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Case Study

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ON THE EVALUATION OF MEDICAL WASTE DISPOSAL PRACTICES IN LIBERIA: A CASE STUDY OF MONROVIA DISTRICT HEALTH FACILITIES (OCTOBER - DECEMBER 2010).

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ABSTRACT

This study investigates the evaluation of medical waste disposal practices focusing on segregation, colour coding, waste measurement and medical waste policy. A random selection of thirteen (13) out of two hundred and forty three (243) health facilities in various key localities areas in Monrovia District health care institutions were visited to solicit the views of people on the methods of medical waste disposal practices in Liberia. The population of this study consists of four hundred (446) people from the various health care institutions in Monrovia District. 134 persons were interviewed through the aid of questionnaires. It was found that there is a serious problem in the fight against the medical waste disposal practices by health care institutions in Liberia. Many are not aware of the effect of the improper medical waste disposal, the methods involved in the medical waste disposal and the consequences for improper medical waste disposal. Most of the health care institutions lack incinerators and as a result, burning is predominant in all of the research areas in Monrovia District.

KEYWORDS: Medical waste disposal practices, Monrovia District health care institutions, health facilities, improper medical waste disposal, incinerators.

INTRODUCTION

One of the more silent global health issues is in the area of medical waste management and is a serious challenge to the health care system in the neighbourhood of the 21 century as there will be a rapid increase of people in urban areas where growth has out placed the ability to

provide essential infrastructure (UN-Habitat 2010). Accordingly, in the next quarter century the population of the Developing World is projected to increase by 30% to almost 7 billion, with 90% living in the cities areas which today are experiencing increased levels of disease of poverty. The population Reference Bureau estimated that in 2007, for the first time in human history, the majority of the global population lived in the urbanized areas (PRB 2007).

There has been a growing concern in Liberia on how medical waste is being disposed of in various health facilities across the country in host communities and hospitals. These practices if not properly done; pose a serious health hazard to the environment and residents of the host communities. Indeed, it's extremely important to note that the provision of health care institution, by default, will eventually leads to the creation of waste, there by posing a major health threat to the health workers as well as the environment. Most medical wastes come from the diagnosis and treatment, and some from general household type of waste. Health care waste, according to the World Health Organization (W.H.O), also arise from the homes of patients, in residential and nursing homes, in clinics, in the premises of health centres, in hospitals and any place where people are care for. Due to the changes in the health care processes in Liberia, the volume of medical waste seems to be on the rise. Therefore, this research placed emphasis on the evaluation of the implementation of the Ministry of Health medical waste policy, by gathering information on the classification of waste, methods of medical waste disposal practices, segregation, measuring of the type of waste generated in the study areas. Also, the research targeted disposal sites, waste equipment and the personnel responsible for the handling of the medical waste in the health facilities as well as their knowledge and experience in the management of medical waste.

Liberia is a signatory to many international conventions, needless to mentioned the Basel Convention; the Stockholm Convention, and the World Health Organization(WHO), so therefore this research article is obliged to evaluate the extent at which medical waste disposal practices is be carried out in Liberia. In Liberia, the only document that exists on waste is the recently guidelines and policy on health care waste. On the general waste, neither the Ministry of Health (MoH) nor the Environmental Protection Agency (EPA) has issued any documents concerning the proper management of general waste. The healthcare waste policy documents highlights the proper management of healthcare waste practices, but its implementation remains questionable to the larger society, which has necessitated the importance of this research evaluation on medical waste disposal practices in Liberia. There

are some main health documents: the Public Health Law(1976); the main environmental document: the National Environmental Policy of the Republic of Liberia, the Acts creating the Environmental Protection Agency of the Republic of Liberia, these document did not provide any legal framework on the proper management of the medical waste disposal practices.

Several researchers across the globe have researched in to medical waste disposal management/practices in their country,[1 – 29] and we have[1 – 9] for Bibliography. Notable among the researchers are Srivastav Shalini, Mahajan Harsh and Mathur, B. P. in 2012, worked on evaluation of bio-medical waste management practices in a government medical college and hospital. In the year 2011, Abah, S. O. and Ohimain, E. I, researched into healthcare waste management in Nigeria: A case study. Abor P. A. in 2013 looked into managing healthcare waste in Ghana: a comparative study of public and private hospitals. Bendjoudi, Z. et al., (2009) considered healthcare waste management in Algeria, Ethiopia Country was not left behind, Debere, M. K et al., in 2013, looked into Assessment of the health care waste generation rates and its management system in hospitals of Addis Ababa, Ethiopia. Fadipe, O. O. et al., (2011) worked on characterization and analysis of medical solid waste in Osun State, Nigeria.

Most recently, Muluken, A. et al., (2013) and Ndiaye, M. et al., (2011) looked into healthcare waste management practices among healthcare workers in health care facilities of Gondar town, Northwest Ethiopia and biomedical waste management in five hospitals in Dakar, Senegal respectively.

Recently, Saad, S. A in 2013 and WHO in 2014 researched into comprehensive research, in management of hospitals solid waste in Khartoum State and Safe management of wastes from healthcare activities (2nd edn) Geneva, Switzerland respectively.

In all the aforementioned works, very little had been done on the subject with respect to Liberia, therefore, this research article is designed to investigate the disposal of medical waste practices in Liberia with case study in the highly, densely populated city of Liberia, Monrovia.

Study Area

Montsernado County is one of the fifteen (15) counties in the republic of Liberia. Montsernado is in the north-western portion of the West African nation of Liberia. It has four

(4) districts and Bensenville serves as the capital of Montserrado County. Its area is measured 1,909 square kilometres (737 sq mi), the smallest in the country. As of the 2008 Population Census, it had a population of 1,144,806, making it the most populous county in Liberia. The county is bordered by Bomi County to the west, Bong County to the north, and Margibi County to the east. The southern part of Montserrado lies on the Atlantic Coast.

Evidence had shown that Montserrado County is the oldest in Liberia since the foundation of the country in 1847. The topology/relief of the county is the lowlands on the coast grow palm trees, mangrove woods, and savanna grasslands with tropical forest covering the interior hills, cave and valleys, the land is mainly alluvial soils and primarily clay. Christianity is the main dominant religion of the county followed by Islamic religion. The climate is tropical with dry, which starts from December through April and wet seasons begins May to November. The Harmattan creates wild temperature fluctuations from December to the beginning of March. The county flag is made up of green, brown, blue, and red. Half is red and half is blue, split along a diagonal line running from the lower left hand corner to the upper right hand corner. The blue is at the top half which symbolizes that Montserrado was the first county and red is on the bottom side which indicates the bloodshed from wars between tribal members and the African-American settlers. At the canter, lies a circle with trees which celebrate agriculture and the soil, in addition to the above description we have a small Liberian flag in the upper left corner. (See Figure C).

