Need of Biomedical Waste Management & Health impacts: A Case Study Bilaspur city

Dr.N Guria[1], Mrs. Rama Kundu[2]

1Head Department of Geography Chaitanya College, Pamgarh .Janjgir Champa. C.G. 495554

2 . Asstt.Prof Geography, J K College, Purulia. WB

Abstract

The wastes generated from health care units are generally classified as infectious and non-infectious. The infectious health care wastes are termed as 'bio-medical wastes' and are considered to be potentially hazardous in nature. The disposal of untreated bio-medical wastes mixed with non-infectious health care wastes or other general municipal wastes poses an environmental threatened public health risk. Indiscriminate disposal of untreated bio-medical waste is often the cause for the spread of several infectious diseases. It is also possible for the no monomial diseases i.e. the hospital acquired diseases to the health care personnel who handle these wastes at the point of generation. Moreover, this is equally harmful to persons involved in the bio-medical waste management i.e. segregation, storage, transport, treatment and disposal.

Keywords: Health Care, Segregation, Storage, Transport,

Introduction

Hospital is a place, where an individual is examined by the doctors, diagnosis is made and an appropriate treatment plan is worked out. Depending upon the extent or the intensity of illness, the patients re either treated in outpatient department (OPD) or is admitted in the hospital for treatment and follows up. Type of Health Care Waste: These are of two types (i) Infectious Wastes (ii) Non-infectious Wastes In both the cases, greater amount of waste is generated during this procedure. The quantum of waste thus generated varies according to the site and the nature of treatment. For example, in the minor operation theatres (OT), the amount of waste would be less than in the major OT. Similarly, the amount of infectious waste is more in the maternity hospitals than in a general hospital. In orthopedic specialties, this amount is much less. Thus the amount of waste will vary depending upon the nature of treatment. At individual ward level also, waste is generated. However, Bilaspur, Raipur, durg, korba, Raigarh this is generally non infectious, domestic type. Apart from the hospitals, MW is also generated in the clinics and dispensaries belonging to the general practitioners and the dentists.

Hospital waste is different from domestic waste and must be segregated, collected and disposed of using scientific technology. If segregation is not done properly at source, it can get mixed with municipal solid waste resulting in possible exposure of the entire community to the micro-organisms, which are responsible for highly infectious and dreadful diseases like HIV Hepatitis A, B and C, Tuberculosis and other Skin and Respiratory ailments. In many hospitals, unscientific technologies, like burning of the waste are used for disposal of the hospital waste Mani SK, Bansal AK, Banerjee R,

Choudhry A.(2001). This can lead to dangerous levels of emissions of gases like dioxins and furans in the environment which contain cancer causing agents. Residual ash, if not disposed off in secured landfills, can also pollute the underground water and contaminate the soil. The waste generated in the hospitals in particular can be categorized as follows:

General Waste: This makes about 80-85% of the total waste generated in a hospital. This is non-infectious and can be easily managed if it is segregate at source properly Krishna S, Tomar A, Meenu R. (1998) . General waste includes items like paper, cardboard boxes, plastic packaging, metal boxes etc. which is non biodegradable. Another category of general waste includes kitchens waste which consists of leftover food, vegetable and fruit peels, meat, fish, tea bags or used tea powder, coconut shells, flowers or bouquets brought in by patient's visitors etc. which is bio degradable.

Infectious Waste: This accounts for only a small fraction comprising about 10-15% of the total volume of waste generated in a hospital. However, this small fraction is of the biggest concern as it poses direct threat to the health and hygiene of the human beings by transmitting viral, bacterial fungal or parasitic diseases. This type of waste includes:

Table No. 1

Bilaspur city: Garbage collection trolleys' bins and bags

Sl. No.	Size	Bin dimension (inches)	Cost (Rs.)	Bag dimension (inches)	Cost (Rs.)(for all the colors)
1	Small	8x10x21	1000	17 x 25	2.50
2	Small with plastic bin	9x11x16	1000	17 x 22	2.50
3.	Large	12x14x32	1700	25x37	5
4.	Extra large	17x14x33	2800	36x40	9
5.	Tilt Bin	14x12x28	3000	29x36	3.5

