

## **Evaluation of Medical Waste Treatment in Sudanese Hospitals**

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**ABSTRACT:** The waste produced in the course of health care activities carries a higher potential for infection and injury than any other type of waste, wherever it is generated, safe and reliable methods for its handling are there for essential. Inadequate and inappropriate handling of health care waste may have serious public health consequences and a significant impact on the environment.

The study is carried to investigate the current situation of waste management in hospital of Khartoum state (48 hospitals) NO based system of waste management, uncompleted segregation, insufficient equipment, no proper handling, deficient protective measures, unsanitary storage place, huge amount of waste daily generated and not treated with recommended way of WHO. It can be concluded that NO adequate plan of action for proper handling and management of medical waste in Khartoum state.

**Keywords:** Medical Waste Treatment, Incineration.

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### **I. INTRODUCTION**

Medical waste is generated by hospitals, dental clinics, physician's offices, medical laboratories, medical research facilities and veterinary clinics as the result of treatments, immunizations, surgeries, diagnostic procedures, autopsies, or other medical procedures. Medical waste can also be generated through body modification shops such as where body piercing, tattoo, or permanent cosmetic coloring is practiced. In addition to these facilities, personal health care and veterinary care at home can generate medical waste.

Medical waste includes anything that is potentially pathogenic or infectious (i.e. could carry or transmit disease). Examples of medical waste include: Blood and other bodily fluids, Blood-soaked bandages, compresses, etc, Tissues, such as organs or biopsy samples, Used and unused hypodermic needles from the injection of insulin or other prescribed drugs, Tattoo and body piercing needles, Home kidney dialysis filter, bags, and equipment and Automatic lancets used for blood sampling, Contaminated gloves or other protective materials; or Culture materials and swabs.

#### **1.1 Medical Waste from Facilities:**

Medical waste from facilities must be properly treated prior to disposal to prevent transmission of disease. Under state regulation acceptable treatment processes are those that involve decontamination, incineration, or sterilization of the waste. Hospitals, clinics, medical laboratories, veterinarians, home health providers, and body modification shops are responsible for properly treating and disposing of all medical wastes. Each facility should have a procedure in place to ensure that medical waste is collected and treated prior to disposal. Facilities that do not have their own autoclave or incinerator should collect and ship medical waste to an appropriate treatment facility prior to disposal.

#### **1.2 Medical Waste from Home Health Care:**

Medical waste can also be generated in the home by people who are collecting samples, treating a disease condition, recovering from surgery, or recuperating after an injury in their own home. If you have a home health nurse, they may be able to collect the medical waste from your home on their regularly scheduled visits. This waste is potentially harmful, and should not be thrown in the garbage like regular trash.

If you are managing diabetes, allergies, or another medical condition yourself or for someone in your home, contact your local pharmacy, medical service provider, health clinic, or hospital for disposal options. In most cases, your health care provider will accept home health waste and can treat and dispose of the waste for you. A second disposal option is to contact a local medical waste disposal company. They sometimes accept home medical waste at little or no charge. Mail back companies are a third disposal option. They typically provide the waste container, a box for mailing, and shipping costs

#### **1.3 Medical Waste from Home Pet Care:**

Medical waste also includes any medication, instruments or syringes from treating pets for conditions such as diabetes, allergies, wound treatments and postoperative care or even routine vaccines. For home animal

related medical waste, contact your veterinarian office. Most offices will take back used sharps and medical waste for proper disposal from medications or treatments they have prescribed.

**1.4 Other Disposal Options for Home Medical Waste:**

ADEC prefers that medical waste be disposed through medical service providers or medical waste disposal professionals. However if you do not have access to a medical waste service provider, clinic that is able to treat medical waste, or a medical waste disposal company, you must handle medical waste carefully to protect yourself and others such as waste collection workers and landfill workers. Place all sharps and potentially infectious waste in a puncture-resistant container with a sealing lid like a one-liter soda bottle, one gallon juice container, or plastic laundry detergent container. Clearly label the container as medical waste (example “SHARPS: DO NOT OPEN!”), seal tightly, and tape closed for added safety. The container will keep the waste away from others and protect against accidental punctures or cuts.