Figure A: Map of Republic of Liberia

Figure B: Map of Montserrado in Republic of Liberia, the Case Study Area.

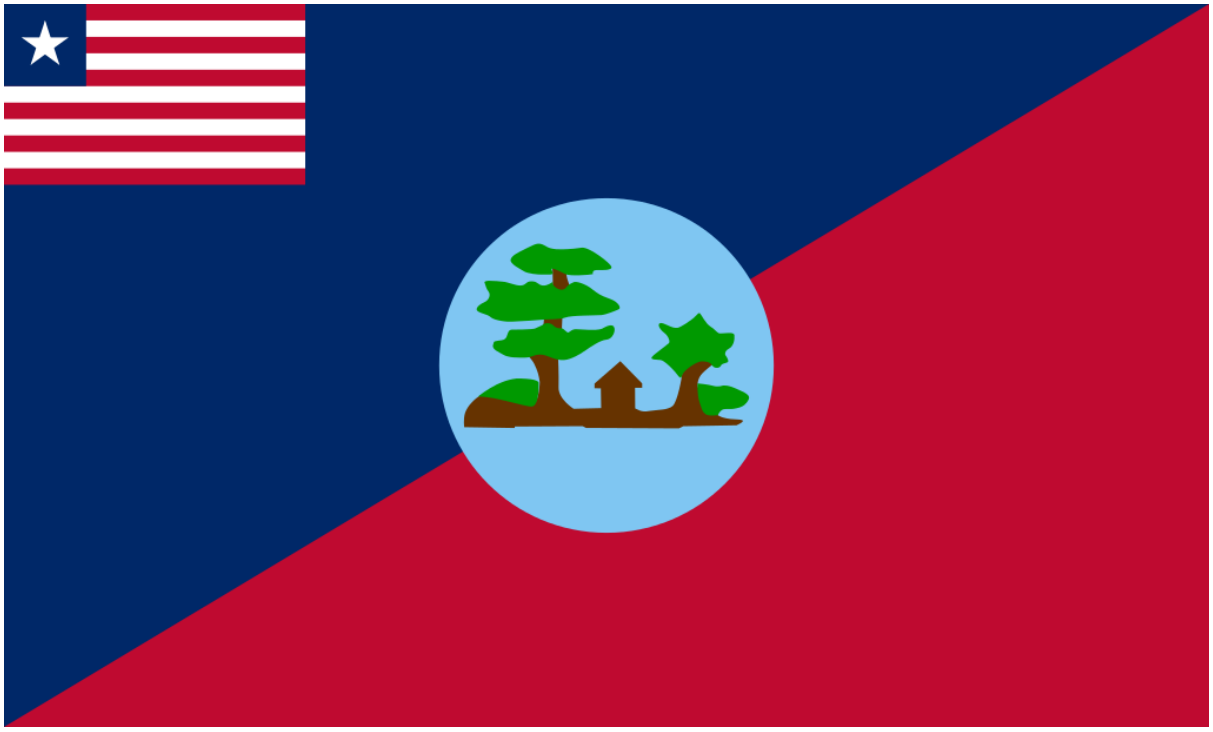

Figure C: Map of Montserrado, the Case Study Area.

Method Used

The population of this study consists of 446 people from the various health care institutions in Monrovia District with focus on: Doctors, nurses, housekeepers, sanitation workers, and

those handling medical wastes in the health facilities in the research area. There are 279 health facilities in Monrovia District out of which 13 were randomly selected in various localities of the district. The simple size of the research comprises of 134 people. The researchers use the random sampling technique to arrive at it simple size for the study. We made use of two important useful data collection instruments which are interview and questionnaires. The questionnaires were first pre-tested for reliability and validity on a group of hospital workers in the study population.

Data Analysis and Discussion of Results

Below is a question by question analysis of the result by individual opinion on the methods of medical waste disposal practices in Liberia a case study in Monrovia health District.

Table 1: Respondent Age Category

	Facility	Respondents age category(N=134)			Total	Percentage
		20-35	35-45	>45		
1	SOS Clinic	4	2	2	8	5.9
2	RHF Clinic	6	3	4	13	8.9
3	Benson Hospital	5	3	3	11	7.4
4	Clara Town Clinic	7	3	0	10	7.4
5	Fredai Clinic	4	6	3	13	9.7
6	Duport Road Clinic	6	3	2	11	8.2
7	Dr. Swaray Medicover Clinic	7	4	0	11	9.7
8	Slipway Clinic	4	2	3	9	8.2
9	Bankor Clinic	7	2	0	9	8.2
10	Redemption Hospital	6	9	4	19	14
11	Star of the Sea Health Center	3	0	2	5	3.7
12	Catholic Hospital	8	1	1	10	9.7
13	SDA Cooper Hospital	1	2	2	5	3.7
	Total	68	40	27	134	100%

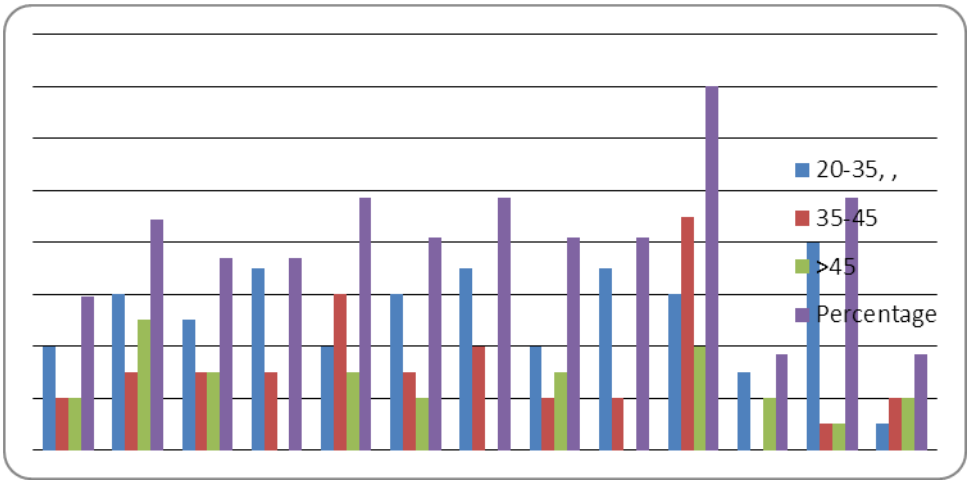

Figure 1: Respondent Age Category

Analysis: All categories of the ages and sex seem that men are the predominant in the health facilities.

