% of the waste produced by health-care providers considered as non-risky; the remaining 10–25% of health-care waste is regarded as hazardous and may create a variety of health risks.

WHO (2006), proposed that hospitals should provide either plastic bags or strong plastic containers for medical wastes and that they should make use of different colour liners namely, Black, Yellow and Red (three bin system) for general, infectious and highly infectious waste respectively. Bags and containers for highly infectious waste should be marked with Biohazard symbol but in most health facilities in Yenegoa metropolis proper colour coding is a serious problem.

WHO, (2006) and Abdullah *et al.*, (2013) stated that the use of a brown liner is also encouraged by WHO for pharmaceutical wastes (expired drugs) but this is rarely used. These have become open windows for the spread of diseases like HIV, Hepatitis Virus, Tuberculosis, cholera, diarrhoea, etc. as a results of (i) absence of waste management team, (ii) lack of awareness about their health hazards, (iii) insufficient financial and human resources for proper management (iv) poor control of waste disposal and adherence to environmental and waste management laws and policies, (v) lack of trained environmental management officers in most of the hospitals. These have led to improper waste collection, storage, transportation and disposal system in most facilities in Yenegoa metropolis, some patient’s relatives and staffs has been seen using waste collection poly bags for storage of materials at home.

Currently in Yenegoa metropolis, only Bayelsa State Medical University and the Niger Delta University Teaching Hospital (NDTH) have functional incinerators for proper and acceptable treatment of biomedical wastes.

The strategy for Biomedical Waste Management otherwise known as the integral strategy of biomedical waste management comprises of appropriate measures, identification, plans or activities from point of generation to point of disposals which includes Identification, handling/collection, segregation, packaging, storage, transportation, treatment and final disposal.

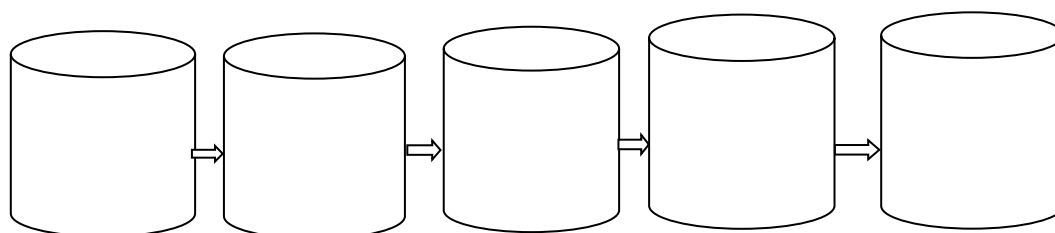


Fig. 1: Integral of biomedical waste management system
1(Identification) 2 (Separation & Packaging) 3 (Collection, temporary storage, treatment)
4(Transportation) 5 (Disposal)
Source; Author research 2024

The increase in health facilities in Yenagoa metropolis and the high patronage of medical services have resulted in higher quantities of biomedical wastes produced at any given time medical services are rendered; however, the management of these wastes has not been adequately carried out thereby breeding the ground for the spread of diseases around the hospitals environs. This may be so because wastes are seen dumped in open places along the streets not properly disposed. Also, waste collection and storage systems are not properly colour coded for proper information on the type of wastes been stored or contained in those waste collection systems. To this end, the need to comparatively analyse biomedical waste management in both public and private hospitals in Yenagoa metropolis cannot be over emphasised. It is therefore the objectives of this study to examining the various methods of biomedical waste management applied in the healthcare facilities, and to know the reasons why these biomedical wastes are not properly managed in the various facilities in compliance with W.H.O standard.

Study area description

A first hand familiarization tour was carried out to have a first-hand information of the study area, Description of the study area, Yenagoa Local Government Area (L.G.A is the Capital City of Bayelsa State, With a population size of about 532,294 (2006 population census). The Yenagoa metropolis mainly comprises of seventeen (19) Communities in Epie Kingdom and Twelve (12) Communities in Atissa Kingdom making a total of Forty One(41) Communities, which are all Epie speaking tribes within the Local Government Area. Okolobiri Community although a notable Ijaw speaking community was also considered as part of the study Area due to its significance in this study and as a Community in Yenagoa (L.G.A).

