



ASSESSMENT OF KNOWLEDGE AND PRACTICE OF BIOMEDICAL WASTE MANAGEMENT OVER A SPAN OF FIVE YEARS IN HINDU RAO HOSPITAL AND NORTH DMC MEDICAL COLLEGE

Pharmacology

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ABSTRACT

Background: Biomedical waste pose a risk on human health as well as contaminate the environment. Previous studies shows that knowledge and practice on biomedical waste management among health care personnel was dismal hence further studies are required to know the current status.

Objective: The aim of this study was to assess knowledge and practice of biomedical waste management among health care workers over a span of five years in Hindu Rao hospital and North Delhi municipal corporation Medical college.

Methodology: The study was carried out on 200 health care workers including 100 doctors, 50 nurses, 40 Lab technicians and 10 class-IV waste handlers.

Result and Conclusion : It was found that knowledge and practice regarding biomedical waste BMW management was higher among Doctors and Nurses as compared to lab technicians and class- IV health workers. Frequent programs and training should be conducted among non-technical staff to increase knowledge and safe practice of biomedical waste BMW management.

KEYWORDS

Biomedical waste; hospital knowledge; practice; needle stick injury

INTRODUCTION:

Every system in nature results in disintegration leading to generation of waste. This waste includes sewage, industrial and agricultural waste, which are hazardous and require safe disposal. These waste products pollute air, water and soil and impose danger to human beings, animals and environment. Waste generated in various hospitals and health care facilities can cause infections mainly HIV, Hepatitis B & C and Tetanus to the people who handle the waste material. Health care professionals such as doctors, nurses, hospital attendants and sanitary workers spend their maximum time with the patients which increases their exposure and risk to the hazardous waste present in the hospital mainly known as Biomedical Waste (BMW).

BMW is defined as any solid/liquid waste is produced during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biologicals or in health camps during health care activities (Biomedical Waste Management and Handling Rules, 1998). [1]It consists of human anatomical waste, animal anatomical waste, soiled waste, expired or discarded medicine, chemical waste, chemical liquid waste, microbiology, biotechnology and other clinical laboratory waste, contaminated waste (recyclable and non-recyclable), waste sharps including metals, glasswares and metallic body implants. All biomedical waste is hazardous and carries risk of infection than any other waste material. It is projected that approximately 10-25% of health care waste is dangerous and can be harmful to humans, animals and environment [2]. Thus, these should be safely managed under Biomedical Waste Management and handling Rules (Biomedical Waste Management and Handling Rules 1998) to protect the public, healthcare and sanitation workers who are regularly exposed to BMW as an occupational hazard.

Evidence suggest that studies on practice and information of BMW management (BMWM) is inadequate in India [3]. Thus, present study indicated the existence of inappropriate and hazardous BMWM practices. Recognizing the urgent need for a nationwide situational analysis to generate evidence for gaps in BMWM so that appropriate

measures was carried out to improve the knowledge and practices of management of BMW among health care professionals working at Hindu Rao hospital and North Delhi municipal corporation (NDMC) Medical college over the period of 5 years.

MATERIAL AND METHODS:

This study comprises of assessment of the knowledge and practices regarding BMWM. For this purpose, total of 200 health care personnel from Hindu Rao hospital and NDMC Medical college were selected for study. The sample size consisted of about 200 personnel (medical+ paramedical staff) which included 100 doctors, 50 nurses, 40 Lab technicians and 10 class-IV waste handlers. The information was obtained from the paramedical and medical staff by a pre-designed self-administered questionnaire. The questionnaire was validated by conducting a pilot study and designed keeping in mind the Biomedical Waste Management & Handling rules 1998. The study data was collected using this pre-tested and post-tested questionnaire and it was collected simultaneously from all the wards, outpatient departments and laboratory by the primary investigator under the supervision of senior faculty. Inclusion criteria was individuals selected by sampling method with work experience of more than six month in the current institution. Individuals who are not willing to participate in the study were excluded. Informed consent was taken from the study participants.

