

Research Article

Knowledge, attitude and practices of biomedical waste management among health care personnel in selected primary health care centres in Lucknow

Neeraj Kumar Gupta¹, Mukesh Shukla^{2*}, Shantanu Tyagi³

¹Medical Officer, PHC Sarojininagar, Lucknow, UP, India

²Department of Community & Family Medicine, All India Institute of Medical Sciences, Patna, Bihar, India

³Department of General Surgery, MLB Medical College, Jhansi, UP, India

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*Correspondence:

Dr. Mukesh Shukla,

E-mail: drmukeshshukla@gmail.com

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ABSTRACT

Background: Lack of adequate knowledge regarding bio-medical waste management leads to health risks as well as environment apprehension. Proper handling and disposal of bio-medical waste is therefore very important. The present study aimed to assess the knowledge and practice of bio-medical waste management among the health care personnel in selected primary health care centres in Lucknow.

Methods: This was a Cross-Sectional study conducted among health care personnel working at the Primary Health Centres. A total of 89 health care personnel comprising of doctors, nurses, health workers, laboratory technicians, pharmacists and class IV workers were interviewed with a pre-designed and pretested semi-structured questionnaire.

Results: About 35.0% of the staff nurses, 56.2% of paramedical staff and none of the class IV workers had complete knowledge about colour coding and segregation of bio medical waste. As compared to other health care personal, only 18.8% of class IV workers had heard about universal precautions, while 45.4% were concerned about needle stick injury. None of the class IV workers had ever received training for BMW management. Proportion of staff nurses, paramedical staff and class IV immunized for Hep B Vaccine was 50%, 21.8% and 9.1% respectively.

Conclusions: The study revealed lack of knowledge and awareness about bio-medical waste management amongst primary healthcare workers which results in inadequate handling and management, thereby exposing them as well as the general public to health and environmental hazards.

Keywords: Knowledge, Attitude, Practices, Biomedical waste, Healthcare personnel

INTRODUCTION

The term “biomedical waste” has been defined as “any waste that is generated during diagnosis, treatment or immunisation of human beings or animals, or in the research activities pertaining to or in the production or testing of biological and includes categories mentioned in schedule I of the Government of India’s Biomedical Waste (Management and Handling) Rules 1998”.¹ With

the increasing health care facilities and increased generation of biomedical waste, its proper management has become a burning issue. It is estimated that annually about 0.33 million tons of hospital waste is generated in India with average waste generation rates of 0.5 kg to 2 kg per bed per day.² It is estimated that 10-25% of the healthcare waste generated is hazardous & causes serious health problems.³ Improper management of biomedical waste poses a serious threat to human health and may

lead to various health hazards like transmission of diseases, not only to health workers, but also to patients and their attendants visiting the health centres.

Inadequate biomedical waste management not only poses significant risk of infection due to pathogens like HIV, Hepatitis B & C virus but also carries the risk of water, air & soil pollution thereby adversely affecting the environment and community at large.⁴ Therefore, the Ministry of Environment and Forests has promulgated the Bio-Medical Waste (Management and Handling) Rules, 1998 for proper management of Bio-Medical waste.⁵ The purpose of BMW management is to ensure its proper collection, handling, as well as safe disposal. Health care personnel are not only expected to have knowledge regarding proper segregation and disposal of BMW, but should also have the capacity to guide others regarding the same. Due to improper biomedical waste management and lack of awareness and inadequate knowledge, health centres now a days are becoming a hub for spreading infections. Therefore the present study aimed to assess the knowledge and practice of bio-medical waste management among the health care personnel in selected Primary Health Care Centres in Lucknow.

METHODS

Study setting

Hospital-based cross-sectional study was conducted at primary health care centres of Lucknow.

Study population

All the health care personnel (designated as doctors, nurses, health workers, laboratory technicians, pharmacists and class IV workers).

Sampling

The present study was conducted from March 2014 to May 2014 in 13 randomly selected primary health centres in Lucknow A total 89 health care personnel working at

primary health centres who were present during the visit of investigator to centre and consented to participate were included in the study.

