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Hospital Waste Management and its Monitoring

2nd Edition



Madhuri Sharma

Foreword
BD Athani

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2 Safety Measures

According to World Health Organization (WHO) (1999), with regard to life-threatening virus infections such as HIV/AIDS and hepatitis B and C, healthcare workers, particularly nurses, are at greatest risk of infection through injuries from contaminated sharps (largely hypodermic needles).

IMPACT OF BIOMEDICAL INFECTIOUS WASTE

Some Facts

- In 1992, eight cases of HIV were recognized as occupational infections in France. In two of them transmission took place through wounds in waste handlers.
- In June 1994, out of 39 cases of HIV infection in USA, 34 reportedly occurred from an injury through the sharp biomedical waste. Four resulted from exposure of skin or mucous membrane to infected blood.
- By June 1996, the number of cumulative recognized cases of occupational HIV infection had risen to 51 in USA and all of them were nurses, doctors or laboratory assistants.
- It is estimated that in USA, approximately 86,000 to 160,000 healthcare workers are injured annually by sharp biomedical waste. Out of these about 164 to 323 persons develop hepatitis B infection subsequently.
- It is estimated that in Japan the risk of HIV and hepatitis B infection after hypodermic needle puncture is 0.3 and 3% respectively.
- Nearly 66% of the rag pickers in India suffer from an injury (or wound) because of biomedical waste.
- A hospital housekeeper in the USA developed staphylococcal bacteremia and endocarditis after a needle injury.
- Thota et al (2014) observed that "Everyone wins, when the environmental health is respected and safe guarded". In many

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developing countries, the proper disposal of infectious waste is a growing problem and if it is not managed in a sustained way, it will make the situation worse. Every concerned health personnel are expected to have proper knowledge, practice, and capacity to guide others for waste collection, proper handling techniques, and management. Dentists are encouraged to follow best management practices when disposing hazardous wastes. All the dental personnel as required to undergo continuing training program on biomedical waste management"

- Yadav M has stated that as biomedical waste is the major source of dioxine production during incineration, which is generally the cause of incurable cancers, the Medical ethics dictate that prevention must be carried out as we all are bound by Hippocratic oath.
- Mathur P et al observed that the biomedical Waste scattered in and around the hospitals, invites flies, insects, rodents, cats and dogs that are responsible for the spread of communication disease like plague and rabies. Rag pickers in the hospital, sorting out the garbage are at a risk of getting tetanus and HN infections. The recycling of disposable syringes, needles, I/V sets and other article like glass bottles without proper sterilization are responsible for hepatitis, HIV, and other viral diseases.

It should be clear by now that anyone can be affected by the hazards of biomedical waste. Members of the medical profession are especially vulnerable to the same. Therefore, each of us needs to observe certain safety measures while handling biomedical waste to protect ourselves as well as others from hazards of exposure to the same. Use of safety measures is very easy and convenient. These measures may be quite effective if used properly.

AIMS OF BIOMEDICAL WASTE MANAGEMENT

Universal precautions refer to the practice, in medicine, of avoiding contact with patients' bodily fluids, by means of the wearing of nonporous articles such as medical gloves, goggles, and face shields.

- To prevent the transmission of disease from patient to patient, from patient to healthcare worker and vice versa.
- To prevent injury to the healthcare workers and workers in support services, while handling biomedical waste.
- To prevent a general exposure to the harmful effects of the cytotoxic, genotoxic and chemical biomedical waste as much as possible.
- To protect the environment.

To achieve these aims, a healthcare worker must be equipped with (and prepared to use) several personal protective devices as and when

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needed and should also observe various other precautions. It should not be difficult to do this once a habit is formed.

