

## Recommendations through a Complete Study on Healthcare Solid Waste Management Practices of Government Hospitals in Colombo, Sri Lanka

Liyanage Bundunee Chanpika<sup>1\*</sup>, Athapattu Prathapage Priyantha<sup>1</sup> and Tateda Masafumi<sup>2</sup>

<sup>1</sup>Department of Civil Engineering, Faculty of Engineering Technology, The Open University of Sri Lanka

<sup>2</sup>Department of Environmental Engineering, Toyama Prefectural University, Toyama, Japan

### Abstract

Eighteen hospitals in Colombo, Sri Lanka were investigated in terms of understanding the current situation of healthcare management. Out of these, central government and the rest are administrating ten hospitals by the provincial government. The focus points of this study were the following: 1) general information (i.e., names and types of hospital selected for investigation, amount of waste generated, numbers of beds, and so on); 2) waste types; 3) sources of waste generated; 4) segregation of healthcare waste; 5) waste storage, transportation, and disposal; and 6) adherence to regulations. Questionnaires and investigations involving direct visit were done to obtain more concrete data. The results of our study suggested that most of the hospitals investigated were neither satisfactory in terms of World Health Organization (WHO) guidelines for waste disposal, nor on environmental grounds. Several recommendations were made based on information obtained through this study.

**Keywords:** Healthcare solid waste; Hospital; Storage; Segregation; Treatment; Disposal; Regulation

### Introduction

Healthcare wastes are defined to include all types of wastes produced by health facilities such as general hospitals, medical centers, and dispensaries. Blenkharn [1] introduced comprehensive literature on healthcare waste. Healthcare wastes represent a small amount of total residues generated in a community. However, such residues can potentially transmit diseases and present an additional risk to the staff of the healthcare facilities, patients, and the community when they are not managed properly [2,3]. Healthcare wastes may be classified into different types according to the source, type, and risk factors associated with their handling, storage, and ultimate disposal. Komilis et al. [4] investigated healthcare waste generation from different categories of healthcare facilities. Throughout the world, the health sector is developing and improving more rapidly compared to other economic sectors. However, it seems that the fraction of waste generated at healthcare institutions has not attracted the same level of attention as other types of wastes, particularly in developing countries, despite the fact that healthcare wastes are labeled as hazardous waste because they pose serious and direct threats to human health [5-10]. Healthcare waste poses serious threats not only to human health but also to economy of a country. An illicit economy based on healthcare waste has also been reported [11].

The healthcare service system in Sri Lanka can be divided into government and private hospitals. Governmental hospitals serve around 95% of the Sri Lankan population, and the private sector serves the rest 5%. The governmental service system in the country is divided into curative services and preventive services. Health care is provided free of cost to all people including the super specialty services. For preventive services, there is one Medical Officer of Health (MOH) in each Assistant Government Division (AGD), per 60,000 people. Peripheral Health Mid Wives (PHMW) and Public Health Inspectors support each MOH. They are responsible for the mother and child health programme and for the food hygiene and sanitation respectively. In each district, there is a Deputy Director Provincial Health officer (DDPHS); for each province, there is a Provincial Health Officer (PHO); and at the top of this hierarchy is the Director General of Health Services (DGHS). The number of private medical services is relatively

small in Sri Lanka, and these services are predominantly located in Colombo and the other larger cities. Management of healthcare wastes is a major environmental issue in the country. Though healthcare services are responsible to manage healthcare wastes they generate, most of them fail to do this efficiently, which results in environmental pollution through such wastes.

This study aims at examining healthcare waste, especially solid waste management practices by surveying the current practices followed by the government hospitals in the Colombo District. Colombo district was selected as the survey area because all the hospitals in the district are government administered.

