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Generation and Management of Clinical Waste in Healthcare Facilities in the Yilo and Manya Krobo Municipalities in Ghana

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ABSTRACT: *This study sought to examine reasons for why the health care facilities in the Yilo and Manya Krobo Municipalities in the Eastern Region of Ghana are unable to properly manage clinical waste they generate. The instruments employed to gather the data were questionnaires and interviews. As a result, all the 150 respondents who were involved in this study were made to respond to the questionnaire based on the research questions while 20 of them responded to an interview schedule. The respondents comprised of facility administrators, head of department/unit each from the Pharmacies, Laboratory, and Mortuary, Clinical waste workers, and Laundry and X-ray. Respondents for the study were made to respond to a designed questionnaire. The found less documentation and records keeping on the quantity, type and composition of clinical waste seen as the common reasons why the selected health care facilities could not properly manage the clinical waste generated.*

KEYWORDS: clinical waste, generation, collection, treatment, disposal

INTRODUCTION

According to Eshun, Ampomah, Mensah, and Djan, (2021, p. 1) "Sanitation and cleanliness are necessary for good health and socio-economic development." The world has witnessed rapid population growth in different patterns with extraordinary waste generation as a result of human activities to provide energy for survival (Rahele & Govindan, 2013). Contributing to the preceding viewpoint, Eshun, Bassaw and Bordoh (2014), posited that "the rapid increase in the volume and types of solid waste as a result of continuous economic growth, urbanisation, and industrialization is becoming a burgeoning problem for national and local governments to ensure effective and sustainable management of solid waste." However, places that the generated waste must be

disposed are becoming increasingly scarce since some of their contents are unpleasant and dangerous. To put it inversely, "there is a disconnection between people's concerns about the state of solid waste management and the activities that are anticipated to be performed to address the environmental crisis" (Eshun, Mensah, & Ampomah (2021, p. 128). This has become the debilitating effect in the generation, management and disposal of solid waste.

Clinical waste is one of the general waste whose management has become an "acute problem around the globe and is of great concern as urbanization and economic activities increase leading to generation of larger quantity of waste materials that require immediate attention of the newly emerging economy" (Abdul, Ahmad & Farah, 2013). Clinical waste management in itself is a complex phenomenon with multiple component parts, encompassing generation, collection, treatment, and final disposal of waste produced by households, small and medium sized businesses, clinics, industries and agriculture (Wenke, Maria & Maic, 2002). In many developed and developing countries, collection, transportation, treatment and disposal of clinical waste are the major challenges for government, organizations and other institutions for several reasons. As observed by Pacione (2005, p. 111):

> *"Most city governments are confronted by mounting problems regarding the collection and disposal of clinical waste. In high-income countries, the problems usually centre on the difficulties and high cost of disposing of the large volume of waste generated by households and businesses. In lower-income countries, the main problems are related to collection, with between one-third and one-half of all waste generated in Third World cities remaining unmanaged" (Pacione, 2005, p. 611).*

The problem of "clinical waste management has intensified recently in developing countries where there is little history of the implementation of formal and informal community environmental education awareness programme" (Asokan, Sexena, Asolekar, 2007; Rahele & Govindan, 2013) and has been acknowledged by most governments and municipal authorities (World Bank Technical Guidance Report 2004). The situation has become worsened as globalization and urbanization have been seen as playing a negative role in waste management in African cities. Impacts include the transfer of globalized or internationalized clinical waste management methods and ideologies together with an increased volume and variety of waste, resulting from increased demand for medical services (Achankeng, 2003). This, for instance, implies that in the rapid urbanizing cities of the developing world, there is increase in volume and types of clinical waste as a result of continuous economic growth, and industrialization.

The current study of the literature has shown that, "clinical waste management has become a huge huddle for authorities of health care facilities in Ghana with very few studies focusing on how clinical waste management process from generation, collection, treatment and disposal are carried

out" (Wiafe et al., 2016). Though the Ministry of Health and its allied agencies in Ghana, over the years, have implemented significant changes to their health care practices to meet the standard of waste management, the area of clinical waste management seemed to be neglected in terms of research and studies in Ghana (Akum, 2014). Even the changes brought by the Ministry of Health and its allied agencies regarding health care waste management have brought a lot of requirements on the health care facilities to develop and implement new strategies for managing clinical wastes to meet the recent international standards (Asante *et al.*, 2014). However, this arrangement for managing clinical waste in the developing countries to meet the recent international standards was not realized for several reasons.

Reasons of Unsuccessful Clinical Waste Management in the Developing World

Researchers, particularly those in the field of clinical waste management (Bdour et al., 2007; Hassan et al., 2008; Nemathaga et al., 2008; Coker et al., 2009), have identified several reasons why health care facilities are not able to successfully manage clinical waste. The reasons were due to inadequate reliable information on the quantities and characteristics of various types of clinical waste generated in the health care facilities (Diaz, Eggerth, Enkhtsetseg & Savage, 2008; Bdour et al., 2007). On this note, Askarian et al. (2004) concluded that, the most common reasons for unsuccessful clinical waste management in developing countries are inadequate clinical waste management operational strategy, Poor Regulative Measures (PRM) for clinical waste management, inadequate Green Procurement Policy (GRP) on clinical waste management, Waste-picking and Re-using of clinical waste, inadequate of Top Management Commitment (TMC) in clinical waste management, inadequate capacities for clinical waste management, inadequate Institutional arrangements for clinical waste management, inadequate financial constraints for clinical waste management, reluctance to change and adoption (RCA), inadequate pressure from societies and inadequate enforcement of medical waste management regulations among others which the current study is poise to find out.

