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Research Article

AWARENESS AND PRACTICES ABOUT HEALTH CARE WASTE MANAGEMENT AMONG HOSPITAL STAFF OF A MEDICAL COLLEGE HOSPITAL IN BHOPAL, CENTRAL INDIA

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ABSTRACT

Background: Improper management of healthcare waste (HCW) poses a risk for health and environment. Awareness about HCW management among hospital staff can greatly impacts practices of appropriate waste disposal.

Method: A questionnaire containing 32 questions based on knowledge, practices and attitude (KPA) regarding HCW management was filled by 125 study participants (25 each of doctors, interns, nurses, technicians, class IV employees). Observation of the actual practices of BMW management was done by using checklist. Self made scoring system was used to categorize level of awareness as good, average and poor.

Result: Average level of awareness was found amongst majority (71.2%) of our study participants. The BMW management practices in our hospital were found to be inadequate and unsafe.

Conclusions: There is a need to evolve continuing education programme about the proper management of HCW at all levels. This should be coupled with effective implementation of rules and regular monitoring by authorities.

INTRODUCTION

Healthcare is one of the fastest growing sectors in India. The curative, promotive or preventive healthcare services are a basic requirement of human kind but inevitably create waste which itself may be hazardous to health. The waste generated from healthcare facilities referred also as healthcare waste (HCW) or biomedical waste (BMW) and is defined as "any waste that is generated during diagnosis, treatment or immunization of human beings or animals, or in the research activities pertaining to or in the production or testing of biologicals and includes categories mentioned in schedule I of the Government of India's Biomedical waste (Management and Handling) Rules 1998" (MOHFW, 2002). According to World Health Organization reports, 85% of hospital wastes are actually non-hazardous whereas 10% are infectious and 5% non-infectious (Pruss *et al.*, 1999). Nearly 40 years ago, it was suggested that in developed countries approximately 1-5 kg of waste were generated per bed per day, whereas in developing countries the figure was 1-2 kg/bed/day (De Roo, 1974). In a study undertaken in an Indian hospital and published in 2005, HCW generated was 2.31 kg/bed/day, indicating a rise in waste

generated in recent years (Patil and Pokhrel, 2005). HCW contains pathogenic viruses and bacteria and some of these are dangerous, because they may be resistant to treatment and possess high pathogenicity. Mismanagement of HCW may also cause growth and multiplication of insects, rodent and worms. This may lead to transmission of disease like typhoid, cholera, hepatitis (Henry and Heinke, 1996). Accidental exposure to blood and needle –stick injury may be responsible for acquisition of infections like HIV/AIDS and Hepatitis (http://www.worldgastroenterology.org/assets/downloads/en/pdf/guidelines/16_needlestick_en.pdf). Massrouje (Massrouje, 2001) has reported in his study that disorganized management of medical waste presents an increasing high risk to doctors, nurses, technicians, drain cleaners, sweepers and patients and their visitors. In view of the seriousness of BMW management in India, the Ministry of Environment and Forest of the Government of India has enacted the biomedical waste (Management and Handling) Rules, which came into effect on 20th July, 1998. (<http://envfor.nic.in/legis/hsm/biomed.html>) Later on, amendments were made in these rules in 2011 (<http://moef.nic.in/downloads/public-information/salient-features-draft-bmwmh.pdf> as accessed on 09/05/15). The rule makes it mandatory for the health care establishments to segregate, disinfect and dispose their waste in an ecofriendly manner. Though such legal provision exist for BMW handling and management and even after a decade of its implementation,

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most Indian hospitals are yet to achieve the described standards of waste management practices (Jahnvi and Raju, 2006; Hanumantha Rao, 2009). Sharma *et al.* (2013) concluded from his study that there were poor levels of knowledge and awareness about HCW generation, hazards, legislation and management among health care personnels in Jaipur, India. Chudasama *et al.* (2013) also reported the same.

The above studies and the survey of other hospitals show that HCW is posing serious threat to the environment and the people associated with it largely due to lack awareness regarding safe management of HCW. With this background, present study was planned to assess awareness regarding HCW management amongst staff and to observe actual waste management practices at a tertiary care hospital situated in Bhopal, Central India.