### Methods of Research

#### Hospitals for investigation

Eighteen out of 26 government hospitals in the Colombo District were selected in order to characterize the healthcare wastes in the national context. Colombo District was selected as the survey area because it is the most important district in the country and has the most comprehensive healthcare centers in the country. Colombo is also the most populated, industrialized, urbanized, and developed district in the country based on the social and economic sectors. Additionally, the population in the district represents every ethnic group and every religious group in the country. The social framework of the district consists of municipal, urban, suburban, and rural areas. Every type of government hospital is located within this district. These include

**\*Corresponding author:** Liyanage Bundunee Chanpika, Department of Civil Engineering, Faculty of Engineering Technology, The Open University of Sri Lanka, Nawala, Nugegoda, Sri Lanka, Tel: +94 1 1288 1480; Fax: +94 1 1282 2737; E-mail: [bcliya@ou.ac.lk](mailto:bcliya@ou.ac.lk)

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categories like national hospitals, general hospitals, teaching hospitals, base hospitals, district hospitals, peripheral, rural and others hospitals. The central government while base, district, peripheral administrate national, general, base and other hospitals, and the provincial government administrates rural hospitals. There is a national hospital in Colombo, which has all the specialty and super specialty services, and is the apex referral center in the health system. In each district, there is one general hospital with specialties like ENT/ophthalmology, dermatology, and radiology apart from medical, surgical/pediatrics, and obstetrics and gynecology (OBG). Teaching hospitals are attached to the medical colleges. Base hospitals act as referral units with medical, surgical, pediatrics, and obstetrics and gynecology specialties. Further, there are five to eight district hospitals in each district, depending on district size and population. For curative services, the government has established peripheral units (PU) in rural villages. Rural hospitals offer basic treatments.

### Research design

Research design for conducting this study consisted of four major tasks: 1) developing a questionnaire, 2) identifying the hospitals in the Colombo District to be visited for data collection, 3) conducting site visits to selected hospitals and collecting data and information through interviews and observations, and 4) analyzing survey results to make recommendations regarding sound healthcare waste management in the government hospitals in the Colombo District.

### Questionnaire development

The questionnaire was developed based on the recommendations of the World Health Organization (WHO) for evaluation of hospital waste management in developing countries [6]. After taking into consideration specific differences which may exist in hospitals in Sri Lanka and the views of environmental specialists regarding the present problems in the management of medical waste and the expected results from the questionnaire, some modifications were made to the questionnaire suggested by the WHO. The questionnaires were divided into seven sections. They were 1) general information, such as names and types of hospitals selected for investigation, amount of waste generated, numbers of beds, and so on; 2) waste types; 3) sources of waste generated; 4) segregation of healthcare waste; 5) waste storage, transportation, and disposal; and 6) regulation adherence.

### Site visits

Authors made two to five visits to each of the selected hospitals. Five visits to the national and teaching hospitals, three visits to base hospitals and two visits to the rest were made during this study. Each visit consisted of spending time in the different departments of the hospital, recording notes, and making observations about the healthcare waste management practices followed by staff responsible for the task. Regular visits were conducted to general medical wards, maternity wards, surgical and intensive care wards, operation theaters, and orthopedic sections, as well as waste collecting, treatment, and disposal areas. During those visits, the authors collected information examining the rules, procedures, and regulations to be followed by the personnel regarding the management of medical waste generated at the hospital. During the visits, one or two members of hospital staff, the head of the hospital, who is in charge of the infectious control unit, and a public health officer, accompanied the authors; in addition, two personnel engaged in waste management were interviewed for collecting data and information included in the questionnaire. Site visits were helpful in obtaining firsthand knowledge of handling and disposal

practices of healthcare wastes. The authors also made use of both primary and secondary data. Secondary data were obtained from the hospital documentation. Information was also obtained from published and unpublished books, journals, newsletters, periodicals, articles, and internet. Primary data were collected through questionnaires and interviews during the site visits.

### Data analysis

The analysis is essentially descriptive. Data for the analysis were extracted from questionnaires and personal interviews carried out by the authors.