Inadequate Clinical Waste Management Operational Strategy

One major reason why health care facilities are not able to manage clinical waste is the inadequate operational strategy by the health care facilities (Athavale & Dhumale, 2010). Clinical waste management "operational plans should include the location and capacity of the storage containers, proper arrangement for frequent collection of various types of wastes and schedule of activities. Clinical wastes are to be stored in the designated colour-coded leak-proof containers for safe handling and can be treated by the available units in the health care facilities. Storage of clinical waste within the health care facility is to be carried out in closed and covered waste bin to avoid spillage to the health care facility. After disinfection/sterilisation, the waste is transported to a common treatment facility, such as an incinerator or controlled landfill" (Patil & Shekdar, 2001).

In Indian, for instance, clinical wastes are collected in mixed forms. The central storage containers are found to have no proper lining resulting in the indiscriminate discharge of leachate into the environment. Clinical wastes are for this reason stored in open waste bins thus allowing spillage to occur (Athavale & Dhumale, 2010) and "waste sharps are discarded without disinfection and mutilation, which may result in their being re-used thus spreading an infection" (Patil & Shekdar, 2001). All these came about as a result of an inadequate operational plan which might go a long way to undermine effective clinical waste management in the health care facilities (Coker et al., 2009).

In furtherance, Coker et al. (2009) contend that "the management practices for dealing with clinical waste at Ibadan hospital were ineffective and this cut across waste storage, handling, collection, transportation and disposal practices due to little awareness. Wastes were collected at point of segregation into metal dustbins, drums, plastic bins, baskets, pans, cartons, buckets or bowls before transference into larger or final disposal containers." Coker et al. (2009) further did indicate that "waste handlers in some health care facilities in Ibadan opt to carry waste containers on their shoulders or with their bare hands, which indicated a possible lack of awareness or training about the potential risks involved."

Poor Regulative Measures for Clinical Waste Management

The inadequacy of an effective legal system and technical standards constitutes a major reason for unsuccessful clinical waste management in many developing countries (Askarian et al., 2004). Commonly speaking, "there is no integrated legal framework to deal with clinical waste management in developing countries. The legal provisions relating to clinical waste are often incorporated as fragmented elements in disparate laws such as laws for public hygiene, local administration, and environment protection in the various health care institution and agencies. These agencies responsible to enforce the rules in the various health care facilities are on the one hand lacking adequate power and on the other hand there is no commitment. As a result, most of the large health care facilities have not complied with these rules (Dwivedi Pandey, & Shashi, 2009). Though "the regulatory authorities have to take the blame for not doing enough to ensure implementation, there is lack of coordination between the regulatory authorities and Department of Health who exercise functional control over all health care facilities in one way as regard clinical waste management as well as the lack of will to enforce implementation" (Verma, 2010). No agency has been assigned the task of spreading awareness and even standards of collection and storage devices, equipment, are inadequate (Patil & Shekdar, 2001). Moreover, the smaller Health Care Units (HCUs) may not be fully aware of proper clinical waste management since rules that have been publicized have not been dealt with in detail.

Lack of Green Procurement Policy on Clinical Waste Management

Green public procurement is defined in the EU as a "process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured" (European Commission, 2008). It is a "process whereby public and semi-public authorities meet their needs for goods, services, works and utilities by choosing solutions that have a reduced impact on the environment throughout their life-cycle, as compared to alternative products/solutions" (Dwivedi et al., 2009). This means purchasing products and services that cause minimal adverse environmental impacts. It incorporates human health and environmental concerns into the search for high quality products and services at competitive prices.

Establishing a "green and ethical purchasing policy including the purchase of environmentally friendly products can play a central role to the implementation of many green and healthy hospital goals" (HCWH, 2011). Personnel responsible for procuring health care products and services (materials managers or purchasing agents) come from varying environmental background or training but this is not a prerequisite for the individuals responsible for securing health care products and services. Waste minimisation can be achieved by purchasing reusable items made of glass and metals which can be disinfected and reused (Patil & Shekdar, 2001). For example, a Polyolefin Intravenous (PLIV) bag does not contain chlorine, so it has less potential to produce dioxins through incineration than a PLIV bag containing polyvinyl chloride (PVC) (Kaiser, Eagan & Shaner, 2001). Similarly, mercury thermometers can be replaced with mercury free thermometers. Health care units should stimulate the purchase of environmentally preferable products by mandating certain practices in their purchasing policy. Also, health care facilities in many countries consume significant amounts of fossil fuels energy (Shojaei, & Tehrani, 2004). They can reduce significant amounts of greenhouse gases emission and energy costs by applying alternative forms of clean and renewable energy (HCWH, 2011).

Waste-Picking and Re-using of Clinical Waste

Waste-picking and Re-using of clinical waste is another reason why health care facilities are not able to properly control the waste they generated. Reuse of plastic syringes and other plastic materials used in health care delivery is a thriving business of billions of people. For example, more than one million Indian Rupees are engaged in rag picking (more than 100,000 in Delhi alone). The estimated figure of business on this score in Delhi alone is more than 50 million Indian Rupees per year (Verma, 2010). Lucrative monetary returns and lack of awareness about the problems associated with clinical wastes encourage waste-picking and reusing activities (Gayatri. & Pokhrel, 2005). It would however, not be fair to blame the rag pickers only for this as the circle of connivance starts from the hospital staff itself. It thereafter goes to the waste handlers, then to

the rag pickers, to the packaging outlets situated in a decrepit area of a 'basti (slum)', to the medical shop, and finally sold to the unsuspecting patients or their relatives (Verma, 2010).

Lack of Top Management Commitment in Clinical Waste Management

A study conducted by Mahbobeh, Mohsen, Charles, Mina and Mehrdad (2014) has indicated that managerial weakness was an important reason to improper clinical waste management in most developing world. This included poor planning and lack of organizational resources, supervision and evaluation. In the light of this, Patil and Shekdar (2001) argue that the most important barrier to effective clinical waste management was inadequate involvement by top management and their inability to overcome operational barriers on time. Governments and the health care providers have gone in for one type of option for treatment of the clinical waste since the regulatory bodies are also not committed to an intensive supervision. No health care provider wants or has undertaken a base line survey to collect data regarding quantum of clinical waste and its type being generated, nor about the waste generation points in its premises (Nemathaga *et al*., 2008). Budgetary commitment by top management is poor in the government run health care facilities, the corporate hospitals and the nursing homes.