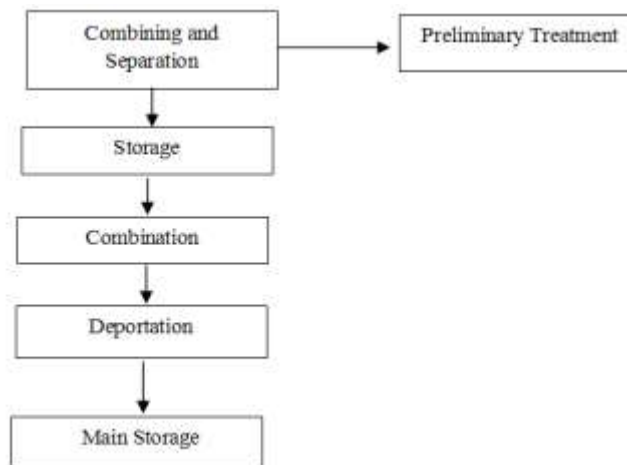
**II. Material and Methods**

**2.1 Annual Medical Waste:**

Some studies in Hospitals Explain Medical Waste Percentage in Hospitals that have 80 beds. Table (2.1): Annual Medical Waste.

Type of Medical Waste	Medical Waste Percentage
Human Organs.	68%
Contaminated Farms	22%
Blood Samples	4%
Liquid Human Waste	3%
Needles and Injections.	1%
Blood Donors Expired	1%
Blood Donors Untainted	1%

**2.2 Medical Waste Treatment Methods:**



**Figure (2.1):** Medical Waste Treatment Methods.

**Table (2.2):** Medical Waste from Khartoum Hospitals.

The Hospital	The Weigh of Waste (safety Box)	The Weight of the Damaged Blood	Medical Waste Location According to Standards
Mohamed Elamin Hospital	100	7 Kg.	There is NO
Alsaudi Hospital	100	53 Bottles.	There is NO
Ibrahim Malik Hospital	140	108.55 Kg.	There is NO
Gabal Awlya Hospital	50	105 Kg.	There is NO
Om Bada Hospital	22	20 Kg.	There is NO
ALturky Hospital	25	70	There is NO
Ibn Sina Hospital	30	180	There is NO
Alsadaga Omdurman Hospital	25	25 Kg.	There is NO
Alnaw Hospital	10	10	There is NO
Ibrahim Saeed Hospital	25	10 gram.	Use Keratin, required two Locations.

2.3 The Guidelines Principles for Standards Emissions from the Burning of Hazardous Medical Waste:

Table (2.3): Standards Emissions from the Burning of Hazardous Medical Waste.

Polluter	Unit (Mg/m <sup>3</sup> )
Total Suspended Solids	34
Darkness	10
CO	50
CO2	150
Hcl	100
Nitrogen Oxides.	400
Organic Compounds	8
HF	5
Dioxin and Furan.	125
Cd	0.16
Pb	1.2
As	1.2
Hg	0.55

Table (2.4): Medical Waste in Hospitals.

Hospital	Corrupted Blood			Safe Box			Masks			Gloves		
	Percentage	Achieved	Required	Percentage	Achieved	Required	Percentage	Achieved	Required	Percentage	Achieved	Required
Khartoum	% 100	283	283	%92	582	632	%38	470	768	% 82	786	894
Bahari	% 82	314	384	% 93	433	464	%96	303	316	%90	554	654
Omdurman	% 56	604	1087	% 98	1041	1061	%64	371	580	%93	428	462

III. Experimental Results and Discussion

Table (4.1): Distribution of Hospital through the Localities of Khartoum state

Valid	Frequency	Percent
Khartoum	3	10.7
Jabal awlya	4	14.28
Umdurman	5	17.85
Karri	6	21.42
Umbada	1	3.5
Bahari	5	17.85
Sharg anile	4	14.28
Total	28	100

4.1 First Collection of Waste: Waste collection in the lab

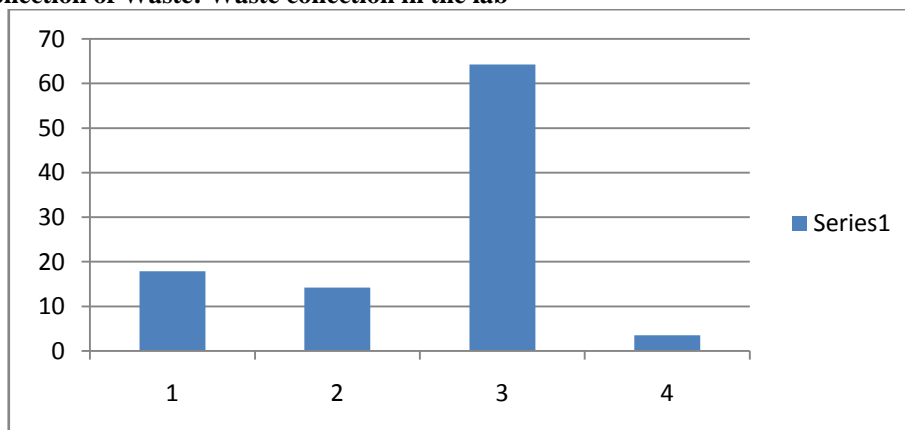


Figure (4.1): Waste collection in the lab.

