CHAPTER-III

CONCEPTUAL FRAMEWORK OF THE STUDY

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3.1 Introduction:

Hospitals are life saving centers for all people, as we get number of treatments for different diseases and health related problems. But there is a dark side of the story, which is more dangerous and harmful for the human life. The danger caused by the waste generated from hospital and allied activities. Hospital waste is defined as the waste which is generated during diagnosis, and treatment of human being or in research activities. Hospital waste is classified as one of the most dangerous wastes in the world. Hospital waste refers to any waste that is generated during medical activities such as diagnosis, monitoring, and Immunization or treatment of human beings. It includes viruses and bacteria that potentially cause diseases which are produced by hospitals, clinics, doctor's offices and other types of healthcare institutions.(Kamalakanta Muduli ,2012)

Medical care is vital for our life and health, but waste generated from medical activities represents a real problem of living nature and human world. Improper management of waste generated in health care facilities causes a direct health impact on the community, the healthcare workers and on the environment. Every day, relatively large amount of potentially infectious and hazardous waste are generated in the health care hospitals. Exposure to such waste possesses serious threat to environment and to human health that requires specific treatment and management prior to its final disposal. There is a need to create awareness amongst the personnel involved in healthcare unit so as to create healthy and peaceful atmosphere in the environment. (Praveen Mathur, SangeetaPatan2012)

3.2 DEFINITIONS:

(a)Bio-Medical Waste: May be defined as "any solid, fluid or liquid waste, including its container and any intermediate product, which is generated during its diagnosis, treatment or Immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biological and the animal waste from slaughter houses or any other like establishments."

(b) **Medical Waste:** Is a term used to describe "any waste that is generated in the diagnosis, treatment or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biological."

(c) **Clinical Waste:**Is defined as "any waste coming out of medical care provided in hospitalsor other medical care establishments, but does not include waste generated at home."

(d) **Hospital Waste:** Refers to all waste, biological or non-biological that is generated from ahospital, and is not intended for further use.

(e) **Pathological Waste:** Is defined as "waste removed during surgery/autopsy or other medical procedures including human tissues, organ, body parts, body fluids and specimens along with their containers."

(f) **Infectious Waste:** Refers to that portion of Bio-Medical Waste which may transmit viral, bacterial or parasitic diseases, if concentration and virulence of pathogenic organisms is sufficiently high.

(g) **Hazardous Waste:** Refers to that portion of Bio-Medical Waste which has a potential to cause hazards to health and life of human beings.

In addition, other types of waste generated in hospitals are :

(h) **Radioactive Waste:** Which includes waste contaminated with radionuclide's, it may be solid, liquid or gaseous waste. These are generated from in-vitro analysis of body fluids and tissues, in-vitro imaging and other therapeutic procedures.

(i) **Pressurized Waste:** Include compressed gas cylinders, aerosol cans and disposable compressed gas containers.

(j) **General Waste:** Includes general domestic type waste from offices, public areas, stores, catering areas, comprising of newspapers, letters, documents, cardboard containers, metal cans, floor sweepings and also includes kitchen waste.

(k) **Recyclable Waste:** Includes the following: Glass after cleaning and disinfection, paper, corrugated cardboard, aluminum, X-ray film, reclaimed silver from X-ray developing solution, Plastics after disinfection and shredding.

3.3 Classification of hospital waste

(1) **General waste:** Largely composed of domestic or house hold type waste. It is non-hazardous to human beings, e.g. kitchen waste, packaging material, paper, wrappers, and plastics.

(2) **Pathological waste**: Consists of tissue, organ, body part, human foetuses, blood and body fluid. It is hazardous waste.

(3) **Infectious waste:** The wastes which contain pathogens in sufficient concentration or quantity that could cause diseases. It is hazardous e.g. culture and stocks of infectious agents from laboratories, waste from surgery, waste originating from infectious patients.

(4) **Sharps**: Waste materials which could cause the person handling it, a cut or puncture of skin e.g. needles, broken glass, saws, nail, blades, scalpels.

(5) **Pharmaceutical waste**: This includes pharmaceutical products, drugs, and chemicals that have been returned from wards, have been spilled, are outdated, or contaminated.

(6) **Chemical waste:** This comprises discarded solid, liquid and gaseous chemicals e.g. cleaning, house keeping, and disinfecting product.

