

Article

Knowledge and practices of health workers on safe disposal of sharp medical wastes in selected hospitals

Eti Samadder^{1*}, Ashees Kumar Shaha², Irtiza Ahmed Chowdhury³, Sajeda Khatun⁴, China Rani Mittra⁵ and Hafiza Sultana⁶

¹Senior Staff Nurse, Sadar Hospital, Bagerhat, Bangladesh

²Nursing Officer, Upazila Health Complex, Bagha, Rajshahi, Bangladesh

³Dental Surgeon, Zia Heart Foundation Hospital and Research Institute, Dinajpur, Bangladesh

⁴Lecturer (deputed), Dinajpur Nursing College, Dinajpur, Bangladesh

⁵Upazilla Health Complex, Abhaynagar, Jashore, Bangladesh

⁶Associate professor, NIPSOM, Mohakhali, Dhaka, Bangladesh

*Corresponding author: Eti Samadder, Senior Staff Nurse, Sadar Hospital, Bagerhat, Bangladesh. Phone: +880116774094; E-mail: etisamadder1984@gmail.com

Received: 07 December 2020/Accepted: 18 December 2020/ Published: 31 December 2020

Abstract: Sharp medical waste is infectious and hazardous because of their high potential diseases transmission and injury. It poses serious threats to environmental health. A cross sectional study was done to assess the level of knowledge and practices of health workers on safe disposal of sharp medical wastes. This study was done in Pirojpur Sadar Hospital, Nazirpur Upazilla Health Complex and Zia Nagar Upazilla Health Complex. Sample size was 200 Health Workers. A Semi-structured interviewer administered questionnaire was used for data collection. The collected data were processed and analyzed with the help of SPSS (Version 20) software on the basis of different variables. The period of study was from January to December 2016. The study result shows that among 200 respondent mean age was 44.05 (± 7.01) years. The designation varieties were nurses (70.0%), doctor (10.0%), Aya/ward boy (15.0%). This study found that, majority of the respondents had knowledge about the concept of medical waste and sharp medical waste. Among the respondents (90.0%) respondents knew the correct color bin to segregate sharp medical waste. Multiple responses of the respondents (80%) mentioned that they got information from Course curriculum. Knowledge of the respondents on sharp medical waste disposal (64.5%) had Good knowledge, (23%) had Fair Knowledge and (12.5%) had Poor Knowledge. Most of the respondents (47.5%) had Good practices, (33%) had Fair and (20%) had Poor practices regarding safe disposal of sharp medical waste disposal. Adequate supply of equipment's and strict monitoring system should be established to improvement the practice of the health care providers regarding safe disposal of sharp medical waste. Training on sharp medical waste disposal will help the participants to improve their knowledge and practices.

Keywords: medical wastes; sharp wastes; hazardous hospital wastes; biomedical waste; infectious medical wastes; disposal of sharp wastes

1. Introduction

Sharps waste is part of infectious waste generated in health facilities. Among the infectious waste category, sharps waste are the most hazardous because of the ability to puncture skin and cause infection. Sharps waste contain items that could cause puncture wound, cuts which include needles, syringes with needles, broken glass ampoules, scalpel and blades, infusion sets, etc. The sharps wastes are generated by nurses, laboratory technicians and doctors who are parts of waste management teams in the different areas of service delivery or waste generation points.

Despite of higher generation of sharps waste for some days studied, all of the sharps waste was being incinerated. There is, however, a lack of appropriate sharps waste compartments in the storage bay, which leads to mixing of wastes after collection. The WHO recommends storage rooms for sharps waste of which unauthorized person are not allowed to enter, inaccessibility to animals, insects and birds, with enough ventilation. The storage rooms at MNH are not standard, allowing scavengers' to mix the sharps waste with other infectious waste. Moreover, appropriate sharps waste transportation trolleys are required at MNH. This will decrease the chances of injury for waste handlers due to protruding sharps during collection, transportation and loading into the incineration (Veilla *et al.*, 2016).

Health-care professionals must take the greatest care in the use and disposal of sharps, although evidence suggests that the standard of care is less than perfect. Although it is recognized that sharps injury rates are highest among frontline healthcare professionals, a recent US study comparing injury rates with employment statistics shows an overall rate of injury among support staff ten times greater than that for nurses, and 30–40 times greater than that for clinicians (Leigh *et al.*, 2008).

