

Evaluation Healthcare Waste Management in Base Hospitals in Sabaragamuwa Province of Sri Lanka: Index Based Approach

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Abstract

Healthcare wastes are highly infectious and management of healthcare waste is of great importance due to its potential environmental hazards and public health risks. In recent years, many efforts have been made by environmental regulatory agencies towards the better management of wastes through healthcare facilities. This study brings into focus the organization of waste collection and disposal methods that are being adopted in base hospitals of Sabaragamuwa Province as a case study, in order to assess human and environmental risks due to their improper management. According to the adoption level of waste management, composite index called Healthcare Waste Management Index (HWMI) was developed to assess the hospitals comparatively. Further SWOT analysis was carried out to identify the weaknesses, strengths, opportunities and threats in each base hospital relate to waste management. Rules and regulations and national colour code system pertaining to the current practices were also studied. Calculated index values lie between 0 to 100 and value of 100 for well adoption. Index value obtained for six hospitals lie in between 56.57 to 27.99, recording the highest Index value from Karawanalla base hospital. All other hospitals' Index values are less than 50. Average Index value for Rathnapura district is 48.00, which is higher than the Kegalle district of 34.24. Out of 6 hospitals, only one hospital adopts the standard colour coding system. According to the results obtained from SWOT analysis, the biggest strength of Province was, having of full time infection control nursing officers. The main threat was high disposal cost. Finally it is concluded that. The management levels of healthcare waste management of base hospitals in Sabaragamuwa Province are in a optimal condition but none has reached up to maximum level. Further, study suggested that increasing regular monitoring with staff trainings, financial and physical resource allocation would enhance the healthcare management in the base hospitals in Sabaragamuwa Province in Sri Lanka.

Key words: Healthcare waste management, waste disposal, Hospital Waste Management Index

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Introduction

The establishment of healthcare is basic requirement of every civilized society. Healthcare activities lead to the production of waste that can have adverse health effects. The disposal of waste originating from healthcare establishments is likely to have effect on the health and human wellbeing and the environment. The safe management of healthcare waste is essential for community and environmental health. It is also important that irrespective of technologies used for treatment and disposal, the standards for the protection of environment and human health are uniform for all healthcare establishments. A number of difficulties are being faced at many places for implementation of these requirements in practice. The National Environment Act (NEA) Number 47 of 1980 with its amendments

Numbers 56 of 1988 and 53 of 2000 are the basic legal documents that regulate the hazardous waste in Sri Lanka. The guidelines for managing healthcare wastes have been revised and approved at 2001 (Anonymous, 2001). To implement a uniform system of segregation throughout the country; the ministry of healthcare has developed a national color code for healthcare waste in March 2006. This study has designed to assess the healthcare waste management practices in Sabaragamuwa Province.

Methodology

Sampling procedure and data collection

Questionnaire based survey was carried out to gather information on waste management system and national colour code system currently use in all base

Table 1 : Bio Medical solid Waste Management of Base Hospitals in Sabaragamuwa Province

Category	PO	Mawanella Base Hospital	Warakapola Base Hospital	Karawaela Base Hospital	Kahawattha Base Hospital	Embilipitiya Base Hospital	Balangoda Base Hospital	Standard Practice recommended from WHO
Standard colour cord system	-	Not adopt	Poorly adopt	Well adopt	Mildly adopt	Average adopt	Mildly adopt	
Human Anatomical waste /Infectious waste	1	Bury (1)	Dumping to pit (1)	Dumping to pit (1)	Incineration (2)	Bury in Cemetery (1)	Bury in Cemetery (1)	Incineration
Microbiology & Biotechnological waste	1	(0)	Flushing (1)	Incineration (2)	Incineration (2)	Incineration (2)	Burning & Dumping to pit (1)	Incineration
Discarded medicine &cyto-toxic drugs	1	Send back (1)	Burning (2)	Send back (1)	(0)	(0)	(0)	Secured land filing
Waste sharps	4	Burning (1)	Burning (1)	Incineration (2)	Incineration (2)	Incineration (2)	Burning & Dumping to pit (1)	Autoclaving
Liquid waste	4	Discharged to Ma Oya (1)	(0)	Move to Sewage system (3)	Dumping to Pit (1)	Move to Sewage system (3)	Septic tank (3)	Chemical treatment
Chemical waste	4	(0)	(0)	Move to Sewage system (2)	Toilet pit (1)	Move to Sewage system (2)	Collect & Dumping to pit (3)	Secured land filing
Glass waste	7	Selling (3)	Selling (3)	Storage & Reused (2)	Selling & Municipal collection (3)	Municipal collection (2)	Selling (3)	Recycling
Plastic & Polythene waste	8	Selling (3)	Municipal collection (2)	Selling & Burning (3)	Selling (3)	Selling & Burning (3)	Selling (3)	Recycling
General waste (Food Residue)	9	Municipal collection (3)	Municipal collection (3)	Municipal collection (3)	Dumping to Pit (2)	Dumping to Pit (2)	Composting & Municipal collection (3)	Municipal collection
Incinerated Ash	9	(0)	(0)	Bury 3	Dumping to Pit (2)	Bury (3)	Dumping to pit (2)	Secured land filing
Paper waste	11	(0)	(0)	Selling & Burning (3)	Municipal collection (2)	(0)	Burning (1)	Recycling
HWMI		27.99	40.50	56.57	49.49	45.92	40.02	