Data management

A pre-designed and pretested semi-structured questionnaire was used to collect data through face-to-face interviews. Descriptive summary using frequencies, proportions and cross tabs were used to present study results.

RESULTS

A total 89 health care personnel including 15 doctors (medical officers), 20 staff nurses, 32 paramedical staff (Lab Technician and Pharmacist) and 22 class IV workers (cleaners and maintenance personnel) were included in the study. Majority (93.3%) of the medical officers had knowledge regarding biomedical waste generation and legislation, while only one-fourth of Class IV worker were aware about the same. As compared to a class IV worker, knowledge regarding hazards of biomedical was quite better amongst doctors, staff nurses & paramedical staff (100%, 95.0% and 90.0% respectively). Knowledge of colour coding and segregation of biomedical waste at source was much lower among class IV workers (0% & 4.6% only). Only half of the staff nurses & paramedical staff had idea about segregation of biomedical waste at source, while the knowledge about color-coding was found in 35.0% and 56.2% respectively. Although more than eighty percent of all health care personnel were aware about discarding needle, but only one-fifth of the class IV workers had knowledge about discarding items causing punctures or cuts. Only one out of twenty two class IV could correctly identify the symbol of bio-hazard. Knowledge, with respect to, concern for needle stick injury as well as universal precaution was found in more than 50% among all health care personnel categories except class IV workers (Table 1).

Table 1: Distribution of health care personnel on the basis of knowledge regarding bio-medical waste. (N=89)

Knowledge regarding bio-medical waste	Medical officers (n=15)	Staff nurses (n=20)	Paramedical staff (n=32)	Class IV worker (n=22)
Bio-medical waste generation and legislation	14(93.3)	11(55.0)	20(62.5)	5(22.7)
Hazards of Biomedical waste	15(100)	19(95.0)	29(90.6)	17(77.2)
Segregation of biomedical waste at source	13(86.6)	10(50.0)	16(50.0)	5(22.7)
Biomedical waste storage time (As per BMW rules)	10(66.6)	9(45.0)	17(53.1)	1(4.6)
*Colour-coding segregation of BM waste.	8(53.3)	7(35.0)	18(56.2)	0(0.0)
Discarding items causing punctures or cuts	10(66.6)	12(60.0)	17(53.1)	5(22.7)
Discarding of needles	12(80.0)	16(80.0)	22(68.7)	19(86.3)
Identification of Bio-hazard symbol	15(100)	12(60.0)	14(43.7)	1(3.1)
Concern regarding needle stick injury	15(100)	17(85.0)	19(59.3)	10(45.4)
Universal precautions	13(86.6)	15(75.0)	17(53.1)	4(18.8)

* As per colour coding guidelines

Almost all health care workers concerned management of biomedical waste as an important issue. Although almost all medical officers & staff nurses stated the management of biomedical waste as collective responsibility of all health care staff, but only about half (46.8% and 45.4% respectively) of the paramedical staff and class IV workers agreed with the same. According to the majority of the medical officers and paramedical staff, biomedical waste management causes extra expenses and leads to financial burden. Apart from that, majority (70.9%) of class IV workers stated that biomedical medical waste

management increased their work load. A very favorable result was found with respect to willingness to attend training on biomedical waste management among all health care personnel. Although medical officers were quite concerned regarding compliance and effective management of biomedical waste but the attitude regarding the same among class IV workers was quite casual. Although medical officers showed a major concern about reporting of biomedical waste system in case of noncompliance with the guidelines, the class IV workers were least concerned about same (Table 2).