Ethical Approval: The study was conducted after approval from the institutional ethics committee and review board of Hindu Rao Hospital Delhi, India.

Statistical analysis:

Results were analyzed by using z test of proportion. Responses to questions were calculated as absolute numbers and percentages. Analyses were performed using SPSS software version 18.

Setting:

North DMC Medical College & Hindu Rao Hospital, Delhi, India.

Study design and duration:

A cross sectional questionnaire survey was used that consist of 22 questions regarding knowledge and practice of biomedical waste study for a period of 6 months. All the questions with similar ideas were grouped together either as knowledge or practice items and then correct information among all 4 groups were analyzed.

RESULTS:

A total of 200 health care workers (HCW) were participated in the study. Among them approximately 90% HCW participated voluntarily in both the pre-test and post-test. A pilot study was carried out on participated HCW and necessary modifications were made in the questionnaire in order to simplify the analysis. We divided the questionnaire into three groups. Group 1 describes correct knowledge regarding BMW among HCW. Group 2 denotes correct practice regarding BMW. Group 3 describes response to knowledge and practice questionnaire of HCW on pre-test and post-test expressed as absolute numbers and percentages (%).

Knowledge analysis

It was observed in our study that majority of doctors (81/100;81%) and nurses (28/50;56%) had adequate knowledge about color coding of BMW, but on the contrary this knowledge was lacking among lab technician and waste handlers. Further prior to disposal segregation of waste forms an important step in BMW and preventing hospital acquired infections. Most of the participants; doctors (82/100;82%), nurses (36/50;72%) and lab technicians (28/40;70%) were aware of the importance of segregation of waste at its source except waste handlers. However, knowledge regarding universal precaution was lacking among health care professional since (44/100;44%) of doctors, (8/50;16%) of nurses were aware of universal precaution in BMW and almost all of the lab technicians and waste handlers were ignorant of this term. Information regarding transmission of Hepatitis B and HIV through BMW was sufficient among all the subjects except waste handlers (Group 1).

Practice analysis

It is recommended that segregation of BMW should be followed strictly. Majority of doctors, nurses, lab technicians and waste handlers were disposing BMW in the respective bins. HCW are at a very high risk of needle stick injuries. Unfortunately, knowledge was poor for some aspects of injection safety to prevent needle stick injury. Only (47/100;47%) of doctors, (18/50;36%) of nurses and (13/40;32.5%) of lab technicians were aware of used disposable syringes with needle attached should be discarded in puncture resistant containers.

Improper handling of BMW spreads infection like HIV and Hepatitis. Only 25% of doctors, 16% of nurses, 12% of lab technicians, 10% of waste handlers had received post exposure prophylaxis (PEP) followed by a needle stick injury. Hospital acquired infection can be prevented by Hepatitis B vaccine and proper hand hygiene technique. It was observed in our study that above 75% of doctors, 70% of nurses, 52% of nurses and 40% of waste handlers had completed three doses of scheduled vaccination against Hepatitis B. However, the majority did not practice proper hand hygiene technique with soap and water (Group 2).

Group 3 depict the comparison of pre and post intervention assessment of knowledge and practice regarding biomedical waste management respectively. Following intervention, it was observed that there was remarkable improvement amongst doctors and nurses in the knowledge with respect to the risk of transmission of disease after needle stick injury, used disposable syringes in respective container to prevent hospital acquired infection, other aspects in which huge improvement is seen; ideal time for PEP in HIV patients, information regarding immunization status of hepatitis B was collected and it was observed that 30% of waste handlers, 27.5% of lab technician, 42% of nurse and 69% of doctors had complete three dose of HBV vaccination schedule, rest were partially immunized with either one or two doses, after the intervention remarkable improvement in immunization status of all the health care professionals is seen as many as 89% of doctors, 80% of nurses, 60% of lab technicians, 60% of waste handlers had completed 3 dose vaccination schedule of Hepatitis B.