PO - Priority Order

Note: Figures in the parenthesis are Rank give for the waste management practices

0 = Not Adoption 1 = Poor adoption 2 = Moderate Adoption 3 = Well Adoptio

hospitals in Sabaragamuwa Province of Sri Lanka. To assess the Strength, Weakness, Threats and Opportunities (SWOT) related to waste management were obtained through interviews with relevant officials from each hospitals, field observation and literature search.

Development of a Healthcare Waste Management Index (HWMI)

Eleven waste categories and their standard practices were obtained from literature. The identified waste categories are Human anatomical & Infectious waste, Microbiology and bio technological waste, Discarded medicine & cytotoxic drugs, Shapes waste, Liquid waste, Chemical waste, Glass wastes, Plastic & polythene waste, General waste, Incinerated ash and Paper waste. As an effective method of quantification of level of adoption of waste management, Integer Scoring system was assigned for waste management system in each hospital in such a way that, if particular hospital does not adopt any waste management method for particular waste category assigned zero (0), while rank 3 was assigned if particular hospital adopts exactly the standard method. Similarly rank 1 and 2 were assigned for poor and moderate adoption of waste management respectively. Finally, each waste category was weighted according to their importance of management using the ranks obtained from ten relevant expertise from different institutions (Universities, Health Department, Central Environment Authority etc.). Rank 1 to 11 was given according to the degree of hazardous to the human and environment from the highest to the lowest. Then the relative weight of each waste category was taken as the reciprocal value of the rank obtained for the waste category by using following equation to give highest weight to the more hazardous waste.

$$W_i = \frac{1}{S_i} \quad (1)$$

Where, W_i = weight of i^{th} waste category, S_i = Rank of i^{th} waste category

Then Health care Waste Management Index (HWMI) was developed by using following equation which lies between 0 to 100. The index value 100 indicates the perfect adoption while 0 indicates the non-adoption of the standard waste management practices.

$$HWMI = \frac{\sum_{j=1}^n W_j \times R_{ij}}{R_{max} \times W_{sum}} \times 100 \quad (2)$$

Where, R_{ij} is rank obtained by j^{th} base hospital for i^{th} waste management

R_{max} is Rank given for adoption of standard method (In this case it is 3)

W_{sum} is sum of all weights

SWOT analysis

SWOT analysis was carried out and prioritized the Strength weakness, opportunities and threats related to hospital waste management.

Results and Discussion

Calculated Index values lie between 56.57 and 40.02, recording the highest index value from Karawanalla Base Hospital. All other hospitals' Index value is less than 50. Average Index value for Rathnapura district is 48.00, which is higher than the Kegalle district of 34.24. Out of 6 hospitals, only one hospital adopts the standard colour coding system. These figures clearly show that adoption of standard waste management practices are below 50% in all hospital except one (Table 1). Human Anatomical waste/Infectious waste, Microbiology and Biotechnological waste and discarded medicine and cyto-toxic drugs waste are the most important wastes to manage according to the priority order. But most of the hospitals not practice any of the methods to manage them or poorly manage while none of the hospitals practice the standard method. (Table 1). According to the results obtained from SWOT analysis, the biggest strengths of the waste management in Sabaragamuwa Province are, having a dedicated staff with appropriate knowledge and adequate support from the municipal council to improve the waste management in the study area. The main problem encountered from the study for waste management is high disposal cost. Other than that, lack of enough land area, waste storage facilities, insufficient amount of floor cleaning chemicals, mal functioning of Sewage system, poor drainage system and lack of financial support were also recorded as problems. Most of these outcomes of the study are comparable with the findings of Weerathilake et al. (2011).

Conclusion

Karawanalla base hospital records the highest index value while Mawawanalla base hospital records the lowest. The management levels of healthcare waste management of base hospitals in Sabaragamuwa Province are in a optimal condition but none has reached up to maximum level.

References

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