Table 2: Distribution of health care personnel on the basis of attitude towards bio-medical waste management.(N=89)

Attitude towards biomedical waste management	Medical officers (n=15)	Staff nurses (n=20)	Paramedical Staff (n=32)	Class IV worker (n=22)
Management of bio-medical waste properly is an important issue	15(100)	20(100)	31(96.8)	19(86.3)
Effective bio-medical waste management is collective responsibility of each and every health care staff	13(86.6)	18(90.0)	15(46.8)	10(45.4)
Financial burden increases because of biomedical waste management	12(80.0)	10(50.0)	30(93.7)	2(9.1)
Biomedical waste management adds extra burden of work.	2(13.3)	14(70.0)	5(15.6)	20(90.9)
Willingness to attend training on biomedical waste management	15(100)	20(100)	32(100)	15(68.2)
Reporting to concern authorities if centre is not complying with the guidelines of bio-medical waste management	12(80.0)	10(50.0)	13(40.6)	2(9.1)

Table 3: Distribution of health care personnel on the basis of bio-medical waste management practices. (N=89)

Biomedical waste management practice *	Medical officers (n=15)	Staff nurses (n=20)	Paramedical staff (n=32)	Class IV worker (n=22)
Disposal of sharps in puncture proof container	12(80.0)	16(80.0)	28(87.5)	18(81.8)
Disposal of expired drug in black colour bag	11(73.3)	10(50.0)	12(37.5)	4(18.1)
Disposal of used gauze piece in yellow colour bag	13(86.6)	7(35.0)	11(34.3)	2(9.1)
Not recapping the used needle	12(80.0)	12(60.0)	15(46.8)	2(9.1)
Discarding of used needles by hub cutter	12(80.0)	14(70.0)	4(12.5)	1(4.5)
Vaccinated for hepatitis-B	14(93.3)	10(50.0)	7(21.8)	2(9.1)
Ever undergone training for bio-medical waste management	15(100)	4(20.0)	3(9.3)	0(0)

* As reported by health care personnel

Almost all the health care personnel (more than 80%) reported that they dispose sharps only in puncture proof containers. Majority of medical officers said that they dispose expired drugs, used gauze in black bag and yellow bag respectively, but the practice of the same was reported quite less ($\leq 50\%$) amongst other health care personnel. The practice of non-recapping of used needles and its immediate cutting with hub cutter was reported quite less among paramedical staff and near about nil

amongst class IV workers. Apart from that proportion of staff nurses, paramedical staff and class IV immunized for Hep B Vaccine was reported quite less (50%, 21.8% and 9.1% respectively). None of class IV employee had ever received any training on biomedical waste management (Table 3).

DISCUSSION

The study was conducted at 13 randomly selected primary health care centres of Lucknow. As similar to study conducted by Mathur et al,⁶ the present study revealed that more than 90% of medical officers had knowledge about biomedical waste management guidelines and segregation with lesser knowledge among staff nurses (55.0%) and paramedical staff (62.5%) and least awareness among class IV workers. Similar findings were also reported in other studies.⁷⁻¹⁰

Similar to study conducted by Malini A and Bala Eshwar⁷ most of the nursing staff, paramedical staff and class IV worker had poorer knowledge regarding the colour coding for the segregation of waste as compared to medical officers. This might be attributed to fact that the medical officers had previously received the periodic training for biomedical waste management from the state.

However more than 90% of all health care personnel except class IV were aware about hazards of biomedical waste, but a major of concern was inadequate knowledge about universal precautions (18.8%) amongst class IV workers, who in spite of being most proximate to biomedical waste while handling and during final disposal phase from the centre work mostly without personal protection equipment.

The study also reported that paramedical staffs and class IV workers were comparatively less concerned about needle stick injury. Similar findings were also reported in other studies.^{7,8,13,14} Lack of awareness about needle stick injury predisposes them to risk of infections like HIV, Hep B etc.¹⁵

The non-agreement of almost half of the paramedical staff and class IV employees regarding the collective accountability of proper biomedical waste management by all health care staff of the centre reported in present study is quite a matter of concern. It must not be addressed as extra burden of work as stated by class IV workers in the present study.

The present study also revealed that not all the staff nurses and paramedical staff were practising needle destruction by hub cutter or avoiding recapping of used needles. These findings were quite similar to that reported in other studies.^{7,13,14,16} These practices may lead to needle stick injuries.

However the study cannot be generalized due to the small size of sample and limited area as it was conducted only at thirteen randomly selected PHCs. Apart from that only those health care workers who were present at respective centre during the time of visit of the investigator were included in study.

