

Knowledge and Practices on Healthcare Waste Management among Healthcare Staff in a Specialized Infectious Disease Hospital in Sri Lanka



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ABSTRACT

Introduction: Hospital waste management is increasingly becoming important in Sri Lanka since mismanagement may lead severe adverse effect to the patients, health care workers (HCW) as well as to the community. The waste management practices of Infectious Disease Hospital is greatly important due to patients with infectious disease being managed in this specialized hospital.

Objective: To describe the knowledge and practices on hospital waste management and associated factors among health care workers of the Infectious Diseases Hospital (IDH), Sri Lanka

Methods: A hospital based descriptive cross-sectional study in conducted in the Infectious Disease Hospital. All health care workers of IDH coming in contact with patients or their biological materials consisted the study population. A total of 209 hospital staff participated with a response rate of 85%. A self-administered questioner to assess knowledge and practices and a checklist to observe practices were used as study instruments.

Results: The overall knowledge of HCW were satisfactory with a mean knowledge score of 84.4). Nursing officers had the highest knowledge score (mean=91.1) and paramedical staff and medical officers had a mean knowledge score of 89.8 and 86.9 respectively. The health care workers who had past training on waste management had a lower knowledge score (79.5) than who did not have past training (84.0). Mean practice score of the total sample was 66.6 which is not satisfactory when compared with the knowledge. Of self-reported practices, the lowest practice score was seen in medical officers. Observable correct practices of sections of the hospital varied with highest score in the ICU (87.5%) and lowest score (33.33%) in the OPD and clinic

Conclusion: Knowledge on hospital waste management is satisfactory among the health care workers with certain identified gaps in some categories. Practices of waste management is not satisfactory and needs effective and sustainable interventions. In overall context the knowledge, and practices of nursing officers are higher than the other categories. Continuous monitoring and evaluation leading to result based training are recommended to maintain a effective hospital waste management process.

KEYWORDS: Healthcare waste management, Healthcare staff, Infectious Disease Hospital, Knowledge, Practices

I. INTRODUCTION

Hospital waste or healthcare waste is defined as a total waste stream of the entire hospital setup.¹ Healthcare waste is all the accumulated waste generated in health care establishments, research facilities and laboratories. Hospital waste can be broadly categorized into hazardous and non-hazardous general waste. Non-hazardous waste includes all waste that has not been contaminated with infectious or hazardous substances such as blood, body fluids or chemicals.

In many countries improper management of waste generated in healthcare facilities causes direct harm to the community, to people working in health care facilities and to the environment. In addition, pollution from inadequate treatment of waste can cause indirect health harm to the community. The disposal of certain types of devices should follow specific safety rules. For example, a syringe is a common item that require safe disposal. Waste management options need to be efficient, safe and environmentally friendly to protect people from voluntary and accidental exposure to waste when collecting, handling, storing,

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transporting treating or disposing of waste. Furthermore, in Sri Lankan context such options need to be cost effective, taking into account the local logistical needs.²

Hospital waste management procedures aim at containing infections and reducing public health risk both within and outside the health care facility. This procedure has following measures; Waste minimization and segregation, Waste collection and onsite transportation, Waste storage and Waste treatment.³

Waste segregation consists of separating different types of waste based on the type of treatment and disposal practices.⁴ It should take place at the point of generation of waste. Different colour coded containers should be used for this purpose. Hazardous waste; should be collected in yellow polyethene bags of minimum 300micron gauge with the international biohazard symbol and placed in yellow bins. Sharps should be placed in specific cardboard or plastic boxes which are puncture proof and leak proof. Sharps boxes should be designed with small opening so that items can be dropped in but no item can be removed. General waste should be placed in black polythene bags minimum 200microns gauge.⁵

A separate central storage facility should be provided for waste storage, Non-hazardous waste which is to be taken away by local government authorities should be stored separately from hazardous waste. The central storage facility should be totally enclosed and sealed from unauthorized access. It should be inaccessible to animals, insects and birds and easy to clean and disinfect. It should have a good water supply, drainage, and ventilation systems. Different types of hazardous hospital waste should be treated appropriately. Infectious waste should preferably be incinerated in a double chamber incinerator. In densely populated areas it can be treated by autoclaving. Blood should be autoclaved before being discarded and alternatively, samples of blood can be kept overnight in a container of concentrated hypochlorite before discarding. Blood bag should be incinerated. When disposing radioactive waste, the radiation protection officer should be responsible. In the process of disposal, the instructions provided by the atomic energy authority regarding storage and disposal should be followed.^{6,7,8} According to the available data, 0.36Kg of waste per bed was produced for a single day in Sri Lanka. Annually, 5000metric tons of Infectious waste is produced in the Colombo district.⁹

