



Full Length Research Article

AWARENESS REGARDING BIOMEDICAL WASTE MANAGEMENT AMONG HEALTH CARE WORKERS IN A TERTIARY CARE HOSPITAL IN NEW DELHI, INDIA

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ABSTRACT

Introduction: Segregation forms the backbone of Biomedical waste (BMW) management, and the hospitals lack segregation practices which ultimately results in the mixing of BMW with the general waste, and the whole waste stream becomes contaminated & hazardous. Though BMW management rules in India were framed in 1998, many hospitals are still disposing their BMW in a completely indiscriminate manner. Awareness of BMW amongst Health Care Workers (HCWs) plays a key role in its management.

Objectives: This study was done to assess the awareness regarding BMW management among Healthcare workers (HCWs)

Materials and Methods: 700 HCWs (Doctors & Nurses) dealing with patient care were interviewed by a self-structured questionnaire to assess the level of awareness about BMW management

Results: Out of total 700 HCWs, 422 (61.14%) had adequate knowledge. 71.56% Doctors and 42.4% Nurses were found to have adequate knowledge of BMW management. 72.4% of HCWs were adequately aware about BMW rules. Awareness about Biohazard symbol was found to be 90.7%, awareness regarding hazards associated with poor BMW was found to be adequate in 82.9% of HCWs, awareness regarding segregation of BMW was adequate in 76.6% of HCWs and 55.3% of HCWs had adequate awareness regarding the proper transportation of BMW. The awareness levels about disposal of BMW were found to be 58.4% in HCWs. Also 79.42% of HCWs have attended BMW training program on BMW.

Conclusions: Regular and refresher training program on BMW management is needed in the hospital for HCWs to improve the awareness level among HCWs as BMW management is important aspect of Hospital infection control practices. It should be made mandatory at the time of recruitment and to be included in the curriculum of Medical & Nursing staff.

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INTRODUCTION

Every day, relatively large amount of potentially infectious and hazardous waste are generated in the health care facilities around the world¹. Now it is a well-established fact that Biomedical waste (BMW) has many adverse and harmful effects on the environment & human health.

Various hazards associated with poor Biomedical waste management (BMWM) are (Chartier *et al.*, 201; Meyer, 2003):

- Needle prick injury to HCWs – HIV, HBV, HCV
- Needles may be used by drug addicts and can led to further spread of infection.
- Spread of infection to community by quacks
- Increasing antibiotic resistance due to spread of resistant strain
- Repacking of used needles/ cotton etc. by unscrupulous elements.
- Air pollution due to incineration of improperly segregated waste produces toxic gases.
- Improper liquid waste management.

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Although the BMW rules in India were notified in the year 1998 (Ministry of Environment & Forest), but there have been

problems in implementing them. Most of the hospitals are facing problems in BMW management. As generators (HCWs) are responsible for segregating BMW, awareness regarding its proper management is of utmost importance. Therefore this study was done to find out the awareness level of BMW among HCWs who are directly dealing with BMW.

Aims & Objectives

- 1) To assess the proportion of HCWs having adequate awareness regarding Biomedical Waste Management.
- 2) To compare the level of awareness of Biomedical Waste Management among Doctors & Nursing Staff.
- 3) To find out the reasons behind improper Biomedical Waste Management

MATERIALS AND METHODS

This Study was conducted in the Lady Hardinge Medical College & Associated Hospitals during November 2013 to March 2015. In L.H.M.C & associated hospitals we have a BMW team which regularly conducts training program on BMW. Training program on BMW is mandatory at the time of the recruitment of HCWs. Onsite training on BMW is imparted to nursing staff during regular inspection rounds/visit. 700 HCWs directly dealing with patient care in LHMC & Associated Hospitals were evaluated of their awareness regarding BMW rules, hazards associated with BMW, segregation, transport and disposal of BMW. A self-structured questionnaire having 10 questions with 1 mark each was used for evaluation of awareness. HCWs scoring more than 50% in each category were deemed having adequate awareness in that category and a total score of more than 50% in all the categories taken together was considered having adequate awareness for overall BMW. Categorical variables was analysed with Chi-Square test for statistical significance. Data was analysed with SPSS version 16. P values of <0.05 were considered significant

RESULTS

A total of 700 HCWs participated in our study of various aspects of BMW and its management. Of the 700, 457 (65.3%) were Doctors and 243 (42.4%) were Nurses. Of the 700 HCWs participating in our study, 428 (61%) were found to have adequate level of awareness regarding BMW management, whereas 272 (39%) HCWs had inadequate level of awareness (Figure 1). The difference in awareness regarding BMW among Doctors and nurses with (P <0.05) is statistically significant. (Table 1). The difference in awareness among doctors & nurses regarding various aspects of BMW with P <0.05 was found statistically significant. (Table 2).

DISCUSSION

BMW rules were notified for the first time in 1998 by the Ministry of Forest & Environment, in order to ensure the safety of human health & environment. These rules are applicable to all the hospitals and all the persons who handle BMW in the hospital. If these rules are not complied with then it is punishable under the IPC (Government of India, 1998)

.Therefore all the HCWs must have awareness about correct practices of BMW & its disposal. In our study, 61% of HCWs were found to have adequate awareness regarding various aspects of BMW. The findings are almost consistent with the study done by Ndiaye et al. (Senegal, 2012), where 62.6 % of HCWs were having adequate knowledge regarding BMW. Among the HCWs, 71.1% of doctors and 42.4% of nurses had adequate levels of awareness. Mostafa et al. (Egypt) reported 36.8% of Doctors and 27.4% of the nurses had satisfactory knowledge regarding BMW (Mostafa et al., 2009). Whereas Sharma et al. (2013) found that 64% of Nurses had satisfactory knowledge & Awareness regarding BMW (Sharma et al., 2013). The findings in our study could be attributed to the fact that BMW training is mandatory for all Doctors at the time of the recruitment to the hospital, also onsite training is giving to all HCWs in the wards by BMW team.

