

Hospital Waste Management Practices in Biratnagar, Nepal

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Abstract

About 15 to 20% of hospital waste consists of hazardous waste (infectious waste, some toxic chemicals, heavy metals, and radioactive substances), which poses severe threats to the people in contact. Most of this hazardous waste in Nepal ends up in municipal landfill without proper segregation and treatment. The current practices of waste management in different hospital is necessary to understand the system's shortcomings and to check the effectiveness of the guidelines and regulations prepared and implemented. The objectives of this study are to understand the current waste management practices of the hospitals and to check the level of awareness of various hospital personnel with four sets of questionnaires. Two hospitals - one private and one government, from Biratnagar metropolitan city were selected for the study. Studies showed that both hospitals practiced source segregation and disinfection using chemicals and autoclaves. Recyclable materials are being sold to generate revenue, while biodegradable waste is composted in one hospital while the other has a biogas system. These hospitals provide necessary protective equipment and conduct awareness programs and training related to waste management for healthcare and waste handling staff.

Keywords

Hospital waste, Waste management, Management Practices, Awareness, Biratnagar

1. Introduction

Hazardous hospital waste is a serious threat to the people inside as well as outside the hospital facility who directly or indirectly come in contact with the waste. Due to its hazardous nature, hospital waste is of serious concern, especially in developing countries, as these countries lack appropriate treatment and disposal facilities for such waste. Lack of proper treatment and haphazard disposal of hazardous hospital waste can have detrimental effects on the environment and public health [1].

Hospital waste has been in increase in past years due to the increase in the number and size of hospitals, medical services, and use of disposable medical items [2]. Due to the rapid increase in the number of hospital facilities in Nepal, hospital waste management has become a serious challenge as most waste ends up with municipal waste without proper segregation or treatment. When hazardous waste is mixed with non-hazardous and municipal waste, the total quantity of waste becomes hazardous [3]. In such case, the total waste should be disposed of as per the guidelines for hazardous waste disposal [4]. As per a publication, total hospital waste generated in Nepal is estimated to be 0.533 kg/bed/day [5]. Another study that surveyed six hospitals in Kathmandu valley estimated the average waste generation as 0.66 kg/person/day, out of which hazardous waste is 0.13 kg/person/day and non-hazardous waste is 0.53 kg/person/day [3].

The quantity and composition of hospital waste depend on several factors such as type and size of the hospital facility, number of patients, waste handling methods, policies & guidelines, and the country's economic status [6]. Most of the time, people who are responsible for hospital waste handling are not trained and not provided guidelines on hazardous waste handling & sufficient protective equipment for their safety [1].

In addition to infectious waste, hospital waste might contain toxic chemicals, heavy metals, and radioactive substances. This waste has harmful impacts on the environment as well as public health. In developing countries like Nepal, poor nutrition, lack of adequate vaccination, and inadequate hospital facilities increase the risk of infection through waste [7].

Solid Waste Management Guidelines in Nepal, 2011 states that the processing & management of hazardous, medical, chemical, or industrial waste is the responsibility of the person or institution that has generated the waste. The institution can dispose of the waste in a sanitary landfill site after processing & treatment of hazardous waste after getting the permission of the local body. According to the Hospital Waste Management Guideline of Nepal, hospitals are responsible for the safe management of hospital waste [5]. However, in developing countries like Nepal, the presence of guidelines on hospital waste management is not effective due to poor implementation and no inspection [8].

The study of current waste management practices in different hospitals is necessary to understand the system's shortcomings and to check the effectiveness of the guidelines & regulations. The lack of adequate data is a problem for analyzing the present status and future requirements for improvement.

With the increase in the number of hospital facilities, the generation of hospital waste will increase. Though hospital waste impacts the entire environment & public health, hospital workers and waste handling staff are in the most danger as they are directly in contact with the waste. This study focuses on the level of awareness among the management staff, hospital staff, waste handling staff as well as patients/visitors, which can be helpful to determine the necessity of awareness programs and training on hospital waste management.