Table 2: Distribution of respondent by Occupation (N=134)

No.	Facility	Distribution of respondent by Occupation(N=134)					Total	Percentage
		MD	RN	PA	NA	CM		
1	SOS Clinic	0	2	1	4	1	8	5.9
2	RHF Clinic	0	4	2	5	2	13	8.9
3	Benson Hospital	0	2	1	6	2	11	7.4
4	Clara Town Clinic	0	4	0	5	1	10	7.4
5	Fredai Clinic	0	3	1	7	2	13	9.7
6	Duport Road Clinic	0	0	2	6	3	11	8.2
7	Dr. Swaray Medicover Clinic	0	1	2	7	1	11	9.7
8	Slipway Clinic	0	1	0	6	2	9	8.2
9	Bankor Clinic	0	0	0	7	2	9	8.2
10	Redemption Hospital	0	2	5	7	5	19	14
11	Star of the Sea Health Center	0	0	1	3	1	5	3.7
12	Catholic Hospital	0	5	0	4	1	10	9.7
13	SDA Cooper Hospital	1	0	1	2	1	5	3.7
	Total	1	24	16	69	24	134	100%

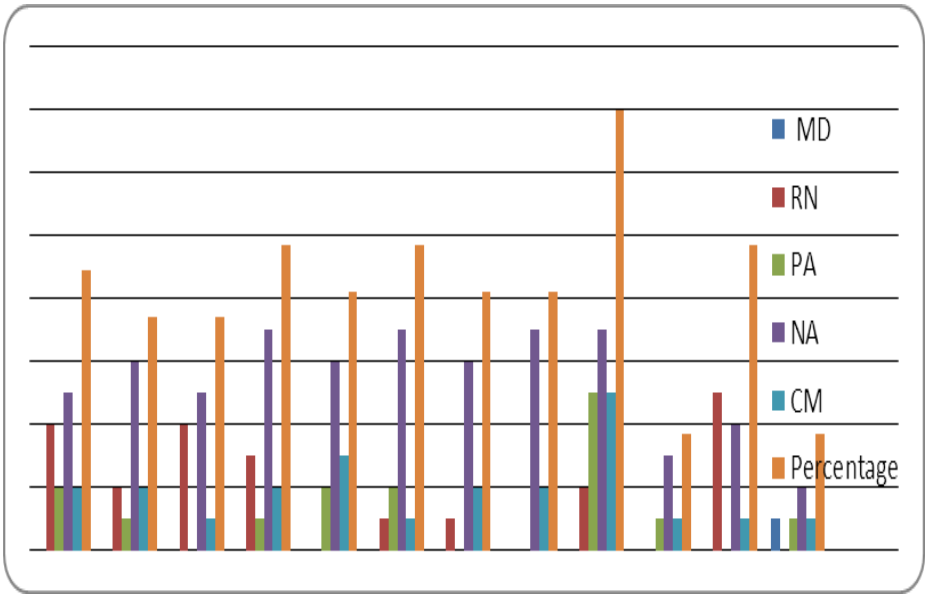

Figure 2: Distribution of respondent by Occupation (N=134).

Analysis: Respondents represented a wide variety's of occupations, with Nurse Aid being the most prevalent in the health Facilities.

Table: 3 Respondent by Gender Category (N=134)

No.	Facility	Male	Female	Total	Percentage
1	SOS Clinic	2	6	8	5.9
2	RHF Clinic	8	5	13	8.9
3	Benson Hospital	4	7	11	7.4
4	Clara Town Clinic	7	3	10	7.4
5	Fredai Clinic	6	7	13	9.7
6	Duport Road Clinic	5	6	11	8.2
7	Dr. Swaray Medicover Clinic	8	3	11	9.7
8	Slipway Clinic	2	7	9	8.2
9	Bankor Clinic	4	5	9	8.2
10	Redemption Hospital	9	10	19	14
11	Star of the Sea Health Center	4	1	5	3.7
12	Catholic Hospital	2	8	10	9.7
13	SDA Cooper Hospital	3	2	5	3.7
	Total	64	70	134	100%

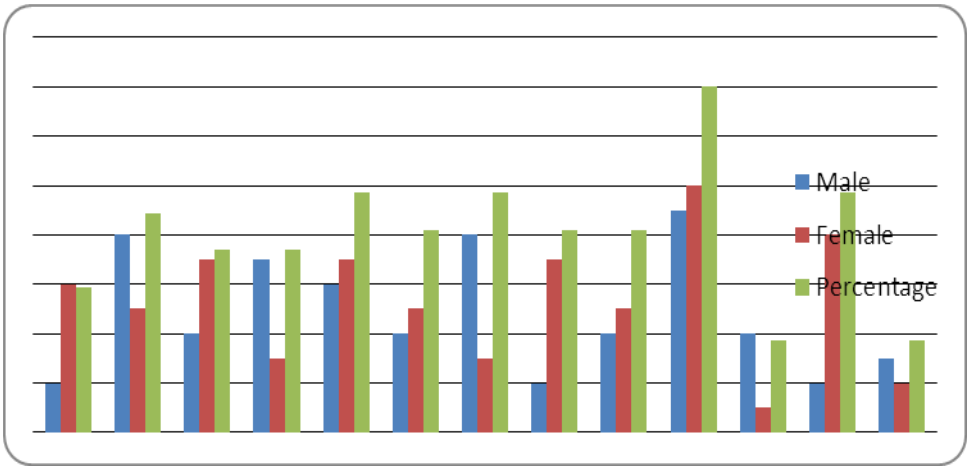

Figure 3: Respondent by Gender Category (N=134)

Analysis: All categories of the ages and sex seem that men are the predominant in the health facilities.

