

HOSPITAL WASTE MANAGEMENT AND ENVIRONMENTAL PROBLEMS IN INDIA

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ABSTRACTS

The main purpose of this paper is to convey a browse of the hospital waste management and environmental drawback in India. the target of this study is to analysis the health care waste management system, as well as practices and compliances. Most countries of the planet, particularly the developing countries, are facing the grim situation arising out of environmental pollution because of pathological waste arising from increasing populations and also the resulting ascent within the range of hospital units. In India, there are regarding six lakhs hospital beds, over 23,000 primary health centers, more than 15,000 small and personal hospitals. In India, the biomedical Waste (Management and Handling) Rules 1998 build it obligatory for hospitals, clinics, and different medical and veterinary institutes to eliminate bio medical wastes strictly consistent with the principles. The few studies on bio medical waste

management from india have established that hospitals did not manage health care waste properly.

Improper disposal of health care waste disposal cause dangerous infection and posses a attainable threat to the encircling surroundings, persons handling it and to the overall public. Within the past, medical waste was usually mixed with unit waste and disposed of in municipal solid waste landfills. In recent years, inflated public considerations over the improper disposal of health care waste have led to a movement to control the waste additional consistently and strictly by the Indian government. Waste reduction and utilisation are still not well promoted, which ends in vital amounts.

Key words: Hospital waste, Waste management, Infectious wastes, Non infectious wastes and Waste minimization.

INTRODUCTION

Over the past 20 years, health care wastes has been known united of the main issues that negatively impact each human health and also the setting once improperly keep, transported and disposed. for several years, the world Health Organization has advocated that medical waste be thought to be special waste and it's currently usually acknowledged that sure classes of health care waste square measure among the foremost venturous and doubtless dangerous of all waste arising in communities.

There are several institutions that grime the environmental however recently the unnoticed field that manufacture the pollution by means of health care wastes and attracts the attention of

the environmentalists are the hospitals, dispensaries, medical retailers, medical clinics of doctors and alternative paramedical employees . Hospital waste is outlined as any kind of waste generated by health care establishments, together with hospitals, medical laboratories, animal experimentation units, and clinics Hospital

waste isn't solely venturous and grime the surroundings however dangerous for people in general, animals and plants by alternative ways that conjointly. Every day, the countries varied hospitals and alternative medical establishments churn out lots of loads of waste. Associate frightening proportion of the waste lies on open area making environmental issues. Health care

wastes square measure venturesome in nature. These damage the surroundings even at low concentration. Thence it's necessary to require precautionary measures in order that venturesome elements within the waste square measure rendered harmless through correct treatment by technology and safe disposal ways.

The problem of health care waste has acquired large proportion in today's cities. About

1.50 kilo of waste was made per head/per day of the entire hospital waste, that was contaminated with illness carry pathogens. If we tend to take associate example if a patient lying within the hospital for treatment and a standard man sleep in the society. A patient within the hospital desires a lot of and a lot of hygienically and pollution free setting. He desires element. however the setting of hospitals, particularly of presidency hospitals was thus impure by the hospital wastes that it becomes terribly troublesome even for a standard man to travel within the hospitals and provides a visit to his involved patient. Most of the hospital they're selling the hospital waste to open place or municipal solid waste its have an effect on the environmental and human health .

The wastes generated from health care units are typically classified as infectious and non infectious. The infectious health care wastes ar termed as hospital wastes and ar thought of to be probably risky in nature. The disposal of untreated medical wastes mixed with non infectious hospital wastes or different general municipal wastes poses associate environmental threat and public health risk. Indiscriminate disposal of untreated health care waste is sometimes the cause for the unfold of the many infectious diseases.³ It had been additionally to blame for the health facility diseases i.e. the hospital acquired diseases to the health care personnel World Health Organization handle these wastes at the purpose of generation.

Moreover, this can be equally harmful to persons concerned within the health care waste management i.e. segregation, storage, transport, treatment and disposal. with the exception of the higher than, a decent quantity of health care wastes comparable to disposable syringes, saline bottles, I.V. fluid bottles etc. are picked up by rag pickers and are recycled into the

³ Anon, (2006), "Note on bio medical waste management", *Tamil Nadu Pollution Control Board*, Chennai, India.

market with none medical care. It's imperative, therefore, to adopt an applicable environmentally safe methodology for the disposal of the health care wastes.

