

Medical Waste in the Capital City of Bangladesh, its Causes and Impacts on Human Health: An Analysis Based on Legal Framework

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ABSTRACT

Medical waste is not only infectious, it is hazardous too. It causes deaths and poses serious threats to the environment. So the medical waste needs to be treated properly before its final disposal. But, due to the absence of a proper health care system in Bangladesh, numerous hospitals, clinics, and diagnostic centers have sprung up elsewhere in Dhaka city and produce a huge amount of waste daily. Medical waste of those hospitals, clinics, and diagnostic centers is dumped elsewhere without proper treatment, thanks to the mismanagement and lack of discipline, causing a serious threat to the health and environment. As well as there is no supervision and guidance for proper treatment of the waste, there have been no enough data or research work on the very critical issue in Bangladesh. Moreover, the overall situation has worsened due to various issues including lack of interest and awareness in medical waste management, unhealthy waste management, lack of specific laws and policies to address the issue. However, the authorities concerned are yet to take any measures in this regard despite such an alarming situation. The existing environmental laws are not enough to address the issue of not having specific provisions in the laws. Besides implementation of those legal frameworks is largely absent in the country. This paper aims to find out the existing practice of medical waste management; the types and amount of waste generated by the healthcare service providers; causes of medical waste; existing problems; and analyze the impacts of the waste on human health and the environment. Besides, this paper will analyze the related policies and find out the gaps. This study will also come up with some recommendations to bring an end to the mismanagement of medical waste generation through policy and law. Secondary data, *i.e.* books, articles, different national and international laws, acts, etc. have been used in this paper.

Key words: Bangladesh, Dhaka city, Human health, Impacts, Medical waste.

Introduction

Medical waste means any kind of waste generated at the healthcare services including hospitals, clinics, laboratories, etc. Usually, medical waste is classified as infectious, hazardous, radioactive, and general.

Most of the time the infections from medical waste cause death and its hazardous substances including pathological, sharps, and chemical waste poses serious threats to the environment. In Bangladesh's hospitals and diagnostic centers, a variety of therapeutic procedures and medical tests, such as cobalt

therapy, chemotherapy, dialysis, surgery, delivery, resection of gangrenous organs, autopsy, biopsy, para clinical test, injections, and others, generate sharp objects, radioactive wastes, and chemical materials. This waste may carry the germs of hepatitis B and AIDS and other infectious fatal diseases (Hasan *et al.*, 2008). But, the healthcare providers and the authorities in the government are not concerned about the mismanagement of medical waste in the least developed countries like Bangladesh. Usually, most of the medical waste is dumped along with the domestic waste in the country, posing a serious threat to public health and the environment. Medical waste contains hazardous metals, toxic compounds, pathogenic viruses, and bacteria that can cause a pathological malfunction in the human body (Babu *et al.*, 2007). Not only the patients, doctors, nurses, technicians, sweepers, hospital visitors are also at high risk due to the haphazard management of medical waste in the country. In Dhaka, the capital city of Bangladesh, there is a common scenario that the poor scavengers, women, and children are collecting medical wastes such as syringe needles, saline bags, and blood bags without taking any safety measures and selling these for their livelihood amid deadly health risks. As it is known that the re-use of syringes can spread fetal infections disease like AIDS and hepatitis B, disposable medical waste collection and re-use without sterilization could cause serious disease (Dana, 2011). So, it is mandatory to dispose of and destroy medical waste safely to reduce health hazards and prevent environmental contamination. Unplanned medical waste disposal makes it impossible to determine the full amount of the spread of blood-borne viruses, respiratory, gastrointestinal, and soft tissue illnesses. However, there is no doubt that the mismanagement of medical waste has been of major concern in Bangladesh.

Medical Waste: General Meaning and Concept

Medical waste is a variety of solid or liquid waste that is generated from the treatment, clinical diagnosis, pathological testing and medical research in a hospital, clinic or research institute. The medical waste includes blood, diseased body fluids, dressing materials, sharps, non-sharps, surgically removed body tissues, chemicals, pharmaceuticals, medical devices, and radioactive substances which are produced by various activities as part of the treatment. Usually, most medical waste is a normal waste but

only a part of it is dangerous. As the medical wastes are not disposed of following proper procedure and dumped with the general waste, it poses a serious threat to both human health and the environment in Bangladesh (Alam and Bahauddin, 2015). But there are no specific legal provisions to deal with the issue in the country. However, the government of this country has enacted rules in 2008 to address the issue. Besides, there are several other laws and policies related to medical waste management. Hospitals, clinics, and other healthcare services are growing rapidly around the world to provide medical care to a growing number of people, and inevitably medical wastes are generated to provide services to patients. In most cases, if these wastes are not treated properly, they will mix with the environment. Leaving these wastes in the environment with MW can cause environmental pollution and infect people. Usually, MW means waste generated from various activities related to treatment (Syed *et al.*, 2012). According to the World Health Organization, healthcare waste (HCW) is a by-product of healthcare that includes sharps, non-sharps, blood, body parts, chemicals, pharmaceuticals, medical devices, and radioactive substances.