(7) **Radioactive waste:** It includes solid, liquid, and gaseous waste that is contaminated with radionuclide's generated from in-vitro analysis of body tissues and fluid, in-vivo body organ imaging and tumour localization and therapeutic procedures.

3.4 Bio-medical waste (management and handling) rules, 1998:

Biomedical waste management and handling rule in India was first established in 1998. The amendment in the act was made in 2005 and then in 2011. The biomedical waste management and handling act is given by Ministry of Environment and Forests New Delhi is as follows

S.O. 630 (E).-Whereas a notification in exercise of the powers conferred by Sections 6, 8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986) was published in the Gazette vide S.O. 746 (E) dated 16 October, 1997 inviting objections from the public within 60 days from the date of the publication of the said notification on the Bio-Medical Waste (Management and Handling) Rules, 1998 and whereas all objections received were duly considered..

Now, therefore, in exercise of the powers conferred by section 6, 8 and 25 of the Environment (Protection) Act, 1986 the Central Government hereby notifies the rules for the management and handling of bio-medical waste.

3.4.1. SHORT TITLE AND COMMENCEMENT:

(1) These rules may be called the Bio-Medical Waste (Management and Handling) Rules, 1998.

(2) They shall come into force on the date of their publication in the official Gazette.

3.4.2 APPLICATION:

These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio medical waste in any form.

3.4.3 DEFINITIONS: In these rules unless the context otherwise requires

(1) **"Act"** means the Environment (Protection) Act, 1986 (29 of 1986);

(2) **"Animal House"** means a place where animals are reared/kept for experiments or testing purposes;

(3) **"Authorization"** means permission granted by the prescribed authority for the generation, collection, reception, storage, transportation, treatment, disposal and/or any other form of handling of bio-medical waste in accordance with these rules and any guidelines issued by the Central Government.

(4) **"Authorized person"** means an occupier or operator authorized by the prescribed authority to generate, collect, receive, store, transport, treat, dispose and/or handle bio-medical waste in accordance with these rules and any guidelines issued by the Central Government;

(5) **"Bio-medical waste"** means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological, and including categories mentioned in Schedule I;

(6) **"Biological"** means any preparation made from organisms or micro-organisms or product of metabolism and biochemical reactions intended for use in the diagnosis, immunization or the treatment of human beings or animals or in research activities pertaining thereto;

(7) **"Bio-medical waste treatment facility"** means any facility wherein treatment. disposal of bio-medical waste or processes incidental to such treatment or disposal is carried out;

(8) **"Occupier"** in relation to any institution generating bio-medical waste, which includes a hospital, nursing home, clinic dispensary, veterinary institution, animal house, pathological laboratory, blood bank by whatever name called, means a person who has control over that institution and/or its premises;

(9) **"Operator of a bio-medical waste facility"** means a person who owns or controls or operates a facility for the collection, reception, storage, transport, treatment, disposal or any other form of handling of bio-medical waste;

(10) **"Schedule"** means schedule appended to these rules;

3.4.4. DUTY OF OCCUPIER:

It shall be the duty of every occupier of an institution generating bio-medical waste which includes a hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank by whatever name called to take all steps to ensure that such waste is handled without any adverse effect to human health and the environment.

3.4.5. TREATMENT AND DISPOSAL

(1) Bio-medical waste shall be treated and disposed of in accordance with Schedule I, and in compliance with the standards prescribed in Schedule V.

(2) Every occupier, where required, shall set up in accordance with the time-schedule in Schedule VI, requisite bio-medical waste treatment facilities like incinerator, autoclave, microwave system for the treatment of waste, or, ensure requisite treatment of waste at a common waste treatment facility or any other waste treatment facility.

3.4.6. SEGREGATION, PACKAGING, TRANSPORTATION AND STORAGE

(1) Bio-medical waste shall not be mixed with other wastes.

(2) Bio-medical waste shall be segregated into containers/bags at the point of generation in accordance with Schedule II prior to its storage, transportation, treatment and disposal. The containers shall be labeled according to Schedule III.

(3) If a container is transported from the premises where bio-medical waste is generated to any waste treatment facility outside the premises, the container shall, apart from the label prescribed in Schedule III, also carry information prescribed in Schedule IV.

(4) Not with standing anything contained in the Motor Vehicles Act, 1988, or rules there under, untreated biomedical waste shall be transported only in such vehicle as may be authorized for the purpose by the competent authority as specified by the government.