## Results and Discussion

### General information

The collected data was analyzed explaining the present healthcare waste management practices adopted by the government healthcare establishments in the Colombo District. To analyze the data, the investigated hospitals were divided into Groups A and B, based on the following facts. The hospitals in Group A are administrated by the central government and available for specific treatment facilities of operation theaters, radiotherapy, testing laboratory, intensive care, blood bank, wards, and clinics. The hospitals in Group B are administrated by the provincial government and include an outpatient department, dental unit, isolation ward, wards, and clinics. General information on the selected hospitals is summarized in Table 1 (ANNEX).

A total of 14 hospitals in Group A were located in Colombo and consisted of one national and general, nine teaching, one base, and three other hospitals. Eight of the hospitals in Group A were investigated. On the other hand, a total of 12 hospitals from Group B existed in Colombo i.e., three base, three district, five peripheral unit, and one rural, out of which 10 hospitals were investigated in this study. Waste generation and bed occupancy represent averaged values at the time the authors received the data from the hospitals. As has been reported by Komilis et al. [4], our results also showed that waste generation increases with a higher number of beds. As shown in Table 1, the eight hospitals investigated from Group A and 10 from Group B generated 7,920 kg and 1,624 kg of healthcare waste per day, respectively.

### Waste types identified

Table 2 (ANNEX) shows the result of waste types identified by hospitals. In this study, it was revealed that, two hospitals out of the eight investigated (25%) in Group A separate all healthcare wastes into seven categories called as general, pathogenic, infectious, sharps, radioactive, recyclable, and other wastes, and only these two hospitals (25%) generate radioactive wastes. Another six hospitals out of the eight investigated (75%) in Group A separate their healthcare wastes into five categories. According to Pruss et al. [6], wastes are generated from the various activities carried out in the hospital. Types of wastes and their amount may vary from hospital to hospital and may depend on climatic season, location of the hospital, and many other factors. General wastes produced at hospitals are related to food preparation in the hospital kitchen or canteens, administrative activities, and land clearing. This type of waste is similar to domestic and municipal wastes. With regard to healthcare wastes in hospitals, different kinds of therapeutic activities such as cobalt therapy, chemotherapy, dialysis, surgery, delivery, resection of gangrenous organs, autopsy, biopsy, paraclinical testing, and injections, among other treatments, are carried out and result in the production of infectious and pathogenic wastes, contaminated sharps with patients' blood and secretions, radioactive

wastes, and chemical materials, which are considered to be hazardous wastes.

Except for Kalubowila (34.0%) in Group A and Angoda Fever (27.0%) and Aturugiriya (52.6%) in Group B, it was found that general waste occupied a large portion of the total waste generated and was more than 60% in both the groups.

### Waste source generated

Sources of waste generation may vary from hospital to hospital; the main categories of such sources being patients' services, theaters, laboratories, kitchens, canteens, staff hostels, pharmacies, and gardens.

Table 3 (ANNEX) shows the presence of different categories of sources of waste generation in the hospitals investigated. Our study revealed that all hospitals investigated in Group A have patients services, laboratories, kitchens, canteens, staff hostels, pharmacies, and gardens and only one out of the eight hospitals investigated in Group A did not have theaters as a waste generation source. All hospitals investigated in Group B have patients' services, pharmacies, and gardens as their sources of waste generation. Meanwhile four out of ten hospitals have theaters, eight out of ten have laboratories, two out of ten have kitchens, four out of ten have canteens, and three out of ten have staff hostels. The number of waste generation sources of the hospitals in Group B as a whole is less than that of Group A.