Causes of Medical Waste in Dhaka City and its Impacts on Human Health

The growing number of healthcare establishments (HCE) including hospitals, clinics, and diagnostic laboratories in Dhaka, the capital city of Bangladesh, has a huge impact on public health and the environment. About 200 tonnes of wastes are generated in 600 healthcare establishments in the city per day. Excluding the capital, six other divisional cities of Bangladesh has around 1,380 healthcare establishments — public and private — and produces over 20 tons of medical wastes every day (Ahmed, 2011). Those wastes are dumped at the bins or elsewhere like ordinary household waste in cities. It has also been known that body parts are also dumped on the streets along with various medical wastes. Hazardous liquids and solid wastes are discharged to the nearest drain or garbage dump. The proper management of medical waste is crucial to minimize health risks (Akter, 2002). If the situation cannot be improved and the present situation continues in Bangladesh, it will have a significant long-term impact on human health and the environment. So proper treatment need for medical waste from its source to final disposal. Disposing of such garbage

into dustbins, drains, canals or any other dumping areas in and around the city without following the proper procedure poses a major public health risk. Thus, to bring discipline to the whole process and minimize the impact, it is urgent to launch a concentrated effort. Though the medical wastes causing environmental hazards and public health risk salarminly in Bangladesh, the proper management of medical wastes has received much attention. The waste management system in different countries is usually different. As these systems are not completely risk-free, the risks can be minimized properly. Thanks to improper disposal, sharp instruments of medical waste may damage human health, infectious elements transmit diseases to humans, and toxic and hazardous chemicals may contaminate the environment. So, proper management of medical waste is now a major concern for the health of both humans and the environment. The proper medical waste management systems are largely absent in Bangladesh. Medical wastes account for only about one percent of the total solid wastes generated in the country, but its impact is much bigger. When a small amount of garbage is combined with household solid waste, the entire waste stream becomes dangerous. But, there was no proper system for medical waste management in the country so far to protect the hazards. Almost all medical wastes are disposed of in the same way as normal domestic wastes in Bangladesh. Recently, the government is trying to bring discipline by developing a system to handle medical waste.

The Medical Waste (Management and Processing) Rules, 2008

There is no specific provision relating to the management of medical waste management in the Environment Conservation Act, 1995 and the Environment Conservation Rules, 1997 of the country. However, as an attempt to ensure proper MWM in the country, the Ministry of Environment and Forest (MoEF) in 2008 formulated Medical Waste (Management and Processing) Rules under section 20 of Bangladesh Environment Conservation Act, 1995 (Bangladesh Environmental Protection Act, 1995). In the rule, they also define MW as "any solid, liquid, the gaseous, radioactive substance produced, emitted, dumped due to medical treatment of human beings, immunization process, pathological diagnosis or any medical research, which causes an adverse impact on the environment and also includes differ-

ent categories of wastes mentioned in the Schedule-1 of this Rules".

The classifications of MW as given in Schedule - 1 are in General waste (non-infectious/non-toxic); ii. Anatomical waste, Pathological waste; iv. Chemical waste; v. Pharmaceutical waste, vi Infectious/Toxic waste; vii. Radio-active waste; viii. Sharp waste; ix. Reusable/recycled waste; x. Liquid waste (infectious/non-infectious); and xi. Pressurized waste. The MW Processing includes "collection, segregation, packaging, destruction, burning incinerating, treating and disposal of MW". The MW Management includes "transportation, storage/dumping, keeping of records, observation, review, monitoring and supervision of MW". Health care establishment includes "all institutions and establishments, such as government or private hospital, consultation chamber, private clinic, nursing home, pathological laboratory, dispensary, drug store, blood bank and any institution that is engaged in the generation of MW as stated in the Schedule-2 of the Rules". As per this Schedule, and research center, post-mortem center, animal research, diagnosis and treatment center, the practice of acupuncture and chiropractor are also included.

All the sources of medical waste have been mentioned in the Rule. It also stated about the formation of an Authority in every division comprising three members headed by the Divisional Director of Directorate of Health to supervise the medical waste management process. As per the Rule, the functions of this Authority include grant, renew, and cancel the license; supervise and monitor the activities of the license-holder, issue directives regarding MWM; outreach activity on pollution through MW; send annual reports to MoEF, and communicate with the DoE as necessary. But there is no presentation of civil society in the body to raise the voice of the mass people. The MW management job is given under three categories of licenses according to the Rules. The categories are collection and transportation; treatment, decontamination and disposal; and segregation, packaging, storage, destruction, and incineration. Initially, these licenses are given for three years tenure but these can be renewed. Before that, an "Experimental license" is issued for one year term to examine that whether the licensee would be able to do the job. However, these City Corporations do not follow the Rule as they have their own waste management system, which is a major concern to bring discipline to the waste management system

under the Rule. Usually, most of the medical wastes are produced in city corporation areas where proper waste management is largely absent. So, keeping the city corporation areas out of the purview of the Rules, it is not possible to control or minimize the damage and concern caused by the medical waste as the city corporations have no specific rules on waste management.