Therefore, they find it convenient to ignore the rules for monetary consideration in clinical waste management (Verma, 2010). Top management in most health care facilities is showing unwillingness to make an effort towards dealing with the clinical waste management. The wastes are therefore instead of being segregated, discharged in a mixed condition to the site of disposal, separating only the saline bottles, which are sent for auctioning (Athavale, & Dhumale, 2010). For instance, Physicians are usually aware of the need for proper infectious waste management and the associated risks for disease transmission; however, they are often unfamiliar with the tenets of the rules and regulations (Pandit et al., 2005). For a successful clinical waste management, the health care facility management and key staff must cooperate on planning and evaluation to assess the quantum of clinical waste generated on daily, weekly and monthly basis so as to project into the future clinical waste management issues.

Inadequate Capacities for Clinical Waste Management

The inadequate provision of facilities for storage, collection, treatment and disposal of clinical wastes as well as inappropriate technologies have so far been a great reason why most health care facilities in the third world countries are not able to manage the clinical waste they generated (Ogawa, 2002). For example, adequate and requisite number of sanitary landfills for effective management of clinical waste by the various health care facilities poses a similar challenge to clinical waste disposal (Akter *et al.*, 1998). Therefore, the clinical waste is openly dumped into the

open bins with the municipal waste on the road sides for days before conveyed to the treatment centres.

As a result of inadequate requisite number of sanitary landfills, low lying area is mostly used for disposal of clinical waste with some of such waste being directed into the water bodies, through which severe disease causing agents are spread into the air, soil and water (Dwivedi, *et al.*, 2009). Self-contained on-site treatment methods are the most desirable and feasible means adopted by most large health care facilities but these methods are impractical or uneconomical for smaller health care facilities. Moreover, available disposal techniques are neither able to meet disposal requirements nor innovations in disposal options are in pace with the evolution of complexity of health care waste streams. Mahbobeh *et al*. (2014). In the emergency units of the facilities, as well as other departments, cleaners do not correctly separate the wastes primarily because of understaffing leading to an increase in the volume of infectious waste, creating a financial burden.

Proper management requires cost-effective measures, including providing a sufficient human workforce as well as the necessary physical facilities (Manyele & Lyasenga, 2010). "An acceptable common system should be in place which will provide free supply of colour coded bags, daily collection of infectious waste, and safe transportation of clinical waste from point of generation to offsite treatment facility and final disposal with suitable technology" (Rao, Ranyal, Bhatia & Sharma, 2004).

Inadequate Institutional Arrangements for Clinical Waste Management

"Inefficient institutional arrangements adversely affect clinical waste management in developing countries generally and environmental service delivery in particular" (UN-Habitat, 1989; Ogawa, 2002; Zurbrugg, 2002). Management of clinical waste depends on the input from the administration and active participation by trained staff in segregation, storage, collection, transportation, treatment and disposal. In the health care facilities, personnel assigned to be responsible for clinical waste management are mainly ward attendants and other supporting staff (Verma, 2010). "A committee consisting of the head of the establishment, all the departmental heads, hospital superintendents, nursing superintendents and hospital engineers needs to be formed with a waste management officer who would be advised by an environmental control advisor and an infection control advisor need to be put in place for proper and effective clinical waste management purposes" (Patil & Shekdar, 2001).

Studies showed lack of such kind of hospital waste management committee or a documented waste management and disposal policy in Indian hospitals (Athavale, & Dhumale, 2010). For example, in Iran, national guidelines are used as educational resources with most of these guidelines having several weaknesses (Onibokun, 2013). Nurses, for instance, stated that clear operational

explanations have not been provided for some waste types, with clinical waste as no exception. Thus, the national guidelines need to be reviewed by authorities and compared to international standards (Mahbobeh et al., 2014).

Inadequate Financial Provisions for Clinical Waste Management

With dedicated systems being installed in most of the Health Care Units (HCUs), financial provision is considered necessary for capital and recurring expenditure including funds for sufficient manpower, disinfectants, devices and equipment (Onibokun, 2013). In his attribution to the improper clinical waste management of health care facilities, Armah (2006) posits that over reliance on central government subventions which are not adequately enough has deepened the challenge of improper clinical waste management. According to him, any health care facilities that rely so much on central government subventions to operate a waste management service is bound to fail because such subventions are often limited and unreliable. Funds usually provided to the health care sector by both national and local governments are very limited and the level of service required to protect public health and the environment cannot be attained (Ogawa, 2002). Hence, most health care facilities are unable to attract suitably qualified personnel for the various aspects of clinical waste management such as planning, operations and monitoring (Onibokun, 2013). Clinical waste requires additional funds for conducting training and awareness programs for health care staff (Patil & Shekdar, 2001). As a result of these, smaller health care units ignore clinical waste management practices to the minimum due to financial constraints (Rao *et al.*, 2004).

In corroboration, Ogawa (2002) indicates that developing countries characteristically lack the technical expertise that is needed for clinical waste management planning and operation at both national and local levels. Usually, a separate allocation of funds for clinical waste management is not found in almost all the health care facilities. Ogawa argues that many officers in charge of clinical waste management have little or no technical background training in engineering or management. Without sufficiently trained personnel, however, clinical waste management projects cannot be effective and sustainable. He observed that in many cases, clinical waste management programmes initiated by external consultants have collapsed in the hands of local management due to the lack of expertise and loss of funding. In support of this, Lohse (2003) has observed that health care facilities in developing countries generally lack the required capacity and technical expertise to accomplish effective and sustainable clinical waste management programmes due to inadequate funds.