DISCUSSION:

Biomedical waste are hazardous and pose a serious life threatening risk to health care workers. Poor management of BMW expose HCW including doctors, nurses, lab technicians and waste handlers to

infection and its toxic effects. WHO has reported that the risk is higher in developing countries [3]. Studies carried out in India showed that the awareness and practice on biomedical waste management among health care personnel was far below the acceptable level [4,6]. Hence, this study was conducted to assess knowledge and practice of BMW by distributing predesigned pretested, and post tested questionnaire to health care personnel in Hindu Rao Hospital.

In our study, it was observed that knowledge and awareness for BMW was adequate among doctors while it was lacking among class IV Workers. This was similar to the findings from other studies done by Saini S et al [5]. Similarly, correct knowledge about color coding of containers, which is one of the most important and crucial elements for waste management, was found better among the doctors only, this was consistent with the findings of the study done by Mathur et al. [6]. which reported 91%, 92%, 85%, 27% for doctors, nurses, lab technician and class IV workers respectively. Awareness regarding proper segregation of waste before disposal was satisfactory among doctors, nurses and lab technician while waste handlers (2/10;20%) were not aware of standard segregation of waste at the point of generation of source. This lack of knowledge could lead to the lack of practice among waste handlers. Which can further led to the littering and scattering of infectious waste in the non-infectious waste. Thus posing a great risk of transmission of infection to all HCW [7]. It was also observed that doctors had maximum knowledge regarding transmission of viral infections (Hepatitis B and HIV) through BMW. While less than half of the participants from other groups had required knowledge. As well as almost less than one fourth of all HCW had knowledge and access to post exposure prophylaxis to HIV following occupational exposure, similar findings were seen in other studies conducted by ,Tanzania where 22.5% has such access .

All HCW should be adequately immunized for hepatitis B infection due to its immediate and long term sequel. Vaccination was highest among doctors (69%), low among nurses (42%), lab technician (27.5%) and waste handlers (30%). Lack of awareness and high cost could be attributed to low vaccination coverage. This finding is consistent with the 22.4% reported by Ibekwe RC [8].

Prevention of occupational exposure to healthcare waste involve strict adherence to universal precautions and standard methods of segregation and disposal of healthcare wastes. The Centre for Disease Prevention and Control recommend that regardless of patient status, universal precautions must be consistently and correctly applied in management of healthcare wastes . Universal precautions involve proper hand washing, use of face masks, protective eye shield, hand gloves, aprons and/or gowns, safety booths and other use of other personal protective equipments or devices during service delivery. In our study, it was seen that less than half of doctors and their staff had knowledge on universal precautions however the study done by Oliveira AC et al., showed that non-compliance with universal precautions was more likely with unskilled workers [9].

It was observed in this study that amongst all the group doctors followed the maximum correct practice regarding BMW. Similarly, the nursing staff followed Hospital good practices in disposal of sharps in their respective puncture proof container and disposal of BMW done according to color code. But on the other hand, waste handlers and lab technicians did not practice proper segregation due to lack in knowledge for the proper waste disposal. This could be improved with the support of the hospital management and by allocating the proper budget for periodic training on all such aspects in a tertiary care hospital [10] As observed by Larson that the practical demonstration has positively influence in practices of an individual and their behavior at their work place [11]. Face to face trainings has been proven to be one of the most effective strategies for improving the practices and health behavior, especially when combined with other training interventional approaches [12]. In our study, we provided with a lecture based training to all the HCW that result in more effective post test questionnaire analysis.

LIMITATIONS

1. Limited no of health care workers and study was limited to only Hindu rao hospital
2. Follow up should be done for 5 years
3. Due to technical jargon, variation in the interpretation of the questionnaire among HCW.

CONCLUSION:

This study showed that there was poor knowledge and high level noncompliance to standard medical waste management procedures, in addition to lack of regular training and update on BMW. Knowledge regarding BMWM was very poor among waste handlers and lab technicians as compare to doctors and nurses. Hence there is great need to conduct training and retraining workshops on BMWM and occupational safety procedures. Furthermore there should be strict adherence to standard methods of waste disposal. Employers should also provide adequate personal protective devices, vaccination against preventable disease, as well as offer PEPs to those who had risky occupational exposure to infectious and hazardous materials.

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