(5) No untreated bio-medical waste shall be kept stored beyond a period of 48 hours

Provided that if for any reason it becomes necessary to store the waste beyond such period, the authorized person must take permission of the prescribed authority and take measures to ensure that the waste does not adversely affect human health and the environment.

3.4.7. PRESCRIBED AUTHORITY

(1) The Government of every State and Union Territory shall establish a prescribed authority with such members as may be specified for granting authorization and implementing these rules. If the prescribed authority comprises of more than one member, a chairperson for the authority shall be designated.

(2) The prescribed authority for the State or Union Territory shall be appointed within one month of the coming into force of these rules.

(3) The prescribed authority shall function under the supervision and control of the respective Government of the State or Union Territory.

(4) The prescribed authority shall on receipt of Form 1 make such enquiry as it deems fit and if it is satisfied that the applicant possesses the necessary capacity to handle bio-medical waste in accordance with these rules, grant or renew an authorization as the case may be.

(5) An authorization shall be granted for a period of three years, including an initial trial period of one year from the date of issue. Thereafter, an application shall be made by the occupier/operator for renewal. All such subsequent authorization shall be for a period of three years. A provisional authorization

will be granted for the trial period, to enable the occupier/operator to demonstrate the capacity of the facility.

(6) The prescribed authority may after giving reasonable opportunity of being heard to the applicant and for reasons thereof to be recorded in writing, refuse to grant or renew authorization.

(7) Every application for authorization shall be disposed of by the prescribed authority within ninety days from the date of receipt of the application.

(8) The prescribed authority may cancel or suspend an authorization, if for reasons, to be recorded in writing, the occupier/operator has failed to comply with any provision of the Act or these rules:

Prove ided that no authorization shall be cancelled or suspended without giving a reasonable opportunity to the occupier/operator of being heard.

3.4.8. AUTHORISATION

(1) Every occupier of an institution generating, collecting, receiving, storing, transporting, treating, disposing and/or handling bio-medical waste in any other manner, except such occupier of clinics, dispensaries, pathological laboratories, blood banks providing treatment/service to less than 1000 (one thousand) patients per month, shall make an application in Form 1 to the prescribed authority for grant of authorization.

(2) Every operator of a bio-medical waste facility shall make an application in Form 1 to the prescribed authority for grant of authorization.

(3) Every application in Form 1 for grant of authorization shall be accompanied by a fee as may be prescribed by the Government of the State or Union Territory.

3.4.9. ADVISORY COMMITTEE

The Government of every State/Union Territory shall constitute an advisory committee. The committee will include experts in the field of medical and

health, animal husbandry and veterinary sciences, environmental management, municipal administration, and any other related department or organisation including non-governmental organizations. The State Pollution Control Board/Pollution Control Committee shall be represented. As and when required, the committee shall advise the Government of the State/Union Territory and the prescribed authority about matters related to the implementation of these rules.

3.4.10. ANNUAL REPORT

Every occupier/operator shall submit an annual report to the prescribed authority in Form 11 by 31 January every year, to include information about the categories and quantities of bio-medical wastes handled during the preceding year. The prescribed authority shall send this information in a compiled form to the Central Pollution Control Board by 31 March every year.

3.4.11. MAINTENANCE OF RECORDS

(1) Every authorized person shall maintain records related to the generation, collect ' ion, reception, storage, transportation, treatment, disposal and/or any form of handling of bio-medical waste in accordance with these rules and any guidelines issued.

(2) All records shall be subject to inspection and verification by the prescribed authority at any time.

3.4.12. ACCIDENT REPORTING

When any accident occurs at any institution or facility or any other site where bio-medical waste is handled or during transportation of such waste, the authorized person shall report the accident in Form III to the prescribed authority forthwith.

3.4.13. APPEAL

Any person aggrieved by an order made by the prescribed authority under these rules may, within thirty days from the date on which the order is communicated to him, prefer an appeal to such authority as the Government of State/Union Territory may think fit to constitute

Provided that the authority may entertain the appeal after the expiry of the said period of thirty days if it is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time.