CONCLUSION

It can be concluded from the present study that there is inadequate and suboptimal knowledge and awareness about biomedical waste generation, legislation and management among health care personnel working at primary health centre specially the class IV workers. It also revealed that adequate and effective precautions are not being taken for prevention of needle stick injuries. A majority of class IV workers had not received Hepatitis B vaccination. An optimistic attitude and collective accountability is required for proper segregation and safe disposal of biomedical waste so as to protect the environment as well as health care workers. Periodic and orientation based training programmes should be provided to all health care workers, so that both the knowledge as well as practice of bio-medical waste management can be upgraded. Apart from that, quality assessment for management of biomedical waste at centres should be routinely done from time to time.

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REFERENCES

1. Government of India, Ministry of Health and Family Welfare (MoHFW). National Guidelines on Hospital Waste Management Based upon the Bio-Medical Waste (Management and Handling) Rules, 1998. New Delhi: MoHFW. 2002.
2. Patil AD, Sekhda AV. Health- Care Waste Management in India, *J Environ Manage*. 2001;63:211-20.
3. Safe management of waste from health care activities. WHO, Geneva. 1999.
4. Central pollution control board. Environmental standard and guidelines for management of hospital waste. CPCB, Ministry of Environment and Forest, New Delhi. 1996.
5. Ministry of Environment and Forests. Notification of Bio-Medical Waste (Management & Handling) Rules. 1998.
6. Mathur V, Dwivedi S, Hassan MA, Misra RP. Knowledge, attitude and practices about Bio-medical waste management among health care personnel: a cross-sectional study. *Indian Journal of Community Medicine*. 2011;36:143-5.
7. Malini A, Eshwar B. Knowledge, Attitude and Practice of Biomedical waste management among

- health care personnel in a tertiary care hospital in Puducherry *International Journal of Biomedical Research*. 2015;6(03):172-6.
8. Sharma A, Sharma V, Sharma S, Singh P. Awareness of Biomedical Waste Management Among Health Care Personnel in Jaipur, India. *Oral Health and Dental Management*. 2013;12(1):32-40.
 9. Sharma S. Awareness about bio-medical waste management among health care personnel of some important medical centres in Agra. *International Journal of Environmental Science and Development*. 2010;1:251-5.
 10. Narang RS, Manchanda A, Singh S, Verma N, Padda S. Awareness of biomedical waste management among dental professionals and auxiliary staff in Amritsar, India. *Oral Health and Dental Management*. 2012;11:162-8.
 11. Sreegiri S, Krishna Babu G. Bio-medical waste management in a tertiary level hospital in Visakhapatnam. *Journal of Community Medicine*. 2009;5:1-6.
 12. Nagaraju B, Padmavathi GV, Puranik DS, Shantharaj MP, Sampulatha SP. A study to assess the knowledge and practice on biomedical waste management among the health care providers working in PHCs of Bagepalli Taluk with the view to prepare informational booklet. *Int J Med Biomed Res*. 2013;2(1):28-35.
 13. Chudasama RK, Rangoonwala M, Sheth A, Misra SKC, Kadri AM, Patel UV. Biomedical Waste Management: A study of knowledge, attitude and practice among health care personnel at tertiary care hospital in Rajkot. *J Res Med Den Sci*. 2013;1:17-22.
 14. Sharma A, Sharma V, Sharma S, Singh P. Awareness of Biomedical Waste Management Among Health Care Personnel in Jaipur, India. *OJDM*. 2013;12(1):32-40.
 15. Palwankar PV, Singh A. Safety and measures for auxiliary staff associated with hospital waste disposal. *Indian Journal of Dental Sciences*. 2012;4:104-6.
 16. Ismail IM, Kulkarni AG, Kamble SV, Borker SA, Rekha R, Amruth M. Knowledge, attitude and practice about bio-medical waste management among personnel of a tertiary health care institute in Dakshina Kannada, Karnataka. *Al Ameen J Med Sci*. 2013;6(4):376-80.

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