Location: Yenagoa metropolis, lies between latitudes $4^{\circ}55^1$ and $5^{\circ}05^1$ North, Longitude $6^{\circ}05^1$ East and $5^{\circ}20^1$ East of the Greenwich Meridian, located along River Nun four kilometre square bounded in the North by Mbiama in Rivers State, South by Ijaw speaking communities, East also Ijaw speaking Communities and West by Ogbia ethnic group. .

The study area has differences hospitals and health facilities, currently Yenagoa metropolis has about thirty (30) hospitals (Public and Private) and other health facilities.

Materials and Methods.

Materials used in the study includes letter of ethical approval obtained from the ethical committee of Niger Delta University Wilberforce Island through the Director, Institute of Biodiversity Climate and water shed, this ethical approval was taking to the selected health

facilities with a consent letter prior to the study. Also adopted was the use of structured questionnaire, focus group discussion and physical observation.

Sample size Determination Data Collection

In the selection of sample size of healthcare facilities to be sampled, the Purposive sampling technique which is a non-probability sampling method was used to choose the study sample with the purpose to include a predetermined category of healthcare facility of interest.

A comprehensive list of healthcare facilities the (sampling frame or universe) was obtained from the State Health Management Board, from which the sample size was purposively selected. The selection of the sample size was based on the patronage, specialization and efficiency in healthcare delivery system; using also, waste production and size as inclusion criteria. Furthermore, the number of healthcare workers considered as population for the study was provided by the administrative units of the selected healthcare facilities and a total of 297 employees constituted the population drawn from each facility. The distribution is as shown in table 2.1 below.

Results and Discussion

The results obtained from the respondents through the administration of questionnaire, personal interviews and field survey were analysed and are presented as follows:

Data on Biomedical Waste Awareness

This study aimed to comparatively analyse biomedical waste management (BWM) practices in public and private health facilities and provide needed information on policy decisions in on the subject matter in the study area. To that end, data on awareness is contained in Table 3.0. Results indicated that 67% of the respondents were aware of BWM and 33% are not aware of BMW. Expectedly, this 67% is more than the 56.8% reported in a similar study by Deress *et al.* (2018). It must be noted that the majority of the respondents were those with bachelor's degrees in both private and public health facilities. Awareness on BWM is very instrumental to the reduction of biohazards in our surroundings, especially when taking into consideration the fact that dental practices alone can generate a significant amount of potentially hazardous waste (Singh *et al.*, 2018).

Table 1: The number of sampled healthcare facilities and their population purposively selected.

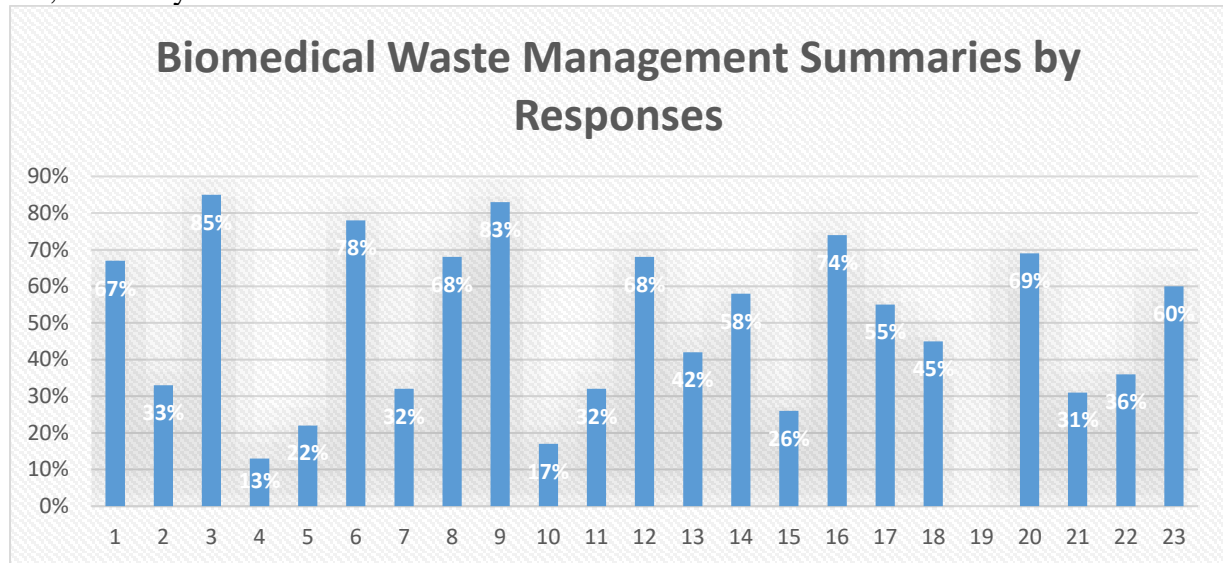
Healthcare Facility	Doctors	Nurses	CLEANER SS	Ward mates	Radiologist	pharmacist	Laboratory Tech	Total
1 Federal Medical Center Yenagoa (FMC)	17	20	10	13	7	7	7	81
2 Niger Delta Teaching	13	19	9	7	7	7	7	69

