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Biomedical waste and environmental pollution

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Abstract : Biomedical wastes mean any solid or liquid waste which is generated during diagnosis or immunization of human being /animal. Human anatomical wastes, discarded machines, psycho toxic drugs, blood ,pus, liquid and chemical wastes associated with medical operations, treatment, pathological investigations, waste sharps, animal wastes microbiological and biotechnological wastes- these are when untreated or disposed in open spaces, created a lot of environmental pollution including bad odor, infection ,air pollution, soil pollution and even water pollution also.

The biomedical waste is to be properly segregated, collected and packed for adequate disposal, but due to improper management, this is not done in a better way. The biomedical waste are thrown outside, from where it is picked by the rag pickers and sold to the rag sellers. Here the wastes like plastics, needle with syringe is sent to the recycling plants. After repacking again it comes to the market. This gives rise to many infectious diseases like AIDS, Hepatitis B and C, Malaria and other infectious diseases from blood and pus.

The immense need of Biomedical Waste Management is necessary to minimize and control the problem. Hospitals and Medical Institutions should follow the guidelines of World Health Organization.

Keywords : Biomedical Waste, Pathological Waste, Anatomical Waste, Biotechnological waste, Microbiological Waste, Disposal, Management.

INTRODUCTION

Medical care is vital for our life, health and well being. But the waste generated from medical activities can be hazardous, toxic and even lethal because of their high potential for diseases transmission. The hazardous and toxic parts of waste from health care establishments comprising infectious, bio-medical and radio- active material as well as sharps (hypodermic needles, knives, scalpels etc.) constitute a grave risk, if these are not properly treated/ disposed or is allowed to get mixed with other municipal waste. Its propensity to encourage growth of various pathogen and vectors and its ability to contaminate other nonhazardous/ non-toxic municipal waste jeopardize the efforts undertaken

for overall municipal waste management. The rag pickers and waste workers are often worst affected, because unknowingly or willingly, they rummage through all kinds of poisonous material while trying to salvage items which they can sell for refuse. At the same time, this kind of illegal and unethical reuse can be extremely dangerous and even fatal. Diseases like cholera, plague tuberculosis, hepatitis (especially HBV), AIDS (HIV), diphtheria etc., either in epidemic or even endemic form, pose grave public health risk.

MATERIALS AND METHODS

To study the impact of biological waste pollution, various government and private hospitals in the city were visited. These included RIMS, Sadar Hospital, Sevasadan, Raj Hospital, Popular Nursing Home, Jivan-Jyoti Clinic in Ranchi. The nearby places around hospitals contain more

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biomedical wastes. Wastes are scattered here and there, giving invitation to people living in that area. It is a common seen that rag-pickers are searching something from the waste materials. They pick the syringes, plastics etc from there and unknowingly getting the infectious diseases, in private Hospitals the management is better. They are more clean in and around.

Some reports are also collected from newspapers. Reports say that rag pickers collect needles, plastic materials including syringe etc and sell it to the Kabariwala at the rate of 15-20 Rs /kg. From here it is sent to metropolitan cities where it is recycled and again sent to the market.

RESULT AND DISCUSSIONS

Some hospitals have incinerators, but most of the time they don't function properly. the private hospitals have contracts with disposal companies, but there is lack of proper management. Biomedical waste is disposed in open area, from where the poor people pick the syringes and sell it.

New guideline of World Health Organization says that the use of disposable syringe should be closed, because plastics pollute the environment. It is better to use glass syringe. It should be well sterilized to avoid infection. There is no chance of recycling of glass syringes.

Components of Bio Medical Wastes

- (I) Human anatomical waste (tissue, organs, body parts etc.),
- (II) animalwaste (as above, generated during research/ experimentation, from veterinary hospitals etc.)
- (III) microbiology and biotechnology waste, such as, laboratory cultures, micro-organisms, human and animal cell cultures, toxins etc.
- (IV) sharp wastes, such as, hypodermic needles, syringes scalpels, broken glass etc.
- (V) discarded medicines and cyto-toxic drugs.
- (VI) Soiled waste such as dressing, bandages, plaster casts, material contaminated with blood etc.
- (VII) Solid waste (disposable items like tubes, catheters etc. excluding sharps),
- (VIII) Liquid waste generated from any of the infected areas,
- (IX) Incineration ash,

- (X) Chemical waste.

Health hazards associated with poor management of Bio-medical waste

- (i) Injury from sharps to staff and waste handlers associated with the health care establishment.
- (ii) Hospital Acquired Infection (HAI) of patients due to spread of infection.
- (iii) Risk of infection outside the hospital for waste handlers /scavengers and eventually general public.
- (iv) Occupational risk associated with hazardous chemicals, drugs etc.
- (v) Unauthorised repackaging and sale of disposable items and unused / date expired drugs.