Table 4: Distribution of respondent by qualification (N=134)

No.	Facility	Distribution of respondent by qualification (N=134)				Total	percentage
		High Sch	College	Associate	Others		
1	SOS Clinic	3	2	1	2	8	5.9
2	RHF Clinic	6	2	0	5	13	8.9
3	Benson Hospital	6	2	0	3	11	7.4
4	Clara Town Clinic	4	2	0	4	10	7.4
5	Fredai Clinic	7	3	1	2	13	9.7
6	Duport Road Clinic	5	1	2	3	11	8.2

7	Dr. Swaray Medicover Clinic	8	0	1	2	11	9.7
8	Slipway Clinic	5	1	0	3	9	8.2
9	Bankor Clinic	5	0	0	4	9	8.2
10	Redemption Hospital	8	5	0	6	19	14
11	Star of the Sea Health Center	3	0	2	0	5	3.7
12	Catholic Hospital	8	2	0	0	10	9.7
13	SDA Cooper Hospital	3	1	1	0	5	3.7
	Total	71	21	8	34	134	100%

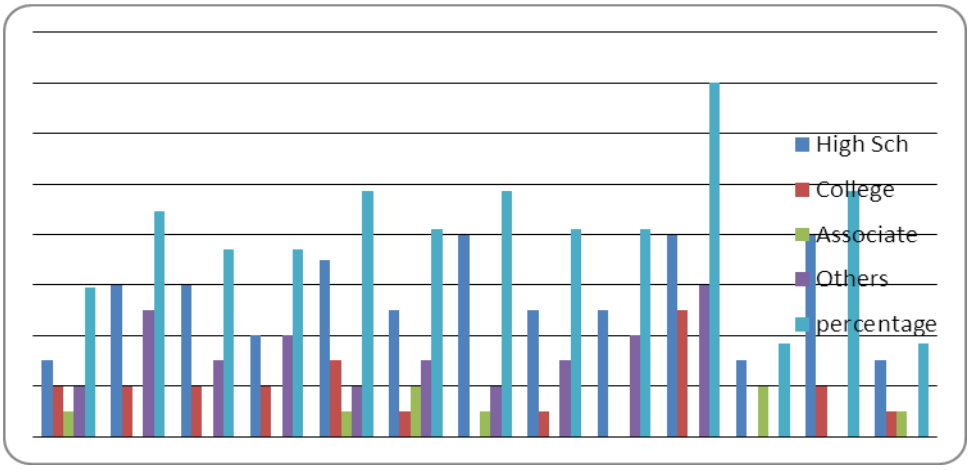

Figure 4: Distribution of respondent by qualification (N=134)

Analysis: Respondents represented a wide variety's of qualifications, with high school graduate being the most prevalent in the health Facilities.

We shall now make use of the figures to explain each of the question raised and their analysis.

Q.1: Is there any waste management committee here in the facility?

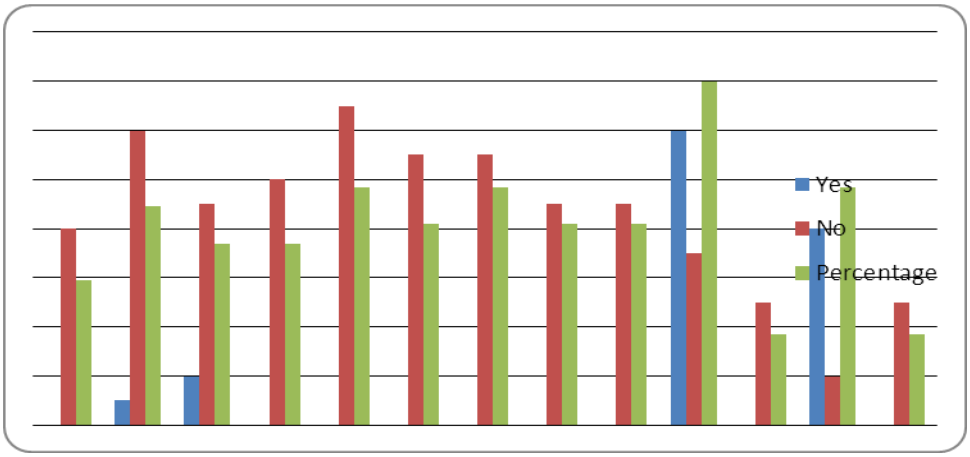

Figure 5: Showing the answer to the question; is there any waste management committee here in the facility?

Analysis: The respondents overwhelmingly stated that there was no waste management committee in the health facilities.

Q.2: Have you undergone training in medical waste? (N=134)

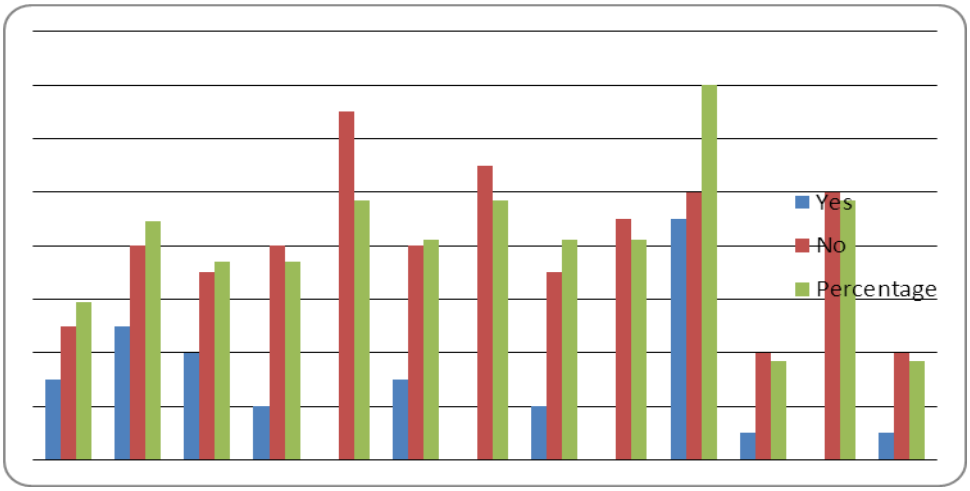

Figure 6: Showing the answer to the question; Have you undergone training in medical waste?

Analysis: 53% of the respondents in the health facilities said they have had no training in health care waste management.

Q.3: Do you Recapped needle after used?

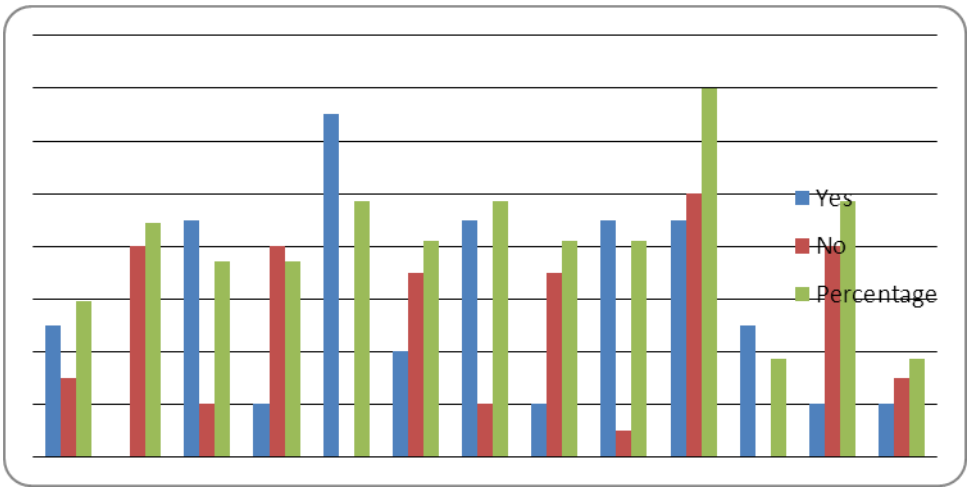

Figure 7: Showing the answer to the question; do you recap needle after used?