3.4.15 Schedule I(Rule 5)

CATEGORIES OF BIO-MEDICAL WASTE

Option	Waste Category	Treatment & Disposal
Category No. I	Human Anatomical Waste (human tissues, organs, body parts)	Incineration @/deep burial*
Category No. 2	**Animal Waste** (animal tissues, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals colleges, discharge from hospitals, animal)	Incineration @ ' deep burial*
Category No 3	**Microbiology & Biotechnology Waste** (wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biological, toxins, dishes and devices used for transfer of cultures)	local autoclaving / micro-waving / incineration@
Category No 4	**Waste sharps** (needles, syringes, scalpels, blades, glass, etc. that may cause puncture and cuts. This includes both used and unused sharps)	disinfection (chemical treatment @ 01/auto claving / micro- waving and mutilation/ shredding"
Category No 5	**Discarded Medicines and Cytotoxic drugs** (wastes comprising of outdated, contaminated and discarded medicines)	Incineration @/destruct ion and drugs disposal in secured landfills drugs disposal in securec
Category	**Solid Waste**	Incineration @ autoclaving / micro-

No 6	(Items contaminated with blood, and body fluids including cotton dressings, soiled plaster casts, lines, beddings, other material contaminated with blood)	waving
Category No. 7	**Solid Waste** (Wastes generated from disposable items other than the waste sharps such as tubing, catheters, intravenous sets etc).	disinfection by chemical treatment@@ autoclaving/micro-waving and mutilation/
Category No. 8	**Liquid Waste** (waste generated from laboratory and washing, cleaning, house-keeping and disinfecting activities)	Disinfection by chemical treatment@@ and discharge into drains.
Category No. 9	**Incineration Ash** (ash from incineration of any bio-medical waste)	disposal in municipal landfill
Category No. 10	Chemical Waste (chemicals used in production of biological, chemicals used in disinfection, as insecticides, etc.)	chemical treatment @@ and discharge into drains for liquids and secured landfill for solids

@@: Chemicals treatment using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection.

@ There will be no chemical pretreatment before incineration. Chlorinated plastics shall not be incinerated.

- Deep burial shall be an option available only in towns with population less than five lakhs and in rural areas.

3.4.16 SCHEDULE II

COLOUR CODING AND TYPE OF CONTAINER FOR DISPOSAL OF BIO-MEDICAL WASTES

Colour Conding	**Type of Container** -I Waste Category	**Treatment options as per Schedule I**
Yellow	Plastic bag Cat. 1, Cat. 2, and Cat. 3, Cat. 6.	Incineration/deep burial
Red	Disinfected container/plastic bag Cat. 3, Cat. 6, Cat.7.	Autoclaving/Microwaving/ Chemical Treatment
Blue/White Translucent	Plastic bag/puncture proof Cat. 4, Cat. 7. Container	Autoclaving/Microwaving/ Chemical Treatment and destruction/shredding
Black	Plastic bag Cat. 5 and Cat. 9 and Cat. 10. (solid)	Disposal in secured landfill

Notes:

1. Colour coding of waste categories with multiple treatment options as defined in Schedule I, shall be selected depending on treatment option chosen, which shall be as specified in Schedule I.

2. Waste collection bags for waste types needing incineration shall not be made of chlorinated plastics.

3. Categories 8 and 10 (liquid) do not require containers/bags.

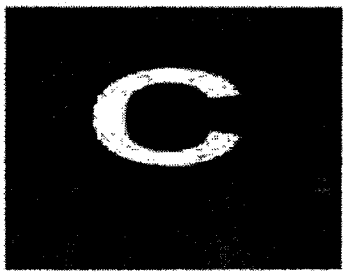
4. Category 3 if disinfected locally need not be put in containers/bags.

3.4.17 SCHEDULE III

LABEL FOR BIO-MEDICAL WASTE CONTAINERS/BAGS

SCHEDULE-III
LABEL FOR BIO-MEDICAL WASTE CONTAINERS/BAGS

BIOHAZARD SYMBOL **CYTOTOXIC HAZARD SYMBOL**



BIOHAZARD **CYTOTOXIC**

HANDLE WITH CARE

Note : Label shall be non-washable and prominently visible.

HANDLE WITH CARE

Note :Lable shall be non-washable and prominently visible.

SCHEDULE IV

(see Rule 6)

LABEL FOR TRANSPORT OF BIO-MEDICAL WASTE CONTAINERS/BAGS

Day..... Month.....
Year.....
Date of generation.....