Source: Municipal Health Department, Raipur (C.G)

Table No. 2

Bilaspur City : Garbage collection bags

Colour	Dimension (inches)	Cost (bag in Rs.)
Yellow	12x21	14
Red	23x37	16
Black	32x40	30

Source: Municipal Health Department, Raipur (C.G)

Table No. 3

Bilaspur City: Nature and the types of the Medical Waste

Sr. No.	Category	Nature of waste
1.	Pathological/Anatomical waste	Human tissue such as limbs, fetuses, blood, and other tissues, Animal carcasses and tissues, related swabs, dressing material etc.
2.	Infectious waste	Solid surgical dressing. Swabs or any other object that has come in contact with infected patient or animal body. Waste from the isolation wards, cultures or stocks of infectious agents such as bacteria, form the laboratories, dialysis equipment, apparatus and disposable gowns, aprons, towels, gloves etc.
3.	Metal Sharps	Any sharp pointed or sharp edged objects such as needles, razors, scalpels saws, blades etc.
4.	Pharmaceutical waste	Drugs, vaccines cytotoxic and/or outdated drugs and chemicals etc.

5.	Chemical waste	Any discarded solid, liquid or gaseous chemicalsn form labs, cleaning, disinfection etc. which may be hazardous or non hazardous.
6.	Aerosols and pressurized containers	Solid, liquids and gases from in vitro analysis of body tissue and fluid etc.

Source: Field Survey, 2010

TableNo. 4

Bilaspur City: Category-Wise Waste Generated

Waste Type	Kg/ Bed / Day
Total Infectious	25.00
Non Infectious	14.00
Recyclable	3.00
Total Waste	**42**

Source: Field Survey, 2010

INFECTIOUS HEALTH CARE WASTES (Bio-medical Waste):

Human anatomical / surgical waste,

Animal waste

- Pathological waste including tissues, organs, blood and body fluids, microbiological cultures, Cotton, Swabs etc.
- Used Syringes, I.V. tubes, Blood bags and other items contaminated with blood and body fluids.
- Items such as plaster, casts and bandages, when contaminated by blood and pus.
- Waste from isolation wards. The amount of infectious waste is near about 25% of the total wastes generated from a health care establishment.

NON-INFECTIOUS HEALTH CARE WASTE

Non-infectious waste is broadly classified as Kitchen waste and Office wastes. It is similar to household waste. Non-infectious wastes constitute nearly 75% of the total wastes generated from a health care unit.

In absence of proper segregation, the non-infectious waste becomes infectious and poses environmental threat to the society. Banerjee R, Mani SK,(2005)

