lassification Study of Solid Medical Waste in Heet General Hospital

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Abstract

Is rated about (10-25 %) Of these wastes as hazardous and can affect the public health environment and pollution in particular, the medical waste m n this hospital if it is not handled properly can cause health problems for health workers in the hospital and for the patients and the community. Medical waste consists of hazardous waste and non - hazardous wastes include waste and hazardous waste infectious , disease, drugs , sharp tools, chemicals, toxic waste genetic and radioactive either non - hazardous waste fats included garbage and general daily waste of residues of food , materials , office and other.

Keywords: *Waste, medical, solid, Hit General Hospital*

Introduction

The medical waste resulting from the diagnosis and treatment in health institutions of the important topics due to the danger to public health and the environment as a not managed well and that the presence of non - integrated program leads to imbalance in the management. Is rated about (10-25 %) Of these wastes as hazardous and can affect the public health environment and pollution in particular, the medical waste m n this hospital if it is not handled properly can cause health problems for health workers in the hospital and for the patients and the community. Medical waste consists of hazardous waste and non - hazardous wastes include waste and hazardous waste infectious , disease, drugs , sharp tools, chemicals, toxic waste genetic and radioactive either non - hazardous waste fats included garbage and general daily waste of residues of food , materials , office and other. And the World Health Organization reports that 85% of hospital waste is non-hazardous. The remaining 10% of waste is infectious and 5% of waste is non- infectious but hazardous, thus about 15% to 35% of waste for hospitals is infectious waste.

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Literature Review

1. Types of medical waste

Hazardous medical waste: It is the waste that is produced from polluted sources or the possibility of contamination with chemical, infectious or radioactive factors, which constitutes the least percentage of the total health care waste (20%). As for the types of hazardous medical waste

a. Infectious waste materials: are all material to be blunt disposed of after patients contaminated with blood or body fluids take care of the patient , such as blood, sputum, saliva, spinal fluid sample cord .

b. Remnants of pathology: Remnants of human tissues, remains of human or animal organs,

remnants of surgical operations from blood and body fluids excised, and parts rose in surgical operations sent for tissue transplantation**.**

Chemical residues: all liquid chemical residues used in health centers, such as disinfectants and sterilization materials used to clean wounds and surgical devices.

Non-hazardous medical waste: It can be defined as ordinary waste that does not contain infectious, hazardous chemical or radioactive waste. It constitutes the bulk of the total medical waste, up to about (80%), and this type is treated like household waste such as kitchen waste, laundries, administrative offices , covers and furniture waste if Mixed with some hazardous medical waste (radioactive materials, needles, blood) treated as hazardous wast

Table (1) the approximate proportions and quantities of each type of medical waste:

non-infectious waste	**80%**
Pathological waste and infectious waste	15th%
sharp waste	1%
chemical or pharmaceutical waste	3%
Pressurized cylinders, broken thermometers	less than 1%

Used bags and special containers with fixed colors indicate the nature of the waste inside them, according to the following colors:

General waste ● black or ● blue

Waste metal ● yellow or ● red

Waste contaminated with cytotoxic substances ● orange

Chemical waste ● airtight iron containers

Waste contaminated with radioactive materials ● yellow

Medicines and medical consumables ● yellow

Sharps ● Custom container ● Yellow or ● Red.

WHO classification and characterization of medical waste

Table (2) WHO classification and characterization of medical waste

T	waste type	Description
1	Ordinary	Waste similar to household waste such as food scraps and metal cans Plastic and paper
2	infectious	Waste containing germs such as bandages, bedding, patient clothes, doctors' clothes used in surgical operations, gauze and paws
3	pathological	The patient's tissues, fluids, organs, and blood
4	Sharp or sharp	Needles, knives, surgical scissors, laboratory glassware
5	pharmaceutical	Medicines and expired drugs and the remains of their boxes and containers
6	Toxic to fetus	Substances capable of destroying human cells (cancer drugs)
7	chemical	Sterilization materials, laboratory and radiological solutions, and the like
8	Heavy metals container	Batteries and pressure devices (lead and mercury)
9	radiological	Radioactive materials from research laboratories, analyzes, and clothes of patients and therapists
10	pressurized containers	Oxygen cylinders and gas canisters, for example