Analysis: Most of the respondent (57%) said they do recapped needle before disposing of it; a very dangerous practice.

Q.4: Do you segregate the medical waste before final disposal?

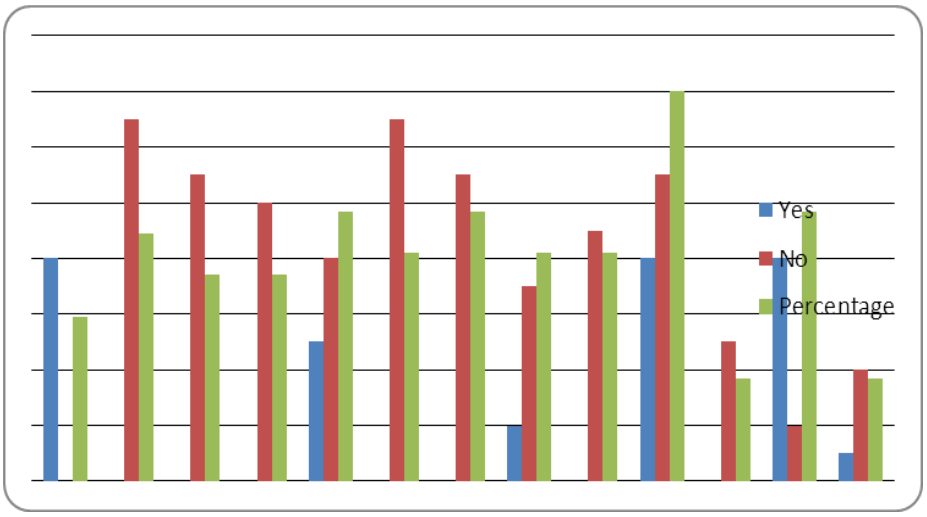

Figure 4: Showing the answer to the question, do you segregate the medical waste before final disposal?

Analysis: Most of the respondent (87%) said they do not practice segregation of medical waste.

Q.5: Do you practice color coding system in your facility?

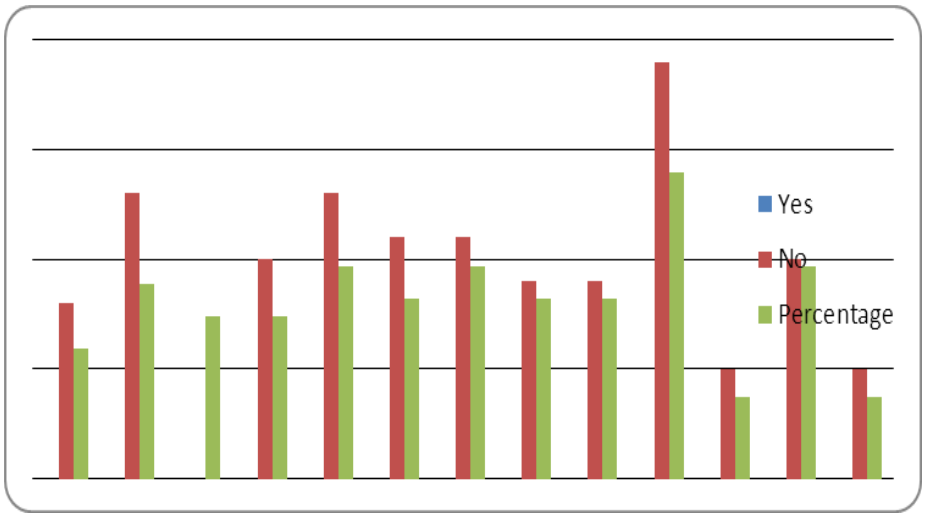

Figure 5: Showing the answer to the question, do you practice color coding system in your facility?

Analysis: 125% of the respondents said they have no system of color coding in the health facility. Meaning no special container to indicate which of the type of medical waste is this or that.

Q.6. Do you have authorized dumpsite in this area?

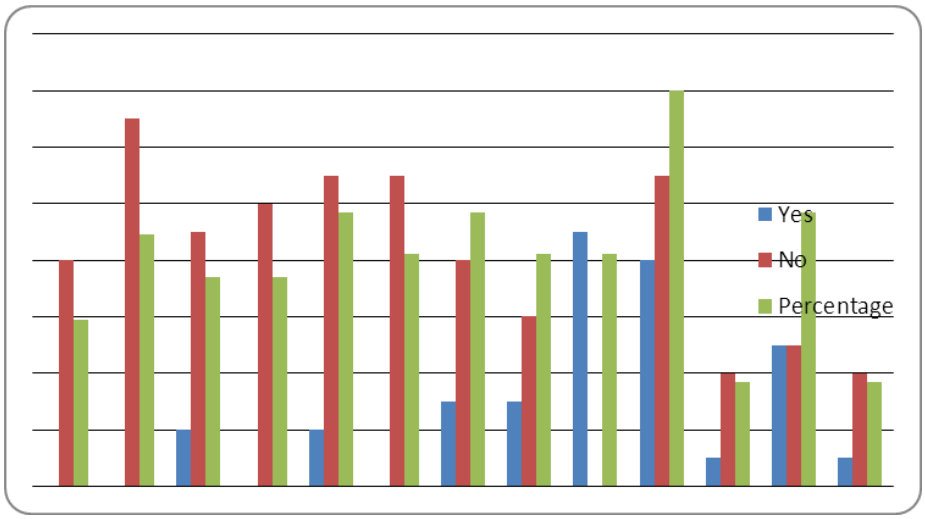

Figure 6: Showing the answer to the question, do you have authorized dumpsite in this area?

Analysis: 90% of the respondents agreed not having authorized dumping sites in their area.