Aim of the Study:

To analyze the sources of medical wastes, to examine the impact of medical waste, and to know about the various methods of disposal of medical waste.

KINDS OF HOSPITAL CARE WASTES

These are of two kinds, infectious wastes and non infectious wastes

Infectious Wastes:

← Human anatomical or 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.

← materials such as plaster, casts and bandages, when contaminated by blood and pus.

← Waste from isolation wards.

The amount of infectious waste is close to regarding 15 to 20 percent of the whole wastes generated from the health care institution

Non Infectious Waste:

Non infectious waste is loosely classified as room waste and workplace wastes. It's kind of like social unit waste. Non infectious wastes represent nearly about 85% to eightieth of the

entire wastes generated from a health care unit. In absence of correct segregation, the non infectious waste becomes infectious and poses environmental threat to the society.⁴

BIO MEDICAL WASTE MANAGEMENT RULES, 1998 (Amended in 2000 and 2003)

The bio medical waste management rules was introduced with the help of environment protection act.. These rules are directly relevant to the health sector. The salient features of those rules are as follows:

← Bio medical wastes means that waste that's generated throughout the identification, treatment or immunizations of people at large or animals or in analysis activities pertaining to that or within the production or testing of biological.⁵

← The obligation of each occupier of an producement creating bio medical waste which has a hospital, house, clinical waste , dispensary, veterinary dispensary, animal dispensary, pathological laboratory and blood bank by no matter name known as to require all steps to confirm that such waste should not affect the human health and therefore the setting, policies, legislation and rules policy framework, March 2007.⁶

CURRENT SCENARIO OF HOSPITAL WASTES

In India, hospital wastes generate around three million tones once a year and therefore the quantity is anticipated to grow at 8.00 per cent annually. Health care wastes if not handled and disposed indiscriminately might cause adverse effects on human health and atmosphere. Consistent with the accessible information from the State Pollution management Boards (2007-08) 52,001 (53.25 %), health care institutions area unit operational while not getting authorization from their several SPCB/PCC. There are about 288.20 tons per day (56.87%) out of 506.74 tons per day wastes produced is being treated either through Common Bio Medical Waste Treatment Facilities or captive treatment facilities. There are about 602 bio medical waste incinerators, 2218 autoclaves, 192 microwaves,

⁴ http://www.isec.ac.in/WP%20312%20-%20Manasi,%20Umamani%20and%20Latha_Final.pdf

⁵ Dept. of Health Services, (2004), "Biomedical Waste Management Status in NCT of Delhi," *Govt. of NCT of Delhi*.

⁶ <https://www.aiims.edu/en/departments-and-centers/central-facilities/265-biomedical/7346-bio-medical-waste-management.html>

151 hydroclave and 8,038 shredders within the country. Acknowledging (70.4%) out of 602 incinerators are given pollution management devices and 178 (29.6 %) incinerators are operational while not pollution management devices.⁷

LIMITATION OF HOSPITAL WASTES IN INDIA

← To treat 420561 metric weight unit per day of bio medical waste in accordance with BMW Rules.

← Range of Common Bio Medical Wastes Treatment Facility (CBMWTF) to be inflated manifold. Presently there square measure 157 facilities that don't seem to be adequate handle all the bio medical wastes generated.

← CBMWTF is to be originated below public personal partnership mode.

← New technologies to be promoted for destruction of venomous bio medical wastes.

Out of 84,809 health care institutions, 43,075 authorizations are generated by SPCBs for management of bio medical waste. Out of 420461 kg/day of waste generation, solely 24 0682 kg/day of waste is treated.⁸ Out of 84,809 hospitals, 48,183 hospital square measure either victimization common bio medical waste treatment facilities (which square measure a hundred and seventy in Numbers) or have engaged personal agencies. There are; 391 incinerators (with APCB), 2562 autoclaves, 458 microwaves, 145 hydroclaves and 6047 shredders operating. Further, 14,959 hospitals are served as show cause notices as defaulters. Surveys administrated by numerous agencies show that the health care institutions in India don't seem to be giving due attention to their waste management. During the alert of the Bio medical Waste (Handling and Management) Rules, 1998, hospitals are costive streamlining the approach of waste segregation, accumulating, treatment, and discharge.

⁷ Blenkham, J.I.(2007), "Standards of clinical waste management in hospitals, *"A second look Journal of Royal Institute of Public Health.*, Article in Press, .UK

⁸World Bank, (2000), "Health Care Waste Management" Guidance Note.