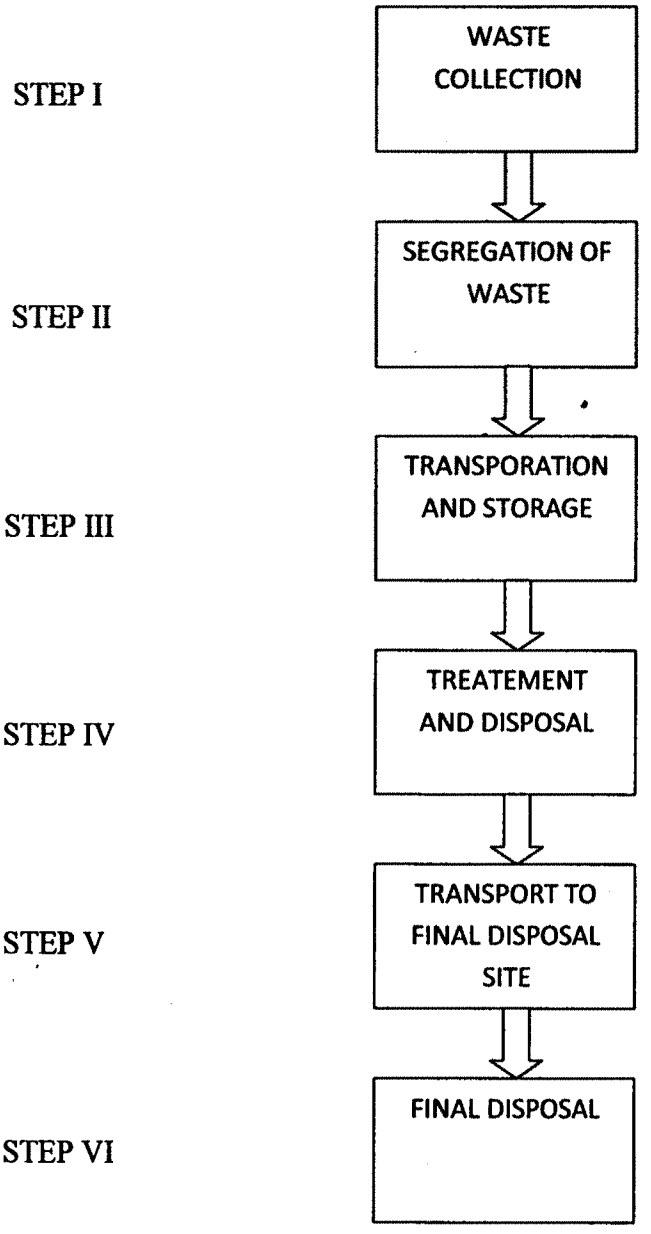
Waste category No.....
Waste class
Waste description

Sender's Name & Address
Phone No.....
Telex No....
Fax No.....
Contact Person.....
In case of emergency please contact
Name & Address:

Receiver's Name & Address
Phone No.....
Telex No.....
Fax No.....
Contact Person.....

3.5 Hospital waste management process

The flow chart shows the hospital waste management process which contains different steps for effective management of hospital waste. The process starts from the collection of waste from different units of hospitals and ends at the final disposal of hospital waste



STEP I: WASTE COLLECTION

The first step involves the collection of hospital waste from different units of the hospitals. According to biomedical (H& M) act the waste must be segregated at the point of generation.

While collecting the waste the waste handlers should used safety equipments like hand gloves, mask, apron etc, which is helpful to protect against the hazardous infections.

STEP II: SEGREGATION OF WASTE

The second step is the segregation of collected waste. The waste should be segregated according to act in different plastic container and bags with separate colour code, Black colour bag are used for collection of normal waste that is for discarded medicines from the hospitals.Red colour container or bags are used to keep hazardous waste like human body part or tissues etc, Blue /white bag is used to keep the waste sharps and needles etc. Generally here puncture proof bags or container is mandatory. Red bags are used to keep the microbiology waste or biotechnology waste. The responsibility of segregation should be with the generator of biomedical waste i.e. doctors, nurses, technicians and administrative staff.

