



# Waste Management Systems in Sri Lankan Healthcare and Apparel Industries

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**Abstract:** Waste management is a growing problem in urban areas and also institutes, industries, and companies around World. But 'Waste to energy' or 'money waste' is a positive development method in those areas. A proper waste management system for a company is economically and environmentally friendly and can sustain the company without environmental pollution. According to the waste generation rate, managing and handling Waste is very important. Here it represents the experience of solid and hazardous waste management, which our group members do to get a better experience and make new suggestions for further improvement of current waste management systems.

**Index Terms:** Throwaway society, Waste as energy, Hazardous wastewater management

## 1 INTRODUCTION

Sri Lanka is a "throwaway society" with no proper waste management system. The available system needs to be better planned and implemented, as it has adversely affected humans and the ecological system over the past two decades [1]. On average, a person generates between 0.4kg to 1.0kg of waste, and local authorities or municipal councils collect only about half of the generated waste. The current practice is collecting trash and dumping it in low population-density areas, resulting in over 300 visible dumpsites in Sri Lanka. On September 8, 2009, the garbage dump in Bloomandal erupted due to the accumulation of methane gas. The mount subsequently collapsed, burying dozens of houses [2]. As a result, stop the Supreme Court ordered garbage dumping in the Bloomingdale area in Colombo 13 on March 29th, 2009[2]. However, the solid waste collected from the Colombo MC began accumulating in the Kolonnawa 13th area, spreading across 21 acres and becoming another waste division [3], [4]. On April 14, 2017, the Meethotamulla-Kolonnawa dumpsite collapsed, causing over 26 casualties and destroying around 145 houses [5]. Therefore, a proper waste management system must be introduced urgently to prevent such incidents from happening again. This system must focus on improving waste management in all industries, not just one or two. The apparel and healthcare industries are the most prominent waste-generation trends in Sri Lanka, and a sound waste management system is necessary. This waste is a significant problem, but it is also a valuable source that can be converted into useful products. Throughout this research, we visited many industries, hospitals, and healthcare centers to collect data on the current waste management practices and identify potential suggestions to improve waste management.

## 2 WASTE MANAGEMENT IN APPAREL INDUSTRY OF SRI LANKA

To better understand waste generation trends and effective waste management systems in the field, we visited some apparel industries in different areas. Exporter companies are a significant part of Sri Lanka's economic cycle. From the beginning until today, this industry has made every effort to innovate its products and services, striving to excel with its labor and processes.

The mission of many industries is to create an excellent place to work that achieves operational excellence while ensuring a high degree of social and environmental responsibility. They work with various materials and final products, and in this industry, their crucial aspect is to reduce the negative environmental impact of every process. We pointed out and listed every process and its effect on the environment. For example, if a labourer comes to work with a motorcycle, it is suitable for the company because it is free of their cost. However, if every person tries to go to work with their vehicle instead of the company's transport service, fuel consumption, energy dissipation, gas emissions to the atmosphere, overall cost, and other factors will increase. Overall, it could be healthier and more efficient. With thousands of workers and several waste categories, the apparel industry needs something beyond just the 3R concept to manage them. Waste categories also depend on the season, and waste generation is relatively high and hard to control during the New Year and in December.

According to the accurate data provided, this research provides information on the following:

- What types of waste are generated?
- The amount of waste generated.
- How the generated waste is managed.
- Whether any waste management plants exist.
- How existing waste management plants are managed.
- Whether there are any plans for waste management.
- To what extent have they adapted to the waste hierarchy

### Rules and Regulations

Many industries manage their working patterns with thousands of labourers according to the ISO 14001:2015 standard. The international standard ISO 14001 outlines the criteria for a successful environmental management system (EMS). Instead of creating ecological performance standards, it offers a framework that an organization can adhere to. As a voluntary standard that enterprises can certify, ISO 14001 is a member of the ISO 14000 family of environmental management standards. Incorporating it with other management systems standards, notably ISO 9001 can help the firm achieve its objectives [6]. An environmental management system is "part of the management system used to manage environmental elements, meet compliance duties, and address risks and opportunities," according to the International Organization for Standardization (ISO). An approach to continuous improvement known as plan-do-check-act (PDCA) can be used with the ISO 14001 standard's structure. Any organizations wishing to build, enhance, or maintain an environmental management system compliant with its defined ecological policy and measures should adopt ISO 14001:2015. The extent to which any environmental management system incorporates the objectives of the standard depends on the organization's location, industry, environmental policy, and product and service offerings [6].