2. Objectives

The objectives of this study are:

- To understand the waste management (collection, storage, transportation, treatment, and disposal) practices of hospitals
- To check the adherence of hospitals to the hospital-waste related regulations and guidelines
- To check the awareness of the hospital management staff, healthcare staff, waste handling staff, patients and visitors about the impacts of hospital waste on human health

3. Literature Review

Hospital waste management is of serious concern, especially in a developing country like Nepal, as the growth of health institutions is on the rise and most of the waste generated is not handled & disposed of safely [3]. Segregation at source, efficient and safe transportation, appropriate treatment & safe disposal together form an effective hospital waste management system. However, most of the hospitals in Nepal lack some or all of the necessary steps in waste management [5].

Even though the Hospital waste Management Guideline of Nepal recommends segregation of waste at source, in many hospitals, all kinds of waste (infectious and non-infectious) are collected, transported, and disposed of together [9]. A study conducted in Nepal in hospital institutions with bed capacity above 25 concluded that the quantity of waste generated in hospitals depends on the type of hospital, bed capacity, and annual budget of the hospital, of which less than 5% on average was allocated to waste management in hospitals. The same study found that only about 60% hospitals disinfected their waste, and the remaining disposed of their waste without disinfection. In addition, very few hospitals have incinerators for waste disposal, and the incinerators are not maintained properly [10].

The level of impact due to improvement in the waste management system in a tertiary hospital was studied in 2013 for seven months. The intervention included the formation of the waste management committee, conducting training & vaccination programs for staff, improving the source separation & ensuring safe transportation of waste, disinfection of bins, and a few more. These interventions improved the overall waste management status of the hospital [11]. This study demonstrates the possibility of good improvement in waste management through small changes.

A study conducted in ten healthcare facilities in Biratnagar found that the waste generation rate was 16.8 kg per day in each hospital. Most healthcare facilities use private contractors and some practice open dumping for final disposal. Most of them lack a waste management department and have not provided any training to the workers related to waste handling. Hospital facilities have poor source separation & transportation, and most rely on municipalities for waste disposal without any treatment [12].

4. Methodology

Separate sets of questionnaires were prepared for management personnel, hospital professionals, waste handling staff, and patients/visitors based on the recommendation of the World Health Organization. However, some questions relevant to hospital waste management in the context of Nepal were added. Some questions were added to check the awareness of hospital waste risks and the willingness of the staff & management to improve waste management. The surveyor observed the present condition of the waste handling practice of hospitals, and the observations were checked with the information provided by the hospital management. The information provided by the management was also checked with the answers provided by healthcare professionals and waste-handling staff. Two hospitals from Morang district were selected for the study. The data was collected through Kobo Toolbox. Separate questions were asked to the management, hospital professionals, waste handling staff, and patients/visitors. The surveyor observed the present condition of the waste handling practice of hospitals, and the observations were checked with the information provided by the hospital management. The information provided by the management was also checked with the answers from healthcare professionals and waste-handling staff.

5. Results

A private and a government hospital were selected for the study. Both hospitals were located in Biratnagar metropolitan city in Morang district of province number 1.

Table 1: Hospital Information

Hospital	No.of bed	No.of waste-handling staff
1	350	150
2	350	200

Color-coded/labeled containers were present at both hospitals, and both hospitals practiced source segregation. The waste was generally classified into four groups. Degradable food waste was disposed of in a green-colored container, while the blue-colored container was used to store recyclable materials such as plastics, papers, and metals. The red-colored container stores infectious waste such as gloves, catheters, IV sets, bandages, chemicals, body parts, etc. Sharps & reusable materials, and blood-stained materials were stored in a separate containers. Blood-stained materials and anatomical waste were stored in yellow containers in one hospital. The same hospital had black-colored containers for infectious waste. Waste containers were kept at an isolated place outside the wards, and the healthcare workers used a trolley with different colored small buckets for different kinds of waste. The healthcare and waste handling staff surveyed were aware of the hazards of hospital waste and practiced segregation of waste at source. However, the waste handling staff mentioned that few patients/visitors disposed of all kinds of waste in one container, whichever was near to them, which required further segregation after the collection due to a lack of awareness about the hazards of hospital waste and the significance of segregation.

5.1 Temporary Storage

Both hospitals had temporary storage areas where waste was stored and disinfected before transporting for final disposal. The temporary storage area had separate compartments where the waste from different containers was emptied into different compartments. In the storage area, the waste was kept for 12 to 24 hours.