Where:

1	2	3	4
Safety box	basket	Safety box+ basket.	Safety box+ basket+ other.

Only 17.9% of total use safety box and 64.3% use safety box in additional to basket.

**4.2 Waste collection in the Theater:**

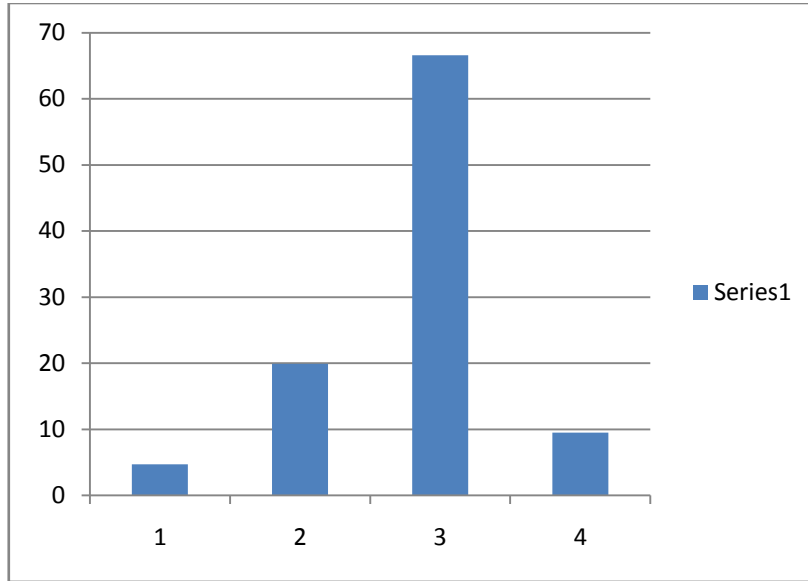


Figure (4.2): Waste collection in the Theater.

Where:

1	2	3	4
Safety box	Basket	Safety box+ basket.	Safety box+ basket+ other.

66.7 % use basket and safety box and 19% use basket.