However, under the Rules, the whole management work is done under six Schedules. Schedule-1 classifies medical wastes; Schedule 2 identifies sources of WM generators; Schedule-3 specifies separate color codes for MW storage, collection, and disposal; Schedule-4 specifies symbols for packaging medical waste; Schedule-5 maintains information on the packet or cover of MW for transportation; Schedule-6 maintains standards for MW treatment and destruction. Despite the Rules, MW is not managed properly and this issue has been addressed as a serious issue in the country. Though the Rules is a major initiative to bring discipline to the MW, there are some shortcomings in the Rules. There is no provision for regulating MW generation in the Rules. Besides, there is no proper provision for managing liquid medical waste and radioactive waste management. Due to the lack of low awareness in the hospitals or clinics, lack of implementation of the Rules, the overall scenario has not been changed after the formation of the Rules. Lack of expertise, manpower, and investment in medical waste management are also some major reasons behind the hazardous situation in this sector.

Steps of Medical Waste Management (MWM)

Only proper MWM can reduce prevailing harm to human health and the environment. So some effective steps, including waste identification, segregation, collection, storage, treatment, and disposal, should be taken immediately at every stage. To expedite the steps, active regulation and monitoring are mandatory to minimize the environmental health impacts of disposing of wastes.

So necessarily and appropriate legal frameworks and policies should adopt, all people involved in the whole process should be trained to make them skillful, technological and financial supports should be ensured. Besides, a mass awareness campaign is also needed to save the human being and environment from the consequences of MW hazards. The World Health Organization (WHO) has come up with the following steps in this regard:

- Waste minimization;
- Waste generation;
- Segregation at source and containerization
- Intermediate storage (in the healthcare facilities)
- Internal transport (in the healthcare facilities)
- Centralized storage (in the healthcare facilities)
- External transport
- Treatment and disposal.

Here are some problems caused due to the improper management of MW:

- Possible risk of injuring or inflicting infections to patients, visitors, and community by infectious agents, sharps, hazardous chemicals of MW.
- Health risks of healthcare service providers including workers and handlers and workers involved in waste disposal facilities, including scavengers.
- Environmental damage including soil and air pollution and surface and underground water contamination.

The main reasons behind the mismanagement of medical waste in Bangladesh include:

- improper and inefficient waste collection practice
- Largely absence of legal frameworks and policies
- Lack of following existing waste management rules
- Incapacity of the authorities concerned including local government authorities and hospital authorities
- Inadequate waste management infrastructure
- Absence of proper bodies to manage the waste
- Lack of knowledge and insufficient training on MWM
- Inadequate manpower related to waste management
- Lack of public awareness and knowledge of people
- Irresponsibility of waste management workers and authorities
- The growing use of urban non-biodegradable material

Conclusion

The random dumping of medical waste elsewhere and accumulation of untreated medical wastes at landfills not only in Dhaka and six other cities of Bangladesh are posing a serious threat to public health and the environment in the country. According to the United Nations 5.2 million people, includ-

ing 4 million children, die due to medical waste-related diseases each year. This picture in Bangladesh is also quite alarming as the generation of medical waste in Dhaka has been increasing both in quantity and variety, due to the wide acceptance of single-use disposable items. The importance of proper disposal of medical waste has been widely discussed in recent times in the context of the widespread mixing of medical waste with household waste and the disposal of municipal solid waste in landfills. At the same time, the discussion on general waste treatment has gained importance. Efforts should be made to reduce and reuse medical waste before it is finally disposed of. Until a new method of medical waste management is available, the existing incineration process could be used to mitigate the continuous impact on health and the environment. But in the case of incinerators of medical waste, many toxic substances like dioxin emissions can be generated, causing potential risks to humans and the environment. So the whole process of the incinerator should be monitored properly. The lack of suitable legal frameworks and procedures, as well as apathy among those involved in the process and a lack of understanding, are the key causes of inappropriate medical waste disposal in Dhaka. Besides, due process of the medical waste collection, segregation, and disposal are not maintained in line with the standards process, accelerating the health and environmental hazards. To ensure the safe disposal of medical waste, the whole process should be handled in a very professional way. Though the current MW system contributes to a limited number of HCE, new processes and facilities should be adopted in light of the international standard in every part of Dhaka

city. Alongside that, the existing facility should be extended. Awareness and effective steps should have come from both concerned healthcare service providers and waste management authorities.

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