An irresponsible attitude to safety is not unknown, with little thought for the welfare of those who will come into contact with clinical waste as it passes along the disposal chain. Discarding sharps into clinical waste sacks intended only for soft clinical waste continues to be a common problem. This places hospital ancillary and support staff and commercial waste contractors at great risk of injury. Despite extensive personal protective equipment that will normally include reinforced puncture and cut-resistant panels to trousers, and gloves or gauntlets manufactured from similar ballistic protective materials, sharps injuries to the hands and legs continue to occur (Aziz *et al.*, 2009).

A sharps injury will have a psychological impact, even when seroconversion does not occur, and may precipitate severe stress/anxiety and disabling post-injury morbidity. This adversely affects the lives of those suffering injury and of their partner or family group, and may force job change or result in an inability to work (Sohn *et al.*, 2006; Worthington *et al.*, 2006). Although bloodstains may be visible, microscopic contamination detected using sensitive forensic techniques is often found to be widespread and extensive, generally having been spread and smeared over a wide area but not removed effectively during cleaning, highlighting, the need for better and more extensive cleaning methods (Blenkarn, 2009).

The main Nurses must take great care in the use and disposal of sharps as the risks to ancillary and support staff and to waste handlers may be particularly great. It is an uncomfortable truth that in almost all cases, the root cause of sharps injuries and of blood and body fluid exposures to ancillary staff and waste handlers is a failure in the safe disposal of clinical waste by health-care professionals. Despite updated guidance on the safe management of health-care waste (Department of Health, 2006) sharps injury and blood and body fluid exposures continue to occur and every effort must be made to protect the welfare of those who will handle clinical waste they pass along the disposal chain. The objective of this study was to assess the level of knowledge and status of practices on safe disposal of sharp medical wastes by the health workers in selected hospitals.

2. Materials and Methods

2.1. Ethical consideration

This study was conducted with the intention of protecting the human rights of all subjects. All the information collected for the study was utilized only for the purpose of thesis and was not disclosed to anyone outside the research team. At the beginning, approval was obtained from the ethical committee of NIPSOM, under the Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. Before collection of data, written permission was taken from the corresponding hospital or clinic and also informed written consent was obtained from participants after informing about the purpose of the study. A complete assurance was given that all information keeps confidentially. Their participation and contribution was acknowledge with due respects. The right was being given to the participants not to participate and to discontinue participation at any time in study with consideration/without penalty. Informed consent will be documented properly. Each respondent was interviewed separately and their privacy and confidentiality was maintained strictly. Outcome of the study would be public health importance.

2.2. Study design: The study is a descriptive type of cross sectional study.

2.3. Study population: Health workers who worked in Pirojpur Sadar Hospital, Nazirpur Upazilla Health Complex and Zia Nagar Upazilla Health Complex.

2.4. Study period: The study period was 1st January to 31th December, 2016.

- a) **Study place:** The study was carried in one district hospital and two Upazilla Health Complexes of Pirojpur district. The hospital and Health Complexes were Pirojpur Sadar Hospital, Nazirpur Upazilla Health Complex and Zia Nagar Upazilla Health Complex
- b) **Sampling technique:** Purposive sampling technique was used. Sample size – 200.
- c) **Inclusion criteria:** Permanent employee of the institution and having work experience in the study place for more than six months
- d) **Exclusion criteria:** Respondents who were on leave or training and unwilling to participate in this study

2.5. Tools of the study: Semi-structured questionnaire administered by interviewer to collect the data. The questionnaire was prepared by using the selected variables according to objectives. The questionnaire was pretested in Infectious Disease Hospital (IDH) and necessary modifications were done and finalized before collection of data. First part of the questionnaire included personal information of the respondents. Second part contained 17 questions to assess their knowledge regarding safe disposal of sharp medical waste. The subjects were asked to choose correct answer. 1(One) point was given to a correct answer while 0 was given to an incorrect answer. The total score ranged from 0-17 and it was then converted into percentage. The Knowledge scores were categorized into good ($\geq 80\%$), fair (59-79%), and poor ($\leq 59\%$) (Khanam *et al.*, 2020). Third part contained 08 questions to assess their practices regarding safe disposal of sharp medical waste. 1(One) point was given to a correct answer while 0 was given to an incorrect answer. The total score ranged from 0-8 and it was then converted into percentage. The practice scores were categorized into good ($\geq 80\%$), fair (59-79%), and poor ($\leq 59\%$) (Khanam *et al.*, 2020). Data from the respondents were collected through face-to-face interview. Collected data were coded, entered and analyzed in a computer. The statistical analysis was conducted using SPSS (statistical package for social science) version 20 statistical software.

