pp. 67-75 https://dx.doi.org/10.4314/johasam.v7i1.7

Critical Examination of Health Impacts of Healthcare Waste Storage and Segregation in Ghana: A Study of the Ho Municipality

[1]Austin Dickson Amoako, [2]Seth Yaw Ahiabor, [3]Felix Amofa & [4]John Tisimbo Machator

1. PhD Environmental Science Year IV Candidate – University of Ghana Graduate School – IESS. E-Mail: aaustinwash@gmail.com Tel: +233244751673 / +233277370172
2. Lecturer – Fred N. Binka School of Public Health - University of Health & Allied Sciences – Ghana. E-Mail: sahiabor@uhas.edu.gh Tel: 0244154406
3. Senior Sanitation Specialist – USAID – En - WASH Project
   Global Communities – Ghana. P.O. Box CT 1762,
   TEL: +233244515781 / 0509528462, Email: famofa@globalcommunities.org
4. Senior WASH Officer
   Global Communities Ghana – USAID En - WASH Project.
   Email: machatorjohn@gmail.com Tel: +233248480892

Abstract

The management of clinical waste generates several environmental and health challenges in most countries, particularly, developing countries including Ghana. Despite the possible health implications associated with clinical waste, much attention has not been given to its proper management. The study sought to evaluate clinical waste management and disposal system in the Ho Municipality. The study involved six (6) healthcare facilities in the Ho Municipality. A total of 165 respondents comprising doctors, nurses, waste collectors, EPA, Municipal assembly formed the sample of the study. Site visits, interviews and survey questionnaires were employed to collect information on the methods, process, environmental and public health impact, adherence to clinical waste management code of practice as well as challenges faced in clinical waste management. Purposive sampling method was adopted in selecting respondents for the study. Results from the study showed that segregation of clinical waste was poorly done in most of the healthcare facilities studied. Additionally, waste handlers only use industrial gloves without full personal protection equipment when working on clinical waste and non-availability of waste management facilities. The findings also revealed that clinical waste have negative impact on public health and the environment. The study recommends among other things that training should be intensified on proper waste management practices in the healthcare facilities. Management of the various healthcare facilities should endeavor to provide modern clinical waste management facilities.

Keywords: healthcare facilities, clinical waste, hospital, waste management, incinerator

1.0 INTRODUCTION

In Ghana, Engineered Clinical Waste Management Facility (CWMF) is used by few health facilities which are mostly the referral or teaching hospitals. The district, municipal and other community health centres do not benefit from CWMF as the concentration and priority is given solely to referral and teaching Hospitals in the country.

In Ghana enormous quantities of infectious and hazardous wastes are generated in health care facilities which eventually find their ways into waste containers of municipal waste bin and waste bins provided by private waste management companies like Zoomlion Ghana 'thus, posing public and environmental health threat. Asante et al. (2014) observed that medical wastes are still handled and disposed together domestic wastes, posing a great danger to municipal workers, the public and the environment. They further stated that most hazardous and toxic wastes are placed on dumping sites and with no or few safeguards to protect nearby inhabitants and water sources from contamination. Again, most healthcare facilities in Ghana have no engineered clinical waste management system to help hygienically manage waste generated from these facilities on WHO Healthcare Waste Management guidelines hence making clinical waste management very difficult and unhygienic (Asante et al., 2014).

1.2 Objective of Study

To examine healthcare waste storage and segregationand itshealth impacts in the Ho Municipality.

2.0 LITERATURE REVIEW

When population grows more peopleseek healthcare hence the drastic increase in waste generation. The result of this is that questions such as who is affected by this waste, who handles it and how well prepared are the waste handlers (Mbongwe et al., 2008). A study done in Ghana discovered that all the clinical laboratories indicated that their liquid waste was poured down the drain through the sink (Williams, 2013).