These poor management challenges are found due to the economic constraints of the developing countries which have prevented governments from adequately supporting and building an effective capacity for clinical waste management (Da Silva et al., 2005). Proper clinical waste management practices are generally a low-priority in government budget allocations, thus, the financial base for

these activities is weak. This is particularly true of local governments who are the real overseers of clinical waste management programs. To make up for deficiencies in the budget allocations, health care facilities have tended to switch from outsourcing contracted services to internally clinical waste disposal methods. In addition, many developing countries suffer from a lack of capacity in fiscal planning and management (Mahbobeh et al., 2014). For a successful clinical waste management, appropriate budgets should be allocated to supply organizational resources and provide comprehensive training at the hospital level, along with development of health literacy.

Reluctance to Change and Adoption

Though new alternative technologies are permitted as per the Biomedical Rules, it takes a long time to change the mind-set of the people (Rao, *et al.*, 2004). Even now, most of the health care providers and decision-making authorities talk of incinerator only although autoclaves and other advanced waste handling equipment are available. Indiscriminate throwing of the waste is still seen in most hospitals and the waste handlers still are without protective clothing and gears. There is hardly any change in the applied knowledge and awareness seen in Indian hospitals (Verma, 2010).

Inadequate Pressure from Societies

Studies have shown that "pressure from various environmental advocacy groups forces organizations to seriously think about their environmental management programmes" (Walker, Di Sisto, & McBain, 2008) which is lacking in case of Indian organizations. There is no doubt in the mind of any educated or enlightened person that improper clinical waste management is the source of many communicable and infectious diseases. But when it comes to doing anything, there is a complete lack of will, and a lackadaisical attitude towards clinical care waste management by all players in the waste stream (Verma, 2010). However, the major reason for improper clinical waste management is actually related to the mass generation of clinical waste without consideration for their final disposal (Patil & Shekdar, 2001). There can be no solution to the problems of clinical waste until the entire society puts pressure on the various facilities who are engaged in improper management of the wastes generated by them.

Inadequate Enforcement of Medical Waste Management Regulations

Another major reason why health care facilities are not able to manage the clinical waste they generated is as a result the inadequate clearly "stipulated rules that apply to all persons who generate, collect, receive, store, transport, treat, dispose of, or handle medical waste in any form. This will help to maintain occupational and public health" (Manyele & Lyasenga, 2010). "Those

who generate clinical waste must be legally responsible. It shall be the duty of every generator of medical waste (which includes a hospital, nursing home, clinic, dispensary, veterinary hospital, animal house, pathological laboratory, blood bank) to take all steps to ensure that such waste is handled without any adverse effect to workers and the environment" (Pruss et al., 2002). Clinical waste shall not be mixed with other wastes, and shall be segregated into well-labelled containers or bags at the point of generation prior to its storage, transport, treatment and disposal.

"Apart from the prescribed label, transit containers containing clinical waste shall bear information on the date of generation, the waste category/class/ description, the sender's/receiver's name and address (phone/fax numbers) and the contact person in case of emergency" (Patil & Shekdar, 2001). It is also presumed that "the label shall also be marked with symbols, such as the universal biohazard or cytotoxic hazard symbol, and warning signs, e.g. handle with care" (Manyele & Lyasenga, 2010). Untreated medical waste shall be transported only in a special vehicle owned by a competent authority, as specified by the government. No untreated medical waste shall be kept or stored beyond a period of 48 hours. The municipal body of the area shall continue to pick up and transport segregated non-medical solid waste generated in hospitals and nursing health centres, as well as duly treated medical wastes for disposal at a municipal dump site.

"Every generator/occupier/operator shall submit a report to the prescribed authority every year, to include information about the categories and quantities of medical wastes handled during the preceding year" (Verma, 2010). T"he prescribed authority shall compile this information for future reference. Meanwhile, every authorized person shall maintain records related to the generation, collection, reception, storage, transport, treatment, disposal and/or any form of handling of medical waste, in accordance with these rules and any guidelines issued. All records shall be subject to inspection and verification by the prescribed authority at any time" (Manyele and Lyasenga, 2010). For example, "the potential microbiological risks associated with the clinical waste are still unfamiliar to healthcare workers. This is because of the literature on the role of infectious clinical waste as reservoir of diseases is extremely limited" (Salkin, 2003).

Although there have been a few reports documented on the infectious risks on clinical waste management, unfortunately scientifically substantiated evidence on the actual content of microorganisms, survival of micro-organisms in clinical waste and the infectious risks to healthcare workers and general public are extremely rare. Furthermore, the available information is restricted to the developed countries, and therefore does not reflect the exposure, practices, and risk situations in developing countries (Salkin, 2003).

METHODOLOGY

this study employed a concurrent nested mixed methods design to allows for both qualitative and quantitative data to be collected concurrently with less emphasis placed on the nested or less

primary approach with the aim of gaining a broader perspective than could be gained from using only the predominant data collection method. The concurrent nested mixed method design employed for this study, gave more priority to the qualitative data collection than the quantitative data. The respondents were interviewed to find out their views on the reasons why healthcare facilities in the Yilo and Manya Krobo municipalities are unable to properly manage the clinical waste they generate. The use of a qualitative approach allowed the researchers to obtain a rich set of data that could not easily obtainable when using a quantitative approach. This study also involved site visits or walks through the healthcare facilities to assess working conditions, and gather basic information about the facilities and issues relating to clinical waste management.

The decision to combine quantitative and qualitative methods in this study can also be based on the claims that it will make it possible for the researchers to explore the research questions from different perspectives which would lead to better and broader understanding of the issues connected with clinical waste management in the health care facilities (Baabereyir, 2009). The combination again enabled me to find a common ground to obtain in-depth information from the different categories of participants including health care facilities administrators, doctors, nurses, lab technicians, clinical waste management workers and other service providers who are involved in the generation and management of clinical waste in one way or the other, and communities hosting health care facilities in the study areas. Without this mixed methodological approach, reliance on any single approach to data gathering in this study could lead to loss of valuable information needed to answer the research questions (Aggrey, 2013).

