

Management of healthcare waste in Egypt

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ABSTRACT-

According to the Ministry of State for Environmental Affairs (MSEA) in Egypt, the outbreak of infectious diseases such as hepatitis is on the rise. This is largely due to improper management of hospital wastes (HW). Many factors contribute including unlawful gathering and selling of hospital waste due to corruption and scarcity, lack of proper disposal facilities, lack of proper training and awareness, and the lenience of legislation. This paper examines the policies and procedures employed in the disposal of hospital waste materials and the challenges and issues that must be overcome in order to finish this crisis.

I. INTRODUCTION

Over the past 12 months there were significant changes in the amount of medical waste management. These changes appeared more complex than it is in reality as it the Egyptian manages to get to grips with the organization of waste disposal. In order to penetrate uncertainty. With the provision of health care more and more in the vicinity of the community, either in the homes of patients in private clinics or health centers, and the amount of clinical waste arising in this area could increase. In addition, there is an abundance of existing other producers in the Pacific community, rather than a typical hospital surroundings, including dentists, GPS, veterinarians, laboratories, funeral directors, tattoo, school nurses, and the role of nursing care. There are also organizations that occupied in the collection and disposal of waste that thinking, including private contractors and local authorities, and the latter is usually involved in the collection of waste produced by households clinical. In the collection of the past as authorities were ill-treatment has been focused guidance and assistance to senior producers such as acute hospital funds and clinical waste producers' society. This article tries to identify the main parts of

the information that facing those who produce, and waste management and collection in clinical community.

II. THE AIMS

The main aim of control of healthcare waste is to Minimize the risks of hazardous agents (such as pathogens) . Prevent their transmission to patients, health care workers and the environment. Also to quantify the amount of solid wastes generated; identify the current solid waste handling practice (e.g. Storage, collection, transportation and disposal) within the hospital premises; also to assess the needs of training for hospital waste management, Moreover, suggest remedial measures for better management of medical wastes in the surveyed hospitals.

III. LITERATURE REVIEW

Generally, hospital waste is defined as the discarded or unwanted material or garbage or solid waste which is generated from the diagnosis, treatment, or immunization of Human beings or animals, in research pertaining thereto, or in the production or Testing of Biologicals [14] These have the potential to cause disease and are a health risk. It is a by-product of health care that includes sharps, non-sharps, blood, body parts, chemicals,

pharmaceuticals, medical devices and radioactive materials [14].

The HCE is one of the major producers of solid wastes which are hazardous in nature. Poor management of clinical wastes exposes health workers, waste handlers and the community to infections, toxic effects and injuries [2].

In all hospital waste or special Health care waste, refers to waste streams generated by Hospitals or health care facilities and containing infectious, Pathological, or radioactive fractions . In most countries, Medical waste Is regulated or defined as a form of Hazardous wastes by laws or directives, such as the European Waste Category, The Medi Cal Waste Tracking Act in the [14] , Hazardous Waste Reg elections in the UK, and the Nationa l Catalog of Hazardous Wastes in China [14], requiring special collection, Treatment , and disposal. The treatment technologies for Medical waste, excluding radioactive waste, could be Categorized into two types : incineration technologies, e.g., Cement incinerator, rotary kiln incinerator, or payroll issuing cinerator, and non -incineration technologies ,e.g. ,Autoclave,microwave disinfection, and plasma disinfection. The issue of environmental pollutions relating to these two Categories has been discussed since the 1980s, especially Since dioxins and anthropogenic mercury have been Detected in significant amounts of gas and ash from medical Waste incinerators [5]. Medical waste Incinerators are ranked among the top four sources of these Two emissions in the US [8]; [1]. However, incineration is the most frequently used Option , due to its advantages regarding the sterilization of Pathological and anatomic was tea, volume and mass reduction, and energy recovery. According to previous studies [6], about 49 – 60% of medical waste is treated by various incinerations, 20– 37% by autoclave sterilization, and 4 – 5% by other methods. Incineration and steam autoclave sterilization are the main methods currently being used and are considered mature technologies. Waste policy