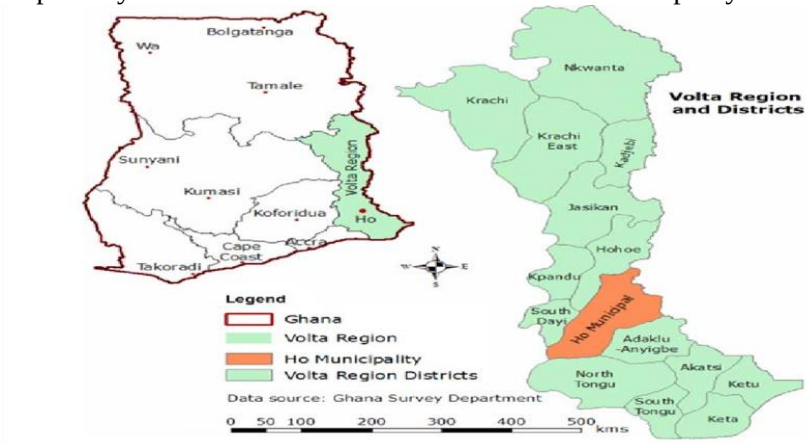
Although everyone who is exposed to hazardous waste is potentially at risk, it is the group of people who directly belong to medical profession, as well as waste workers, scavengers, patients, and their visitors in the hospital who are highly at risk. Different researchers illustrate that there are numerous diseases which can be transmitted among the group of people who are highly at risk, but most significant diseases are Hepatitis B and C, as well as AIDs (Acquired Immunodeficiency Syndrome) (Nwachukwu et al., 2013; Kumari et al., 2013). According to WHO (2010), the unscientific management of healthcare waste can have direct impact on public health and the natural environment.

It is argued that, if the infectious component gets mixed with the general non-infectious waste, the entire mass becomes potentially infectious. It is the responsibility of hospitals and other healthcare institutions to ensure that there are no adverse health and environmental consequences as a result of their waste handling, treatment and disposal activities (Patil & Pokhrel, 2005).

Contaminated sharps and syringes as the major harmful components of clinical waste pose untold health risks due to potentials for direct exposure to pathogens in blood and other fluid from patients through percutaneous injuries (PI), abrasion and a cut in the skin. Pruss-Ustun et al. (2005) estimated that more than three million HCWs experience the stressful event of a PI with a contaminated sharp object each year.

3.0 METHODOLOGY

The study employed descriptive survey research design to examine healthcare waste management and disposal systems in the healthcare facilities in Ho Municipality of Ghana.



3.1 Sample and sampling technique

The study sampled six (6) health facilities from the total population of 45 health facilities using purposive sampling method. The researchers depended on their own judgment to select sample group members.

Table1: Number of respondents in surveyed healthcare facilities

Name of healthcare facility	No of health workers	Number of health workers sampled
Volta Regional Hospital	386	77
Ho Municipal Hospital	189	38
Ho Polyclinic	96	19
Royal Hospital	44	9
Miracle Clinic	29	6
Matse Clinic	26	5
Total	**770**	**154**

Source: Surveyed healthcare facilities, 2022

$$sample\ size = 0.2 * population\ size$$

3.2 Data Analysis

Data was analyzed using SPSS version 22. Data collected from the field was first edited to check for errors and omissions and inconsistencies that might be recorded. Data was then coded and entered into the SPSS for analysis. Descriptive tools of data analysis were employed. Results were presented using tables and graphs. Discussions on the findings were presented after each table and graph.

4.0 RESULTS AND DISCUSSIONS

4.1 Types of Medical Waste Generated in the Healthcare Facilities Surveyed

The results of analysis revealed that the healthcare facilities under study generated non-infectious waste, sharps, pathological waste, chemical waste, and pharmaceutical waste in varying quantities on daily basis. The finding was in line with the study results of Asante et al. (2014).

4.2 Sources of Clinical Waste in the Surveyed Healthcare Facilities

Medical waste generated in the healthcare facilities were mainly from the surgical theatre, delivery room, various wards, laboratory, pharmacy of the healthcare facilities.

4.3 Segregation of Clinical Waste Generated in the Healthcare Facilities

Respondents who handle waste generated directly or indirectly were asked whether they undertake segregation of clinical waste in their healthcare facilities. 73.6% of the respondents said they do segregation of clinical waste in their facility whiles the rest 26.4% responded no, saying they do not segregate clinical waste generated in their healthcare facility. These findings contradict the findings of Akum (2014) who pointed out that, majority of health workers interviewed representing 86.67% indicated that waste is not separated prior to disposal to the larger storage containers in the hospitals in Ghana. The results above showed that workers of the health facilities surveyed were doing well to follow proper waste handling practices which will go a long way to prevent infections. This view was supported by Assemu (2020) who stated that segregation at point of production breaks the chain of disease transmission, determines disposal method, injury to the persons who handle waste and lesser amount of waste to be managed and is critical to ensuring safe management of healthcare waste.