Results and Discussion

Clinical waste as being the most dangerous waste need to be properly managed because of its infectious risks to healthcare workers and general public. However, the data collected for this study has shown that the selected health care facilities in the Yilo and Manya Krobo Municipalities have several reasons why they are not able to manage the clinical waste generated. The reasons are presented and discussed below.

Existence of Clinical Waste Management Department in the Health Care Facilities

To find out from the facility administrators of the surveyed health care facilities, if they have clinical waste management departments through interviews, it was disclosed that, though, there were general waste management department in all the facilities, none of the health care facility have a functional department or an office allocated for clinical waste management.

The study further revealed from participants that through questionnaire administration, if the lack of existing functional clinical waste management department was a reason why they were not able to manage the clinical waste in their facilities, the responses were gathered and presented in Figure 1.

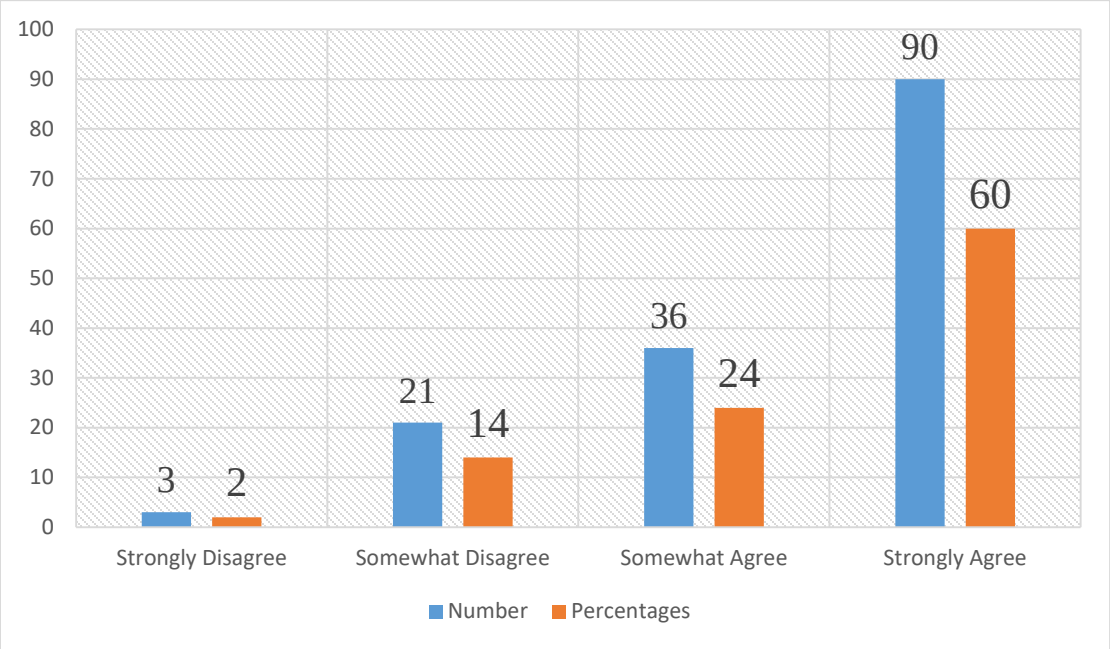

Figure 1: Respondents View on Functional Clinical Waste Management

Source: Fieldwork, 2023

From Figure 1 above, only 2% of the participants strongly disagree that the lack of functional waste department in the surveyed health care facilities is the reason why they were not able manage the clinical waste while 60% of participants strongly agree that they are not able manage the clinical waste they generated as a result of lack of functional waste department in the surveyed health care facilities. Also, 14% of the respondents somewhat disagree while (24%) somewhat agree that the lack of functional waste department in the surveyed health care facilities is a reason why they are not able manage the clinical waste they generated.

In an interview with Martha, a nurse and Mr. Klopa, the laboratory technician at the *Atua* and *Akuse* health care facilities respectively, it was confirmed that waste management departments in the facilities were not functional with none of them dedicated to clinical waste management while the rest of the facilities employed in this study had not got waste management departments in their facilities. A further probe made it clear that clinical waste management had not been given any serious attention by the facility administrators but only left in the hands of the orderlies.

Inadequate Clinical Waste Management Capacity

Clinical waste management capacity, in the context of this study, refers to the equipment and resources available to the health care facility for efficient and proper management of clinical waste

and health care waste in general. The study has categorized the capacity into staff capacity and logistics and equipment capacities. To describe the adequacy of the staff capacity for proper management in the health care facilities, the following responses were recorded and presented in Table 1.

Table 1: Respondents View on the Adequate Staff for Proper Clinical Management

Responses	Number	Percentage %
Very Adequate	18	12
Adequate	27	18
Satisfactory	48	32
Inadequate	57	38
Totals	**150**	**100**

Source: Fieldwork, 2023

The result from Table 1 indicates that 32% of participants are of the view that the staff capacity for clinical waste management in the facilities are satisfactory while 38% of them described the staff capacity as inadequate. On the other hand, 12% of the respondents indicated that the staff capacity was very adequate while 18% said the staff capacity of the facilities was adequate. It could be deduced from the above that majority of the respondent agree that the inadequate staff capacity at the facilities constitute a reason for improper clinical waste management.

Logistics and Equipment for Clinical Waste Manage

Logistics and equipment for clinical waste management in this context refers to storage receptacles, yellow sharps boxes, litter-bins and containers, wheelbarrows, Wallington boots and all personal protective equipment. To find out respondents' views on adequate Logistics and Equipment situations for clinical waste management, respondent's responses were presented in Table 2.

Table 2: Respondents View on the Adequate Logistics and Equipment for Proper Clinical Management

Responses	Number	Percentages %
Very Adequate	05	03
Adequate	25	17
Satisfactory	50	33
Inadequate	70	47
Totals	**150**	**100**

From Table 2, only 3% responded that the clinical waste management equipment were very adequate for clinical waste management while 17% responded that the clinical waste management equipment were adequate for clinical waste management. However, 47% said that equipment were inadequate for clinical waste management while 33% rated clinical waste management equipment as being satisfactory for clinical waste management. Through observation, it was noticed at the *Somanya* health care facility, a packed of clinical waste sharps ready to be sent to the Atua health care facility for disposal as a result of inadequate capacity to dispose it by the facility.