3. Results and Discussion

After completion of the data analysis, the results were organized in the tabular form and figures as necessary respectively. The tables and figures are described as follows:

Table1. Distribution of the respondents according to Demographic characteristics (n=200).

Age (in years)	Frequency	Percentage
20 to 29	10	5.0
30 to 39	76	38.0
40 to 49	89	44.5
50 to 59	25	12.5
Mean \pm SD = 44.05 \pm 7.01		
Gender		
Male	141	70.5
Female	59	29.5
Designation		
Nurses	140	70.00
Doctor	20	10.00
Aya/Wordboy	30	15.00
Cleaner	10	5.00
Working experience (in years)		
Up to three	19	9.5
Four to five	21	10.5
Above five	160	80.0
Monthly income (in taka)		
Up to 15000	8	4.0%
16000 to 30000	27	13.5%
31000 to 45000	110	55.0%
Above 45000	55	27.5%
Training on sharp medical waste		
Present	139	69.5
Absent	61	30.5
Duration of training (in days)		

One	19	13.7
Three	107	76.9
Seven	13	9.4
Total	n = 200	100%

Table 1 shows the mean age of the respondents was 44.05 ± 7.01 years. Among them, 5.0% respondents were from 20 to 29 years age group, 38.0% respondents were from 30 to 39 years age group 44.5% respondents were from 40 to 49 years age group and 12.5% respondents were from 50 to 59 year's age group. Majority 70.0%, respondents were male and 29.5% were female. Among them 140 respondents, (70.0%) were nurses, 30 respondents (15.0%) were aya/word boy, 20 respondents (10%) were doctors and 10 respondents (5.0%) were cleaner. Majority (80%) respondents had working experience above 5 years, 9.5% respondents had working experience up to three years and 10.5% respondents had working experience four to five years. Here, 110(55.0%) respondents monthly income were 31000 to 45000 taka, 55(27.5%) respondents monthly income were above 45000 taka, 27(13.5%) respondents monthly income were 16000to 45000 taka and only 8(4%) respondents monthly income were up to 15000 taka. Most of the respondent's 69.5% had training on medical waste and 30.5% had no training on medical waste. Majority of the respondents 107 (76.9%) had three days training, 19(13.7%) respondents had one day training and 13(9.4%) respondents had seven days training.

Table 2. Distribution of the respondents by the knowledge about Safe Disposal of Sharp Medical Wastes (n=200).

Variables	Categories	Frequency	Percentage
Medical waste is any solid or liquid waste that is generate from treatment of human being in a hospital, diagnosis, pathology test and from medical research	Yes	173	86.5
	No	27	13.5
Knowledge about types of medical waste	Infectious waste	167	83.5
	Hazardous waste	176	88.0
	Radio-active waste	150	75.0
Sharp medical waste is a form of biomedical waste composed of used sharps, which includes any device or object used to puncture or lacerate the skin	Yes	169	84.5
	No	31	15.5
Knowledge about Sources of sharp medical waste	Indoor	189	94.5
	Outdoor	11	5.5.
Knowledge about Importance of sharp medical waste	It prevent various health hazards and decrease economic burden	189	94.5
	Don't know	11	5.5
Knowledge about health hazard due to improper disposal of sharp medical waste	Hepatitis B	150	75.0
	Hepatitis C	141	70.5
	HIV/AIDS	129	64.5
Total		n = 200	100%

Table 2 shows the distribution of the respondents by the knowledge about medical waste. Majority (86.5%) of the respondents had knowledge about medical waste and 13.5% didn't. Among the respondents 88.0% mentioned that, medical waste is hazardous waste, 83.5% mentioned infectious waste and 75% mentioned radioactive waste. Here, majority (84.5%) of the respondents think sharp medical waste is a form of biomedical waste and 15.5% didn't. Out of 200 respondents 189(94.5%) were knew indoor is the sources of sharp medical waste and 11(5.5%) were knew outdoor is the sources of sharp medical waste. Most of the respondents 189 (94.5%) mentioned about the importance of safe disposal sharp medical waste is that, it prevent various health hazards and decrease economic burden and 11(5.5%) didn't know. Among the respondents 150(75.0%) mentioned that, health hazard due to improper disposal of sharp medical waste is Hepatitis B, 141(70.5%) were mentioned hepatitis-C and 129(64.5%) were mentioned HIV/AIDS.