Institutions dealing with hazardous waste should obtain Scheduled Waste Management License (SWML) from the Central Environmental Authority for the management of waste specified in the Schedule VIII of the National Environmental (Protection and Quality) Regulation Act. No 01 of 2008. Certain hospitals have developed standard treatment and disposal facilities for infectious waste such as double chamber incinerator for autoclaving of infectious waste. The non-contaminated general waste produced in hospitals is managed by the local authority of the area. However, in some hospitals this process is not functioning due to issues in proper waste segregation.

II. METHODS

Infectious Disease Hospital (IDH) is situated in the Colombo district. The hospital has an isolation ward, HIV management unit, medical wards, pediatric ward, dengue management unit, medical intensive care unit and out patient's department.

An institution based cross sectional descriptive study was carried out. All health care workers who are directly in contact with the patients or their body fluids in patient care consisted the sample and 242 members falling into this eligibility criteria were included in the study. Of them 209 responded with a response rate of 86.3%.

A self-administered questionnaire was used to assess the knowledge and self-reported practices on healthcare waste management. An observational checklist was used to assess the practices of health care workers in managing hospital waste.

III. RESULTS

Of the eligible staff of 242, 209 responded with a response rate of 86.3%. a majority of health care workers (48.3%, n=101) were minor staff followed by nursing staff (24.9%, n=52).

Table 1: Distribution of Health Care Workers by staff category

Staff category	Frequency	Percentage (%)
Medical Officers	36	17.2
Nursing Officers	52	24.9
Paramedical staff	16	7.7
Minor Staff	101	48.3

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Others	04	1.9
Total	209	100.0

A majority (59.3%, n=124) of the health care workers had not received training on waste management.

Table 2: Distribution by training on waste management

Training	Frequency	Percentage (%)
Received	85	40.7
Not received	124	59.3
Total	209	100.0

The mean knowledge score of the total group was 84.4. Highest mean knowledge score (91.1) was obtained by the nursing officers followed by medical officers (86.8).

Table 3: Distribution of knowledge score by staff category

Category of staff	Mean knowledge score
Medical Officers	86.8
Nursing Officers	91.1
Paramedical Staff	89.8
Minor staff	74.8
Others	79.5

The mean practice score of the total group was 66.6. The highest mean practice score (72.0) was seen in nursing officers and the lowest mean practice score (61.0) was seen in medical officers.

Table 4: Distribution of practice score by staff category

Category of staff	Mean practice score
Medical Officers	61.0
Nursing Officers	72.0
Paramedical Staff	63.0
Minor staff	66.0
Others	71.0

Health care staff with diploma or equivalent education level had the highest practice score (70.0) and the staff members who had an education below ordinary level had the lowest practice score of 57. The highest mean practice score (80.0) was seen in the staff of the dispensary and the lowest mean practice score (57.0) was seen in the staff of OPD.

There was no major difference in the practice score between the staff who have undergone or not undergone a training on waste management.

The highest practice score was in the group with highest knowledge score and vice versa.

Table 5: Distribution of mean practice score by selected factors

Factor	Mean practice score
Highest educational level	
Below Ordinary level	57.0
Up to Ordinary level	68.0

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Up to Advanced level	67.0
Diploma or equivalent	70.0
Degree	60.0
Post graduate qualification	63.0
Period of work in health sector	
Less than 1 year	64.0
1 to 3 year	65.0
>3 to 5 years	69.0
>5 to 10 years	65.0
>10 years	67.0
Training	
Received	66.5
Not Received	66.7
Knowledge score	
Below 50	55.0
50 - 74	64.3
75 and above	68.0

Table 6 shows that except in paramedical staff in all other categories highest knowledge score category had the highest practice score. Highest practice score was seen in “other staff” category followed by nursing officers. The medical officers had the lowest mean practice scores.