PERSONAL PROTECTIVE DEVICES (FIG. 2.1)

Important protective devices are:

- Gloves
- Cap and mask/face mask
- Gown/apron (and full sleeve shirts)
- Gumboots with thick sole
- Eye glasses/protective goggles
- Shield

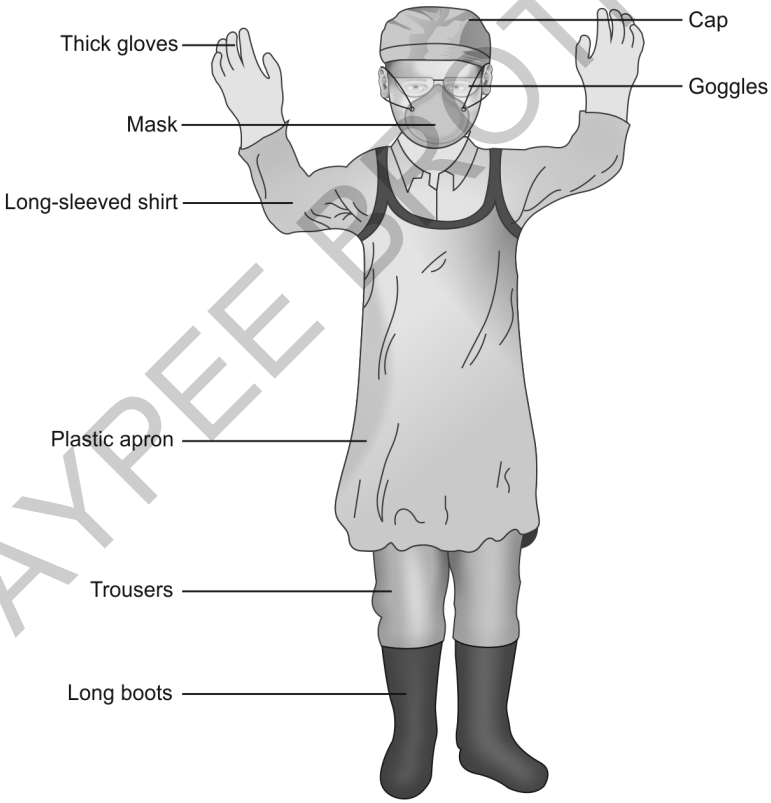


Fig. 2.1: Personal protective gears/devices

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Gloves

- They are meant to protect hands. They also help in prevention of disease transmission from one person to another. Proper uses of gloves involve the following:
  Wear them while
  - Doing an invasive procedure
  - Dressing a patient
  - Handling blood or body fluids, and
  - Dealing with sharps and chemicals.
- Wash your hands with soap and water before and after using gloves.
- After wearing gloves, one should not touch anything other than the work for which the gloves are worn.
- Ideally, gloves should be changed after serving or examining each patient. If, however, this is not feasible, then the hands (with the gloves on) should be dipped in 1% hypochlorite solution for one minute and then only the next patient should be examined.
- Ensure a proper disposal of used gloves. Put the gloves in 1% sodium hypochlorite solution for a period of 30 minutes, cut them to alter the original shape and then throw them in the red waste bag.
- Thick layered gloves are used by the waste handlers while handling biomedical waste.

Cap, Mask/Face Mask and Gown

All these devices are meant to protect the body. Their proper use involves the following:

- Wear the mask in such a way that it covers the mouth and the nose. If it is soiled with blood/body fluid, it should be discarded and replaced immediately.
- Apron/Gown should cover the body from neck to knees.
- Wear all these gears whenever blood/body fluid is likely to spill over.
- Wear them during all surgical procedures including while delivering a baby (childbirth).
- Wear at least cap and mask while working in wards.
- For cleaning, dip them in 1% hypochlorite solution for 30 minutes and then wash thoroughly with soap and water. After drying, these should be autoclaved.

Gumboots with Thick Sole

These should be used while working in the operation theaters and labor rooms. These prevent injury (and thus the transmission of disease) from

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spilled material and sharp biomedical waste. This precaution is a must for those working at incinerator and landfill sites.

Eye Glasses/Protective Goggles

Goggles (or plain glasses) should be worn while performing dental surgery, orthopedic surgery and if the patient is known to be HIV/Hepatitis B positive. Eye glasses/protective goggles must be worn by biomedical waste handlers.