All firms, regardless of size, geography, sector, or industry, should use ISO 14001:2015. At the highest level, ISO 14001:2015 covers the following topics regarding environmental management systems: [6]

- Context of the organization
- Leadership
- Planning
- Support
- Operation
- Performance evaluation
- Improvement

### **ISO 14001:2015 Now Requires Some Key Improvements [7];**

- Environmental Management should be more prominent within the organization's strategic direction
- The implementation of proactive initiatives to protect the environment from harm and degradation, such as sustainable resource use and climate change mitigation
- A focus on life cycle thinking to ensure consideration of environmental aspects from development to end of life (cradle to grave).
- The addition of a stakeholder-focused communication strategy [7].

### **What Benefits Will It Bring To Organizations?**

- Demonstrate compliance with current and future statutory and regulatory requirements.
- Increase company reputation and the confidence of stakeholders through strategic communication.
- Will provide a competitive and financial advantage through improved efficiencies and reduced costs.
- Encourage better environmental performance of suppliers by integrating them into the organization's business system.
- Increase leadership involvement and engagement of employees.
- Achieve strategic business aims by incorporating environmental issues into business management.

### **Waste Categorization.**

Waste is generated inside the apparel industry in several ways. Those wastes can be categorized under several determinations.

### **FABRIC WASTE**

Different studies give different estimations about the fabric waste generation from garment factories worldwide. However, in some acceptable manner, garments generate between 80 to 150 billion pieces

globally in a year before the COVID-19 pandemic. “2020 preferred Fiber and Material market report” reveals that global fibre production has doubled during the last 20 years. In summary, the all-time high record was in 2019, which was about 111 million Metric tons. According to the pre- Covid 19 results, the potential growth of fabric waste to be 146 million metric tons by 2030. In addition, we know not all textile fibre gets reused in fashion. Some research shows that up to 47% of all fibre entering the fashion value chain becomes waste. Generally, in Sri Lanka, apparel industries store generated waste in some special place and then twice a week, the waste collectors visit to bring whatever the amount of fabric waste

### **FOOD WASTE**

There are several canteens inside the premises of garment industries. From food transportation, cutting, preparation, packaging and stores entire spectrum of food production generates waste. In addition, the worst thing is that about 95% of discarded foods are in landfills. In Sri Lanka, it is with open dump sides. And it is estimated that reducing food waste by 15% could feed more than 25 million Americans yearly. So this waste can be classified differently based on where it occurs.

### **CARDBOARD AND PAPER WASTE.**

The consumption of pulp and paper is anticipated to double worldwide between 2010 and 2060. The quantity of waste paper will remain the same. The burden on the world's forests, which are currently under severe stress and worsening, will intensify as paper output rises. Three hundred eighty-six million hectares of forest were destroyed worldwide from 2001 to 2019. (In all forest types combined). Since 2000, the number of trees has decreased by about 10% due to this loss [8].

In Many apparel industries, paper waste collects mainly from the Administration office and the internal canteen system. Cardboard waste is primarily from the garment factory, which are fabric containers, Garment packaging boxes, Garment containers, Waste containers, raw textile containers, etc. [8].

### **CHEMICAL & HAZARDOUS WASTE**

The apparel industries had set up an extraordinary place in the corner of the premises to store the chemical waste. In addition, third-party persons are not allowed to access it. Chemicals that are used in boiler operations and colouring dyes are the main chemical waste that is generated during the production process.

### **LIQUID WASTE**

Due to the fact that water covers around 71% of the Earth's surface, liquid waste is a significant issue worldwide. Any waste substance that meets the “liquid “criteria is considered liquid waste, according to the Environmental Protection Agency (EPA). According to the EPA's definition of a liquid, the substance must "pass through a 0.45-micron filter at a pressure differential of 75 psi." In addition to the above-mentioned solid waste, it was seen that the amount of liquid waste is also much larger quantity. The amount of water used by thousands of employees per day is enormous, and besides, there is a separate administrative staff and a significant number of minor employees. Therefore, the amount of water all these people use is of considerable value.