### Segregation of healthcare waste

Rao et al. [12] have specified identification and segregation of wastes as the main steps in healthcare waste management. The data collected regarding segregation status by hospitals (Table 4 (ANNEX)) in this study shows that 100% of the hospitals in Group A separate healthcare by waste category and also adopt a color code system. Meanwhile, three hospitals out of ten in Group B separate their healthcare wastes into four categories: infectious, sharps, recyclable, and general wastes. Four hospitals out of ten separated only sharps as their healthcare wastes and the remaining healthcare wastes were classified as general wastes. The remaining hospitals investigated in Group B did not practice any segregation of healthcare wastes and collected and disposed of all wastes as garbage. This also demonstrated that none of the hospitals investigated in Group B practice a color code system. Figure 1 shows

segregation of healthcare waste by Castle Hospital as per the color code system.

According to the WHO guidelines [6], healthcare wastes are categorized as infectious, pathogenic, sharp, chemical, pharmaceutical, radioactive, wastes with high content of heavy metals, and pressurized containers. However, the healthcare waste categorization used by the hospitals investigated in our study is different from that of WHO. For instance, wastes with heavy metals, chemical wastes, and pressurized containers are not categorized or collected as separate wastes and are disposed of with other wastes in those hospitals. Pharmaceutical wastes in those hospitals are not categorized as wastes, but also do not enter the waste stream since outdated pharmaceuticals are returned to the manufacturing companies to be destroyed. The hospitals basically separate medical wastes from the general waste stream at the waste generation points. Thereafter, they are stored and disposed of separately. However, in terms of qualitatively considerations, the segregation of healthcare wastes differed from hospital to hospital or even from ward to ward within a given hospital. Generally, in the wards, doctors and nurses are required to drop the used sharps into different containers, but this is not diligently followed. Users of sharps sometimes leave them on hospital beds, which could be very dangerous to patients. The mixing of different categories of waste is common in these hospitals. According to recommendations by WHO, hospitals have to provide plastic bags and strong plastic containers, such as empty containers of antiseptics used in the hospital, for infectious waste. Bags and containers for infectious waste should be marked with the biohazard symbol [6]; however, some hospitals do not label infectious waste in this way. According to Franka et al. [13], maintaining a clean environment and disposal of medical waste are social obligations of hospitals. Meanwhile, Johannessen et al. [14] stated that proper management of medical waste could minimize the risk both within and outside healthcare facilities. The first priority is to segregate wastes, preferably at the point of generation, into reusable and non-reusable, hazardous and non-hazardous components. However, considering these recommendations or WHO guidelines, existing practices followed by the Health-care workers for segregation in most of these hospitals are not satisfactory. The importance of training and education with regards to reduction and proper segregation of healthcare waste has been stated by several researchers [15,16] and might prove as a key factor in bringing a positive change in this direction.

### Waste collection, storage, transportation, and disposal

Table 5 (ANNEX) shows frequency of waste collection by hospitals investigated in Groups A and B. Six of eight hospitals in Group A transport wastes collected in wards or clinics to waste storage areas daily, and the other two hospitals transport these wastes to storage areas once every three days. In Group B, out of ten hospitals, transport of wastes collected in wards or clinics to storage areas occur daily in three hospitals, once every two days in two hospitals, once every three days in four hospitals, and weekly in one hospital.

The place where the hospital waste is kept before it is transported to the final disposal site is termed a "temporary waste storage area." This area must be well sanitized and secured in such a way that it should be accessible only to authorized persons [6]. As per recommendations of WHO for healthcare waste storage, storage areas are to be free of odor and must discourage the harborage of vermin. Healthcare facilities must provide an enclosed structure such as a shed, garage, cage, fenced area, or separate loading bay to store waste. The holding area should be located away from food and clean storage areas; it must not be accessible



Figure 1: Segregation as per guidelines of color code system at Castle Hospital.

to the public, have a lockable door and rigid impervious flooring. Clean-up facilities, spill kits, appropriate drainage, and so on should be provided where wastes are stored in locked bins. A specific area with adequate drainage for washing equipment should be designated. All hospitals investigated in this study have temporary storage areas. The wastes are kept in these temporary storage areas until they are disposed of or transported off-site.