Shield

One must wear a protective shield while working in a radiation prone environment (e.g. Radiology and Radiotherapy departments). It protects from radiation hazards. Persons working in the radiology department should also wear a dosimeter to estimate the quantum of exposure to radiation.

OTHER PROTECTIVE MEASURES

- All employees of the hospital, including biomedical waste handlers, must be vaccinated against Tetanus and Hepatitis B.
- Extreme care must be taken while handling needles and other sharps, since most sharp injuries occur between the points of their use and disposal.
- Sharps should not be left casually on counter tops, food trays, beds, etc. as it can result to grievous injury.
- Clipping, bending or breaking the glass and needles with hands must not be practised as this can cause accidental injuries.
- Sharps should be segregated at the site of generation and thereafter placed in a puncture proof container.
- All disposable items must be dipped in 1% hypochlorite solution for at least half an hour to ensure disinfection.
- Exposure to radiation should be avoided as much as possible.
- All universal precautions are to be taken while dealing with HIV positive or hepatitis B positive cases.
  - Always wear double gloves while dealing with these patients.
  - Wear cap, mask and apron.
  - In operation theater (OT), goggles/glasses must be worn.
  - The transfer of instruments in the OT should not be from hand to hand between a nurse and doctor or vice versa. Instead, a tray or bowl should be used during transfer of instruments. Do not hold the instruments from pointed/sharp end.

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- First aid box and emergency medicines should be available in the treatment areas.

MEASURES TO BE OBSERVED IF AN ACCIDENT OCCURS

- Extreme care should be taken while dealing with the sharps. In case, an injury due to (infected) sharps or broken glass takes place, clean the wound immediately, first with saline and then with spirit or povidone iodine. Consult a doctor. Dressing of the wound may be required. An injection of tetanus toxoid (TT) is advisable.
- If an injurious solution is spilled on the body, remove the soiled clothes and wash the part thoroughly with plenty of water. Apply nonirritant antiseptic cream and immediately report to a doctor. In case of spillage in eyes, wash with water and avoid rubbing. See a doctor as early as possible.
- Accidents to be reported immediately as per rule Form III.

RAG PICKERS

Rag pickers usually collect disposable items (like syringes, IV sets, blood bags, urine bags, etc.) from the biomedical waste. There is a possibility that these items are repacked and sold. People are tempted to buy them due to a very low cost. However, all these items can transmit the diseases to the users. As per law, this unauthorized recycling is a crime as it can be fatal to human life. While economic plight of rag pickers deserves a thoughtful consideration on humanitarian grounds, yet they cannot be allowed to continue this trade for the sake of their own health as well as of others. Illegal recycling by all the persons must be strictly curbed.

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Hospital Waste Management and its Monitoring

Salient Features

- It is a unique book giving adequate knowledge about health hazards of hospital waste, proper techniques and methods of handling the waste and practice of safety measures, while handling the waste towards safe disposal
- Intends to give knowledge, awareness, and methodology including the latest techniques for disposal of biomedical waste
- It will be of immense practical help to professionals at different levels in the healthcare establishments
- Serves as an educational aid focusing on varied aspects of handling and disposal of hospital waste.



Madhuri Sharma is a medical graduate from Agra University, Agra, Uttar Pradesh, India, did her MBA in Health Care Administration (HCA) from Faculty of Management Studies (FMS), University of Delhi, and also completed Postgraduate Diploma in Health Planning and Administration, University of Leeds, UK. She was also teacher and examiner for the MBA (HCA) course at Delhi University for 11 years. She worked at Lady Hardinge Medical College and associated hospitals such as Dr Ram Manohar Lohia Hospital, New Delhi in various capacities. She retired as the Deputy Director of Health Services, Ministry of Health and Family Welfare. After that she was appointed as National WHO Consultant. At present, she is providing free consultation and treatment to the society as General Practitioner.

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