Table 2 responses on clinical Waste Segregation by Healthcare Facilities

Response	No. of Respondents	Percentage (%)
Yes	81	73.6
No	29	26.4
Total	**110**	**100**

4.4 Ratings on Waste Segregation

The respondents were asked to rate how the clinical waste segregation was done in the various facilities on a four-point scale: poor, good, very good and excellent. The result showed that 63.6% rated the segregation process as poor, 30.0% said the segregation was good and only 6.4% of the respondents rated very good (Figure 4.1). From the analysis, it was abundantly clear that majority of the respondents considered the process of segregation of clinical waste in their various facilities as not being carried out in accordance with best practices. According to Adjokatse et al. (2021), poor segregation practices defeat the principle of waste minimization, resulting with all types of waste being disposed together. This exposes scavengers as well as healthcare staff and those living around the landfill sites to health hazards. The facilities were not adopting good segregation practices leading to the exposure of healthcare staff to risk of infection.

Figure 1 Rating on Waste Segregation by Healthcare Facilities

Plate 1: Infectious waste mixed with general waste in the healthcare facility. Source: Field Visit 2021.

4.5 Storage of clinical waste

Majority of respondents made it known that waste generated in the healthcare facilities are temporarily stored in the open space awaiting collection. This represents 60.2% of the respondents. 7.8% of the respondents said the wastes were temporarily stored in the garage of the hospital. 24.3% confirmed that the health facilities have special rooms where wastes were kept momentarily awaiting

collection and 7.8% of the respondents said they kept it at other places like corridor, changing room etc (Table 1).

Table 2. Place of storing waste temporary awaiting transportation

Place of Storage	No. of Respondents	Percentage (%)
Open space	62	60.2
Garage	8	7.8
Special room	25	24.3
Others	8	7.8
Total	**103**	**100**

4.6 The way clinical waste is stored awaiting transportation to the incinerator.

The respondents indicated that waste temporarily stored awaiting incineration were not stored securely. 70.9% of the respondents confirmed that clinical waste awaiting incineration were stored insecurely. They were just left in the open in bin without covering it. Only 29.1% said theirs were secured (Plate1).

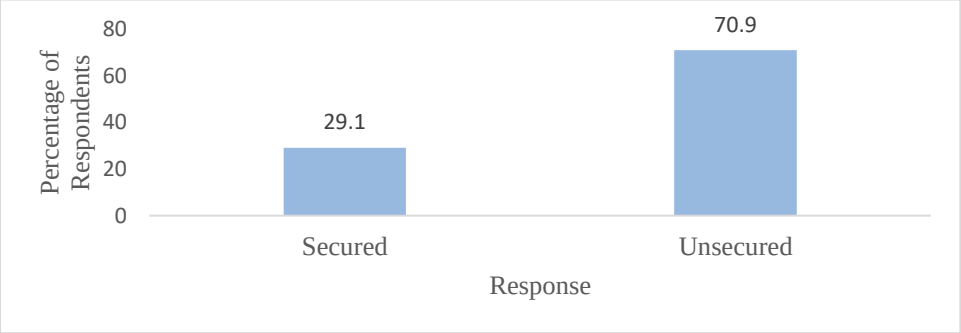


Figure 3: Showing the way clinical waste is stored awaiting transportation to incinerator.

Pictures of clinical waste stored in the open awaiting transport to the incineration that were observed at some facilities under study. Observed (Plate 2).

Plate 2: Unsecured clinical wastes temporarily stored. Source: Field Visit 2021

4.7 Handling of Clinical Waste in the Healthcare Facilities

The study showed how clinical wastes were handled in the various health facilities under study. The collection of the clinical waste was mostly done by laborers as confirmed by majority of respondents representing 90.5%. The collection was also done by cleaners in some of the health facilities constituting only 7.8% of those identified to be collecting the wastes. Only 0.9% of the respondents said that nurses and others such as waste collecting companies did collect the waste in their facility (Table 3).

On the use of personal protective equipment (PPE) before handling clinical waste, 86.2% responded that the waste collectors used personal protective clothing before handling clinical waste. It came to light through field visits and observation that workers who were using PPE only wore industrial gloves without sturdy shoes, goggles, overalls and mask. 13.8% said waste collectors do not use any PPE for clinical waste management (Table 4.4). Korkut (2018) noted that to practice good health safety thereby preventing injuries from sharps, pointers and other operatives were to wear overalls, heavy duty or industrial gloves and sturdy shoes including goggles and mask for clinical waste management. These protective clothing are to be worn to observe good safety practices hence transmission preventions when handling, transporting or incinerating medical waste.