	Univer ty Teachin g Hospital								
3	Women Affairs Clinic	5	7	4	5	3	3	3	30
4	Dieta Koki memoria l Hospital	4	7	5	5	3	4	4	32
5	Asueifai Health Clinic	3	5	3	3	2	3	3	22
6	Glory land hospital	3	5	3	3	2	3	3	22
7	Yenagoa Hospital	5	5	3	3	2	2	3	23
8	Amarata Primary Healthca re Center	Nil	3	2	Nil	Nil	1	Nil	6
9	Ogu Primary Healthca re Center	Nil	3	2	Nil	Nil	1	Nil	6
10	Okaka primary healthcar e center	Nil	3	2	Nil	Nil	1	Nil	6
	Total	50	77	43	39	26	32	30	297

Table 2: Below is a table showing process of biomedical waste management summaries of respondents in terms of Yes and No, in Surveyed Healthcare Facilities

Bio-Waste Management Names of Surveyed Facilities												
S/NO	Yes\No		FMC	NDTH	DIETE	PH	ASUT	YEN	FSP	Glory land	Total % of no. of respondents	
Awareness	Yes		60	48	19	14	12	14	19	14	200	67%
	No		25	25	13	4	10	9	6	8	97	33 %
Daily clearance	Yes		81	69	26	10	16	14	17	10	257	85 %
	No		0	0	6	8	6	9	8	3	40	13 %
Adequate Segregation	Waste Yes		12	40	2	2	3	3	4	2	68	22 %
	No		69	30	32	19	21	19	21	20	221	78 %
Label and Color-coding	Yes		9	53	6	5	5	7	4	5	94	32 %
	No		72	16	27	13	17	16	19	18	203	68 %
Packaging Polythene	Yes		75	57	28	17	18	16	19	16	246	83 %
	No		11	11	5	5	3	6	2	8	51	17 %
Label and Color-coding	Yes		9	55	6	5	5	5	4	5	94	32 %
	No		72	6	30	12	19	16	19	17	203	68 %
Treatment	Yes		22	51	7	8	10	2	7	17	124	42 %
	No		59	10	24	24	12	21	18	5	173	58 %
Disposal Incineration	Yes		13	54	10	0	0	0	0	0	77	26 %
	No		68	7	24	32	22	23	22	22	220	74 %
Disposal Burning	Open Yes		54	24	19	26	4	6	15	14	162	55%
	No		27	45	11	6	18	16	3	19	135	45%
P.P.E Compliance	Yes		67	62	17	21	6	10	16	5	204	69%
	No		14	7	13	12	16	12	2	13	93	31%
Training	Yes		5	58	7	15	3	19	0	0	107	36%
	No		76	3	23	18	19	3	17	18	178	60%

Fig 2: Chart of biomedical waste management summaries of respondents in terms of Yes and No, in Surveyed Healthcare Facilities



Data on Biomedical Waste Management Applied In The Study Areas.

1. Adequate Waste segregation

A critical analysis of waste segregation at the point of generation shows that (51%) of respondents in Private health facilities disagreed that biomedical waste has been properly separated also (49%) of respondents in public health facilities disagreed that BMW has been segregated at the point of generation while (20%) of respondents agreed that BMW segregation was carried out at point of generation (see Table 3.0), Only (3%) of public health facilities’ workers agreed on BMW been segregated at source. It is worth noting that the (3%) of agreed public health facilities are from Niger Delta Teaching Hospital.