Following from this in an interview to ascertain the capacity of the surveyed health care facilities for clinical waste management, Cynthia, a nurse in charge of the female ward at the St Martin's hospital at the *Agormanya*, said that the facility had not got adequate Logistics and equipment in terms of storage receptacles, yellow sharps boxes, litter-bins and containers available for the storage and management of clinical waste. She said, many at times, the shortage of these capacities compelled the staff to use improvised materials thereby using non- prescribed storage containers such as the use of paper or card boxes in place of the containers for the storage of the waste. At the *Agogo* health care facility, Mr. Robson in an interview, also indicated the problem of inadequate human capacity such as orderlies to empty the waste containers and to ensure proper clinical waste management. This, therefore, gave rise to the nurses themselves manually carrying the clinical waste containers to the storage site, he said.

Again, Mr Adinko, the incinerator operator at the St. Martin de Porres health care facility, in an interview noted that clinical waste segregation was practiced by all the units but colour coding and labelling of containers/bags were not provided at all the units as a result of inadequate capacity. He said, as a result of the absence of appropriate colour coding and labelling of clinical waste, it was difficult to identify the source and type of clinical waste when brought to the incineration site. At the *Akuse* government hospital, Evelyn, an orderly, in an interview said the shortage of complete protective clothing was a major challenge in the handling of clinical waste exposing waste workers in general to unnecessary health risk.

Systemic Failure in Terms of Interrelatedness of the Units and Departments for Clinical Waste Management

The tenets of systems theory are integration of parts of a system in problem solving and that problem of a system cannot be solved as well if it is considered in isolation from components that make up the system. For the sake of decision-making on clinical waste management, it is quite common that more than one department or unit of the health care facility should be taken into consideration by employing the tenets of the theory (Agranoff & McGuire, 1999; Borgatti & Foster, 2003; Borgatti & Molina, 2003). Clinical waste management was seen as a system where the health care sector generates various interrelated components to include waste storage, waste

collection, transportation system, transfer stations, management methods, and management options, among others, because of their interrelatedness (Agranoff & McGuire, 1999).

The data collected for this study indicated that the health care facilities employed in this study had not treated clinical waste management in the realm of systemic approach. To find out if there is interrelatedness/interdependences among the units/departments for clinical waste management, the following responses were recorded and presented in Table 3.

Table 3: Interrelatedness/Interdependences among the Units/Departments for Clinical Waste Management

Responses	No. of respondents	Percentage %
Strongly Disagree	90	60
Somewhat Disagree	36	24
Somewhat Agree	21	14
Strongly Agree	3	2
Totals	**150**	**100**

Source: Fieldwork, 2020

From Table 3, it could be seen that 36 respondents, representing 24% strongly disagree while only 2% strongly agree to the interrelatedness/interdependences among the units/departments for clinical waste management in the health care facilities. Also, 60% of participants somewhat disagree while 14% somewhat agree to the interrelatedness/interdependences among the units/departments in the health care facilities. The above distribution clearly showed there is no interrelatedness/interdependences among the units/departments for clinical waste management in the health care facilities.

An interview with Dr. Smith, a medical doctor at the *Atua* government hospital showed that the various components and units were not made interdependent on each other for effective clinical waste management of the facility. He said, at the *Atua* government hospital, for instance, the clinical waste management workers in the various departments and units work in isolation with each department or unit managing its clinical waste generated. At the *Akuse* government hospital, Mr Okai, the facility research assistant, admitted that the interdependence among the various departments and units would ensure effective clinical waste management in the health care facility. He said the current systemic failure in terms of clinical waste management practice at the department and unit levels had led to improper storage, transport and disposal methods which he described to be crude.

> *Each department/unit of the facility was managing clinical waste differently from the other and this may have negative effects on the good habit of waste management in general he said (Interview with respondent- March 3, 2023).*

It could, therefore, be deduced from the above submissions that there was lack of connectivity and interdependence among the various components or departments in the health care facilities as much as clinical waste management was concerned. Hence, when there was a problem with one component's clinical waste management, the health care facilities isolate that component without taking a holistic approach to view the whole system to understand what the problem could be. This was not in line with the study of Nagabhushana (2013) which indicated that using the open systems theory in clinical waste management helps better identify where a problem lies within an individual's waste management departments and units in the health care facility. Often times, when this theory is not put into practice, we can find ourselves chasing ghosts of clinical waste problems because we never truly identify the waste issue. Employing open systems approach to clinical waste management did not only allow us to take a better look at a problem of clinical waste but it also helps us to identify why there is a problem and found a better solution to it (Zerbock, 2003).

Lack of Integrated Clinical Waste Management (ICWM) Approach

The data collected for this study had showed that integrated clinical waste management approach is however not considered and adopted by the health care facilities involved in this study in their clinical waste management practices. Mr Koonson the facility administrator at the *Akuse* health care in an interview, indicated that integrated clinical waste management approach had not been considered by the facility due to lack of appropriate capacity. He said with the integrated approach, the facility had to acquire a recycling machine which the facility did not currently have to recycle clinical waste for reuse. "Even the value of recycled products is sometimes not enough to cover the costs of collecting, storing, transporting, processing and packaging" he said. At the St. Martin de *Porres* health care facility, Mr Odom said though the facility had maximizing benefits and minimizing costs of waste management as well as optimizing the use of resources it had some economic, cultural and technical issues including high costs of procuring specialized raw materials and equipment, employee training; and appropriate technologies which the facility could not afford at that moment.