MATERIALS AND METHODS

Study was carried out after obtaining permission from institutional ethics committee

- **Type of study:** Cross –sectional
- **Study period:** One month (January 2015)
- **Study participants:** 125 health –care personnels working in our hospital (25 doctors, 25 interns, 25nurses, 25 laboratory/OT technicians, 25 class IV employees).
- **Inclusion criteria**
Participants who were working in the hospital for more than three months
Participants who gave oral consent
- **Exclusion criteria**
Participants who were working in the hospital for less than three months
Participants who were not willing to participate
- **Assessment of awareness about HCW management**
A close ended questionnaire consisting 32 questions based on HCW generation and legislation, hazards associated with HCW, methods for prevention of health hazards, colour coding, waste segregation, storage and transportation and attitude assessment of participants was designed.

Questions were designed in English and local language, Hindi. It was distributed among study participants. They were requested to complete it and indicate any questions that they found to be unclear. Confidentiality of the participants was maintained. Each correct answer was awarded one mark.
- **Scoring criteria for each group**
 - Good ($\geq 75\%$) : $\geq 24/32$
 - Average (51-74) : 17-23/32
 - Poor ($\leq 50\%$) : $\leq 16/32$
- **Statistical Analysis:** Data were entered in MS Excel and analyzed using Stata 11.0. Descriptive statistics such as frequencies (percentage) were used.

- Observation of the actual practices of HCW management was done by using checklist in the outpatient and inpatient departments, blood bank and laboratories of our hospital.

RESULTS

Total 125 health care personnel participated in present study. Majority of them were males (60.8%) and age group 15-30 years (76%). 48% study participants working in hospital since < 1year. Only 33.6% study participants received training for HCW management (Table 1). As shown in Table 2, majority (71.2%) of our hospital staff were found to have average awareness about health care waste management. On the basis of scoring system, medical professionals i.e. doctors and interns having good awareness were 44% and 36% respectively. None of them were found to have poor level of awareness. More than three-fourth of our nursing staff, technicians and class IV employees were having average level of awareness. Poorest awareness was found among nursing staff of our hospital (20%). Actual HCW management practices in our hospital were found to be inadequate, inefficient and unsafe.

Table 1. Basic profile of health care study population

| Characteristics | Number | Percentage |
|--|--------|------------|
| Age | | |
| 15- 30 years | 95 | 76 % |
| 31-45 years | 26 | 20.8 % |
| 46-60 years | 02 | 1.6 % |
| >60 years | 02 | 1.6 % |
| Sex | | |
| Male | 76 | 60.8 % |
| Female | 49 | 39.2 % |
| Working in hospital since | | |
| <1 year | 60 | 48 % |
| 1-3 years | 23 | 18.4 % |
| >3 years | 42 | 33.6 % |
| Received training on HCW management | | |
| Yes | 42 | 33.6 % |
| No | 83 | 66.4 % |

Table 2. Level of awareness about HCW management among hospital staff

| | Good n (%) | Average n (%) | Poor n (%) |
|----------------------------|---------------|------------------|---------------|
| Doctors (n=25) | 11(44%) | 14(56%) | - |
| Interns (n=25) | 09(36%) | 16(64%) | - |
| Nurses (n=25) | 01(4%) | 19(76%) | 5(20%) |
| Lab /OT Technicians (n=25) | 02(8%) | 19(76%) | 4(16%) |
| Class IV employees (n=25) | 02(8%) | 21(84%) | 2(8%) |
| Total (n=125) | 25(20%) | 89(71.2%) | 11(8.8%) |

Scoring criteria for each group

Good ($\geq 75\%$): $\geq 24/32$; Average (51-74): 17-23/32; Poor ($\leq 50\%$): $\leq 16/32$

DISCUSSION

Hospitals and other health –care establishment have a ‘duty of care’ for the environment and for public health and have particular responsibilities in relation to the waste they produce. Therefore, segregation, collection, treatment and disposal of health care waste in an appropriate manner are of great importance.