2. Data on Colour Coding

Adequate labelling and colour coding data are shown in Table 3.0. Results revealed that only (25%) of the respondents in public health facilities agreed of prepare use of labelling and colour coding of waste storage materials while (45%) disagreed, in the private health facilities, (7%) agreed and (65%) disagreed. Label and Colour-coding ensures that waste is segregated and ultimately destroyed appropriately according to its risk level (Amin *et al.*, 2013). Despite the significance of colour-coding, only 18.1% of the respondents indicated such practice was undertaken across the three categories of hospitals sampled in the study.

3. Data on Waste Packaging

Generally, a large majority (60%) of public and (40%) of private healthcare professionals are of the view that biomedical waste are mostly packaged with polythene bag depending on the colour made available to them by the management of various facilities. However, about 12% in public and (6%) private facilities disagreed respectively.

4. Data on Waste Storage

Information on proper storage of biomedical waste is illustrated in Table 3.0. It was observed that there was no proper waste storage system, especially in primary healthcare centres, private

and some public hospitals, as (40%) in public health facilities disagreed that biomedical waste has been properly stored, only (30%) agreed, in private (18, 1%) disagreed while only (5%) agreed. Therefore, on the basis of this result the study is in line with ----() as only (18.1) of health professionals agreed that biomedical waste has been properly stored.

5. Data On Biomedical waste treatment

Information on biomedical waste treatment and centralized temporary storage system is shown in Table 3.0, The study noted the absolute absence of temporal storage system in most of the surveyed facilities as (41%) of respondents in public health facilities did not attest to the fact that biomedical waste treatment and central storage places have been provided and complied with. Again, 17% in private health facilities also disagreed while (35%) in public agreed that treatment of biomedical waste is adequately carried out while 6% of public health facilities workers agreed to the presence of proper treatment of bio-waste and central storage. This result is in agreement with, Christian Soledad et al (2021), ‘‘the stage of identification, separation and packaging recorded the highest percentage of compliance, while the temporary storage showed a lower percentage (13%). In a study carried out in Nanjing Hospitals of China and District Hospitals in Malaysia, Yong *et al.*, (2009) reported that most hospitals in Malaysia practice centralized treatment place of biomedical waste, this is not the same in this study, as only Niger Delta Teaching Hospital (NDTH) practice centralized system and treatment biomedical wastes.

6. Data on Biomedical waste disposal system,

Biomedical waste disposal system includes, open landfill, open dumpsite, burning system, autoclave and incinerator etc. Incinerator is a high-temperature dry oxidation process that reduces organic and combustible waste to inorganic, incombustible matter and safe management of wastes from health-care activities results in a very significant reduction of waste volume and weight. This process is usually selected to treat wastes that cannot be recycled, reused, or disposed of in landfills. The results from respondents show that most of the surveyed facilities both public, private and Primary Health centres have no incinerators, only 69 (23%) in one of the study areas has incinerator and make use of it. about 46% of respondents in public and 31% in private health facilities reported that the most adopted biomedical waste disposal system is open dump and open burning systems. This was corroborated in the in a study in Mexico by Christian Soledad *et al.*, (2021), who point out that primary health care centres reported the absence of incinerator. Similarly, the finding in this study 100% of respondents in Primary healthcare facilities agreed to absence of incinerators, just as 73% of the surveyed health facilities have no functional incinerator.

Other studies reviewed revealed that the identification, separation and packaging stage are some of the most critical stages of the process and that they are carried out unsatisfactorily especially in the study carried out by Olufunsho Awodele *et al.*, (2016) in Lagos State. Furthermore, from the findings of this study it suffices to conclude that there is an observable improvement in the management of Medical waste in Lagos State,

Dereje Mesfin *et al.*,(2020) stated that only 15% of the respondents indicated that they segregate waste at the point of generation. However, 47%, 33%, and 5% indicated that they sometimes segregate waste, rarely. Emilia Asuoquo Udofia *et al.*, (2015) have reported that 18% segregation and other biomedical waste management practice was recorded in their case,

Also, Zekieni Y Yelebe *et al.*, (2016) in a study of biomedical waste treatment in Bayelsa State noted that management of biomedical waste is a serious environmental problem in developing countries like Nigeria.

Summary, Conclusion and Recommendations

The study has revealed useful information for BWM in Yenegoa metropolis. For instance, the findings show that there is a relative level of awareness of biomedical waste among healthcare professionals. Furthermore, there were significantly more HCW disposal materials available in public than private hospitals. Also, only a few numbers of the respondents were open to training in BWM. Those been trained are of Niger Delta Teaching Hospital and a few in Federal Medical Centre Yenegoa .