In an interview with the facility Administrator at *Somanya* Polyclinic, it came to light that though integrated clinical waste management approach ensures that everybody in the health care facility has a right to a regular clinical waste collection and proper sanitation, the emphasis on public participation, however, poses major challenge for many health care facilities due to the reliance on the conventional approach to waste management which typically involves the collection and disposal of waste with little or no emphasis on minimization, recovery and recycling.

Again, the medical doctor at the St. Martin de Porres health care facility, Mr. Ayiku, noted that most importantly the attitude of health care workers, especially clinical waste collectors who dump their clinical waste carelessly without adhering to environmental sanitation guidelines leaves much to be desired. Again, Jane, a senior at the *Asesewa* government hospital said the negative attitude

of waste workers were more regrettable, given that clinical waste bins meant for disposal were at strategic places within the health care facilities, yet individual orderlies with no regard for maintaining healthy environment will prefer dumping clinical waste in any manner, mindless of numerous health implications that their action and inaction may cause. She said:

> *"Some of these hazards such as stinking odour that might be produced from the clinical waste as a result of these negative attitudes and the possibility of attracting micro-organism to feast on the decayed clinical waste could cause diseases to human beings and the environment" (Interview with respondent- March 8, 2023).*

Plate 1 showed a picture of one of the researchers in an interview with the senior nurse at Asesewa government hospital.

Plate 1: A Picture showing an Interview session with a Senior Nurse at Asesewa Government Hospital
Source: Fieldwork (2023)

Inadequate Financial Budget Allocated for Clinical Waste Management

For effective clinical waste management to take place in the various units and departments of Health Care facilities, financial provision had to be considered necessary for capital and recurring expenditure including funds for sufficient manpower, disinfectants, devices and equipment (Onibokun, 2013). To find out if the inadequate financial budget allocated for clinical waste management is the reason why the health care facilities are not able to manage the clinical waste they generated, the following responses were collected and presented in Table 4.

Table 4: Inadequate Financial Budget Allocated for Clinical Waste Management

Responses	No. of Respondents	Percentage %
Strongly Disagree	-	-
Somewhat Disagree	9	6
Somewhat Agree	42	28
Strongly Agree	99	66
Totals	**150**	**100**

Fieldwork, 2023

From Table 4, 66%, strongly agree that the inadequate financial budget allocated for clinical waste management in the health care facilities is one of the reason why the facilities are not able to manage their waste whereas 28% somewhat agree. On the other hand, none of the participant strongly disagree that the inadequate financial budget allocation is the reason for the waste not properly managed although 6%, somewhat disagree that the inadequate financial budget allocation constitutes a reason the waste was not properly managed.

The data gathered for this study, indicated that, there were inadequate funds allocation for clinical waste management in the health care facilities engaged in this study. In an interview with the facility administrator at the Asesewa government hospital it came up that there were no funds usually allocated for clinical waste management in the health care facility by both national and local governments. He said the funds were rather allocated for general health care waste management, which were woefully inadequate for the kind of service required in terms of clinical waste management in order to protect public health and the environment was very huge. The facility administrator at the Somanya polyclinic, Mr Kofi, in a similar interview, said the expectation for effective clinical waste management cannot be attained as most health care facilities were unable to attract suitably qualified personnel for the various aspects of clinical waste management such as planning, operations, monitoring and the technical expertise that is needed for clinical waste management. He said:

> *"Many officers in charge of clinical waste management have little or no technical background training in engineering or management without which clinical waste*

> *management projects cannot be effective and sustainable" (Interview with respondent- April 10, 2023).*

At the Agogo polyclinic, Ireen, the medical assistant interviewed admitted that, clinical waste requires additional funds for conducting training and awareness programmes for health care staff and hence health care units ignore clinical waste management practices to the minimum due to financial constraints (Rao, Ranyal, Bhatia & Sharma, 2004). In support of this, Lohse (2003) has observed that health care facilities in developing countries generally lack the required capacity and technical expertise to accomplish effective and sustainable clinical waste management programmes due to inadequate funds.

Poor Top Management Engagement in Clinical Waste Management

Top management commitment was seen as one of paramount importance to clinical waste management in the health care facilities. Within the health care facility itself, the top management must ensure appropriate budget allocated to supply organizational resources and provide comprehensive training at the hospital level, along with development of health literacy. For instance, a study conducted by Mahbobeh, Mohsen, Charles, Mina and Mehrdad (2014) indicated that managerial weakness was an important negative challenge to clinical waste management in most developing world. This included poor planning and lack of organizational resources, supervision and evaluation. Health care facility management and key staff must therefore cooperate on planning and evaluation to assess the quantum of clinical waste generated on daily, weekly and monthly basis so as to project into the future clinical waste management issues.

To find out if the inadequate top management engagement is the reason why the health care facilities are not able to manage the clinical waste they generated, the following responses were gathered and presented in Figure 2.