Classification of solid medical waste according to its main components:

This classification depends mainly on the main component of each type of solid medical waste, as stated by

- **Plastic:** bags, syringes, tubes, paws, etc.
- **Glass:** includes glassware, empty medicine vials, medicine or chemical containers , and glassware contaminated with the patient's body blood or waste.
- **Textile materials:** include cotton waste, gauze and laces (Bandj) and contaminated panels, etc.
- **Metals:** Needles, metal cans filled with drugs or chemicals, staples, scalpels, metallic surgical threads, etc.
- **Organic material:** includes all parts of the human body that are cut or amputated during surgery and includes the results of the birth process.
- **Paper and cardboard:** All paper waste includes medical examination forms, treatment papers, chemical boxes, medical devices, and all papers used in the management of hospital affairs.
- **Food leftovers: It** includes the leftovers of meals provided to patients and the leftovers of food produced during the process of cooking food in the kitchen.

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15.6-37 % Paper

0.0-9.8 % carton

15.8-9.1% plastic

3.7%-0.0% Plaster

0.0-21.7% Parts removed

%14-4.0 glass

26.5 - 12.3% cotton

33.5-21.5% other %

Sources of medical waste:

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A / the main sources:

Hospitals, ambulance points, popular clinics, nursing homes for the elderly, centers, specialized clinics, private clinics and sanatoriums, emergency services, primary health care centers, maternity clinics, dialysis centers, blood banks, military medicine services, medical analysis laboratories, medical research centers, human medicine centers and research centers Animal laboratories and veterinary hospitals.

B/ Secondary Sources:

Doctors' offices used for periodic examinations, small dental clinics, psychiatric clinics, beauty centers, funeral services, acupuncture treatment, physiotherapy clinics and care for the disabled.

Table (2) the color coding of medical waste according to the World Health Organization

(Abu Mohsen , 2014).

waste type	Container color and tag	container type
highly infectious waste	Yellow with the words highly contagious	Durable leak-proof plastic bag or container that can be sterilized by autoclaving
Infectious waste and anatomical waste	yellow	Leak-proof plastic bag or container
Sharps	Yellow with the words Sharps	Puncture Resistant Container
radioactive waste	-	A pencil box marked with the symbol of radiation
Ordinary medical waste	black	Plastic bag
Chemical and pharmaceutical waste	brouwn	plastic bag or container

Methodology

Materials and working methods:

Sorting, weighing and treating solid medical waste.

The process of sorting solid medical waste was carried out in the places of its initial collection in the surgical wards, blood withdrawal centers, recovery rooms, surgeries, sections of the radiology unit, pharmacy unit, laboratory, dialysis unit, isolation rooms for people with corona and other departments in Hit General Hospital, each according to the type of waste that results from that section where Vzr each type of waste type of bags or special containers with this type if the acute waste containers cartoony collection against the hole either infectious waste is collected bags special either Pathological waste mostly are sent parts taken from patients to implant tissue after putting them solution (formalin) The pharmaceutical waste collected from stores if they expired shelf life and then landfilled especially large glass bottles either ointments and substances allowed entry for a waste treatment such as bottles of needles, grains and other of the intervention of the device after collecting them from their locations and when this collection of species of by workers hygiene are taken to room waste chopping (Almthermh) Steril Wave 250 Figure (3) as each of these types is weighed with a regular scale.

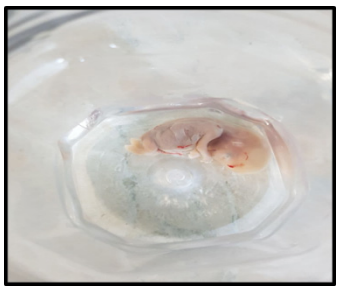

Figure (1) Pathological medical waste

Figure (2) Sharp medical waste

Figure (3) shows the waste disposal device Steril wave 250

Results and Discussion

Classification and weight of solid medical waste:

It showed the results of the classification and the weight of solid medical waste in Hit General Hospital and for a period of one month from the date (2020/8/27) up to '2020/9/27) The results of the table showed (3) that the largest productive amount is medical waste infectious and was at a rate (7.5 - 22 kg) per day and the waste weight for one month (360.3 kg) while the medical waste weight sharp between (05/01 to 04/04 kg) day one and it was the weight of the entire month (71.9 kg) , while the range of pharmaceutical and medical waste weight between (0 - 24.5 kg) per day per was the waste weight of the entire month (49.5 kg) of either Pathological medical waste weight ranged between (0 - 7.5 kg) per day and the weight of the total during the month (31.7 kg), either the weight of the chemical and medical waste ranged between (0 - 2.5 kg) per day either total during the weight of the month was (16.1 kg) there are types of waste are not available due to lack of section The specialist for its production in Heet General Hospital, such as fetal toxic waste, waste with a high content of mercury, and compressed containers, the total total of medical waste of all kinds during a month was (529.9 kg). This result is close to what it came with Tuama, NH(2019)

The weight of waste in Al-Zahraa General Hospital for a month was (444 kg), because it is considered the largest hospital in the city of Kut and has a number of beds of 400 beds, and completely different from what Jawad Abdul Wahed Faydallah (2018) had, as the weight of solid medical waste was The result from Shendi Teaching Hospital (961.6 kg) within a month, and this is due to the large capacity of the hospital , as well as the population density in that area more. It is also considered a teaching hospital that differs from Heet General Hospital. The high production of infectious medical waste in Hit General Hospital is that most of the hospital departments produce this type of waste from patients' clothes, bed covers, and hallways, as well as surgical waste such as gauze, cotton, orthopedic waste, and any waste contaminated with blood or patients' fluids. These are considered infectious waste. The result is in agreement with several studies, including:

As shown in Figure (4) , as was the proportion of medical waste infectious (81%) in this study, the highest proportion of different types of medical waste and the t ratio (16%) of acute waste and (3%) of waste trochanter of .