Therefore this study also agreed with the previous studies about the unsatisfactory and no significant difference between the public and private sector, but this is contrary to the study done by Shahid Mahmood *et al.*, (2011) in Lahore and reported that practices regarding waste segregation were quite good, in accordance with the standards, and were similar in both the hospitals surveyed. Again on practices regarding waste collection, it was reported it was better in public sector hospital (66 – 100%) as compare to private hospital (0 – 50%).

In the light of these and other results, several useful criteria for policy in this regard are recommended as follows:

First, the urgency for education and awareness of the harmful effects and danger of improper BWM and more importantly, the strategies for effective waste management should be prioritized.

The low interest in BWM training among healthcare workers particularly those with higher degrees has implications on the health of the healthcare personnel, the facilities, and the environment. This could be made possible through, organizing meetings, conferences, workshops, and training programs on the negative effects of improper biomedical waste management, and the need for strict enforcement of biomedical waste management standards in both public, private and other health facilities.

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APPENDIX I
LETTER OF ETHICAL APPROVAL



Directorate of Research, Advancement and Linkages
NIGER DELTA UNIVERSITY
Wilberforce Island, Bayelsa State.

INTERNAL MEMORANDUM

From: Director (Chairman, URC)

To: Mr. Albert MOSES
Institute of Biodiversity, Climate
Change & Watersheds.

Date: 24th October, 2023

RE: ETHICAL COMPLIANCE APPROVAL

With reference to your application for ethical approval to conduct a research project titled: *Comparative analysis of biomedical waste management in public and private hospitals in Yenagoa Metropolis*, on behalf of the University Research Committee, I convey the granting of ethical approval to enable you conduct the research project.

We urge you to stay within the scope of your espoused project title, and hope that the outcome would create the expected impact.

We wish you a successful research endeavour.

Prof. Stanley Ogoun
Director of Research, Advancement & Linkages

APPENDIX II
LETTER OF APPROVALS



RESEARCH AND ETHICS COMMITTEE

NIGER DELTA UNIVERSITY TEACHING HOSPITAL, OKOLOBIRI

CLEARANCE CERTIFICATE

Application form number: **NDUTH/REC/2023/ 20765**

Project Title: **BIOMEDICAL WASTE MANAGEMENT IN NDUTH OKOLOBIRI.**

Investigators: ALBERT MOSES (PI)

Department/Institution: **DEPARTMENT OF ENVIRONMENTAL HEALTH AND SAFETY MANAGEMENT**

NIGER DELTA UNIVERSITY

INSTITUTE OF BIODIVERSITY, CLIMATE CHANGE, WATER SHEEDS

Date considered: **8th OF JANUARY, 2024**

Decision of the committee: **APPROVED**

Chairman: Professor Olu Osinowo

Signature & Date

F. Osinowo
[Signature]
08/01/2024

DECLARATION BY INVESTIGATOR(S)

Protocol number: **NDUTH/REC/2023/20765**

To be completed in duplicate, and one copy returned to the Secretary, Research and Ethics Committee, Niger Delta University Teaching Hospital, Okolobiri, Bayelsa State. I/we fully understand the conditions under which I am/we are authorised to conduct the above-mentioned research and I/we guarantee that I/we will ensure compliance with these conditions. Should any departure be contemplated from the research procedure as approved, I/we undertake to resubmit the protocol to the Research and Ethics Committee.

Signature

[Signature]

Date

16/1/2024



RESEARCH ETHICS COMMITTEE
FEDERAL MEDICAL CENTRE, YENAGOA.
CLEARANCE CERTIFICATE

Application Form Number: **FMCY/REC/ECC/2024/JANUARY/669**

Project TITLE: COMPARATIVE ANALYSIS OF BIOMEDICAL WASTE MANAGEMENT IN PUBLIC AND PRIVATE HOSPITALS IN YENAGOA METROPOLIS.

Principal Investigator: **MR. ALBERT MOSES.**

Department/Institution: **BIODIVERSITY, CLIMATE CHANGE & WATERSHEDS, DEPARTMENT OF ENVIRONMENTAL HEALTH AND SAFETY MANAGEMENT, NIGER DELTA UNIVERSITY, WILBERFORCE ISLAND.**

Date Considered: **22ND JANUARY, 2024.**

Decision of the Committee: **Approved**

Chairman: **Dr. ORIJI PETER CHIBUZOR**

Signature & Date:  **22/01/2024**

Notes: This ethical clearance certificate is valid for only this research protocol.