Q.7: How do you disposal of your waste? Burning: Incineration: (N=134)

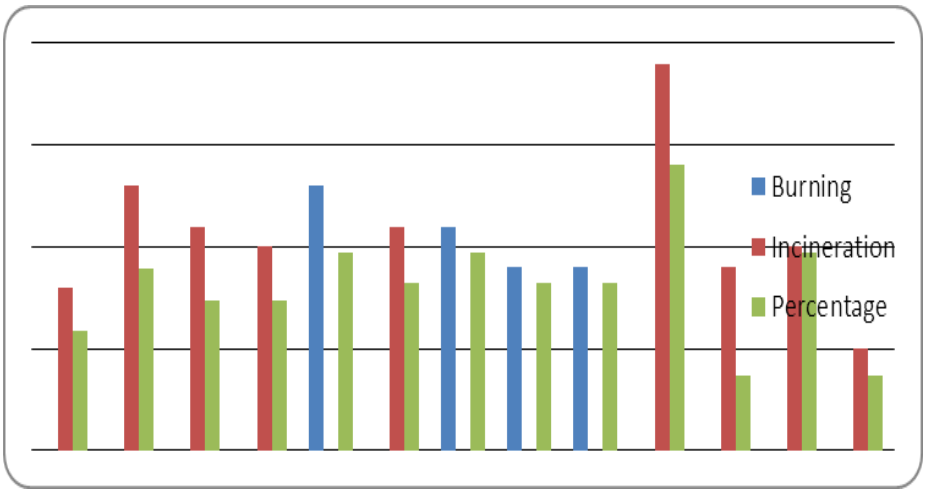

Figure 7: Showing the answer to the question, how do you disposal of your waste? Burning: Incineration: (N=134)

Analysis: Incineration is the best methods of medical waste management, but this research shows overwhelmingly on the burning of their waste in the health faccilities, about 93.3% agreed on burning.

Q.8: Do you have placenta pit in your facility?

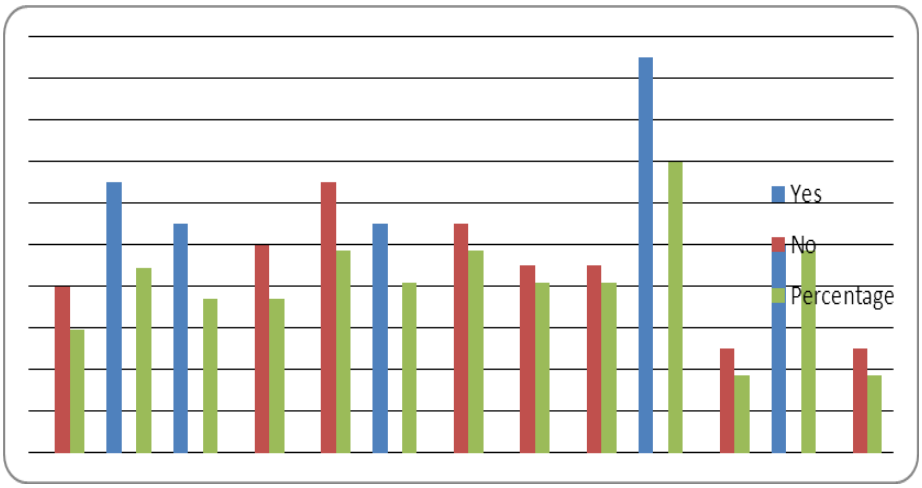

Figure 8: Showing the answer to the question, do you have placenta pit in your facility?

Analysis: 80% of the research area revealed that the lack of placenta pit is a serious concern. 16% of the respondent agreed of having placenta pit.

Q.9: Do you measure the medical waste you generate? (N=134)

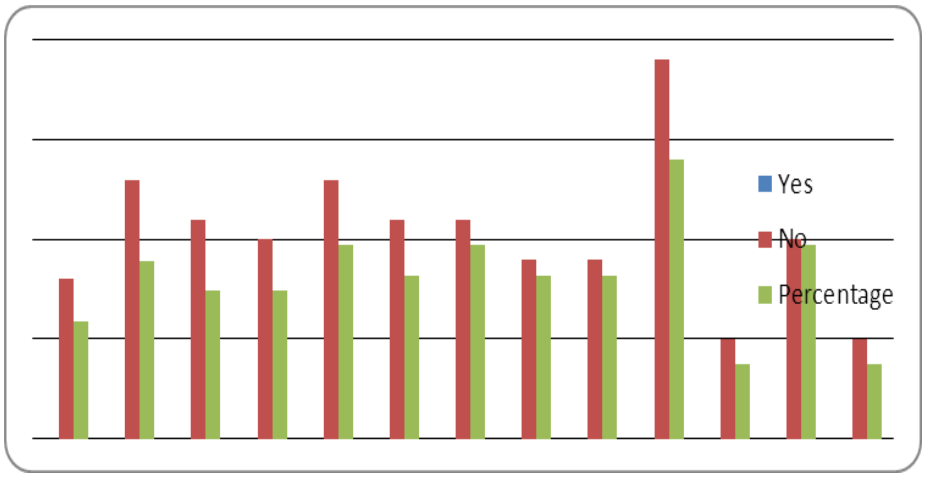

Figure 9: Showing the answer to the question, do you measure the medical waste you generate? (N=134)

Analysis: 100% of the respondent's facilities said they do not measure the medical waste they generate. WHO recommend these methods which all the health facilities in Liberia seem to Lack.

Q.10: Do you have enough equipment to manage your medical waste?

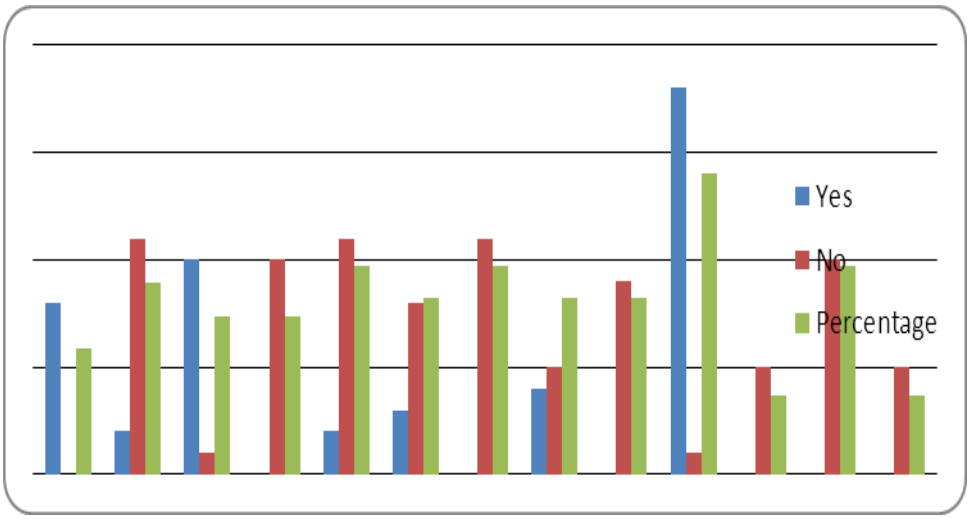

Figure 10: Showing the answer to the question, do you have enough equipment to manage your medical waste?