making is generally based on a waste hierarchy. Although different versions of this hierarchy exist, the following order is usually suggested: reduce the amount of waste reuse; recycle materials; incinerate WI the energy recovery; and , landfill . In medical waste management , the first priority is generally a cc ep ted. However, reusing and are EC is Lin g materials is currently forbidden by regulations due to the high hazardous potential of medical waste. The order of preference regarding incineration and landfill is often discussed. Employing the waste hierarchy y for medical waste management raises further questions , e.g.,“ What is the hierarchy for medical waste treatment? ” And “ what is the hierarchy for final disposal of medical waste after sterilization processing? ”So far, a large number of analytical tools have been used to compare waste treatment strategies, including cost –benefit analysis, life cycle assessment (LCA), analytic hierarchy process, and combinations of them [6] ; [4]. The European Commission ’s Strategy for waste and resource highlights the life cycle thinking is important for more sustainable waste management practice. LCA, as a quantitative tool for life Cycle thinking, could offer decision makers information About potential environmental burdens caused by different Alternatives. Unfortunately, less research has been performed On medical waste than on municipal solid waste (MSW) and biomass waste. The present study therefore evaluated steam autoclave sterilization with sanitary landfill (AL), as the main non-incineration technology, and hazardous waste incineration (HWI) for a specific medical waste composition, from a life cycle perspective. Contribution and perturbation analyses were presented to support the results.

IV. HEALTHCARE WASTE: DEFINITION AND CLASSIFICATION

A. Definition

Healthcare waste includes all wastes that resulting from healthcare establishments, research facilities and laboratories. Also, it includes the waste

generating from sources produced in the course of healthcare in the home as (dialysis, insulin injections, etc.). It has been classified by many researchers such as, [12] as the following:

B. Infection Waste

Infectious waste is suspected of containing pathogens (bacteria, viruses, parasites, or fungi). This category includes:

- Waste from surgery and autopsies on patients with infectious diseases (e.g. tissues, and materials or equipment that have been in contact with blood);
- waste from infected patients in isolation wards;
- Any other materials that have been in contact with infected persons or animals.

C. Pathological Waste

Pathological waste consists of tissues, organs, body parts, human foetuses and animal carcasses, blood and body fluids.

D. Sharps

“Sharps are items that could cause cuts or puncture wounds, including needles, hypodermic needles, scalpel and other blades, knives, infusion sets, saws, broken glass, and nails. Whether or not they are infected, such items are usually considered as highly hazardous health-care waste” (p. 3).

E. Pharmaceutical waste

Pharmaceutical waste includes unused, expired, and contaminated pharmaceutical products, drugs, vaccines, and sera that are no longer required and need to be disposed of appropriately.

F. Genotoxic waste

“Genotoxic waste is highly hazardous and may have mutagenic, teratogenic, or carcinogenic properties. It raises serious safety problems, both inside hospitals and after disposal, and should be given special attention” (p.5).

Genotoxic waste may include certain cytostatic drugs, vomit, urine, or feces from patients treated with cytostatic drugs, chemicals, and radioactive material.

G. Chemical waste

Chemical waste consists of discarded solid, gaseous chemicals, and liquid for example from experimental work and from cleaning, housekeeping, and disinfecting procedures. Chemical waste from health care may be hazardous or nonhazardous; in the context of protecting health, it is considered to be hazardous if it has at least one of the following properties

- Toxic;
- Corrosive;
- Flammable;
- Reactive;
- Genotoxic.

V. HAZARDS OF HEALTHCARE WASTE

Health-care waste includes large ingredients of general waste and a smaller percentage of hazardous waste. This section deals with the potential risks vulnerability to hazardous health-care waste or risk. According to [12], they discussed as coming:

A. Types of Hazards

The hazardous nature of health-care wastes often because one or more of the following characteristics:

- It contains infectious agents;
- It is genotoxic;
- It contains toxic or hazardous chemicals or pharmaceuticals;
- It is radioactive;
- It contains sharps.

B. Persons at Risk

All individuals who have been exposed to hazardous health-care waste are can be at risk. The main groups at risk are:

- patients in health-care establishments or receiving home care;
- visitors to health-care stablishments;

- workers in support services allied to health-care establishments, such as laundries, waste handling, and transportation;

C. Hazards from Infectious Waste and Sharps

Infectious waste might have any of a great variety of pathogenic microorganisms. Pathogens in infectious waste may enter the human body by a number of ways:

- through a puncture, abrasion, or cut in the skin;
- through the mucous membranes; by inhalation;
- By ingestion.

D. Hazards of Chemical and Pharmaceutical Waste

A great deal of chemicals and pharmaceuticals which are used in health-care establishments are hazardous chemicals, such as (toxic, corrosive, flammable, reactive, explosive, shock-sensitive, cytotoxic or genotoxic). Therefore, they may have toxic effects, either through acute or chronic exposure, and injuries, including burns.