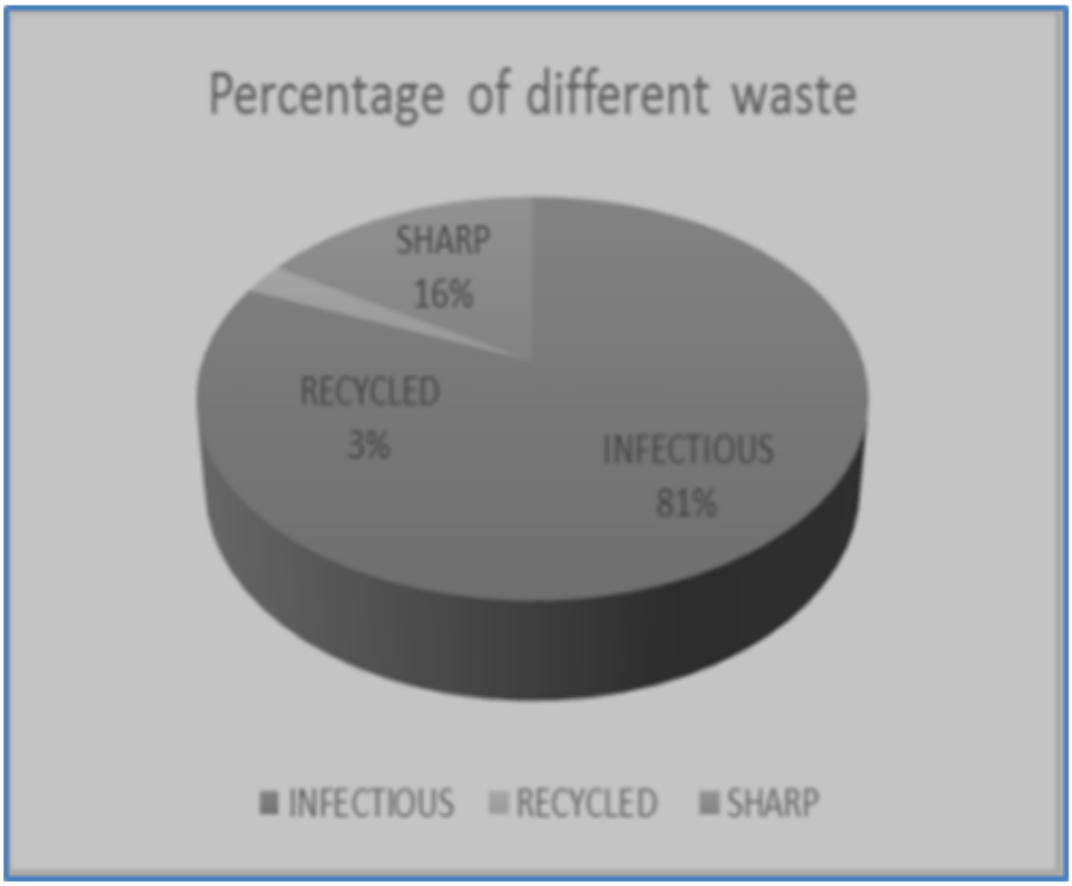

Figure (4) Percentage of solid medical waste distribution according to its classification

Table (3) Weight and type of solid medical waste for a month

waste type	Weight / kg
sharp	71.9
infectious	360 .3
pharmaceutical	49.5
radioactive	0
pathology	31.7
toxic	0
chemical	16 .1
mercury	0
compressed	0
Total	529.5

Average waste collection between days of the week:

Figure shows (4The average collection of solid medical waste by days, where there was a difference in the percentage of waste collection between days of the week, and this indicates a difference in the number of patients visiting Hit General Hospital according to the days of the week, as the average waste collection on Sunday, Tuesday and Thursday was by (19%) and saturday (12%) and monday (16%) and wednesday (15th%).

Conflict of Interest – Nil

Source of Funding- Self

Ethical Clearance – Not required

References

1. Amin, R., Gul, R., and Mehrab, A. Hospital waste management. The Professional Medical Journal, (2013). 20(06).
2. Andrews, Sylvia Magdy Jade and, Awad Saad Hassan.(Better application of medical waste collection and disposal methods in Sudanese hospitals doctoral dissertation, Sudan University of Science and TechnologyJournal of Engineering & Technology (2017 .), 7 (8).
3. Diaz, LF, Eggerth, LL, Enkhtsetseg, SH, and Savage, GM (2008). Characteristics of healthcare wastes. Waste management, (7).

4. Halima Ahmed City. Waste medical, university Success national , College Studies upper Department Sciences environmental . The Professional Medical Journal, . (2010(. 20 (09).
5. Kalia, M., Goel, NK, Rohilla, R., Walia, D., and Singh, N. Biomedical waste management practices in health centers in Chandigarh, India. International Archives of Health Sciences , (2018). 7 (4).
6. KHAN, AA, KANWAL, N., and KHAN, K. Medical solid waste generation and associated health problems in Bahawalpur city of southern Punjab , Pakistan. (2020)..
7. Kindi, GYA. Evaluation of the Reality of the Management and Treatment of Solid Waste in Al-Yarmouk Teaching Hospital. International Journal of Engineering & Technology, 7 (4.20).
8. Maryam Dawood Salman. Evaluation of medical waste management in government hospitals in Gaza governorates. International Journal of Pharmaceutical Research, (2014) 18 (5).
9. Muhammad Ali Ibrahim al-Hashemi and Ghufran Farouk Juma Al-Mandalawi (2007). Management and treatment of solid waste in some hospitals in the city of Baghdad . Engineering and Technology Journal, 25 (5).
10. Piash Saha, M., Islam, A., and Bhowmick . On Medical Waste study Management Scenario Of Badda Thana. Britain International of Exact Sciences (BIoEx) Journal, 2021 .2 (4).
11. Saray Umm Al-Saad and Bougherra winner. The role of the health administration in the effective management of medical waste in light of the controls of sustainable development by applying to the Algerian hospital institution Université de Sétif 1-Ferhat Abbas,Doctoral Dissertation. (2012)
12. Sofia, S., Yogasmara, WS, Andayani, H., and Idayati, R. Impacts of Education's Intervention on Solid Medical Waste Management in Improving Knowledge, Attitude, and Behavior of Medical Health Workers. Britain International of Exact Sciences (BIoEx) Journal, (2021). 3(1).
13. World Health Organization. Management of solid health-care waste at primary health-care centres: A decision-making guide. (2005).