### **WASTE MANAGEMENT SYSTEM**

When we talk about waste generation, it is seen that they properly maintain the logbook and other necessary data collection on every waste type. For some waste categories like chemical and hazardous

waste, they update the logbooks once a month or two because their amounts are reasonable compared to fabric and organic waste. Their waste generation is enormous for the seasons in April, New Year, December, or January. Considering the waste types generated, they care about solid waste and correctly manage liquid waste.

In addition, the following are several steps to manage waste.

- Sorting the generated waste at the source
- Storing the sorted waste
- Send the waste to collectors for recycling and co-processing

They very clearly mentioned that their department vice does the waste collection. Every department they have a separate waste collection system. In addition, the different types of waste are collected separately (Food, Paper, Polythene, Chemical & Hazardous waste etc.) The minor employee is given two months of learning and training courses on managing the generated waste and how to dispose of it separately in most of the apparel industries. As the reason for allowing more time for this, they mentioned that each employee has a different background and their educational level varies considerably. Garbage bins arranged in a separate colour code system have been introduced to collect garbage inside the field. The fundamental purpose of this coloured bin system was waste segregation at the source. Waste segregation refers to the method used to sort and separate the waste to facilitate further processing, such as upcycling, recycling, land filling etc. According to the bin colour code system, red bins are used for glasses, Dark green bins for fabric waste, yellow bins for plastic & polythene, and Dark blue bins for paper and cardboard collection.

Significant places have been constructed to store paper and fabric waste when considering the storage process. Separate and particular areas have been prepared for the storage of chemical & hazardous waste at the edge of the site, and no permission has been given to general workers or visitors to enter them.

In Sri Lanka, most apparel industries send waste to recycle and co-process through the collectors. For example, in most cases, they send their paper waste to Neptune recyclers, E-waste to Ceylon Waste Management, and mechanical and hazardous waste to INSEE eco-cycle.

The apparel company has a well-implemented and maintained wastewater treatment plant. Wastewater treatment converts the wastewater into bilge water, which can then be discharged back into the environment. This wastewater contains contaminants such as chemicals, bacteria and other toxins. The main reason for treating is to ensure that this water is treated to an acceptable level, which is safe for discharge back to the environment [9]. The wastewater treatment process is also a process by which contaminants and other pollutants are removed from wastewater using well-advanced equipment and methods [9].

### 3 WASTE MANAGEMENT IN HEALTHCARE SECTOR IN SRI LANKA

Health waste can be categorized into many kinds to have an experience with more categories of waste such as solid waste, liquid waste, bio degradable waste, non-bio degradable waste, hazardous waste, biomedical waste, and E-waste. Therefore, we have selected some General Hospitals as the organization in which we do our study case. We have identified that there are many waste categories as follows,

1. Clinical waste (Health care waste)

- a. Hazardous waste
- b. non-Hazardous waste

2. Liquid waste

3. Solid waste

- a. Food waste
- b. Plastics
- c. Glass
- d. Cardboard, paper
- e. Polythene
- f. Textile waste

#### **Waste Generation trends.**

There are many waste generation trends. It will depend according to the industry, the production, or a service that provides.

#### **Clinical waste generation**

The total waste stream generated from healthcare institutions is classified as healthcare waste. These are generated from activities in different settings within a healthcare institution, such as,

- Diagnosis and treatment in outpatient departments, emergency treatment units, intensive care units, wards or clinics
- Performing surgeries in theatres
- Deliveries in labour rooms
- Performing testing in laboratories
- Conducting immunization activities
- Conducting pathological and forensic autopsies etc.

Healthcare waste can be divided into two categories. They are,

1. Non-hazardous general waste
2. Hazardous waste or waste that is associated with health risks

Huge amount of waste produced by a healthcare institution is usually called "non-hazardous" or "general healthcare waste". It comes mainly from healthcare facilities' administrative, kitchen and housekeeping

functions. It may include waste from packing material and waste generated during the construction and maintenance of healthcare buildings [10]. The remaining healthcare waste is considered "hazardous" and can pose several health and environmental risks. It includes waste and by-products and covers a diverse range of materials, such as [10],

3. Infectious Waste – Waste contaminated with blood and other bodily fluids, waste from patients with infections (swabs, bandages, disposable medical devices)
4. Pathological Waste – Human tissues, Organs, Body Parts
5. Sharps Waste – Syringes, needles, blades
6. Chemical Waste – Heavy metal contained in medical devices (mercury in broken thermometers)
7. Pharmaceutical waste – expired, unused and contaminated drugs and vaccines
8. Genotoxic Waste – Highly hazardous substances (cytotoxic drugs, cancer treatment and their metabolites)
9. Radioactive Waste – Radio therapeutic materials
10. E-Waste – Electronic and Electrical waste

### **CURRENT WASTE MANAGEMENT SYSTEM.**

Special treatment procedures exist for each waste category, mainly hazardous and Non-hazardous waste management.