5.2 Disinfection and Treatment

The common treatment method was the autoclave, which was present in both hospitals. One hospital had additional shredding and microwave technology for disinfection. Both the hospitals had placenta pits, while one also had a biogas plant installed for degradable waste.

5.3 Final transportation and disposal

The municipality was responsible for waste transportation to the final disposal site in one hospital. At the same time, the other had contracted a private company for waste transportation & final disposal but was planning to reach an agreement with the municipality for transportation & disposal. The waste was transported from the temporary storage area to the final disposal site in tractors. The municipal landfill site was the final disposal site for both surveyed hospitals.

The wastewater from the hospitals was connected to the sewerage system. Although the hospitals did not have wastewater treatment systems, chemical waste and wastewater from operation theaters, maternity wards, and other infectious wards were chemically treated before releasing it to the sewerage system.

5.4 Protective Equipment

According to the hospital management, both hospitals provided protective equipment to their healthcare staff and waste handling staff, including a minimum of masks, gloves & aprons, boots, face shields, gowns, and goggles added as per the requirement. The waste handling staff agreed that hospitals provided the required protective equipment. The healthcare staff were seen using masks and gloves, while the waste handling staff used masks, gloves, aprons, boots, caps, and sanitizer. However, very few patients were seen using masks and sanitizer.

5.5 Awareness and Training

The hospital management staffs interviewed in all the hospitals were aware of Nepal’s hospital waste management guidelines. Both hospitals responded that they followed the national hospital waste management guideline, while one hospital had prepared its own waste management guideline with slight modifications to the national guideline. Both the surveyed hospitals prepared regular reports on hospital waste generation and management. Hospitals had a waste management plan & a waste management committee and allocated a budget for waste management. But the management staffs responded that the budget was insufficient for proper waste management. The revenue earned from selling recyclable materials was also used for waste management in most hospitals.

According to the hospital management and waste handling staff,

the hospitals provided regular training on hospital waste handling.

The healthcare staff and the waste handling staff of both hospitals changed into work clothes before starting work and again before leaving the hospital. The healthcare staffs were aware of the guidelines on hospital waste management as the hospitals provided awareness programs. However, some of the waste handling staff were not aware of the guidelines. Still, they were aware of the hazards of different types of waste and segregation methods as the hospitals provided training regularly. The containers were labeled in the text and pictures for ease of segregation, as some of the waste-handling staff could not read the instructions.

The interviews with waste handling staff revealed that the hospitals had not vaccinated the staff against possible infections and did not provide regular checkups. Waste handling staff from one hospital disclosed that they had been injured while handling sharps, while the staff from the other hospital said that they had never been injured at work.

5.6 Overall Sanitation Status

Among the twenty respondents, majority of them rated their hospital’s overall sanitation status as good.

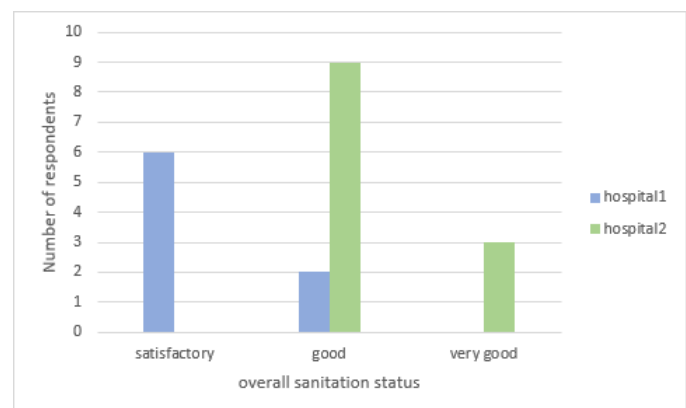


Figure 1: Respondent’s rating on sanitation status of hospitals

6. Conclusion

The interview with the hospital management, healthcare staff, waste handling staff, and the patients/visitors showed that the hospitals had been practicing source segregation of waste with different colored/labeled containers. Both the hospitals had autoclaves for the disinfection of solid waste, and infected liquid waste was disinfected using chemicals such as sodium hypochlorite. Most healthcare and waste-handling staff used protective equipment, while only a few patients/visitors used masks & sanitizers. The final disposal site for hospital waste is the municipal landfill site.

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