Those who said they did not use PPE before handling clinical were asked to assigned reasons why they do not use it. 12.5% assigned lack of fund to purchase the equipment as a reason for no using it, 50.0% said the equipment were in short supply forcing them not to use it and the remaining 37.5% could not state any reason for not using it (Table 5).

Table 3: Handling of clinical waste in the healthcare facilities

Waste Collector	No. of Respondents	Percentage (%)
Nurse	1	0.9
Labourer	105	90.5
Cleaner	9	7.8
Others	1	0.9
Total	**116**	**100**

Table 4: Use of Personal Protective Equipment by waste Collectors

Response	No. of Respondents	Percentage (%)
Yes	100	86.2
No	16	13.8
Total	**116**	**100**

Reasons for No Protective Equipment	No. of Respondents	Percentage (%)
Lack of fund	2	12.5
Shortage	8	50.0
No idea	6	37.5
Total	**16**	**100**

Plate 3: Use of PPE. Source: Field Visit 2021
A worker wearing only industrial glove without other equipment whiles incinerating clinical waste at the healthcare facility.

4.8 Environmental and Public Health Impacts of Clinical Waste Management and Disposal
The results of the study revealed that clinical wastes have impact on public health. Eleven (11) out of the 110 respondents representing 10% confirmed that they had injuries from handling clinical waste in the past 6 months. This was quite worrying as this could result in serious infection of the injured person and people around him/her. However, 99 out of 110 respondents constituting 90% did not suffer injuries in the past 6 months in handling clinical waste (Table 5).
Majority of the respondents were aware of the health risk of improper clinical waste handling and disposal. This is shown by most of them agreeing to the statement that there is health risk of improper disposal of clinical waste.

On scavengers or outsiders coming to pick some materials from the waste bin in the healthcare facilities understudy, 74.1% responded 'no' and 25.9% responded 'yes'. This showed that scavengers and outsiders picking from the waste bin were prone to infections from the infected materials pick from the waste bin. This exposes these people to serious health hazards thereby posing public health problems.

Table 5: Frequency distribution of health impacts of clinical waste management and disposal

Ever sustained any injury during the handling of clinical waste in the past 6 months		
Response	**No. of Respondents**	**Percentage (%)**
Yes	11	10
No	99	90
Total	**110**	**100**

Are there risks of improper clinical waste to human health		
Response	**No. of Respondents**	**Percentage (%)**
Yes	90	77.6
No	26	22.4
Total	**116**	**100**

Do scavengers or outsiders come to pick some materials from the waste bin in your facility?		
Response	**No. of Respondents**	**Percentage (%)**
Yes	30	25.9
No	86	74.1
Total	**116**	**100**

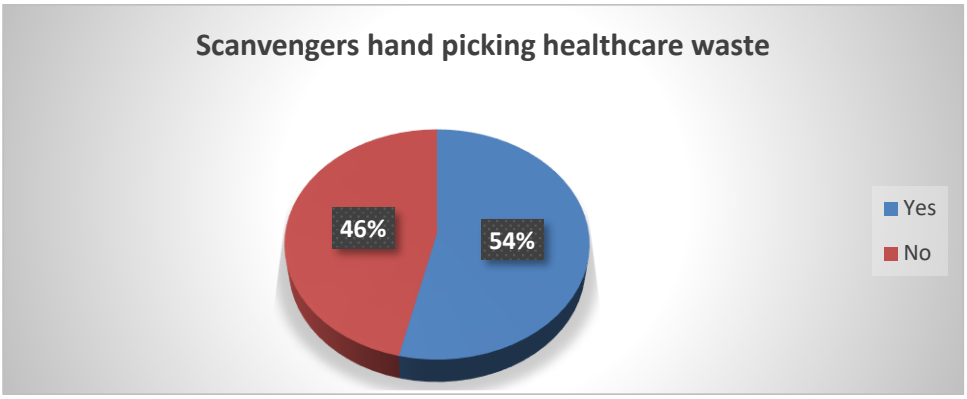


Figure 4: Scavengers or outsiders come to pick some materials from the waste bin.

4.9 Hepatitis B vaccination of healthcare worker who encounter clinical waste in accordance with Clinical Waste Management Code of Practice.