Table 3. Distribution of the respondents by the practices about Safe Disposal of Sharp Medical Wastes (n=200).

Variables	Category	Frequency	Percentage
Correct color bin to dispose sharp medical waste is Red bin	Yes	180	90.0%
	No	20	10.0%
Color coded bin with lid is use for collection of sharp medical waste	Yes	190	95.0%
	No	10	5.0%
Sealing of color bin to dispose sharp medical waste when it is $\frac{3}{4}$ filled	Yes	103	51.5%
	No	97	49.5%
Transportation of sharp medical waste by using wheeled trolley and color coded bin	Yes	165	82.5%
	No	35	17.5%
Precaution for disposal of sharp medical waste should be taken	Wearing gloves, mask, gown, goggles, gumboot	191	95.5%
	Wearing gloves only	9	4.5%
Use needle cutter for segregation of sharp medical waste	Yes	20	10.0%
	No	180	90.0%
Use of color bin for segregation of sharp medical waste	Yes	155	83.0%
	No	45	17.0%
Measures taken when they were injured by sharp	Injured area never sucked	5	2.5%
	Clean injured area with water and soap	15	7.5%
	As much as possible eject/ remove some amount of blood from the injured area	10	5.0%
	Take advice from the physician	00	00%
	Clean injured area with Hexisol/Viodin	170	85.0%
Total		n = 200	100%

Table 3 shows that 180 (90.0%) respondents were knew the correct color bin is red bin to segregate sharp medical waste and 20 (10.0%) didn't know. Among the respondents 190 (95%) were mentioned Color coded bin with lid is use for collection of sharp medical waste and 10 (5.0%) mentioned no. Majority of the respondents 103 (51.5%) were think Sealing of color bin to dispose sharp medical waste when it is $\frac{3}{4}$ filled and 97 (49%) think no. Out of 200 respondents 165 (82.5%) had mentioned that, transportation of sharp medical waste by using wheeled trolley and color coded bin and 35 (17.5%) didn't. Most of the respondents 191 (95.5%) mentioned, Precaution for disposal of sharp medical waste should be taken by wearing gloves, mask, gown, goggles, gumboot and 9 (4.5%) mentioned wearing gloves only. Among the respondents 180 (90.0%) use needle cutter for segregation of sharp medical waste and 20 (10.0%) didn't, 155 (83.0%) use of color bin for segregation of sharp medical waste and 45 (17.0%) didn't. From the 200 respondents 170 (85.0%) clean injured area with Hexisol/Viodin when they were injured by sharp, 15 (7.5%) clean injured area with water and soap, 10 (5.0%) as much as possible eject/ remove some amount of blood from the injured area, 5 (2.5%) injured area never sucked and none one take advice from the physician.

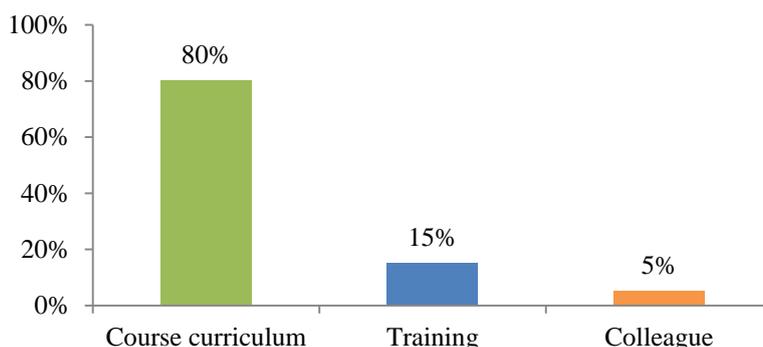
**Figure 1. Distribution of the respondents by the source of information about Safe Disposal of Sharp Medical Wastes (n=200).**

Figure 1 shows, out of 200 respondents 80% mentioned that they got information from course curriculum, 15% mentioned that they got information from training and 5.0% mentioned that they got information from colleagues.

