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RESEARCH PAPER

Biomedical waste management: Health and safety practices and extent of its use by waste handling workers

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ABSTRACT

Biomedical waste management has recently emerged as an issue of major concern not only to hospitals, nursing home authorities but also to the environmental and law enforcement agencies, media and the general public. The present investigation was conducted in Udaipur city of Rajasthan state to know the health and safety practices and extent of its use by 255 waste handling workers in one government hospital,two private hospitals and common treatment facility. The health and safety measures used by waste handling workersas found that they were adopting most of these two practices always as per the biomedical waste (Management and Handling) Rules,1998. Only among few waste handling workers was sometimes not followed these health and safety measures during handling of biomedical waste .It was basically due to un-awareness of health hazards which may occur because of improper training related to the biomedical waste management practices.

Key Words : Biomedical waste, Safety measures, Waste handling workers

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Hospital is one of the complex institutions which are frequented by people from every walks of life in the society without any distinction between age, sex, race and religion. This is over and above the normal inhabitants of hospital *i.e.* patients and staff. All of them produce waste which is increasing in its amount and type due to advances in scientific knowledge and is creating its impact (Rao and Garg, 1994).

In country like India, where there is big and complex health care system, mixed economy, private and government hospitals working together; while providing services generate lot of waste. Till July 1998, there was no system for proper waste disposal. Most of the hospitals were disposing their waste along with general waste. For prevention of these improper practices, the government of India had launched a law known as 'biomedical waste (Management and Handling) rule, 1998". Under this law the Government has given specific guidelines for management of biomedical waste. Biomedical waste is defined as any solid, fluid, liquid waste including container and intermediate product, which is generated during diagnosis, treatment or

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immunization of human beings or in research activities or in production or testing of biological products biomedical waste (Management and Handling) Rules 1998. The government of India notification, 1998 specifies that biomedical waste management is a part of hospital hygiene and maintenance activities.

It is estimated that 10-25 per cent of the health care waste generated is hazardous and causes serious health problems (WHO, 1999). Biomedical waste management is currently a burning issue more so with the increasing health care facilities and increasing waste generation (Mathur *et al*., 2011).

Approximately 75-90 per cent of the biomedical waste is non-hazardous and as harmless as any other municipal waste. The remaining 10-25 per cent is hazardous and can be injurious to humans or animals and can be injurious to humans or animals and deleterious to environment. It is important to realize that if both these types are mixed together then the whole waste becomes harmful (Singh *et al.,* 2007). It is estimated that annually about 0.33 million tons of biomedical waste is generated in India and the waste generation rate ranges from 0.5 to 2.0 kg per bed per day (Patil and Shekder, 2001). Biomedical waste is mainly classified as biological and non- biological waste, some waste may be infectious and some may be non- infectious (Fig. A). Infectious waste can be serious threat to human health if it is not managed in a scientific manner.

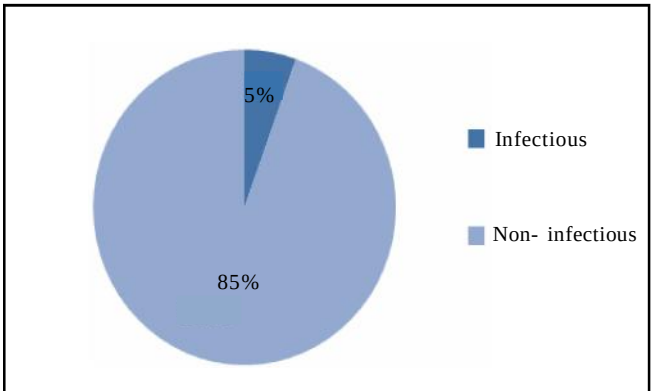

Fig. A : Composition of biomedical waste

Biomedical waste handling and disposal is of ten considered only the job of class IV workers. These workers are rarely provided with immunization facilities, personal protective clothing and training related to biomedical waste management. Proper knowledge about the health hazard of hospital waste, proper technique and methods of handling the waste and practice of safety measures can go a long way towards the safe disposal of hazardous biomedical waste and protect the community from various adverse effects of the hazardous waste.

RESEARCH METHODOLOGY

The methodology of this particular study was followed at two stages:

Stage I :

In the hospital which includes generation, segregation, collection and storage of biomedical waste management in various departments.

Stage II :

Outside the hospital which includes transportation, treatment and final disposal of biomedical waste by common biomedical waste treatment facility.

This investigation was conducted in Udaipur city of Rajasthan state. This study was carried out in one government, two private hospitals and common biomedical waste treatment facility.In government hospital with eighteen departments and two private hospitals with fifteen departments each and one common biomedical waste treatment facility were selected.From each department 5 waste handling workers were selected randomly to judge the extent of health and safety practices and extent of its use. Further, these selected waste handling workers were also the sample to assess the health and safety practices adopted and extent of its use in managing the biomedical waste in hospitals.Thus, in all 240 waste handling workers including 90 from government and 150 from private hospitals (75 from each private hospital) were selected. Whereas, 15 waste handing workers from the common biomedical waste treatment facility were selected. An interview schedule and observation schedule was developed to assess the health and safety practices and extent of its use by waste handling workers both at hospitals and at common biomedical waste treatment facility.

RESULTS AND REMONSTRATION

There is a great risk to all those who generate, collect, segregate, handle, package, store, transport, treat and dispose biomedical waste in hospitals. Occupational

exposure to blood can result from percutaneous injury (needle stick or other sharps injury), mucocutaneous injury (splash of blood or other body fluids into the eyes, nose or mouth) or blood contact with non-intact skin. The most common cause of needle stick injury is two handed recapping and the unsafe collection and disposal of wastesharps.

