

MANAGEMENT OF MEDICAL WASTE IN DIFFERENT HEALTHCARE ESTABLISHMENTS: A CASE STUDY OF DISTRICT MANDI, HIMACHAL PRADESH

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ABSTRACT

Recent advancements in healthcare units have focused on promoting and safeguarding community health through sophisticated instruments in disease treatment. However, these improvements have also led to an increase in waste generation in healthcare settings. This waste includes various items such as needles, scalpels, gloves, bandages, discarded medicine, and chemicals. Healthcare establishments also produce environmentally sensitive waste such as sharp waste, chemical or pharmaceutical waste, radioactive materials and mercury-containing instruments. Improper management of these wastes can seriously endanger the environment, public health, and people who handle them. So, the study on biomedical waste management in diverse healthcare facilities ranging from remote clinics to advanced hospitals holds immense significance. This paper presents the current status of healthcare facilities' methods for handling and managing healthcare waste at Sunder Nagar, in the Mandi district of Himachal Pradesh. Carefully prepared checklists, field observations, and in-person interviews with healthcare personnel were all used during the study. Furthermore, the investigation looked at the limitations and practices related to the segregation, collection, storage, transportation, and final disposal of biomedical waste in healthcare facilities. The results of this investigation showed that the district's medical waste (MW) handling and management system was ineffective mostly due to a lack of information, a guilty attitude, the negligence of healthcare personnel, and inadequate infrastructure. Discussions were held regarding related health and environmental effects in addition to MW management and infrastructures. Suggestions and recommendations were made in light of the current circumstances and MW management procedures to minimize environmental risks while also ensuring possible MW handling and management practices.

KEYWORDS

Medical waste, management, segregation, healthcare facilities, district Mandi, field observations

INTRODUCTION

With the increasing population, the need for healthcare facilities is on the rise, leading to a proportional increase in medical waste generation (MWG). According to the WHO, about 85% of the waste from healthcare facilities is non-hazardous general waste, and about 15% is hazardous waste which is composed of 10% of infectious wastes and 5% of non-infectious wastes like radioactive and chemical wastes (Mitiku et al., 2022). Medical waste (MW) is any waste generated during medical procedures, such as disease diagnosis, patient treatment, or vaccination of humans or animals (Windfeld and Brooks, 2015). MW is divided into eight categories by the World Health Organisation (WHO, 1999). This classification is dependent on several variables, such as the degree of transmission of infected waste, human exposure, and harmful effects on humans. In addition, they are arranged according to their physical, biological, and chemical characteristics (Rudraswamy et al., 2013). These include various items such as needles, scalpels, gloves, bandages, discarded medicine, and chemicals. Healthcare establishments (HCEs) also produce environmentally sensitive materials such as sharp waste, chemical or pharmaceutical waste, radioactive materials and mercury-containing instruments. Though the proportion of residues generated in a community that is made up of MW tends to be small, these residues have the possibility of dispersing pathogens and posing further danger to patients, medical personnel, and the public if wastes are not properly managed (Abor, 2010). According to estimates by Ahmed et al. (2020), more than 5.2 million people worldwide, including 4 million children, die every year from illnesses linked to MW. Therefore, managing MW in healthcare facilities is critical to ensuring public health and environmental safety. So, the present study will explore the management of MW at different HCEs in Sunder Nagar, in the Mandi district of Himachal Pradesh.

METHODOLOGY

A descriptive cross-sectional study was conducted (Meena, 2018). To understand the current medical waste management (MWM) practices in Sundernagar, Mandi district in Himachal Pradesh, 15 healthcare facilities consisting of government hospitals, private hospitals, clinics, and diagnostic laboratories were included in the present study. Carefully prepared checklists, field observations, and in-person interviews with healthcare personnel were all used during the study. Furthermore, the investigation looked at the limitations and practices related to the segregation, collection, storage, transportation, and final disposal of MW in HCEs. The study did not include the healthcare facilities

producing biomedical waste that were discovered to be closed at the time of data collection, did not cooperate, or did not reply to questionnaires. A Microsoft Excel sheet was later used to tabulate the data.