MEDICAL WASTES AND HEALTH PROBLEM

Within a health care facility the main groups submitted to risks are:

- Doctors, medical nurses, healthcare unit workers and maintenance staff
- Patients
- Visitors
- Workers in ancillary services, laundry, medical supplies store, those charged with collecting and transporting waste
- Service workers dealing with waste treatment and disposal of health unit.⁹

Regarding the health care employees, 3 infections are most typically transmitted: hepatitis B Virus (HBV), viral hepatitis Virus (HCV), and Human Immune Deficiency Virus (HIV). Among the thirty five million health care employees worldwide the estimations show that every year concerning three million receive laborious exposures to blood borne pathogens, a pair of millions of these to HBV, 0.9 million to HCV, and 170,000 to HIV. Also, the employees concerned within the assortment and treatment of the health care waste are exposed to a precise risk.¹⁰

MEDICAL WASTE MANAGEMENT AND ENVIRONMENTAL IMPACT

The following are the most environmental issues with relevance improper disposal of health care waste management:

- ← Wide spread of infection and malady through vector that has an effect on the in house also as encompassing population.
- ← Wide spread of infection through contact or injury among medical or non medical personnel and sweepers or rag pickers, particularly from the sharps.
- ← Wide spread of infection through unauthorized usage of disposable things like hypodermic needles, tubes, blades, bottles etc. Reaction because of use of discarded medicines.

⁹ Srinivasa Chary, V,(2001), "Medical Waste Management Practices in urban India and Strategies for safe disposal, Proceedings of Southern Regional Conference on Biomedical Waste Management" organized by *Tamil Nadu Pollution Control Board*, Chennai, Tamilnadu.

¹⁰ Gordon, JG, Rein, PA. (2004), "Medical waste management," *Hospital epidemiology and infection control*.

An important issue of environmental protection method is that the waste management that has accountable designing of assembling, transporting, process and disposing waste matter. The needs are to wash up the encompassing atmosphere and to check that the waste doesn't have a prejudicial result on person health.¹¹

At intervals waste management the health care waste management could be a method that helps to make sure correct hospital hygiene and safety of health care staff and communities. Hospital waste management issues regarding designing and procural, workers coaching and behavior, correct use of tools, machines and prescription drugs, correct strategies applied for segregation, reduction in volume, treatment and disposal of hospital waste.

MEDICAL WASTE SEGREGATION AND STORAGE

The segregation of hospital waste ought to be examined as a result of facility customary operational procedures for hospital waste segregation have an immediate impact on kind and value of health care waste treatment. Every class of waste needs to be unbroken divided in an exceedingly correct instrumentation or bag. Such instrumentation or bag ought to have bound properties it ought to be with none escape it should be ready to contain the designed volume and weight of the waste with none harm. The instrumentation ought to have a canopy ideally operated by foot. Once a bag or instrumentation is crammed at 3/4th capability it should be sealed and an applicable label needs to be hooked up. Arrangement for separate receptacles within the hold with outstanding show of color code has been created in accordance with the legislation yellow for risky health care waste and black for the non risky waste.

MEDICAL WASTE TREATMENT AND DISCARDING

Different ways are developed for rendering medical specialty waste environmentally innocuous and esthetically acceptable. The medical specialty waste legislation has intricately mentioned the suggested treatment and disposal choices in line with the various classes of waste generated in hospitals. Totally different ways and treatment technologies are developed

(a) Burning,

¹¹ Santappa M and RohitKumar V. (2002) "Hospital Waste Management Committee and Salient features of biomedical wastes, Proceedings of Southern Regional Conference on Biomedical Waste Management" organized by *Tamil Nadu Pollution Control Board*, Chennai, India.

- (b) Autoclave treatment,
- (c) Hydroclave treatment,
- (d) Microwave treatment,
- (e) Mechanical/Chemical Disinfecting,
- (f) Hygienically and secured Land filling and
- (g) General Waste.