#### **Hazardous Waste Management**

Infectious waste is also hazardous waste suspected to contain pathogens in sufficient concentration. Infectious waste includes blood and blood products, items contaminated with blood and bloody fluids, clinical specimens etc.

Safe disposal of hazardous waste is essential. Waste generated from healthcare institutions is treated using only the following methods; these are two machines that are used to treat hazardous waste in these hospitals.

- Incinerator
- Using a meta Miser

Sri Lanka has experienced the spread of covid-19. Infectious waste generated from suspected and confirmed covid-19 cases is collected in yellow polythene bags (minimum gauge 300) and tied well. Then it is put into another yellow bag, connected, and sealed with appropriate tape. Mark the waste bag with a red star for easy identification and prioritized disposal. Sharps should be placed in a puncture and leak-proof cardboard alert box. Alert boxes are designed with a small inlet. So that item can be dropped in, but no item can be removed. Covid-19 waste should be transported separately in a trolley or cart, which is easy to load, clean and disinfect and should be treated on a priority basis on the same day. Staff transporting this waste must always wear proper personal protective equipment such as gloves, masks, boots and overalls. Infectious waste handling staff needs to be educated on how to protect themselves. The ministry of health gives all these guidelines. However, at present, some of them still need to be processed.

### **Separated Waste Collecting and Storage**

An individual collects all the waste from each ward regularly with a cart dedicated to garbage collection. So, not transport this waste across the hallway to another location for storage. The waste cart should be transported through the hospital using a designated route to the storage area. Mainly there is a separate area for waste separation and treatment process. The entire waste handler wears a protective gown, heavy-duty gloves, boots etc. We observe all these things and all the techniques they do to separate waste.

Some standard techniques include placing bins with colour codes to collect Non-Hazardous waste. Mainly they use this to collect food waste, plastic, polythene, cardboard, papers, etc. Dumping other waste categories into the infectious waste bin was discouraged because handling and disposal of this waste are costly. So,

- There is a national colour code for healthcare waste for which yellow indicates infectious waste.
- Waste bags are placed inside waste bins according to the above colour code
- The size of the bags and the volume of the bins should be decided according to the unit's needs.

All the other hazardous waste like chemical, e-waste, radioactive waste and some different types of waste are collected by following all the guidelines given by the ministry of health. Those types of waste need to be placed or ordered near where patients are moving. The storage place must be identified as an infectious waste area by using the biohazard sign [11]. The accumulated waste should be disposed of as early as possible and not be kept in the storage area for more than 48 hours. That is the primary method of storing. This hospital has a separate area to manage the waste generated by the hospital area. There are some central parts of this area, like,

- Waste separation area
- Waste storage area
- Incinerator and meta Mizer machine area
- Hazardous waste category and storage area
- Expired medicine storage area
- Bio-degradable waste storage and treatment area
- Water treatment area

### **Non-Hazardous Waste Management**

All food, plastic, polythene and paper waste are categorized as non-hazardous. Therefore, this waste management does separate. The main objectives of the waste management system include,

- Reduce the infectious nature of the waste
- Reduce the volume of the waste
- Ensure safety and health
- Ensure proper recycling



## **Food Waste**

Food waste is a significant issue in many healthcare institutions in Sri Lanka. In a healthcare setting, food waste is mainly generated as follows,

- Preparation of food for patients/ staff
- Unserved food
- Leftovers from patients/ staff

## **Management of food waste**

**Waste avoidance and minimization** is the primary process they follow. So, the below steps are used for that process according to the staff and patient ideas.

- Possible measures that can be taken to reduce food waste,
- Changing the menus
- Improvement in the methods of serving food to patients
- Strick stock taking on the requirement of food for patients and staff

Waste segregation methods are also there. All the Food waste generated at the hospitals is only disposed into waste bags placed inside green waste bins. Municipal waste councils carry some for treatment and other activities like feeding pigs. Once the volume of food waste is reduced and separated, it is necessary to dispose of it environmentally sound and cost-effectively. In this hospital, Food waste is managed as follows.