Table 1. Level of Awareness among HCWs regarding BMW

HCWs	Adequate	Inadequate
Doctors (n=457)	327 (71.2%)	130(28.44%)
Nurses(n=243)	103 (42.4%)	140(57.61%)
Total (n= 700)	430(61.43%)	270(38.57%)

Table 2. Level of Awareness among HCWs regarding BMW

Awareness regarding BMW	Adequate level		P value
	Doctors (n=457)	Nurses (n=243)	
BMW Rules	430 (94.1%)	77(31.7%)	<0.05
Biohazard Symbol	450 (98.5%)	185(76.1%)	<0.05
Hazards associated with improper BMW	430 (94.1%)	150(62%)	<0.05
Segregation of BMW	331(72.4%)	205(84.4%)	<0.05
Transportation of BMW	227(49.7%)	160(65.9%)	<0.05
Disposal of BMW	258 (56.5%)	151(62.1%)	<0.05
Attended BMW training	437(95.6%)	119(49%)	<0.05

HCWs must be aware of BMW rules as defaulter can be punished under the IPC³. In our study, 72.4% of HCWs were adequately aware about BMW rules, among them 94.1% were doctors and 31.7% were nurses. In contrast to our study, Mathur et al. (Jaipur, 2011) reported that percentage of nurses having knowledge regarding BMW legislation was 91.7, slightly higher than doctors (90.7%) (Mathur et al., 2011). These findings show that nursing staff in our hospital needs to be sensitised against BMW rules. Awareness about Biohazard symbol was found to be 90.7% among HCWs, of which 98.5% were doctors and 76.1% were nurses, again nursing staff seemingly having considerably less awareness about the symbol which is present at every corner of a Health care system. Hakim et al. (2014) reported 47.3% doctors & 34.4% nurses were able to identify biohazard symbol⁸. Awareness regarding hazards associated with poor BMW was found to be adequate in 82.9% of HCWS, of which 94.1% were doctors and 62% were nurses. The findings are almost consistent with the study done by Ndiaye et al. (Senegal, 2012), where 80% of HCWs were aware about health related risks due to BMW. In our findings a higher percentage of doctors and nurses were aware regarding the hazards associated with BMW as compared to the study of Pandit et al. (2005) where 74 % of doctors and 50 % of nurses were aware about the risk of transmission of HIV & Hepatitis B (Pandit et al., 2005).

Bansal *et al.* (2008) (Bansal *et al.*, 2011) in their study found 100% of doctors were aware regarding hazards associated with BMW which is higher than our findings. Mathur *et al.* (2011) of found 93.3% of doctors and 91.6% nurses were aware about hazards associated with BMW. Here the findings are almost consistent for doctors but is considerably high for our findings regarding nurses. In our findings nurses were considerably less aware about the hazards as compared to doctors. Awareness regarding Segregation of BMW was adequate in 76.6% of HCWs, doctors contributing 72.4% of the group and nurses 84.4%. Bansal *et al.* (2011) found 44.82 % of doctors were aware about proper segregation of BMW, whereas Mathur *et al.* (2011) found 64% of Doctors & 51% nurses to be aware regarding Segregation of BMW. In our study the level of awareness regarding segregation is higher than previously conducted studies, nurses doing better than doctors regarding segregation of BMW this could be because of the on-site training program of nursing staff on segregation and transportation. In our study 55.3% of HCWs had adequate awareness regarding the transportation of BMW. Nursing staff had higher level of awareness (65.9%) than doctors (49.7%). This could be because in our hospital, nursing staff has been allocated the duties to tie the waste bag properly, to seal the sharp container properly, to label the waste bags and replace them and send them to Common collection site (CCS). The Awareness levels about disposal of BMW were found to be 58.4% in HCWS, with 56.5% of doctors having adequate levels and with 62.1% nurses having adequate awareness better than doctors in this aspect. In our hospital all the segregated BMW is collected at the CCS, weighed and handed over to DPCC approved agency for final disposal CBWTF (common BMW treatment facility for further disposal). The low awareness level could be because we are not disposing BMW on our own but through CBWTF. BMW training program is essential to sensitise & raise awareness among HCWs. It also emphasises the importance of Segregation of BMW and its role in keeping the infective material separate from general waste. The training program also educates about the hazards associated with poor BMW with special emphasis on sharp injuries and PEP. In our study we found that 79.42% of HCWs have attended BMW training program of which 95.6% were doctors and 76.1% were nurses. This also reflects the level of awareness among doctors and nurses. The number of doctors attending the BMW training program is much higher than the nursing staff because it is mandatory for resident doctors. This suggests that there is a greater need to make this training program mandatory for nursing staff.

Recommendations

Every hospital must conduct BMW training program regularly for all categories of HCWs and it should be made mandatory. Refresher training program must be conducted for the HCWs in order to update their Knowledge. BMW should be made part of the Medical and Nursing curriculum.

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Conflict of interest: Nil

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