An evaluation report submitted by Indian Institute of management Lucknow commissioned by Central Pollution Control Board showed that only 50-55 per cent of biomedical waste management generated in country is being properly segregated, transported and disposed. The management of biomedical waste is improving day by day all over the world. There is a lot of understanding with the problems among the generators, operators, decision-makers and the general community about the safe management of biomedical waste.

Personal protective clothing reduces the risk of acquiring an infection, but it does not eliminates the risk completely. It must be used in an effective and correct manner at every time. Where there are chances of contact with blood and body fluids of patients, continuous availability of personal protective equipment and adequate training for its proper use are essential requirement. Thus, safety practices adopted by the waste handling workers during the process of biomedical waste management are rudimentary. The data obtained for the use of protective clothing of different types while handling biomedical waste is presented in Table 1. It can be clearly seen that in government hospital 83.33 per cent and 16.6 per cent waste handling workers wear gloves always and sometimes, respectively. Whereas 48.88 per cent and 32.22 per cent always and sometimes wear mask, respectively. Ninty per cent of the workers always wear apron and 10 per cent respondents never wear apron during the process of handling biomedical waste in the hospital.

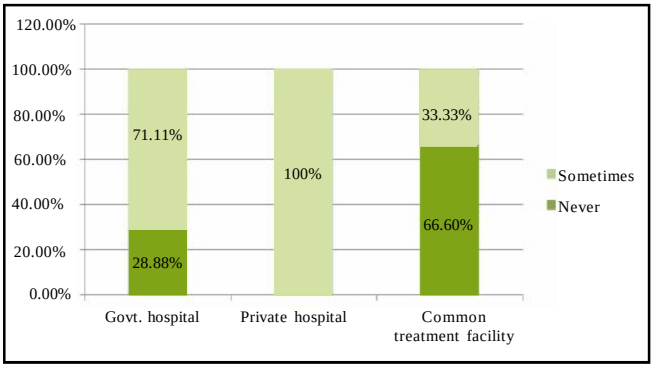

Fig. 1 : Percentage distribution on the basis of immunization with hepatitis B and tetanus vaccine

Majority of waste handling workers (88%) of the private hospitals always wear gloves,58.66 per cent wear mask and maximum respondents *i.e.* 83.3 per cent wear apron during the process of handling biomedical waste. Whereas gloves, mask and apron was used sometimes by 12 per cent, 34.66 per cent mask and 27.77 per cent of waste handling workers of private hospitals.In common treatment facility,100 per cent waste handling workers

Table 1 : Distribution of respondents on the basis of use of personal protective clothing during handling of biomedical waste (n=255)

Sr. No.	Types of personal protective clothing	Always			Sometimes			Never		
		Govt. hospital n=90%	Private hospital n=150%	Common treatment facility n=15%	Govt. hospital n=90%	Private hospital n=150%	Common treatment facility n=15%	Govt. hospital n=90%	Private hospital n=150%	Common treatment facility n=15%
1.	Gloves	75 (83.33%)	132 (88%)	15 (100%)	15 (16.66%)	18 (12%)	-	-	-	-
2.	Mask	44 (48.88%)	88 (58.66%)	15 (66.66%)	29 (32.22%)	52 (34.66%)		17(18.88%)	10 (6.66%)	-
3.	Apron	81 (90%)	125 (83.33%)	-	-	25 (27.77%)	-	9 (10%)	-	15 (100%)
4.	Long boot	-	-	15 (100%)	-	-		-		

Note: Table contains multiple responses

Table 2 : Distribution of respondents on the basis of immunization with hepatitis B and tetanus vaccine (n=255)

Sr. No.	Extent of immunization	Waste handling workers		
		Govt. hospital (n=90%)	Privatehospital (n=150%)	Common treatment facility (n=15%)
1.	Always	-	-	-
2.	Sometimes	64 (71.11%)	150 (100%)	5 (33.33%)
3.	Never	26 (28.88%)	-	10 (66.66%)
4.	Total	90	150	15

always wear gloves and 66.6 per cent respondent always use mask during handling of biomedical waste but 33.33 per cent respondents sometimes wear mask. No one was wearing apron during the process of handling and disposal of biomedical waste management.

Waste handling workers in the hospital and common treatment facility sorting out the waste are at a risk of getting tetanus and HIV infections. The recycling of disposable syringes, needles, IV sets and other article like glass bottles without proper sterilization are responsible for Hepatitis, HIV and other viral diseases. Hence, as per biomedical waste (Management and Handling) Rules, 2011 number 4 (c) that immunize all health care and waste handling workers and other involved in handling of biomedical waste for protection against diseases including Hepatitis B and Tetanus that are likely to be transmitted by handling of biomedical waste.

The health and safety practices followed by the hospital administration can be seen through the data presented in Table 2. It shows that in government hospital 71.11 per cent waste handling workers were sometimes immunized while 28.88 per cent had never vaccinated with Hepatitis B and Tetanus, although in both private hospital 100 per cent waste handling workers were immunized sometimes with Hepatitis B and Tetanus vaccination. Thus, the result reveled that waste handling workers have not been fully immunized against hepatitis B and tetanus. In common biomedical waste treatment facility only 33.33 per cent waste handling workers were sometimes immunized with Hepatitis B and Tetanus but maximum respondents that 66.66 per cent were not vaccinated. This depicts that even after so many years this rule is not followed and the waste handling workers are posed to serious health problems.

Conclusion :

The study shows that personal protective clothing wear by maximum waste handling workers. It can be said that awareness among workers was good. Many workers sometimes had immunized with hepatitis B and tetanus. Some of them had not receive hepatitis B and tetanus vaccine so they faced many problem during collection of needles and syringes. Further, the intervention can be done by providing training programmes, so that the knowledge on the biomedical waste management can be improved.

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