Report - (I) - Rakesh Kumar, student of part -II, Hinoo, Ranchi, is a sufferer of biomedical waste infection. Once a needle penetrated his sleeper and injured his left leg, after some time he got fever. When the reports of blood test came, it was surprising that he was suffering from AIDS. He had never been transfused blood from anyone or made sex relationship with anyone, but the biomedical waste infection made his life hard.

Report - (II) - Ruma the nurse of a hospital, Ranchi, is another victim. While going from hostel to hospital, a needle penetrated her leg. She cleaned the injury with spirit. After some time she became ill. After diagnosis she was told that she was suffering from Hepatitis -B. She is working in the same hospital where she was injured. Nobody from the hospital administration or management helped her.

{Report 1&2 from DainikBhasker, Ranchi 20-12-11}.

BIOMEDICAL WASTE MANAGEMENT

Health care waste is a heterogeneous mixture, which is very difficult to manage as such. But the problem can be simplified and its dimension reduced considerably if a proper management system is planned. The management principles are based on the following aspects:

- Reduction/ control of waste (by controlling inventory, wastage of consumable items, reagents, breakage etc.)
- Segregation of the different types of wastes into different categories according to their treatment / disposal options.

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- Segregated collection and transportation to final treatment/ disposal facility so that they do not get mixed.
- Proper treatment and final disposal as indicated in the rules.
- Safety of handling, full care/ protection against operational hazard for personnel at each level.
- Proper organization and management.

It would be necessary to implement proper bio-medical waste management system for each and every hospital, nursing home, pathological laboratory etc. Comprehensive management system for each and every health care establishment has to be planned for optimal techno- economic viability. At the same time the final disposal for the whole town must not be lost sight of. Since there are a large number of small and medium health care establishments, common treatment and disposal facilities are essential.

A major issue related to current Bio-Medical waste management in many hospital is that the implementation of Bio-Waste regulation is unsatisfactory as some hospitals are disposing of waste in a haphazard, improper and indiscriminate manner. Lack of segregation practices, results in mixing of hospital wastes with general waste making the whole waste stream hazardous. Inappropriate segregation ultimately results in an incorrect method of waste disposal.

A bag not securely tied results in scattering of Bio-Medical waste. Bio-Medical waste scattered in and around hospitals invites flies, insects, rodents, cats and dogs that are responsible for spread of communicable diseases like plague and rabies. Most importantly there is no mechanism to ensure that all waste collected and segregated, reaches its final destination without any pilferage. Additional hazard includes recycling of disposable without even being washed. Usage of same wheel barrow for transportation of all categories of waste is also a cause of infection spreading. Most of the times there is no monitoring of trolley routes, resulting in trolley movement around patient care units posing a serious health hazard.

There is no mechanism for ensuring waste treatment within prescribed time limits. Bio-Medical waste if not handled properly and within the stipulated time period could strike in the form of fatal infections.

According to "Bio-Medical Waste (Management and

handling)Rules, 1998" it is the duty of every "occupier" i.e. a person who has the control over the institution and or its premises, to take all steps to ensure that waste generated is handled without any adverse effect to human health and environment.

Handling, segregation, mutilation, disinfection, storage, transportation and final disposal are vital steps for safe and scientific management of Bio-Medical Waste in any establishment.

The segregation of Bio-Medical waste is the key to successful Bio-Medical waste management. The waste material like solid waste, sharp waste, chemical waste etc, collected from various locations in the hospital at the waste generation point itself. Bins should be located at a stationary location, whereas trolley should be moving from department to department for collection of waste. The transportation of waste should be away from patient care units. Every hospital generating Bio-Medical waste needs to set up requisite Bio-Medical waste treatment facilities to ensure proper treatment of waste. Waste disposal equipments for ensuring smooth functioning of the Bio-Medical waste treatment facilities.

CONCLUSION

Right to live in a clean environment is one of the fundamental rights (Article 21). The article provides that no person shall be deprived of his life and personal liberty. Life and personal liberty means dignify survival i.e. survival in pollution free environment. Bio-Medical wastes have the potentiality to infect and is dangerous. So, it must be properly managed to protect the general public, specially the health care and sanitation workers, who are regularly exposed to biomedical waste as an occupational hazard.

Lastly, the co-ordination between civic authority and the common treatment/ disposal facility is extremely important for timely removal of waste. There should be no confusion regarding placement of the waste components, their containers and colour coding, removal schedule etc.

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