COST OF MEDICAL WASTE MANAGEMENT

The economic factors comparable to investment, cost, pricing, segregation, merchandising and disposal at the side of the management techniques are plays a significant role whereas fitting a waste management system. This health care waste management practices are characterised by poor assortment system and services that as improper disposal at open merchandising yards. The hospital, unsafe and unit wastages are mixed along at website. Thus, this try could bring the simplest system with minimum investment.¹²

The cost of construction, operation and maintenance of system for managing hospital waste represents a big apart of overall budget of a hospital if the bio medical waste handling rules 1998 need to be enforced in their true spirit. Government of India in its pilot program for health care waste management in Government hospitals has calculable Rs.85 lakhs cost of capital in a thousand bedded super specialty teaching hospitals which has on web site final disposal of health care wastes. Two types of prices are needed to be incurred by hospitals for hospital waste management, internal and external price. Internal price is that the price for segregation, mutilation, medical aid, internal storage and transportation as well as hidden price of protective equipment. External price involves off web site transport of waste, treatment and final disposal. Self contained onsite treatment ways could also be fascinating and possible for giant hospital facilities. They're going to not be sensible or economical for smaller institutes. A suitable common system ought to be in situ which is able to offer regular provider of color coded

¹² Gupta, S., Boojh, R., (2006), "Biomedical waste management practices at Balrampur Hospital, Luck now, India: a case story," *Waste Management and Research*, 24.

baggage daily assortment of infectious waste and safe transportation of waste to offsite treatment facility and final disposal with suitable technology.

MEDICAL WASTES MANAGEMENT AND TRANSPORTATION

This activity has three components: assortment of various styles of waste from waste storage luggage and containers within the hospital, transportation and intermediate storage of isolated waste within the premises and transportation of the waste outside the premises towards the treatment or final disposal. The medicine waste must be transported to the treatment or disposal facility website in an exceedingly safe manner.¹³ The vehicle ought to have bound specifications it ought to be coated and secured against accidental gap of door, outflow etc. the inside of the instrumentation while not sharp edges or corners within the aim to be simply washed and disinfected there ought to be adequate arrangements for voidance and assortment of any outflow.¹⁴

LEGAL FRAMEWORK RELATED TO MEDICAL WASTE (MANAGEMENT AND HANDLING) RULES 1998

India participated within the global organization Conference on the Human setting command at Stockholm in June, 1972, wherever choices were taken to require appropriate steps for the protection and improvement of human setting. Therefore, the setting (Protection) Act 1986 (EPA) was fashioned below the Ministry of setting and Forests, that is that the most comprehensive Act on the Indian Statute Book relating to setting Protection .It is general legislation for the Protection of setting, enacted under article 253 of the Constitution, that came in force on nineteenth Gregorian calendar month 1986. In Gregorian calendar month 1998, the Government of Bharat setting (Protection) Act 1986 (Rule twenty nine of 1986) issued a Notification on Biomedical Waste (Management and Handling), Rules 1998, indicating the foundations for the Management and Handling of bio-medical solid waste .The main objective of the BMW Rules 1998 was to promote scientific and systematic management (segregation, transportation and disposal of hospital waste that is infectious) among health care establishments

¹³ Manyele SV & Anicetus H, (2006), "Globalization and its effects on Medical Waste Management in Tanzania" *IET Annual Conference and General Meeting*, AICC Arusha, Tanzania.

¹⁴ Halbwachs, H., (1994), "Solid waste disposal in district health facilities," *World Health Forum* 15 (4).

in Bharat. The any amendments were created within the year 2000 and 2003. As per BMW Rules, 1998, State Pollution management Boards (SPCBs)/ Pollution management Committees (PCCs) within the respective States/UTs and Director General Armed Forces Medical Services (DGAFMS) in respect of the Health Care institutions (HCEs) below the jurisdiction of the Ministry of Defence are notified because the 'Prescribed Authority' for overall enforcement of the same Rules [5]. These rules cowl authorization and duty of the occupier .Hospitals, rest home, clinic, Dispensary Veterinary establishment, Animal House, Pathological laboratory and bank want authorization except such occupier of clinics, dispensaries, pathological laboratories, blood banks providing treatment/service to lower than a thousand (one thousand) patients per months.

1. The establishment of medical waste shall not be mixed with different wastes and Bio-medical waste shall be separate into containers/bags at the purpose of generation in accordance with Schedule II and therefore the containers shall be tagged according to Schedule III.

2.The foundations conjointly impose that if a instrumentality is transported from the premises wherever medicine waste is generated to any waste treatment facility outside the premises, the container shall, except the label prescribed in Schedule III, conjointly carry data prescribed in Schedule IV and untreated biomedical waste shall be transported solely in such vehicle as is also licensed for the purpose by the competent authority as specified by the govt..