STEP III: TRANSPORTATIN AND STORAGE

Transportation is the next important step in hospital waste management. First the transportation root within the hospitals is designed in such way that it should not pass through patient care areas. Special attention should be given to avoid the mixing of hazardous waste with non hazardous waste. Trolleys, Dry wheeled containers be used to transport the waste to the place of storage and treatment. Trolleys should be thoroughly disinfected and cleaned to avoid any type of spoilage. The wheeled containers should be so designed in such a way that the waste can be easily loaded and remains secured during transportation do not have any sharp edges . Hazardous biomedical waste which has to be transport to a long distance should be kept in containers having proper labelling.. The transport is done through desiccated vehicles basically dry and fully enclosed body. There should be a partition between driver's compartment and the load compartment.

STEP IV: TREATMENT AND DISPOSAL:

After transportation of the hospital waste the very important step of hospital waste management is treatment of the waste before disposal. As out of total waste most of the waste that is nearly about 85% of hospital waste is nonhazardous waste and only 15% of the waste hazardous or infectious waste. While treating the waste the precaution is taken that infectious waste should not be mixed with noninfectious waste. There are number of reasons to why the treatment is given to the hospital waste which is given below

1) As the waste is in large volume, by giving treatment to waste one can reduce the volume of the waste.

2) As infectious waste is hazardous to human health and environment, it should be destructed through incineration.

3) If the hospital waste is dumped on open landfill, waste picker may misuse it because the bottles and other usable things are not disinfected

4) Things like saline bottles, pipes, needles can be recycled for further use There are different techniques used for the treatment of hospital waste such as incineration, autoclaving, shredding, secured landfill and deep burial.

STEP V TRANSPORT TO FINAL DISPOSAL SITE

After treatment of the waste that is disinfection of waste by some chemical treatment, the recyclable waste is send to the recycling plant where it is present and remaining waste which is not further used and infectious such as human body part and other material is send to the incineration plant.

STEP VI FINAL DISPOSAL

This is the last stage of the HWM process. After the treatment of the waste final disposal of waste is carried out .the infectious waste is incinerated in the incineration plant and recyclable waste such as needles, hand gloves, saline bottles are recycled for further use. the hospital waste which is in general category is dumped into secured open landfill.

3.6 TECHNIQUES OF HOSPITAL WASTE MANAGEMENT:

Incineration: The incinerator should be installed and made operational as per Specification under the BMW rules 1998 and a certificate may be taken from CPCB/State Pollution Control Board and emission levels etc should be defined. In case of small hospitals, facilities can be shared. The waste under category 1, 2,3,5,6 can be incinerated depending autoclaving. Needle destroyers can be used for disposal of needles directly without chemical treatment.

Autoclave and microwave treatment: Standards for the autoclaving and microwaving are also mentioned in the Biomedical waste (Management and Handling) Rules 1998. All equipment installed/shared should meet these specifications. The waste under category 3,4,6,7 can be treated by these techniques. Standards for the autoclaving are also laid down.

3.7 ROLE OF PERSONNEL INVOLVED IN WASTE MANAGEMENT

The roles and responsibilities of the various personnel in confirmation to the Bio-Medical Waste Management (management and handling) Rules 1998:-

(A) Role of Medical Superintendent

He has the overall responsibility for the formulation and implementation of guidelines for upon the local policies of the hospital and feasibility. The polythene bags made of chlorinated plastics should not be incinerated.

Secured landfill: The incinerator ash, discarded medicines, cyto toxic substances and solid chemical waste should be treated by this option.

be responsible for accident reporting in Form III to the prescribed authority.

(D) Role of concerned Heads/In charge of Labs; Units/Depts.

They will be responsible for the formulation and implementation of waste Management procedures for their departments in conformity with the general guidelines issued by administration. They will also be responsible for getting all staff, doctors, nurses, group-D staff, trained in hospital waste management, and will liaise with the Officer In charge of waste management for Deep burial. The waste under category 1 and 2 only can be accorded deep burial and only in cities having less than 5 lakh populations.

Shredding: The plastic (IV bottles, IV sets, syringes, catheters etc.), sharps (needles, blades glass etc) should be shredded but only after chemical treatment/microwavinghospital waste Management and has to ensure that waste is handled without any advance effect to human health and environment. As the "occupier", he is responsible for applying for grant of authorization (in Form I) to the prescribed authority i.e. J&K Pollution Control Board. He is also responsible for submitting an annual report in Form II to the J&K Pollution Control Board(prescribed authority) by 31st January regarding information about categories and

quantities of Bio-Medical Wastes handled during the previous year. He is answerable to the higher authorities in the Ministry.