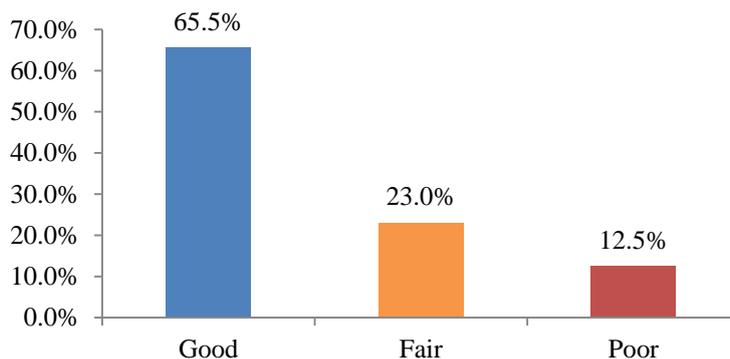


Figure 2. Level of knowledge of the respondents on sharp medical waste disposal (n=200).

Figure 2 showed the level of knowledge of the respondents on sharp medical waste disposal. 64.5% had Good knowledge, 23% had Fair Knowledge and 12.5% had Poor Knowledge.

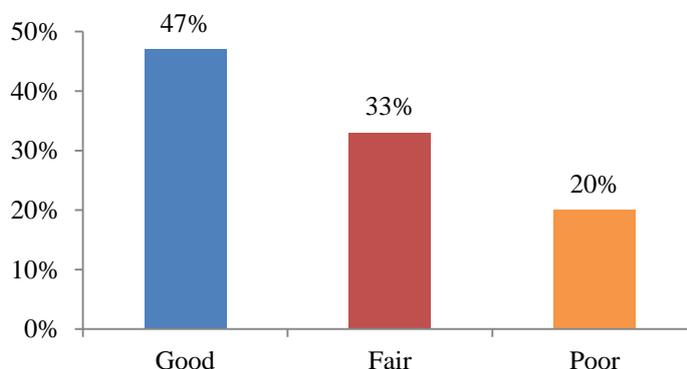


Figure 3. Level of Practices of the respondents on sharp medical waste disposal (n=200).

Figure 3 shows 47% respondents had good, 33% had fair and 20% had poor practices on sharp medical waste disposal.

4. Conclusions and Recommendations

The study finding indicates that no guide lines for the safe disposal of sharp medical waste are strictly followed in the primary and secondary level hospitals of Bangladesh. Health care staffs are not adequate practices on disposal of sharp medical waste. In case of waste handling is left to the poorly educated lowest categories of workers having no training and minimum guidance and supervision. The mandates for the essential health functions like medical waste management are fragmented between various government departments and between the public and private sector. A more coherent approach is required to ensure that all the staffs involved in sharp medical waste management are to co-ordinate and co-operate.

Based on the findings of the study, the following recommendations are made.

- The Hospitals should establish incinerator for safe and proper disposal of the hospital wastes. If not possible the sharp medical wastes should be treated before disposal.
- Training should be provided for all health staff regarding sharp medical wastes up to the Upazilla Health Complex.
- There should have a well-constructed wastes receptacle/ color bin for sanitary measures.
- Strengthening monitoring system which can ensure improvement of knowledge and practice of the health workers.

Conflict of interest

None to declare.

References

- Aziz AM, H Ashton, A Pagett, K Mathieson, S Jones and B Mullin, 2009. Sharps management in hospital: an audit of equipment, practice and awareness. *Br. J. Nurs.*, 18: 92–8
- Blenkharn JJ, 2009. Blood and body fluid exposures in clinical waste handlers. *Am. J. Public Health*, 99: S710–S717.
- Department of Health, 2006. Health Technical Memorandum (HTM) 07-01. Environment and sustainability: Safe management of healthcare waste. DH, London.
- Khanam F, AK Saha and CR Mitra, 2020. Infection control practices in a district hospital. *Asian J. Med. Biol. Res.*, 6: 321-327.
- Leigh JPO, WJ Wiatrowski, M Gillen and NK Steenland, 2008. Characteristics of persons and jobs with needle stick injuries in a national data set. *Am. J. Infect. Contr.*, 36: 414–420
- Sohn JW, BG Kim, SH Kim and C Han 2006. Mental health of healthcare workers who experience needle stick and sharps injuries. *J. Occup. Health*, 48: 474–479
- Veilla E, L Matee and VM Samwel, 2016. Assessment of sharps waste management practices in a referral hospital. *Afr. J. Environ. Sci. Technol.*, 10: 86-95.
- Worthington MG, JJ Ross and EK Bergeron, 2006. Posttraumatic stress disorder after occupational HIV exposure: two cases and a literature review. *Infect. Control Hosp. Epidemiol.*, 27: 215-7.