Table 6 (ANNEX) shows conditions of temporary wastes storage areas of hospitals investigated in Groups A and B. None of the hospitals investigated in this study carry out compliance checks against the recommendations of WHO for healthcare wastes storage. Only one out of eight hospitals investigated in Group A has a waste storage area with a cemented floor and roof. Meanwhile, five out eight hospitals have provided open containers for temporary waste storage and two other hospitals in this group store their healthcare wastes on the open ground, at a place designated for the purpose, in the hospital premises. Three out of ten hospitals investigated in Group B store their wastes on the open ground, but these areas have been separated with fixed fences and lockable doors. However, the rest of hospitals in Group B store their healthcare wastes at the designated areas on the open ground. Figures 2 and 3 show current healthcare waste storage conditions at the hospitals investigated.

Table 7 (ANNEX) shows the ways of disposal for each category of wastes by the investigated hospitals in Groups A and B. The upper and lower values in the table (Upper/Lower) represent the values of Groups A and B, respectively. In Group A, all hospitals dispose of their general wastes through municipal councils following WHO recommendations. Six hospitals dispose of their pathogenic wastes through funeral parlors, but the process is not monitored by these hospitals, and is also not recommended as per the WHO guidelines. One out of eight hospitals disposes the pathogenic waste through outsourced incineration. In terms of disposing of their infectious wastes, five hospitals dispose them of through municipal councils, two hospitals burn them openly on the hospital premises, and the other one incinerates them. As for the disposal of sharps, two hospitals incinerate them on the premises, four incinerate them through outsourcing, and the other two burn them openly on the hospital premises. Two hospitals that generate radioactive wastes dispose of their radioactive wastes by outsourcing. Seven hospitals outsource recyclable wastes for recycling and the other one disposes them of openly on the hospital premises. Two hospitals that generate radioactive wastes segregate them from the other types of



**Figure 2:** Uncovered storage of segregated recyclable healthcare waste for outsource at the hospital investigated in this study.

wastes, and incinerate them on the hospital premises.

Figure 4 shows open burning and dumping conditions in some of the hospitals investigated. As is evident, the methods for healthcare waste management followed by these hospitals are quite basic. Soares et al. [17] discussed the importance of Life Cycle Assessment (LCA) and cost analysis for healthcare waste management. These methods should be applied for healthcare waste management in developing countries.

As per the Gazette No: 1534/18 dated 02/01/2008, published under the National Environmental Act, all healthcare centers including hospitals should obtain an Environmental Protection License and a Scheduled Waste Management License from the Central Environmental Authority.

Table 8 (ANNEX) shows the status of investigated hospitals in terms of regulation adherence. However, our investigation revealed that eight hospitals from Group A have applied for licenses and have been taking corrective actions to meet the requirements. Meanwhile, in Group B, only one hospital out of ten, i.e., Thalagama hospital, has applied for the license and is working towards fulfilling the conditions. While five hospitals, i.e., Angoda Fever, Avissawella, Homagama, Moratuwa, and Premadasa Memorial Maligawatta hospitals, are planning to apply for these licenses and another four out of ten have taken no action in this regard. Table 9 shows number of hospitals in Groups A and B where workers wear safety equipment. According to the guidelines of WHO, workers who engage in healthcare wastes handling activities should wear safety equipment such as overalls, boots, hand gloves, face masks. But this investigation reveals that in eight hospitals in Group A, healthcare workers wear only hand gloves, and in eight hospitals out of ten in Group B wear only hand gloves as safety equipment. Caniato et al. [18] mention that not only is regulation effective, but involvement of stakeholders is also vital to the improvement of healthcare management.



**Figure 3:** Temporary storage on open land at the hospital investigated in this study.



**Figure 4:** Waste treatment at some of the hospitals investigated in this study; (a) open burning of sharps; (b) open burning in metal barrels; (c) dumping in a shallow pit.