DECLARATION BY INVESTIGATOR(S)

Protocol Number: 710

To be completed in duplicate and one copy returned to the Secretary. Research and Ethics Committee Federal Medical Centre, Yenagoa.

I/we fully understand the conditions as stated in the ethical aspect of this project design and I/we guarantee that, I/we will ensure compliance with these conditions. Should any departure be contemplated from the research procedure as approved, I/we undertake to resubmit the protocol to the Research and Ethics Committee.

Signature: 

Date: **24/1/2024**

APPENDIX III QUESTIONNAIRE

RESEARCH QUESTIONNAIRE

I am Albert Moses, carrying out a research on biomedical waste management in both public and private hospital in Yenagoa Metropolis, as requirement for completion Master's Degree (M.Sc) in Environmental Health and Safety Management with the Niger Delta University Wilberforce Island.

The information gathered will be confidentially and basically for academic and research purposes.

Thank for participation.

SECTION A: DEMORAPHC ANALYSIS

Fill or tick in the space or box where applicable:

1. Name of your hospital _____
2. Types: Public Private
3. Gender: Male Female
4. Age: 20-30 31-40 51-60
5. Occupational Health Officer: Nurse Laboratory Staff Pharmacy
Cleaner Waste Collector Community Health Officer
6. Years in Services (work Experience): 5 years – 10years 11 years-20 years 20 years & above
7. Education Qualification: Primary Secondary Tertiary

SECTION B: BIOMEDICAL WASTE GENERATION AND MANAGEMENT PROCESS

8. Are you aware of the word biomedical waste? Yes No
9. Is there any special training and retraining of staff in biomedical waste management?
Yes No
10. What is the frequency of waste collected in your facility? Daily Alternate days
Weekly Others (Specify):

11. Tick the most appropriate means of waste storage system in your facility Drums
Polythene bags Bucket Others (specify)
12. The above waste storage system in your wards, Department properly labelled colour coded? Yes No
13. Is waste segregation carried out at source before package and storage? Yes NO
14. If the answer above is No, state the reason
15. Is the biomedical waste generated in your facility treated before collection?
Yes No
16. In light of the above, if the answer is No, at what point treatment of waste is carried out.....
17. Is there central place of waste disposal site after waste has being collected in various clinics, wards, Departments in your facility? Yes NO
18. What is the means of transportation system of waste to disposal site? Truck Carts
Wheelbarrow Others (specify)
19. Is the transportation means chosen above properly covered to avoid spills? Yes No
20. What type of disposal facilities do you have at the final disposal site? Landfilled
Incinerator Open dumping Combusting Etc.
21. Do you or the waste collectors practice the principle of personal protective equipment (PPE) waring? Yes No
22. If the answer above is Yes, state the level of compliance: Poor Good Very good
23. Are you aware of any health hazard associated with biomedical waste? Yes No

24. Spread of HIV, Hepatitis and other disease can be attributed to improper biomedical waste management, Yes No
25. Is the staff, waste handlers or collectors vaccinated Yes No
26. Does the hospital have a healthcare waste management policy? Yes No
27. If the answer is Yes, kindly state the policy of biomedical waste management in your facility
- i.
 - ii.
 - iii.
28. In your own opinion, what solutions should be used or employed to manage biomedical waste effectively?
-
-
-

APPENDIX IV FOCUS GROUP DISCUSSION GUIDE

As noted, focus group discussion group is an information obtained from respondents that are not captured in the questionnaire. The following question were supplemented.

- What are the characteristic of biomedical waste generated in your facility?
- In involving yourself in biomedical waste handling, collection, storage, transportation and disposal, what are your experiences with the public?
- What are your expectations in terms of policy and legislations?
- How many injuries or accident that has occurred to you that are reported to the management of your facilities in course of caring out your biomedical waste assignment?
- Who is responsible in off-site transportation of waste, staffs of the hospital or contracted?
- Is there proper monitoring and follow up of these transported waste from point of generation to disposal point?
- Is documentation and recording of bio-waste generated done by the waste generators and the managers?
- Are funds properly allocated and manage in terms of acquiring biomedical waste equipment in your facilities?