Table 6: Distribution of knowledge score and practice score among staff categories

Knowledge score	Mean practice score				
	Medical Officers	Nursing Officers	Paramedical Staff	Minor staff	Other staff
75 and above	60.7	72.3	62.0	70.2	75.0
50% - 74%	60.0	71.3	70.0	63.3	75.0
Below 50%	-	-	-	55.0	-

In the practices observed using the checklist showed that the highest correct practices was seen in the ICU (87.5%) followed by wards (85.4%). The lowest practice level (33.3%) was seen in the OPD and the clinic (Table 4.32).

Table 7: Distribution of observable practice by the sections

Section	Correct observable practices (%)
ICU	87.5
Wards	85.4
Primary Care Unit	62.5
Laboratory	62.5
Dental unit	57.1
Dispensary	50.0
Physiotherapy unit	50.0
OPD	33.3
Clinic	33.3

DISCUSSION

Infectious disease hospital is the only designated specialized hospital for the management of infectious diseases in Sri Lanka. Hence the knowledge and practices regarding the hospital waste management is utmost important since any mismanagement may lead to major adverse effects in the institution as well as in the surrounding community of the hospital. There is no previous

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study carried out to assess knowledge and practices on hospital waste management in the healthcare staff Infectious Disease Hospital. The total staff of the hospital was 262 and 245 were eligible to participate. Of the eligible 245 staff members 209 participated in the study with a response rate of 85.3%. The responded staff categories consisted of 17.2% (n=36) medical officers, 24.2%(n=52) nursing officers, 7.7% (n=16) paramedical staff, 48.3% (n=101) minor staff and others which represent drivers and public health inspector were 1.9% (n=4).

Of the sample 31.1 % (n=65) of health care workers had more than 10 years working experience in health sector and only 5,7% (n=12) had less than 01 years' experience. Although being the infectious disease hospital only 40.7% (n=85) had received training on hospital waste management.

Gaps in knowledge lead to performance discrepancy.^{10,11,12} Knowledge of this study population was satisfactory since the mean knowledge score for the hospital waste management at IDH was 84.4 and all categories of staff had a mean score of over 74. Nursing officers had the highest mean knowledge score of 91.1. Minor staff employees had the lowest mean knowledge score of 74.8. The medical officers mean knowledge score (86.9) was lower than nursing officers and the mean knowledge score of paramedical staff (89.77). This may be due to the nursing training paying more emphasis on ward waste management and paramedical staff which includes medical laboratory technicians having to handle infectious during routine duties paying more attention to handling infectious waste.

The mean practice score of the total group was 66.6% and highest mean practice score of 72 was among the nursing officers and the lowest score (61) was in medical officers. This finding is comparable with a which showed that people with high education level such as doctors and consultants had satisfactory knowledge but relatively low percentage of practices.¹³ A study done in India on biomedical waste management among the health care personal revealed some practices were lacking in doctors than other health care staff.¹⁴ The above findings is compatible with the present study where practice score of degree and post graduate qualification holders were relatively lower than advance level and diploma or equivalent level. There was no much difference of mean practice score between the periods of employment in health sector.

There is a direct relationship of mean knowledge score with the mean practice score. The knowledge score "75 and above" category had the highest (68) mean practice score.

The study was conducted only in health care workers who are employees of the ministry of health. There was no assessment of workers working in hospital janitorial service and assessing their knowledge and practices would be more informative. The observable practices were assessed unit wise. If done at individual level it would be more informative. Due to time constrains and practical issues this was not done

Study instrument was a common self-administrative questionnaire to all the categories of health care staff. There may have been differences in interpretation among different categories of staff with different level of knowledge. Due to the need of comparison of scores a common study instrument was applied. Steps were taken to make the questioner simple and addressing fundamentals in waste management which should be known by all categories of staff.

CONCLUSIONS

All the health care workers of IDH had satisfactory level of knowledge on hospital waste management and the knowledge of the healthcare staff had a positive relationship with educational level up to diploma level. Overall self-reported practices on hospital waste management was poor there was no significant level of difference of practices between the period of work in health sector or IDH. Health care workers who had higher knowledge score, had higher waste management practices. An exception was medical officers with higher educational level having the lowest practice score

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