The introduction of HCW management in hospitals has played an important role in reducing many ills such as inappropriate recycling and unauthorized and illegal re-use of such waste. HCW management is not only the responsibility of civic body but also it needs systemic efforts from each category of hospital staff. Knowledge and awareness among medical, paramedical and nonmedical staff of any hospital is an important pre-requisite for effective management of HCW. In the present study, an attempt was made to find out level of awareness among different categories of health care providers i.e. doctors, interns, nurses, technicians and class IV employees of our hospital. Actual waste management practices were also analysed. Among 125 study participants, 76% were in the age group between 15 to 30 years. 60.8% were males and 39.3% were females. Most of the study participants (48%) were working in hospital since less than 1 year. In the present study, only one-third (33.6%) of the study participants received training for HCW managements (Table 1). In a study conducted by Patil *et al.* (2013), 50.3% of study participants had undergone training. Dash *et al.* (2014) concluded from his study that training improved HCW awareness level among study participants and suggested that continued HCW management training and medical education programmes are necessary.

The study revealed that majority (71.2%) of our hospital staff has average awareness about HCW management (Table 2). Sharma *et al.* (2013) found poor levels of knowledge and awareness about HCW generation hazards, legislation and management among health care personnel in Jaipur dental college. As shown in Table 2, level of awareness was found to be good to average among doctors. Similar finding was reported in previous studies conducted in different parts of India (Bansal *et al.*, 2013; Qureshi *et al.*, 2007). Students doing internship after passing MBBS are also important health care providers in a medical college hospital. Therefore, they were also included in survey. 64% interns participated in this study were having average awareness while 36% were having good level of awareness. None of our medical staff i.e. doctors and interns was found to have poor awareness about HCW management (Table 2). Madhukumar *et al.* (2012) conducted similar study and reported that although interns had knowledge about HCW management but attitude and practices were not satisfactory attributed to their less practical exposure.

Since nursing staff spent more time with patients in the ward than any other health care personnel, they are always exposed to risks associated with HCW. Therefore, there is a strong need to improve knowledge, skills and practices in waste management among this particular group. In this study, 76% of participating nurses were found to have average level of awareness, while 20% of them were poorly aware about HCW management (Table 2). Sharma *et al.* (2013) also conducted similar study and found extremely poor knowledge in 36% of the nurses. Qureshi *et al.* (2007) reported inadequate knowledge about HCW among paramedical personnel of their hospital. In another study conducted in medical college hospital, Bangalore, it was found that only 27.3% of technical staff could correctly answer about categories and treatment of HCW (Madhukumar *et al.*, 2012). However, in the present study, majority (76%) of our technicians (both OT and laboratory) participated in study had average awareness. Only 16% of them were poorly aware about the subject (Table 2).

Although poor knowledge regarding HCW management and handling among class IV employees was reported in earlier studies (Bansal *et al.*, 2013; Qureshi *et al.*, 2007; Deo *et al.*, 2006) average awareness was reported in majority (84%) of our class IV employees (Table 2). This may be attributed to non-formal orientation training given to them about HCW management after joining their duty in our hospital.

Observation of actual HCW management practices in our hospital rather present a different picture. Collection, segregation, transportation, treatment and disposal practices of HCW in the hospital were found to be inadequate. Auxillary staff did not wear any personal protective equipment while collection of HCW. It was observed that staff was mixing infectious and non-infectious waste. Above findings are in accordance with other previous studies conducted in India (Gupta *et al.*, 2006; Gupta *et al.*, 2012; Sabour *et al.*, 2007). The study revealed that HCW generated in each ward was collected by in service sanitation staff only once /day. No separate HCW storage room was available in hospital. From outside the HCW was taken by vehicle of Bhopal incineration plant on daily basis for incineration. It was alarming that HCW generation & disposal record as well as injury record due to HCW were not properly maintained in our hospital. Since the present study was conducted in just one medical college hospital and among a small group of subjects, no broad generalization could be made. Therefore, it is recommended that similar studies should be performed among health care providers of both public as well as private sectors. The data obtained will provide an evidence base for future decision making and for developing effective HCW management strategies.

Conclusion

Our study concluded that lack of complete knowledge and awareness about HCW management among hospital staff greatly impacts practices of appropriate waste disposal. There is a need of continuous training programmes in the form of seminars, workshops and symposia on HCW management to create awareness among medical and paramedical staffs. The HCW management cannot be successfully implemented without the willingness, self-motivation and co-operation from all sections of employees of any healthcare establishments. This should be coupled with effective implementation of rules and regular monitoring by authorities.

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