**4.3 Waste collection in Dressing Room:**

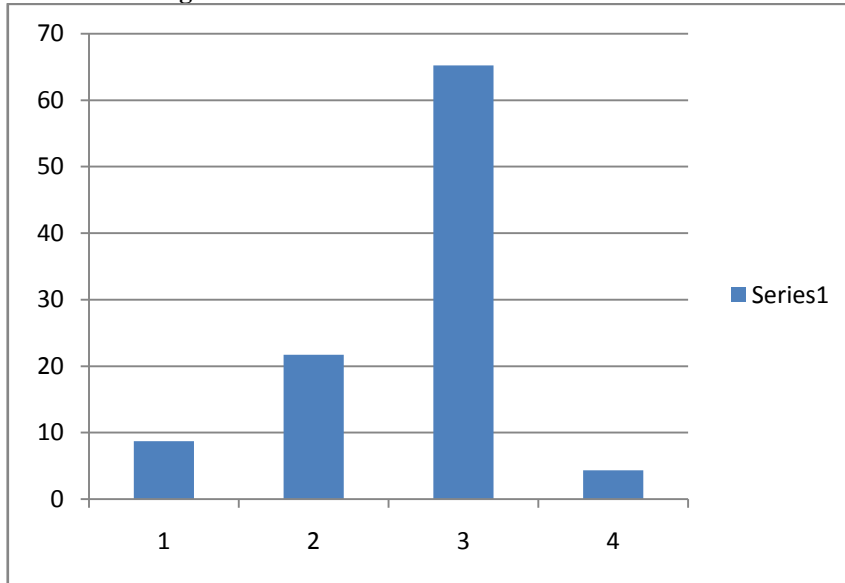


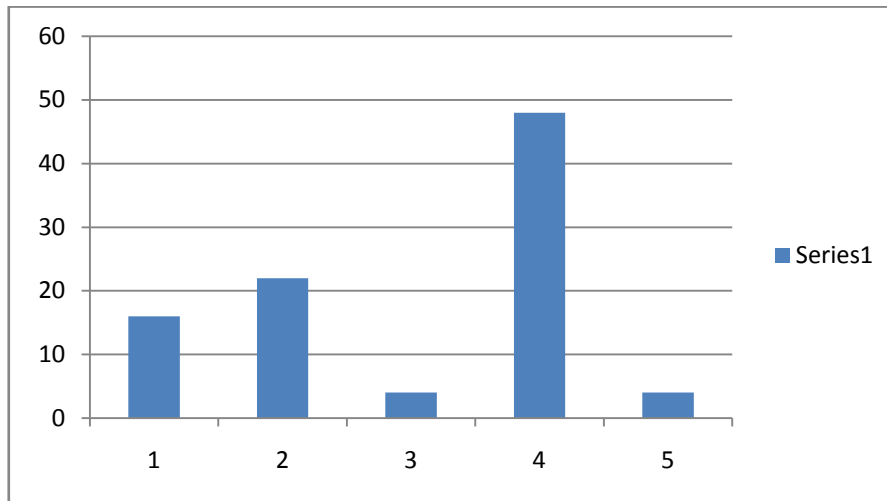
Figure (4.3): Waste collection in the Dressing Room.

Where:

1	2	3	4
Safety box	Basket	Safety box+ basket.	Safety box+ basket+ other.

65.2% use safety box and basket and 21%use basket.

**4.4 Waste collection in Emergency Wards:**



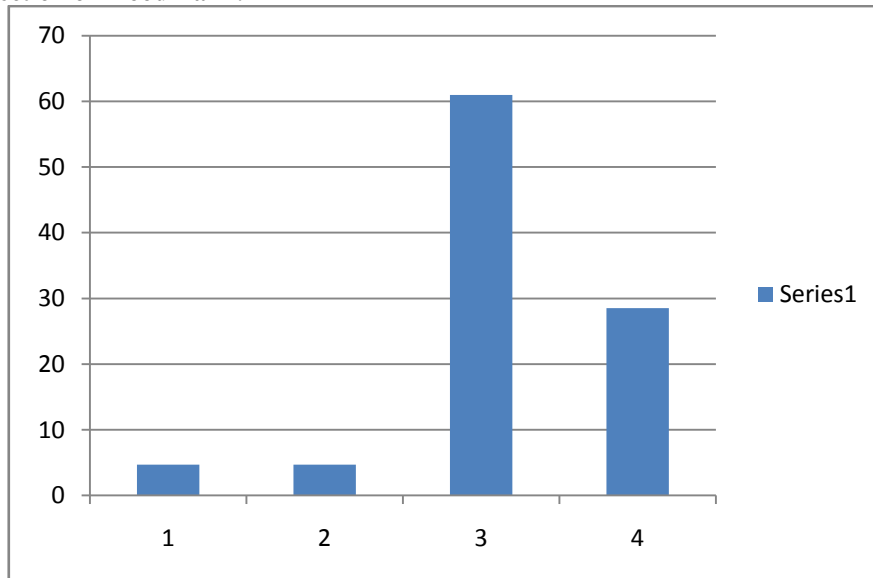
**Figure (4.4):** Waste collection in the Emergency Wards.

Where:

1	2	3	4	5
Safety box	Basket	other	Safety box+ basket.	Safety box+ basket+ other.

16% use safety box, 28% use basket and 48% uses the two together.

**4.5Waste collection of Blood Bank:**



**Figure (4.5):** The Waste Generated by Blood Bank is Expired and Infected Blood.

Where:

1	2	3	4
Safety box	Basket	other	Safety box+ basket+ other.

61.9% of hospital transports it for incineration.

**IV. CONCLUSION**

We are come behind in safe management of waste from health care activities. Waste are not rightly handled, segregated or managed according to WHO classification. Personnel collected waste are not completely protected and even UN educated the training only in form of lectures.

The final fat of medical waste is landfills or open burning locality which develop risk of contamination of underground water tables by un treated medical waste as well as contamination of ambient air un controlled burning . NO Know policy or program no adequate budget for waste management.

## **V. RECOMMENDATIONS**

- In Sudan we need to develop effective care waste programs.
- Policies should be generated and coordinated to achieve the aim.
- Training of personnel and rising public awareness are essential for successful health care waste management.
- Proper education and training must offer to workers from doctors to labors.
- Appropriate container or bag for every ward and department in the hospital (each bag designated for specific health care waste) and should be removed when they are three quarters full.
- Focus in segregation practice.
- Provide secure collection, internal and external transportation system.
- The carrier should use vehicles for collection of infectious waste.
- Vaccination against the disease for which employees may be practically at risk.

## **ACKNOWLEDGEMENTS**

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