- Composting – Use as a fertilizer for food plants which are grown in the garden at the hospital
- Turning into animal food – pig feeding process
- Biogas generation – Small biogas production unit near the kitchen for cooking.

Other types of Non-Hazardous waste are,

**Plastic waste** is another type of non-hazardous waste generated in this hospital. After generations, they collect them and separate them into categories of waste, such as polythene, plastic bottles, and other plastic waste materials. Then, they give separated plastic waste to the municipal waste management council for further processes.

**Paper waste** – all the types of cardboard, papers and waste that include paper-type materials are manually separated using labour and transported to other processes.

**Kitchen waste** – coconut cups and other degradable waste are used to make compost. Some of them are directly utilized for burning processes.

## **LIQUID WASTE MANAGEMENT**

Liquid waste generated from places like operation theatres, labour rooms, labs, laundry, canteen and toilets is first segregated and treated with disinfectant and then poured into a standard drainage facility. This waste produced could lead to infections, and it will be hazardous if the discard is done in local bodies like lakes and rivers. Hospitals should make their Effluent treatment plant to avoid this biomedical waste so that wastewater can be reused eventually. Disposal of the infected and hazardous rubbish from the hospital, including laboratories, has been a threat to the environment, leading to the spreading of the disease, putting the environment at risk and the transmission of prone disease. So, it is the duty of health care facilities which includes hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathology and biochemistry lab, blood banks etc.; steps should be taken to reduce adverse effects on human health and the environment. There is a separate area for the water treatment process in the hospital. They treat all the wastewater generated in the hospital area and all sludge waste. They transport all the wastewater to large storage tanks and fill them using tubes. Mainly they get wastewater from sinks and Bath rooms. After storage, they do basic filtration steps to separate water. Then separated water move to another tank and pumped using the large pump. Then rotational primary filtration process is done. Again, pump that treated water into another rotational type primary filtration system and then pump in to the large water tank and let the water overflow to dissolve oxygen with water. Then again, add some chemicals like chlorine and remove the treated water.

Before releasing the treated water, they analyze some parameters like PH value, nitrogen level, ammonia level and oxygen level of treated water. If parameters are not in good condition, wastewater is treated several times. After the treatment process, the remaining sludge is not used to make any product because of the ministry of health guidelines.

Wastewater discharged from sewage systems and laboratories should comply with the wastewater discharge standards stipulated by the Central Environmental Authority. Wastewater management mainly, wastewater can be reused in several methods. Hospitals focus on treatment methods and then discharge them to the river. Below methods are some good suggestions,

- Reuse of treated black water from the treatment plant for gardening
- Reuse of treated greywater from laundry for gardening
- Displaying posters & billboards
- Foot handle water taps
- Displaying instruction near all water taps & points
- Recycling technology at water ponds
- Mechanical sprinklers to garden
- Monthly analysis of water consumption of each unit by the energy manager
- Awareness to all inward patients through health education on the use of water

### **Hospital laundry waste management**

Hospital Laundry aims to provide a regular and timely supply of clean clothes to the patients and staff for the comfort and safety of the patient and the personal appearance of the personnel. Laundry gives pleasure to patients. First, when a patient comes to a ward, he looks at the bed and its neatness. If it is quality

enough, the patient gets satisfied. However, behind the scene is very difficult. Cleaning staff collect these bed sheets, operating clothes and other washable items and separate them. They do not mix and use chemicals to clean these clothes and put them into the washing machine. Then the washing process goes on, and the clothes are taken to the dry zone after washing. After drying it, send it to the final step. It is an Iron process. Using a big Iron, it automatically gets Iron and folds in a manner. After that, clothes are being collected and distributed to relevant wards. If the capacity of the hospital laundry is fulfilled, then hospital management tender calls to industries or people who wash clothes and allow fulfilling the demand. The amount of textile waste generation depends on the number of words and several patients who are in the hospital. This hospital has a separate area to treat waste textiles, and there are large machines to do this process. But it is easier to manage if more patients are in the hospital.