3. No untreated bio-medical waste shall be unbroken stored on the far side a amount of forty eight hours. The Municipal body of the realm shall still pick up and transport separate non medicine solid waste generated in hospitals and nursing homes, in addition as punctually treated medicine wastes for disposal at municipal dump site.

4. The rule also impose Bio-medical waste shall be treated and discharge of in accordance with Schedule I, and in consent with the standards prescribed in Schedule V given in medicine waste (management and handling) rules 1998.

5. In step with rule maintenance of records such as generation, collection, storage, transportation, treatment, and disposal is necessary and if any accident happens at any institution or facility or the other web site wherever medical waste is handled, the licensed person shall report the accident in type III to the prescribed authority in real time.

6. As per the BMW Rules, 'SPCBs and PCCs as well as DGAFMS area unit needed to submit annual report info in a very compiled type to the Central Pollution panel (CPCB), for the preceding year by thirty first March of every year.

Violations of Rules

As per law, it's necessary for all sorts of medical services supplier to confirm correct implementation of Bio-Medical Waste (M&H) Rules 1998. installation of furnace is necessary for hospitals with quite fifty beds. It may be unbroken in mind that any individual will report any alleged negligence in Management and Handling of Bio-Medical Waste to the suitable authority. The state Pollution management Board/committees have been asked to require action against the defaulting hospitals or nursing homes beneath section 15(1) of the setting (Protection) Act, 1996 that reads as " Whoever fails to benefits or contravenes any of this act, or the principles created or orders or directions issued hereinafter, in respect of every such failure or dispute, be punishable with imprisonment for a term which can extend to%-ve years or with fine which can touch one 100000 rupees, or with each, and just in case of failure or in dispute follows, with further fine that may touch 5 thousand rupees for each day at the time that such failure or dispute continues after the conviction for the primary such failure or contravention." Statutory warning to any or all hospitals for installation of Bio-Medical Waste treatment and disposal systems is already issued in line with schedule given in table No. I, by applicable authority.

Appeal against penalty

Any person aggrieved by Associate in Nursing order created by the prescribed authority underneath these rules might among thirty days from the initiate that the order is communicated to him, like Associate in Nursing charm to such authority because the government of state/ Union Territory may think appropriate constitute; providing the authority may entertain the charm once the end of the previously mentioned period of thirty days if it's happy that the appelland was prevented by sufficient cause 6om filing the appeal in time. the acceptable authority shall dispose of such charm among a amount of six months from the date of its receipt.

CONCLUSION

The proper hospital waste management system will facilitate the management diseases will scale back community exposure to resistant microorganism, and will scale back HIV/AIDS and liver disease transmission from dirty needles and different improperly clean or disposed medical things. Relating to the environmental issues, an correct and property management system of hospital waste will avoid the negative long-standing time health effects, from the environmental unleash of hepatotoxic particles corresponding to organic compound, mercury et al. From every volume and toxicity views, the use of plastics in society is also attention of waste management concern. Within the past, medical waste was typically mixed with social unit waste and disposed of in municipal solid waste landfills. In recent years, exaggerated public issues over the improper disposal of hospital waste have led to a movement to manage the waste a lot of consistently and strictly by the Indian Government. Crucial areas which require to be addressed for effective handling of bio-medical waste are capability building by coaching and grooming, concern and commitment on the a part of attention suppliers, institutional and town level policies, provision of activity safety and private protecting devices, information dissemination and sensible support endeavors. there's a dire would like for evolving policy and protocols by health care establishments and anxious government agencies to manage recyclables. To begin with, it'd be helpful to possess a correct inventory of medical establishments. the govt. should delegate the responsibility to the health offices or BBMP ward offices to simply accept the registration of health care institutions, as conjointly to gather details regarding the hospitals and waste generated in that as a secondary activity. A media campaign is additionally necessary to form awareness and urgency of safe disposal of medical specialty waste. Besides systematisation of hospital solid waste management, installation of treatment plant should be created a precondition for getting permission/operating license for health care institutions, and punitory laws ought to be wont to build obstinate establishments to fall in line. For HWM to be a winning initiative it ought to be taken as social responsibility and everybody's participation/involvement ensured. Awareness coaching camps ought to be conducted altogether the BBMP wards with mandatory participation of the workers. Awareness creation relating to disposal of medicine waste ought to be created a part of the syllabus of all medical connected faculties.

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