Bilaspur City: Different parameter of bio medical waste

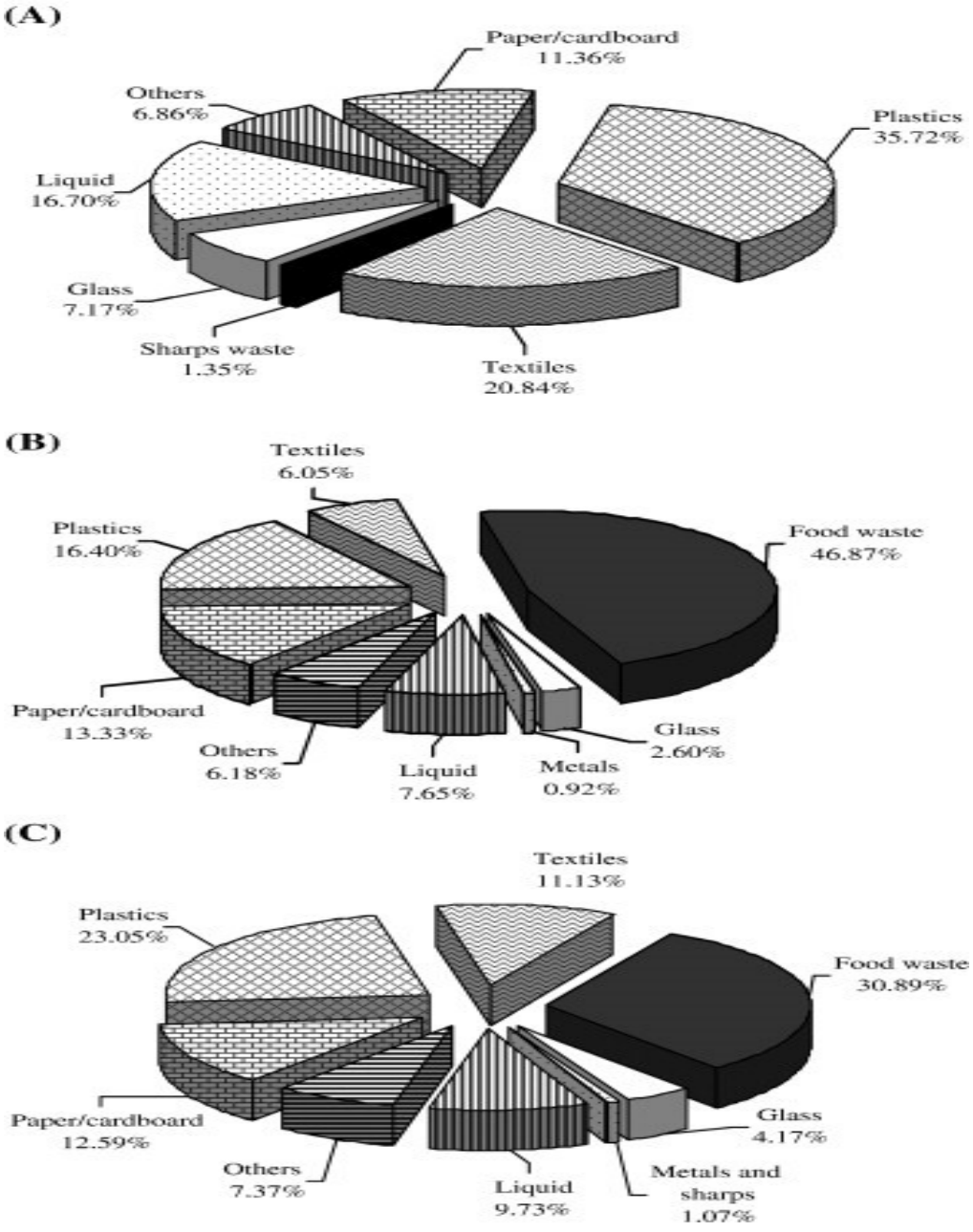

Table No.5

Bilaspur City: Major sources of Bio-medical waste

Units	Kg/day	% of quantity
Hospitals	85	12.18
Clinics	170	24.36
Nursing homes.	175	25.07
Dispensaries	105	15.04
Laboratories	28	4.01
Research centre	10	1.43
Blood banks.	20	2.87
Paramedic services	35	5.01
Autopsy centers	28	4.01
Blood donation campus	42	6.02

Source: Field Survey, 2010

Table No. 6

Bilaspur City: Different units of Hospital

Units	**No of Sweeper**	**% 0f Quantity**
Wards	45	16.19
Administrative Block	105	37.77
Hospital Lab & Blood Bank	49	17.63
Service Sector	8	2.88
Out Patient	36	12.95
Operation Theatre	35	12.59
Total	278	100

Source: Field Survey, 2010

Bio-medical Waste Survey

The quality and the quantity of the bio-medical wastes generated from health care units depend upon a number of factors such as waste management methods, type of health care units, occupancy of healthcare units, specialization of healthcare units, ratio of reusable items in use, availability of infrastructure and resources etc.