E. Hazards from Genotoxic Waste

“The severity of health hazards for health-care workers handling cytotoxic waste arises from the combined effect of the substance toxicity and of the magnitude of exposure that may occur during waste handling or disposal” (p.22). Thus, Special care in handling genotoxic waste is absolutely essential; any discharge of such waste into the environment could have disastrous ecological consequences.

F. Hazards from Radioactive Waste

The kind of disease resulted from radioactive waste is determined according to the type and extent of exposure. It can range from headache, dizziness, and vomiting to much more serious problems. Because radioactive waste, like certain pharmaceutical waste, is genotoxic, it may also affect genetic material.

VI. SITUATION OF HOSPITAL WASTE DESTINATION IN EGYPT

One could recognize many negatives while reviewing the situation of HW destination in Egypt. These negatives due to the absence of the right concepts and proper systems, for the knowhow of waste handling and disposal, as workers and staff accredited to deal with waste are, insufficiently, aware of these concepts. This can be seen in several hospitals, as waste is collected in inconvenient containers and inconvenient spaces, with this, waste transportation is conducted manually and incorrectly. Furthermore, there is no clear and specific management and financial function for waste disposal. While, waste disposal is a significant issue that needs the collaboration of several institutions and agencies to put it in a appropriate situation, which could be suitable for the economic as well as health conditions in Egypt. Moreover, in Egypt, as hazardous HW is classified among hazardous waste, needed regulations and procedures for transportation of hazardous waste should be followed while dealing with hazardous HW.

VII- SUGGESTED PLANE FOR HOSPITALS WASTES MANAGEMENT IN EGYPT

Despite the challenges facing a proper conduct of HWM, rational planning might help overcome these difficulties. According to [9], the Ministry of Health in Egypt has conducted several programs and activities for safe HWM. A proposed plan for HWM in Egypt may be considered in this section. The plan aims to establish sustainable HWM covering all hospitals over Egypt with the segregation of HW from ordinary municipal waste, and establishing techniques for treatment and final disposal of waste. This can be achieved within the plan framework that considers establishing both of environmental and economical sustainability HMW.

The plan tries to: work to prevent random waste disposal and open incineration of HW, and replacing it by safety treatment techniques, on the human health and environment; reduce health due to

insecure disposal of HW; work on improving existing waste incineration regulations to function correctly; encourage creating stations and networks for central treatment outside residential zones work on increasing national consciousness and developing capabilities of staff in HWM filed; promoting ORGANISATIONS PARTICIPATE IN CREATING SYSTEMS FOR waste management on the scale of districts, which can overcome issues of waste disposal for small institutions

This plan can be divided into a number of phases, with respect to a short term phase the following may be taken a place: creating systems for waste handling and segregation inside hospitals, training workers to deal correctly with waste, and provision the necessary equipment and tools; mentioning, and developing based treatment systems; collaboration of local units to create plans for provinces, bill of quantities for the private sector, etc. for HW only or within a framework with ordinary solid municipal waste; cooperation of local units and the Egyptian Environmental Affairs Agency (EEAA) to identify appropriate sites for central treatment and safe disposal; institutional and manpower development to comply with HWM system on its various levels; and waste can be addressed with any environmentally complying system that is approved by relevant authorities.

The medium term phase may concentrate on more costly and time consuming activities, such as: more decentralization of responsibilities; providing further treatment means and facilities; and control and adjust the existing of legislation. "While the long term stage could focus on following up activities and fill in gaps activities" (p.11), in case other phases have been successful, such as: making sure that the guidelines and standards are followed; and more treatment facilities are functioning properly.

VIII. POLICIES AND PROCEDURES IN HOSPITAL WASTE MANAGEMENT

Hospitals are essential to our society for the prevention, treatment, and management of illness.

The downside of this is that in the course of their function they produce waste materials which are decidedly toxic and ridden with communicable diseases.