Analysis: 64% of the respondent said there were insufficient medical waste materials in their health facilities to manage the waste being generated.

Q.11: Do you have incinerator in your facility?

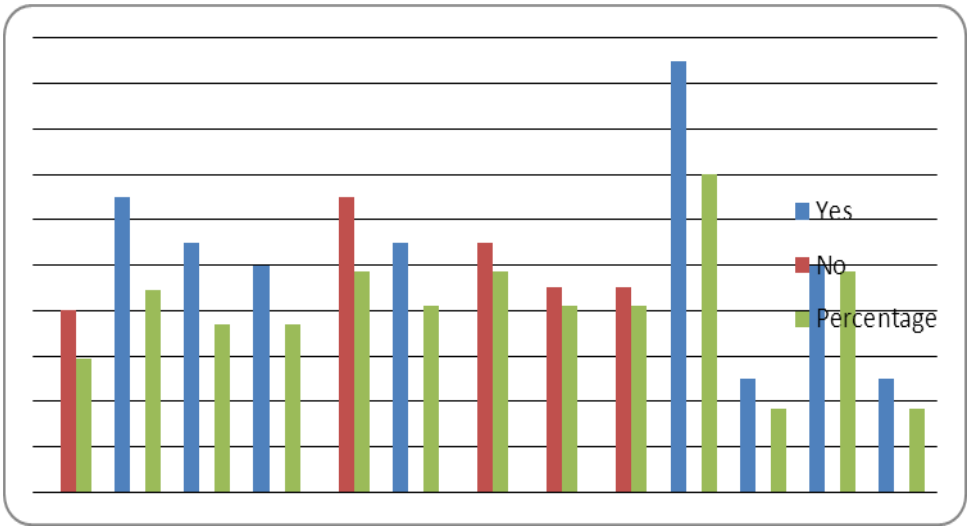

Figure 11: Showing the answer to the question, do you have incinerator in your facility?

Analysis: incinerator is so far the best method of medical waste disposal so far developed. About 96% of the respondent facilities lack incinerator.

Q.12: Are you worried about the danger of poor medical waste disposal practices?

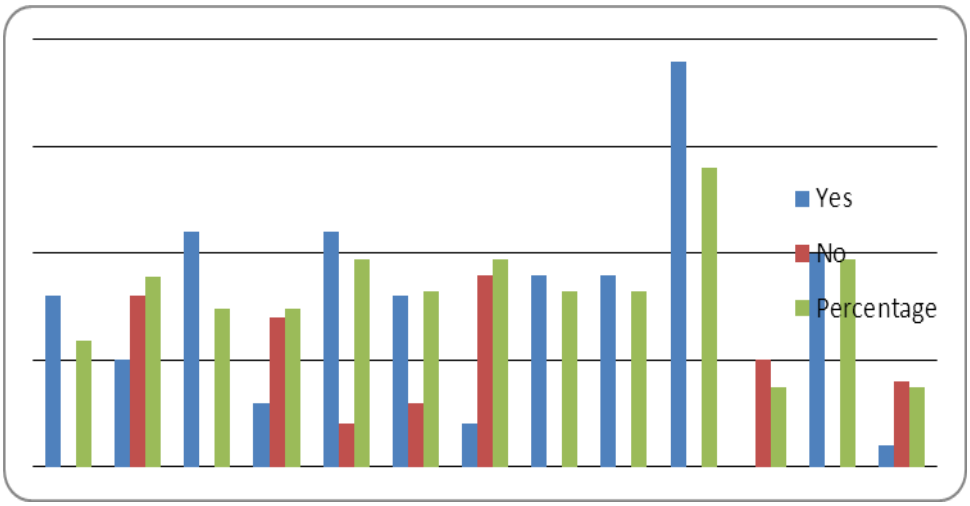

Figure 12: Showing the answer to the question, are you worried about the danger of poor medical waste disposal practices?

Analysis: Most of the respondent in this category said they have no knowledge on the danger of poor management of medical waste, yet majority said they have undergone training in medical waste management.

Q.13: Do you always put all the medical waste together in your health facility?

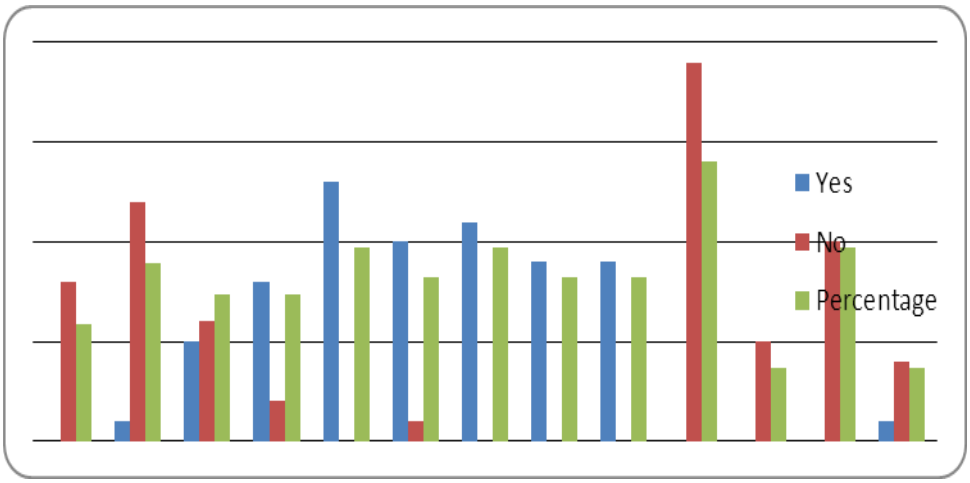

Figure 13: Showing the answer to the question, do you always put all the medical waste together in your health facility?

Analysis: A great number of the respondent agreed that they combine the waste together and disposed of it.

Q.14: Do you know the type of disease that people suffered due to poor medical waste disposal?