The All India Institute of Hygiene and Public Health, Bilaspur conducted a study on Hospital Waste Management in C.G., sponsored by the CGPCB in the year 2001-10 and concluded that

(i) General waste containing food wastes, paper, plastics, floor sweeping, discarded glassware, earthen pot etc. constitute bulk (56-78% by weight) of the hospital waste.
(ii) Waste generated in large government hospitals in Kolkata, is 1044 gms/bed/day whereas waste generated in large government hospitals in districts is comparatively low at 397 gms/bed/day.
(iii) Certain salvageable items like saline bottles, surgical gloves, I.V. fluid bottles syringes etc. are disposed after use in the wards without distorting or damaging. As a result, there remains a possibility of reuse of the said items.
(iv) Incomparable waste constitutes 19-30% (by weight) of the total waste generated.

Health impacts of Bio-medical Waste(BMW)

Exposure to infectious BMW can result in disease or injury. It may contain infectious agents, toxic or hazardous chemicals or pharmaceuticals,. The infectious wastes may contain any of the great variety of pathogenic microorganisms. Pathogens in infectious wastes may enter the human body through a number of routes like a puncture or cut in the skin, mucous membranes, by inhalation or ingestion. Sharps may not only cause cuts and punctures but also infect the wounds if they are contaminated with pathogens. Because of this dual risk – of injury and disease transmission – sharps are considered as a very hazardous waste class. Poor hospital waste management may cause the following:

- Hepatitis B & C
- HIV infection
- Gastro-enteric infection
- Respiratory infection
- Blood stream infection
- Skin infection
- Radioactive toxicity
- Health problems associated with air and water pollution.
- Apart from the above, there are other environmental problems associated with the disposal of untreated

BMW generated from the healthcare units (HCUs). These are as follows:

(i) Decomposing waste may generate foul odour inside the hospital premises and surrounding area.

(ii) Drains may be clogged with waste materials creating an unhygienic environment in the surrounding hospital premises.

(iii)Open dump of waste may decompose to produce leachate that might contaminate ground water.

(iv)Uncontrolled and open burning of wastes can generate dioxins and furans, thus polluting the air.

Segregated incinerable wastes kept in Yellow coloured bag

1 2

1Segregated Autoclavable wastes kept in Blue coloured bag

2General wastes of health care unit kept in Black coloured bag

Table No. 7

Bilaspur City: Average Daily Medical Waste Generate

Health care unit (number of beds)	Non-hazardous waste (kg/24 hours)		Hazardous waste (kg/24 hours)	
785 beds	1.Paper	50	Anatomo- pathological waste and anatomical parts	61
	2.Plastic	80	Infectious waste	60
	3.Sterile packaging	42	Sharp waste	25
	4.Disposable equipment uncontamined with biological fluids	20	Chemical and pharmaceutica l waste	6
	5. Leftovers	154	Pharmaceutica l waste	7
	6. Household waste, waste assimilated household waste	87	Chemical waste	5
	10. Dangerous goods that were not used in the initial purpose and will be returned to the producer	36	Hazardous chemical waste	20
	12. Waste with the pH > 6.0 and < 8.5	15	Special waste	18
	Total (kg/day)	482	Total (kg/day)	202

Source: Field Survey, 2010

Conclusion

During the study, it was observed that, the Hospitals have been properly managing their biomedical waste. The hospitals have been segregating the biomedical waste every day, in accordance with the biomedical problem of waste categories, collected in the appropriate type of container and specified colour coding, in accordance with the legislation. The hospitals also followed the regulation tables given in the legislation. Temporary storage of waste currently generated within the Hospitals is performed in special places that are sanitary authorized, and the storage time not exceeds 72 hours (48 hours within the hospital, 24 hours for transport and final disposal). But not maintain The hospitals practice of decontamination of biomedical waste before disposal or storing of the waste for 48 hours. By introduction a sustainable system of biomedical waste management, significant quantities of hazardous biomedical waste generated will not be stored out of control, but will be recovered, treated, neutralized and recycled, secure in terms of environmental protection. Therefore, on one hand the impact on human health will be significant decreased, and on other hand.

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