RESULTS AND DISCUSSION

This section presents and discusses the findings from the survey on MWM in HCEs in the Mandi district of Himachal Pradesh. The study included participation from 15 HCEs that produce MW. According to findings shown in **Table 1** (Meena, 2018), 60% of the healthcare facilities surveyed were aware of the CPCB rules and amendments, while 40% didn't know about them. 46.67% of the facilities had staff members who were trained in MWM, however 53.33% of the facilities lacked the necessary training. This suggests that a significant portion of the district's healthcare facilities could need training courses to ensure the proper handling of MW (Soyam et al., 2017). Only 33.33% of the facilities surveyed indicated improper record maintenance, compared to 66.67% of the facilities that reported adequate records management. It was also discovered that the accident reporting mechanism was deficient, with just 6.67% of the facilities having a functioning reporting system. This necessitates immediate setup of appropriate accident reporting systems to ensure timely and effective handling of any accidents or occurrences involving MW. Whereas, **Table 2** presents the findings, which show that 46.67% of the facilities had enough color-coded bins available, whereas 53.33% did not have enough. This emphasizes the necessity of having enough bins available for the efficient collection and segregation of various kinds of wastes (Golandaj and Kallihal, 2021). It was discovered that 40% of the healthcare institutions had biohazard symbol bags inside bins, 26.67% did not, and 33.33% had them positioned inappropriately. The majority of the surveyed healthcare establishments 73.33% were found to segregate medical waste as per CPCB guidelines at the source (Golandaj and Kallihal, 2021). However, there were 26.67% of facilities that performed the segregation only after waste collection. This highlights the need for stricter adherence to segregation guidelines at the source to prevent cross-contamination and improve overall waste management efficiency. The utilization of protective gear during MW handling was found to be suboptimal, with 33.33% of the facilities using only gloves, 20% using gloves and masks, and 46.67% not using any protective gear. This underscores the importance of implementing strict protocols and providing proper protective equipment to minimize the risk of occupational hazards for healthcare workers (Mengistu et al., 2021). Regarding using electric needle destroyers (needle burners), 53.33% of the surveyed healthcare establishments had these devices, while the remaining 46.67% did not.

Table 1: Awareness of Central Pollution Control Board (CPCB) rules and amendments, Training for Medical Waste Management (MWM), Records, Accident reporting mechanism and Periodic monitoring system

S.No.	Variable	Number (Facility)	Percentage
1.	Awareness of CPCB rules and amendments		
	Aware	9	60.00%
	Not aware	6	40.00%
2.	Training for MWM		
	Trained	7	46.67%
	Untrained	8	53.33%
3.	Records		
	Properly maintained	10	66.67%
	Not properly maintained	5	33.33%
4.	Accident reporting system		
	Present	1	6.67%
	Not present	3	20.00%
	Not Aware	11	73.33%
5.	Periodic monitoring system		
	Present	2	13.33%
	Not present	3	20.00%
	Not aware	10	66.67%
	TOTAL	15	100%

Table 2: Characteristics of Color-Coded Bins, Biohazard symbol bags inside bins, Segregation of MW as per CPCB guidelines, Use of protective gears while MW handling and Use of electric needle destroyer (Needle Burner)

S.No.	Characteristic	Number (Facility)	Percentage
1.	Colour-coded bins		
	Sufficiently available	7	46.67%
	Not sufficiently available	8	53.33%
2.	Biohazard symbol bags inside bins		
	Present	6	40.00%
	Not present	4	26.67%
	Incorrectly placed	5	33.33%
3.	Segregation of MW as per CPCB guidelines		
	At the source	11	73.33%
	After waste collection	4	26.67%
4.	Use of protective gears while MW handling		
	Only gloves	5	33.33%
	Gloves and mask	3	20.00%
	Without gloves	7	46.67%
5.	Use of electric needle destroyer (Needle Burner)		
	Present	8	53.33%
	Not present	7	46.67%
	TOTAL	15	100%

SUGGESTIONS AND RECOMMENDATIONS

Several approaches had to be put into practice to enhance the management of MW in healthcare institutions in district Mandi, Himachal Pradesh. First and foremost, healthcare staff members must get thorough training and awareness campaigns about how to properly handle and manage MW. This can aid in tackling the ignorance and careless attitudes about the management of waste. Training programs should emphasize the significance of adhering to appropriate waste segregation, collection, storage, transportation, and disposal techniques as well as teaching healthcare professionals about the potential health and environmental concerns related to inappropriate waste disposal. Secondly, to provide efficient MW handling, an adequate infrastructure must be established. This entails setting up equipment that is adequate for the safe storage and transportation of various kinds of MW, as well as providing distinct waste storage rooms with the proper labeling and color-coding systems. Furthermore, collaborations with waste management organizations can ensure the appropriate disposal of biomedical waste.

Adherence to waste management protocols and regulations has to be ensured by consistent monitoring and enforcement measures. To evaluate their waste management procedures, healthcare facilities should undergo regular audits and inspections. Penalties for non-compliance should also be severe. The dissemination of best practices in waste management can also be facilitated by encouraging collaboration and knowledge exchange amongst healthcare facilities. Conferences, forums, and workshops can give medical professionals a forum to share their insights and effective practices. With this joint effort, efficient waste management strategies that are adapted to the unique circumstances of Mandi, Himachal Pradesh, can be identified and put into practice.

CONCLUSION

A multifaceted approach is necessary for the management of medical waste in healthcare facilities located in Mandi district, Himachal Pradesh. This entails creating and executing thorough training and awareness campaigns, developing and operating an adequate infrastructure, keeping an eye on and enforcing waste management laws, and encouraging communication and cooperation amongst healthcare facilities. It is feasible to reduce environmental concerns and ensure efficient management of medical waste in the district by putting these ideas and recommendations into practice.

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