### **EFFECTS OF IMPROPER WASTE DISPOSAL**

Improper management of healthcare waste poses a significant risk to patients, visitors, healthcare workers, the community and the environment. It contaminates the natural environment (air, water, soil, and flora) and the artificial environment, affecting the health of humans and other living beings. Persons exposed to hazardous healthcare waste are potentially at risk of being injured or developing adverse health outcomes. Adverse outcomes associated with mismanaged healthcare waste and by-products in the hospital include [12]:

- Injuries inflicted by sharp objects
- Potential for spreading drug-resistant micro-organisms from healthcare facilities into the environment
- Chemical burns arising the context of disinfection, waste treatment activities or sterilization
- Adverse health outcomes due to environmental pollution
- Toxic exposures
- Thermal injuries

Proper management of healthcare waste is essential in ensuring the health and safety of healthcare staff and all other categories of staff handling such waste. Healthy healthcare staff is a prerequisite for providing quality healthcare services. The improper management of healthcare waste causes environmental problems such as,

- Air pollution
- Water pollution
- Soil pollution

Open burning of healthcare waste or incineration using substandard incinerators adds a significant amount of particulate matter to the atmosphere causing air pollution. Air pollution is a silent killer and a significant risk factor for non-communicable diseases such as ischemic heart diseases, lung cancers, chronic lung diseases, etc. [13]. Children, pregnant mothers, people with pre-existing chronic conditions and outdoor workers are particularly at a higher risk of developing adverse health effects due to air pollution. Improper segregation and disposal of healthcare waste can cause soil and groundwater pollution, adversely affecting human health. Therefore, mainly in the healthcare industry, they all pay more consideration to their waste management and always try to minimize the effects of both hazardous and non-hazardous waste [13].

## **Regulations Environmental licenses;**

- Environmental Protection License (EPL)
- Scheduled Waste Management License (SWML)

Environment Impact Assessment (EIA) Hospitals proposed to be established in sensitive areas should carry out an Environmental Impact Assessment before construction commences to mitigate anticipated adverse environmental impacts due to pollution or construction activities.

**Waste Management License** - Industries engaged in managing healthcare waste generated from healthcare institutions, including medical laboratories and research centres, should obtain scheduled waste management licenses from the CEA (central environmental authority) for the following activities.

- Waste collection, Waste transportation, Waste storage, waste recovering, Waste disposal

According to the discussion with the hospital management and other staff members, we propose some ideas for generated food waste management; they are as follows.

- Build a biogas unit for food waste management,
- Limited polythene usage within hospital premises,
- encourage staff members to use reusable lunch boxes,
- Order food for only needy inward patients,
- Patients were advised to keep only amount of food for their consumption,
- Training of staff regarding waste segregation,
- Arrange farmer to collect the remaining small amount of food waste as animal feed are some of them.

## **4 SUGGESTED PLANS**

- Further, increase the capacity of the wastewater management system
- Making additional products, such as rugs, pillows, etc., from fabric scraps after the production of clothes.
- Earn extra income by handing raw fabric and thread containers to a paper box recycling facility.
- Use of paper containers or bags made from fabric discarded during garment manufacturing instead of polythene for packaging finished garments
- Working with the waste management agency to collect the waste at least once daily.
- Further expansion of waste disposal yard and further expansion of rain cover.
- Construction of billboards with pictures in addition to the existing programs for employees about waste disposal.
- Implement a program for the daily disposal of restaurant waste.
- Using a safe house for storing hazardous waste.
- Healthcare waste should be transported using dedicated, wheeled, leak-proof containers or vehicles.

- Needle cutters should be provided for hospitals to separate needle sharps from the waste stream at their generation points.
- All the hospitals in Sri Lanka should provide necessary training and education for all staff concerning safety, health risks, and environmental issues in healthcare waste handling.
- There should be a healthcare waste management plan for every hospital suitable for their area considering population, area, environmental impacts etc.
- It is recommended that the Central Environmental Authority, in coordination with the Ministry of Health & introduce a manual of guidelines practically applicable concerning healthcare waste management [14].
- Waste treatment places should be more significant according to an increment of hospital wards because waste generation gradually increases with the increase of patients.

## 5 CONCLUSION

- Health effects of healthcare wastes, unaware 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 responsible staff in the hospital.
- In considering environmentally friendly healthcare waste management and WHO guidelines in this regard, some healthcare waste practices were unsatisfactory.
- Waste is not the only product that removes. It can convert into a valuable product by adding value to the waste.
- Currently waste management system should be improved according to the quantity of waste generated in the hospital.

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