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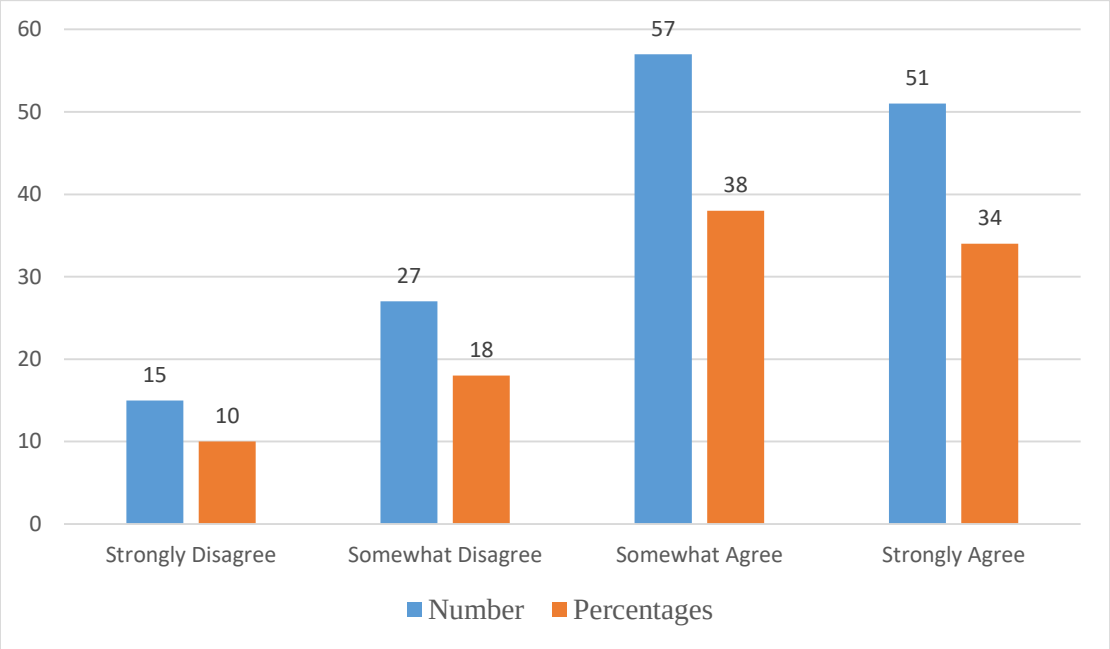

Figure 2: Respondents View on Poor Top Management Engagement in Clinical Waste Management
Fieldwork, 2023

It could be seen from Figure 2 that merely 10% of the participants strongly disagree that the inadequate top management engagement is the reason why clinical waste generated was not properly managed though 18% somewhat disagree to on that fact as a reason. Nonetheless, 38% somewhat agree on the inadequate involvement of management is one reason for improper clinical waste management while 34% strongly agree that the inadequate top management engagement is the reason why the health care facilities are not able to manage the clinical waste they generated.

The data collected for this study showed that in all the health care facilities employed in this study, there was lack of top management involvement in clinical waste management. In an interview, Asamoah, a theatre nurse at the *Atua* government hospital, disclosed that the greatest challenge encountered by the facility's clinical waste management was inadequate involvement by top management and its inability to meet operational difficulties on time. He said, in the facility, no top management member wants or had undertaken or saw to it that a baseline survey was conducted to collect data regarding quantum of clinical waste and its type being generated, nor about the waste generation points in its premises. He went on to add that clinical waste management has been left in the hands of few service providers especially the orderlies. In another interview at the *Atua* government hospital, Baah again contended, that most of the challenges of clinical waste management must be blamed on the lack of commitment of top management of the facility. He said top management had shown, to a large extent, the unwillingness to make an effort towards

dealing with the clinical waste management challenges. The wastes were, therefore, instead of being segregated, discharged in a mixed condition to the site of disposal, separating only the saline bottles, which were sent for auctioning.

In another interview with Teye Kofi, the Medical Assistant at the *Asesewa* health care facility, it came to light that budgetary commitment by top management towards clinical waste management was poor with no exception to Asesewa government hospital. He further explained that clinical waste workers found it convenient to ignore the rules and regulations for effective clinical waste management and have gone in for their own option for treatment of the clinical waste since the regulatory bodies were also not committed to an intensive supervision. A senior nurse in charge of the maternity ward at the Somanya polyclinic further added that all the health care workers including the orderlies were usually aware of the need for proper infectious waste management and the associated risks for disease transmission; however, they were often unfamiliar with the tenets of the rules and regulations as a result of inadequate training and commitment of top management to clinical waste management (Pandit, Mehta, Kartha, & Choudhary, 2005).

Again, a medical officer at the *Asesewa* health care facility indicated the general lack of coordination between the regulatory authorities and the department of Health who exercise functional control over all healthcare facilities in one way and the lack of will to enforce implementation. He said the legal provisions relating to clinical waste management were often incorporated as fragmented elements in disparate laws such as laws for public hygiene, local administration, and environment protection in the various health care institution and agencies. "These agencies responsible to enforce these laws in the various health care facilities were, on the one hand, lacking adequate power and, on the other hand, no commitment" he said. A similar study by Abor and Bouwer (2008), on clinical waste management in healthcare facility in South Africa, identified some challenges of clinical waste management to include inadequate enforcement of the necessary rules, regulations on different aspects of collection and disposal of clinical waste at Kotuba hospital.

CONCLUSIONS AND RECOMMENDATIONS

The study concluded the major reason for improper clinical waste management in the surveyed facilities in the Yilo and Manya Krobo Municipalities was adequate capacitated in terms of storage receptacles, yellow sharps boxes, litter-bins and containers available for the storage and management of clinical waste. There is also less documentation and records keeping on the quantity, type and composition of clinical waste seen as the common reasons why the selected health care facilities could not properly manage the clinical waste generated. The clinical waste management departments in most of the facilities were not functional to coordinate all the activities of the various units that generate all manner of waste with special reference to clinical waste. The inadequate budgetary allocation for clinical waste and general waste management was yet another

reason why the study health care facilities could not properly manage their waste. The minimal facility administration involvement in clinical waste management was found to be yet another reason why the facilities could not properly manage their generated waste. Finally, the inability of the regulatory bodies to be much committed to providing adequate supervision of the clinical waste management practices as well as the negative attitude of waste workers contributed to improper clinical waste management in the surveyed health care facilities.

For the reasons why health care facilities are not able to manage the clinical waste they generated, the study recommends that the waste coordinator must see to it that supplies of consumable items are available (e.g. waste bags, adequate protective clothing and equipment etc) and allocates resources to support the system and to ensure arrangements are in place. These committees must be in charge of periodical reviewing and resolving clinical waste management issues. Also, the study recommends constant education for the health care facility workers on the dangers post by clinical waste to facility administrators, doctors, and nurses, patients, orderlies and even visitors who came to see their relatives if not properly managed. It is further recommended that the top management members of the facility must be involves in the management of the clinical waste generated and must be made to commit adequate funds for clinical waste management in the facilities.

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