## Conclusions and Recommendations

The following are summarized as conclusions of this study:

- Most of the investigated hospitals are aware of the risks or health impacts of healthcare wastes, but are not aware of the environmental damage or pollution that may result from the poor management of healthcare wastes.
- Policies and regulations of healthcare waste management do not address the lack of physical and financial facilities, or the absence of adequate and responsible staff in hospitals.
- In considering sound and environmentally friendly healthcare waste management or the guidelines of WHO in this regard, some healthcare waste practices in the hospitals investigated were satisfactory, but most of them were unsatisfactory.

Using the information obtained through this study, especially observations and literature, the following recommendations should be made for healthcare waste management in government hospitals in Sri Lanka, particularly in terms of the Environmental Protection License and Schedule Wastes License.

- Formal regulations on healthcare waste segregation, treatment, and final disposal must be established.
- There should be a healthcare waste management plan, training, and education in each hospital with respect to waste minimization, efficiency from waste segregation up to disposal, and minimization of health risks and environmental pollution.
- Adequate and necessary physical or financial facilities, especially waste containers, waste storage, transport, treatment, disinfection, disposal facilities, etc., should be provided for hospitals.
- A separate department with necessary staff including a healthcare waste expert, at least for general hospitals, teaching hospitals, and base hospitals should be employed with respect to healthcare waste management.
- It is recommended that the Central Environmental Authority in coordination with the Ministry of Health formulate a manual of guidelines with respect to healthcare waste management.
- Needle cutters should be provided for hospitals to separate needle sharps from the waste stream at their generation points.
- The hospitals should provide necessary training and education for all staff including doctors and other workers with respect to safety, health risks, and environmental issues in healthcare waste handling.
- Healthcare waste should be transported using dedicated, wheeled, leak-proof containers or vehicles.

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## ANNEX:

Group	Hospital Name	Type of Hospital	Waste Generation (tons/day)	Number of Beds	Bed Occupancy (%)
A (Central Government)	Colombo General	National and General	4,444	2,996	84.0
	Angoda Mental	Teaching	329	900	33.3
	Cancer Institute	Teaching	495	879	96.7
	Castle	Teaching	723	485	90.7
	De-Soysa	Teaching	232	227	113
	Eye	Teaching	524	463	64.8
	Kalubowila	Teaching	441	1,094	91.4
	Lady Ridgeway (LR)	Teaching	732	873	26.7
B (Provincial Government)	Angoda Fever	Base	22.2	144	53.3
	Avissawella	Base	654	477	73.8
	Homagama	Base	591	333	78.5
	Moratuwa	District	48.6	64	37.5
	Premadasa Memorial-Maligawatta	District	29.4	53	34.0
	Wetara	District	43.8	107	35.7
	Nawagamuwa	Peripheral Unit	78.5	60	25.0
	Piliyandala	Peripheral Unit	89.6	106	45.5
	Thalangama	Peripheral Unit	48.0	48	54.6
	Aturugiriya	Rural	19.0	53	60.0

**Table 1:** General information regarding the hospitals investigated in this study.

Group	Hospital Name	General	Pathogenic	Infectious	Sharps	Radioactive	Recyclable	Others	Total
A	Colombo General	3,000	260	1,000	30	3	150	0.5	4,444
	Angoda Mental	300	0	4	5	0	20	0	329
	Cancer Institute	320	70	10	10	25	56	4	495
	Castle	550	20	96	12	0	45	0	723
	De-Soysa	160	23	5	6.5	0	37	0	232
	Eye	450	0.3	66	4	0	4	0	524
	Kalubowila	150	85	50	26	0	130	0	441
	Lady Ridgeway (LR)	600	25	80	7	0	20	0	732
B	Angoda Fever	6	0.5	10	0.7	0	5	0	22.2
	Avissawella	500	45	47	2	0	60	0	654
	Homagama	420	54	60	12	0	45	0	591
	Moratuwa	35	0.25	6	0.3	0	7	0	48.6
	Premadasa Memorial Maligawatta	20	0	7	0.4	0	2	0	29.4
	Wetara	30	0.25	3	2	0	8.5	0	43.8
	Nawagamuwa	67	0.24	7	0.25	0	4	0	78.5
	Piliyandala	75	0.07	8	1	0	5.5	0	89.6
	Thalangama	40	0	2	4	0	2	0	48.0
	Aturugiriya	10	0	5	2	0	2	0	19.0