(B) Functions of Hospital Waste Management Committee

1. To ensure the circulation of enough copies of Bio-Medical Waste Rules guidelines for implementation of the same in Clinical Departments. The responsibilities of the individual professionals will be highlighted in these guidelines.
2. To conduct "Awareness Program": Clinical combined/grand round will be held for making the Faculty and the Residents aware of the "Biomedical Waste ((M and H)Rules1998.
3. To conduct training program for Medical Professionals, Nursing Professional &Sanitation Professionals.
4. To hold meeting of the Hospital Waste Management Committee and formulate the detailed plan of action in regard to segregation, collection, storage and transport of waste from the entire patient care areas. To procure the items required in this regards and make the available in all patient care areas.
5. Each Clinical Department (Unit), Lab Services, Blood Bank, Microbiology, and Fathology will make one Faculty Member responsible for supervision segregation in their area of activities.
6. Floor wise one Nursing Supervisor will be responsible for supervision of segregation in the wards of each floor. In each and every OT the same instruction of supervision will be followed and one sister in charge will be responsible.

(C) Role of Officer In charge of Waste Management

The Officer In charge of waste management will be in charge of implementation and will communicate with the Heads of Departments, Infection Control Officer and Matron. He will be the member of the Hospital Waste Management Committee. He will be responsible for monitoring the program from time to time at various levels i.e. generation segregation collection ,storage, transportation and treatment including disposal. He will be responsible for circulation of all policy decisions and the hospital waste management manual. He will administrative support. With regard to the departments which generate radioactive waste one of the consultants should be designated as Radiation protection officer and he will be responsible for implementation of the necessary guidelines.

(E) Role of Matron

The Matron will designate one of the senior administrative level deputies as Sister In charge of Hospital Waste Management, who will be responsible for close monitoring of the activity. She will conduct surprise rounds and will review and evaluate the various aspects of scientific hospital waste management at all levels from generation and segregation to final disposal. She will also attend the meetings of Hospital Waste Management Committee on behalf of the Matron and co-ordinate the training of nurses on Hospital Waste Management with administration.

(F) Role of I/c Sanitation Inspector

The In charge Sanitation Inspector will be responsible for the implementation, monitoring and evaluation of hospital waste management from collection and storage of hospital waste to its final disposal. He will attend the Hospital Waste Management Committee meetings and will ensure the training of the staff posted under him. Regular in-service training and evaluation of the sanitation attendants will be carried out by him. He will also provides feed back information to Officer In charge Waste Management in case of accidents and spills.

3.8 TRAINING ON HOSPITAL WASTE MANAGEMENT

In order to be able to comprehend and implement the Bio-Medical Waste (Management and Handling) Rules' 1998, it is mandatory to provide training to all categories of staff i.e. resident doctors, nurses, paramedical staff, hospital and sanitation attendants, patient and their attendants, canteen staff, operation of Bio-Medical Waste treatment facilities. Before the training is carried out the training needs to be identified content varied accordingly. It should be interactive and should include awareness sessions, demonstrations and behavioral science inputs. It should definitely include the following:

(i) Awareness of different categories of waste and potential hazard

(ii) Waste minimization, reduction in use of disposables

(iii) Segregation policy

(iv) Proper and safe handling of sharps

(v) Use of protective gear

(vi)Colour coding of containers

(vii) Appropriate treatment of waste

(viii) Management of spills and accidents

(ix) Occupational health.

3.9. NEED FOR HOSPITAL WASTE MANAGEMENT

1) **Health problem:** There are number of health problems associated with improper management of hospital waste such as

- Due to the poor waste management and poor infection control nosocomial infections may arise in patients.
- Risks of infections outside hospitals for waste handlers, scavengers, and the general public.
- Risks associated with hazardous chemicals, drugs, being handled by persons handling wastes at all levels.
- Injuries from sharps to hospital personnel and waste handlers to all level
- Disposable" being repacked and sold by unscrupulous elements without even being washed.
- Drugs which have been disposed of, being repacked and sold off to unsuspecting buyers.

2) **Environmental hazards:** Improper hospital waste management also results in air, water and soil pollution, especially due to imperfect treatment and faulty disposal methods.

3) **Legal Obligation** According to the Bio-Medical Waste(Management and Handling)Rules 1998, the waste management practices must be follow by all the hospitals otherwise legal action can be initiated for hospitals not following the rule.

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