The main categories of hospital waste materials include contagious, bio-medical, radio-active, and sharps (scalpels, knives, needles among others). Danger arises when these waste materials are permitted to mix with other common kinds of waste prior to proper disposal or disinfection. When this happens the collection efforts of common wastes (municipal) are rendered useless. Once these materials become combined the whole lot becomes contaminated thus multiplying the potential of infection to the community [11]. Another danger factor lies with individual scavengers who would salvage these materials to use for reselling and the waste workers. In such situations it is common to find outbreaks of hepatitis, cholera, diphtheria, and tuberculosis; diseases which pose an extreme risk to the general public. By implementation of planning and awareness expand the number of infections can be highly reduced. Studies reveal that only 20% of waste material coming from hospitals is infectious [13]. This is a relatively low percentage and infection could be greatly reduced if such materials were separated right from the source. The last 20 years have seen an increased awareness and research towards waste management to maximize the pollution reduction and recycling of re-usable materials. Lack of proper hospital waste management in Egypt has created health hazards and increased pollution. Improper administration affects hospital workers, patients and the environment in general. Without proper hospital waste management the community stands at a now much greater risk of [13].

IX. CHALLENGES AND ISSUES

In order to eliminate the problem of hospital waste management in Egypt, there are hindrances that have to be overcome: Inadequate economic investment, need of awareness and well-organized control, lack of trained medical personnel in waste

management. On top of this, the lack of set guiding principles and legislation and the need of suitable treatment and disposal options play a big role[11].

According to the [15], a report done by the World Health Organization stated that Hospital or Clinical waste is any waste which consists entirely of human or animal tissue, blood or other body fluids, excretions, drugs or other pharmaceutical products, swabs or dressings or syringes, needles or other sharp instruments, which unless rendered safe may prove hazardous to persons coming into contact with. The sources of hospital waste are hospitals and clinics, particularly those providing sensitive services for instance, offering Operating Theatres, Maternity ward, Accident & Emergency, Mortuary, Intensive Care, Isolation Wards, Pharmacy, Pathology Laboratories and other research facilities. Other sources of clinical waste are ambulance services, public health laboratories, blood donation centers and blood banks, practice center of doctors, dentists, veterinary surgeons, immunization/vaccination clinics and hospitals, clinics and nursing homes providing community care, care of the elderly and services related to mental health and learning disabilities [10].

X. HANDLING AND TRANSPORTING HOSPITAL WASTE

Unless hospital waste is properly handled and disposed, it can present risks to healthcare personnel, the public and the environment. As a result, many developed countries have formulated codes of practices and guidelines for handling and disposing such waste. While noteworthy progress has-been found, it still requires further amendment in all aspects of hospital waste management practices [13]. The management of hospital solid waste is considered as difficult due to its massive volume of generation, serious threat for human health as well as the cost of disposal. The disposal of hospital waste has three components: collection of different kinds of waste from waste storage bags and containers inside the hospital, transportation and intermediate storage

of separated waste inside the grounds and transportation of the waste outside the premises to the treatment or disposal facility. The collection containers for bio-medical waste have to be sturdy, leak proof, of adequate size and wheeled. Two wheeled bins and four wheeled bins may be used [7] (Jones, 2006).

The 4 wheeled containers have two fixed wheels and two castors and they are fitted with wheel locking devices to prevent unwanted rolling. There should be no sharp edges or corners, especially in metallic bins. For convenience as well as for avoiding any confusion, the color code applicable for the bags/containers should also be used for the bins [3]. Collection timings and duty charts should be put in a prominent place with copies given to the concerned waste collectors and supervisors. For general waste from the office, kitchen, garden etc., normal wheel barrows may be used. Transportation of Segregated Waste inside the Premises-All attempts should be made to provide separate service corridors for taking waste matter from the storage area to the collection room. Preferably these corridors should not cross the paths used by patients and visitors. The waste has to be taken to the common storage area first from where it is to be taken to the treatment/disposal facility [15].

XI. CONCLUSION

The accumulation of waste emerged from the activities of human life, this including hospital wastes (HW), causing adverse impacts on human health as well as its environment. This assignment addresses the destination of HW as one of HWM stages, and includes: involved hazards of HW as a strong relationship between infectious HW and infectious rates of some illnesses. Furthermore, this paper shows the destination of HW in Egypt situation as it implies some negative results from variety of factors such as the absent of right concept and good system. Thus, this paper addresses suggested plan for HWM in Egypt, which aims to create sustainable HWM covers all hospitals across Egypt separating HW from regular municipal wastes and trying to improve

HWM position, this plan could be divided to several phases including a short and medium term phase, which might concentrate on further time and costly consuming activities. However. In order for the hospital waste management process to be successful, extreme care must be taken at the premises or the generator location in order to guarantee safety of hospital personnel, the public, and the environment in general. The two key issues that will play a role in the future of Egypt's hospital waste management are the setting of strict disposal guidelines and the point of origin and strict legislation concerning the handling of hospital waste.

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