**Table 2:** Types of healthcare wastes generated from the hospitals.

Group	Hospital Name	Patients' Services	Theaters	Labs	Kitchens	Canteens	Staff Hostels	Pharmacies	Gardens
A	Colombo General	√	√	√	√	√	√	√	√
	Angoda Mental	√		√	√	√	√	√	√
	Cancer Institute	√	√	√	√	√	√	√	√
	Castle	√	√	√	√	√	√	√	√
	De-Soysa	√	√	√	√	√	√	√	√
	Eye	√	√	√	√	√	√	√	√
	Kalubowila	√	√	√	√	√	√	√	√
	Lady Ridgeway (LR)	√	√	√	√	√	√	√	√
B	Angoda Fever	√		√		√	√	√	√
	Avissawella	√	√	√		√	√	√	√
	Homagama	√	√	√	√	√	√	√	√
	Moratuwa	√		√		√		√	√
	Premadasa Memorial-Maligawatta	√			√			√	√
	Wetara	√	√	√				√	√
	Nawagamuwa	√		√				√	√
	Piliyandala	√	√	√				√	√
	Thalangama	√		√				√	√
Aturugiriya	√						√	√	

Table 3: Sources of waste generated.

Group	Hospital Name	Segregation as Category Wise with Color Code	Segregation into Four Category	Segregation only Sharps	No Segregation
A	Colombo General	√			
	Angoda Mental	√			
	Cancer Institute	√			
	Castle	√			
	De-Soysa	√			
	Eye	√			
	Kalubowila	√			
	Lady Ridgeway (LR)	√			
B	Angoda Fever		√		
	Avissawella		√		
	Homagama		√		
	Moratuwa			√	
	Premadasa Memorial-Maligawatta			√	
	Wetara			√	
	Nawagamuwa			√	
	Piliyandala				√
	Thalangama				√
Aturugiriya				√	

Table 4: Segregation at the various hospitals investigated in this study.

Group	Daily	Once in Two Days	Once in Three days	Weekly
A	6	0	2	0
B	3	2	4	1

Table 5: Healthcare waste collection patterns.

Group	Covered Fence and Locked Area	Cemented Floor with Roofs	Cemented Floor without Roofs	Covered Container	Open Container	Open Ground
A	0	1	0	0	5	2
B	3	0	0	0	0	7

Table 6: Healthcare waste storage conditions.

	Disposal Method	General	Pathologic	Infectious	Sharps	Radioactive	Recyclable	Others
A/B	Municipal Council	08-Jul		5/-				
	Disposal by Funeral Parlors		06-Jan					
	Open Dumping	-/2	-/1				01-Jan	
	Incineration in Site			1/-	4/-			2/-
	Incineration out site		1/-		2/-			
	Bury		-/5					
	Outsources					2/-	07-Jun	
	Open Burning	-/1		02-Sep	02-Sep		-/3	
Burn and Bury			-/1	-/1				

Table 7: Ways of disposal for each category of wastes by the hospitals investigated.

Group	Applied and Rectifying	Planning to Applied	No Action
A	8	0	0
B	1	5	4

Table 8: Regulation adherence.

Group	Overalls	Boots	Hand Gloves	Face Masks
A	0	0	8	0
B	0	0	8	0

Table 9: Safety equipment offered by the hospitals.