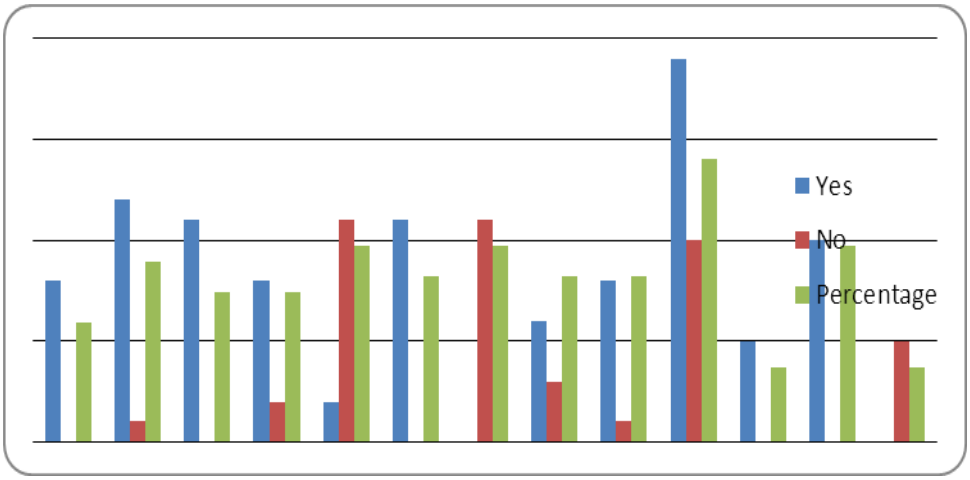

Figure 14: Showing the answer to the question, do you know the type of disease that people suffered due to poor medical waste disposal?

Analysis: 91% of the entire respondent said they have no knowledge on the type of diseases acquired as a result of improper medical waste management.

Q.15: Do you have placenta pit in your facility?

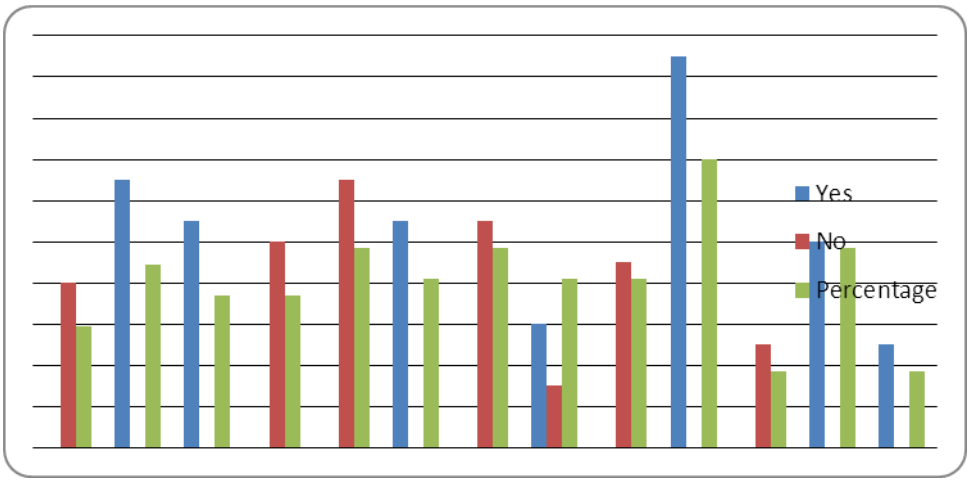

Figure 15: Showing the answer to the question, do you have placenta pit in your facility?

Analysis: 44% of the respondent revealed that they have no ash pit.

CONCLUSIONS

The effective management of medical waste is very vital to the health care sector and the people who need to know that such wastes are managed and disposal off properly.

On the overall knowledge of health care waste management practices in Monrovia health District, the following observations were noted as concluding remarks below:

About 127 % of the Monrovia District health facilities admitted that there was no waste management committees set up in their facilities. 71% has no knowledge on medical waste management. One of the dangers in health care setting is the recapping of needle after used. For many years now, the World Health Organization has recommended that no recapping of needles nevertheless, however and unfortunately, most of the health workers do recap needles before disposal. About 63% of the respondent agrees that they do recapped needle before disposal. In this paper, we present an analytical overview of Liberia health, 99% of the respondents said they do not measure their waste, and about 93.3 respondents in the health facilities workers on the practices of Medical waste disposal. A great number of the respondent agreed that they combine the waste together and disposed of it.

The wastes contain mercury, and other heavy metals, chemical solvents, and preservatives (e.g. Formaldehyde) which are known carcinogens, plastics (e.g., PVC) which when combusted produced dioxins and other pollutants which pose serious human health risks not only to workers but to the general public through food supplies. Workers who handle hospital waste are at greatest risk from exposure to the potentially infectious wastes and chemical hazardous wastes. There are various principles on waste management which include: The appropriate procurement principle which ensures distribution and monitoring of equipment's and related supplies such as safety boxes, auto disable and syringes, protective clothing, gloves masks, disinfectant, and decontamination of blood transfusion services, insulated boxes for transportation, waste treatment instillation, etc. The precautionary procurement principles is the key governing health and safety protection, where there threat of serious or irreversible damage to the environment, lack of full scientific certainty should not be used as a reason postponing cost-effective measure to prevent environmental degradation (RIO degradation principle 15.) The duty of care principle stipulates that any person handling or managing hazardous waste or related equipment's is ethically responsible for using the almost care in that task. The polluter pays principles imply that all producer of waste are legally and financially responsible for the safe, environmentally sound disposal of waste they produce. This principle also attempt to ascertain liability to the part that causes the damage. The proximity principle recommends that treatment and disposal of hazardous waste take place at the close possible location to it source in order to minimize the risk involve in it transport. The monitoring and supervision principle implies that relevant institution supervise

and monitor health facilities at all level to evaluate needs and action for overall healthcare system improvement. Segregation of medical waste is one of the problems in many countries of the world.

Recommendations

- Additional research is needed to better understand Medical waste disposal practices throughout the Country.
- Law enforcement for medical waste policy implementation should be instituted at all level of the society.
- All health facilities in the Republic should have a medical waste plan of their health facility as requirement for operation.
- Training of health care workers in the medical waste management should addressed immediately by the Ministry of health authority.
- All health care institution should form a waste management committee in their health facilities to serve as monitoring body for the health care waste handlers.
- The correct segregation of medical waste should be put in to place in all health facilities.
- Separate waste collection should be carried by the producer and close as possible to the place of waste generation, i.e. segregation should be placed at the source, example, on the ward, at the bed side, operating theater, the laboratory etc. Should be done by the person generating the waste.
- All waste containers or bags should be color coded and identified in all health care facilities.
- Central storage areas for all waste should be established and the area be restricted, well hygienic, appropriately sign-posted and kept secure at all times.
- Infectious waste must be disposal of by approved method; Anatomical waste parts should be safely buried on a cemetery or combusted in a crematorium
- Waste Pit are a viable alternative to incineration for the bulk of infectious waste generated in most health facilities where incineration facilities are not readily available, and should be closely monitored by a trained personnel.
- Incinerator which is the treatment of choice for medical waste should be installed in all health care institution.
- Placenta Pit should be constructed in all health facilities.

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