Out of 103 respondents who responded to the question of being given hepatitis B vaccination when encounters clinical waste in accordance with Clinical Waste Management Code of Practice, 61 responded positively whiles 42 said no representing 59.2% and 40.8% respectively. Hospital staff and all other personnel involved in handling clinical waste were to be vaccinated with Hepatitis B to prevent infection. Health and safety officers in healthcare facilities are to ensure that healthcare workers and contractors for handling wastes are protected Korkut (2018). From the study, majority of the respondents representing 67.3% rated the management of clinical waste in their various facilities in accordance with WHO clinical waste management code practices as average. In addition, 3.6% said it was excellently managed, while 29.1% of the respondents were of the view that the management was poorly done according to the laid down guidelines of WHO (Table 6).

Again, effective health care waste management system requires that all wastes contaminated with blood or bloodstained body fluids are considered potentially hazardous and managed with caution that should not thwart wastes progress along the disposal process. Effective segregation at source and the correct use of waste containers provides the most effective safeguards. The incidence of sharps injury in healthcare workers as well as scavengers is well described and much attention is given to prevention through education and training, product design and changes to clinical practice. However, a significant risk of sharps injury to waste handlers responsible for the onward disposal of healthcare wastes may have been overlooked which is evidential in this study (Figure 4) where the respondents attested to the fact that, scavengers come periodically to handpick healthcare waste in the dumping site and containers.

Table 6 Rating of clinical waste management in accordance with the Clinical Waste Management Code/guidelines?

Rating	No. of Respondents	Percentage (%)
Poorly	32	29.1
Averagely	74	67.3
Excellently	4	3.6
Total	**110**	**100**

5.0 CONCLUSION AND RECOMMENDATIONS

The study concluded that people handling clinical waste in the various healthcare facilities were not well protected as they only wear industrial gloves without other PPE for protection while some did not wear any PPE at all when handling clinical waste. Furthermore, the study concluded that clinical waste management facilities were present in some of the hospitals and clinics however, most of them were not in good conditions and were therefore, not being used for the purpose for which they were

acquired**.** Those who did not have any facility, dump the infectious waste in open pit and on the municipal waste dump without treating them.

The managers of the various healthcare facilities should endeavor to provide complete PPE for waste handlers so that they can be fully protected against infection. The study also recommended that modern clinical waste management facilities should be installed in the various healthcare centers to assist in proper, hygienic and scientific management of clinical waste.

References

Adjokatse, I. T., Adjibolosoo, S. V. K. & Miine, L. K. (2021). Assessment of medical waste management at Cape Coast Teaching Hospital - Ghana. *Assessment, 11*(10).

Akum, F. A. (2014). An assessment of medical waste management in Bawku Presbyterian hospital of the upper east region of Ghana. *Merit Research Journal of Environmental Science and Toxicology*, *2*(2), 27-38.

Asante, B., Ernest Y. & Benjamin, Y. (2014). Healthcare waste management; its impact: A case study of the Greater Accra Region, Ghana. *International Journal of Scientific & Technology Research*, *3*(3).

Assemu, D. M., Tafere, T. E., Gelaw, Y. M. & Bantie, G. M. (2020). Healthcare waste management practice and associated factors among private and public hospitals of Bahir Dar City administration. *Journal of Environmental and Public Health.* https://doi.org/10.1155/2020/7837564

Korkut, E. N. (2018). Estimations and analysis of medical waste amounts in the city of Istanbul and proposing a new approach for the estimation of future medical waste amounts. *Waste Management*, *81*, 168-176.

Kumari, A., Maurya, N. S. & Tiwari, B. (2020). Hospital wastewater treatment scenario around the globe. In *Current developments in Biotechnology and Bioengineering*, 549-570. Elsevier.

Mbongwe, B., Baagi, T. M. & Andrew, M. (2008). Healthcare waste management: current practices in selected healthcare facilities, Botswana. *Waste Management*, *28*(1), 226-233.

Nwachukwu, N. C., Frank, A. O. & Ositadinma, C. U. (2013). Health care waste management–public health benefits, and the need for effective environmental regulatory surveillance in federal Republic of Nigeria. *Current Topics in Public Health*, 2, 149-178.

Patil, G. V. & Pokhrel, K. (2005). Biomedical solid waste management in an Indian hospital: a case study. *Waste Management*, *25*(6), 592-599.

Williams, G. L. (2013). Medical waste disposal practices in some hospitals and clinical laboratories in the Accra Metropolis (Ghana). *Journal of Civil and Environmental Research.* 3, 90-98.