

Medical Waste Management: Field observation in Dhaka City and adjacent Suburban Area

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Abstract: This paper discussed about the patterns of medical waste management on the basis of field observation in public and private hospitals, diagnostic centre and pharmacy. It is a vital issue to dispose the medical waste created by the healthcare providers. The local government and its stakeholders are also responsible for it. Considering the activities of the healthcare providers, this paper explored the real field situation in the institutions in Dhaka City and adjacent suburban areas. It is found that the healthcare provider institutions consider the disposal system and its urgency with significant importance. In many cases, they have logistics, manpower and supervision to manage the wastes but in many cases, it is observed that their limitations are also significant. Lack of systematic direction, supervision and manpower, wastes are creating huge problem for those institutions as well as municipal garbage collectors and mass population groups. Since; medical waste disposal is crucial for the sake of health concerns of the city dwellers, the reality creates a hazardous and troublesome condition because of its mismanagement, inadequate manpower, awareness and lack of systematic pattern of waste disposal. The responding institutes were found conscious but practices are not representing the optimum level of understanding.

Keywords: medical waste management, waste disposal, health hazard, healthcare

1. Introduction

Medical waste is considered the most burdensome and dangerous substances to be managed by the government due to its complexity and hazardous condition of health risks. Hospitals and health facilities are the major sources of medical waste (WHO 2026). Other than those, specimen testing laboratory, blood collection preservative services, clinics, pharmacies and nursing homes, medical camp services, patients' living spaces are also considered as sources. All kinds of diagnostic kits that used for healthcare is also medical waste (ICRC, 2011, WHO, 2026). The medical waste is categorized into infectious, pathological, sharp waste, pharmaceutical, chemical, radioactive, cytotoxic and general waste (WHO, 2026). All medical waste is harmful for human health. Thus, a quick disposal of those wastes is important. The waste management is the most difficult task for the city authorities, local governments and respective management. There are multiples causes behind it. Medical waste is difficult keep for the long time waiting for to be collected. An immediate collection is necessary. A prolonged waiting creates health hazards. The insufficient workforce in this sector is one the causes to abandon the waste on site for long time. In such difficult situations several stakeholders take different steps

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to overcome the problem. Many of the nongovernmental organizations (NGOs), voluntary organizations (VO), private groups/organizations, non-professional associations, community organizations, individual's efforts, etc. engaged as responsible agents to perform the duty. In each area of the city, the activities of different groups are visible. The collection and dumping of medical waste are conducted by the associated persons of those organizations.

A recent study shows that the urban average of the medical waste is approximately 0.11 percent of the total generated waste. It includes the areas of the city corporations and Pouroshava of the country (BWC, 2021). Due to the immediate threats to both human health and the environment, the management of medical waste has drawn global attention. In Bangladesh, the amount of urban garbage were 13330 tons per day in 2005, 23688 tons per day in 2014, 33574 tons per day in 2021 (BWC 2021:10). Surprisingly, medical waste increased to 0.36% in urban areas where suburban pouroushava contributed 0.57% and Cities 0.11 % of the total wastes (BWC, 2021:16).

Alongside this, concerns raise when it is found that some cleaners selling used sharps and saline, test tubes, blood bags, and bags for reusing or without even disinfecting them (Hassan et al., 2008). The hospitals, clinics and diagnostics in Dhaka city are established without proper planning of the space and commute. Even, it became very tough and hard to access many places where the medical waste are kept for collection and take out. There are few clinics in the city that they have no known places from where the wastes could be collected. This study focuses sectors in the city who are engaged in collecting medical wastes from the government hospitals, private hospitals, clinics, diagnostics, urban healthcare centre, pharmacies, etc.

The sole responsibility to control and manage of the medical waste in Bangladesh is carried out by the city corporations, pouroushava and the local governments. Similarly, the public hospitals, private hospitals, clinics and diagnostic centres are also taking responsibility to remove the medical waste. The two city corporation in Dhaka are responsible to collect and dump approximate 7000 tons of waste each day (NSSB 2025). This larger volume of waste includes the medical waste at a significant portion in the city. The corporations are providing equipment, temporary dumping locations, carrying facilities and transporting to the landfill stations. The city authorities have some formal and semi-formal systems to collect and disposal of waste including medical waste.

On the basis of abovementioned discussion, this paper attempts to explore the process of medical waste management by focusing the public and private healthcare providers. Thus, objectives were to understand the process of the removal and managing medical waste of the public hospitals and the private healthcare providers, and the impact on waste collectors, participants and stakeholders in those sectors.

2. Theoretical Perspective

This paper followed the theoretical orientation from the major fields in social sciences: medical anthropology, public health and ecological anthropology. The management of medical waste is widely discussed in that academic arena for last few years with significant importance. Medical anthropology and public health emphasize on the health

issues associated with the medical waste management whereas the ecological aspects give importance of environmental and social issues. The social scientists are predicting a severe health hazards regarding any mismanagement of medical wastes. Long before, the impact of waste on the environmental pollution was pointed out by R. J. Anderson (1964). L. Rushton (2003) explained the processes associated with waste collection and its impact on the human health. Dennis Raphael (2004) identified that health and longevity of life depends on the proper addressing the issues related to the determinants as well as that are related to the total management. Pat Armstrong (2004) described the relationship among the social policy, health and the voluntary sectors. M. N. Muhammad and H. Manu (2013) have shown the involvement of informal sector in waste collection system. M. Muller and A. Scheinberg (2003) identified that the participation of community organizations is playing vital role in the modern waste removal and recycling system.

Medical facilities, such as hospitals, clinics, and diagnostic centers, produce medical waste that is considered particularly dangerous due to its potentials to transmit diseases and contain hazardous substances. Shareefden (2012) defined waste as solid, liquid, or gaseous material that has no specific function and is thrown away permanently. Hazardous waste is one that displays properties, including flammability, reactivity, explosiveness, corrosivity, radioactivity, infectiousness, irritability, sensitization, or bioaccumulation. In recent years, plastic waste became an inevitable component in the medical sector because of its lightweight nature, transparency, flexibility, sustainability, and cost-effectiveness. It replaced traditional materials such as steel, glass and ceramics in several medical procedures. But only a small amount is recycled and other portion remains as waste.

Bangladesh, being a densely populated South Asian country, is being affected by the intersection of heavy waste generation and policy implementation gaps. The waste produced in the hospitals is highly influenced by several variables, including the number of beds, the services offered, the state of the patients, the location of the hospitals, the local economic, social, and cultural conditions, etc. Among the healthcare centers, only a few private institutes segregate their medical waste. There is no proper or systematic management of these wastes in most of the healthcare centers in Dhaka city. An NGO named 'PRISM' is working with the DCC in the management of medical waste. For the ultimate disposal of medical waste, the DCC has designated dumpsite close to the city limits. But it's not sufficient to manage all the medical waste needs. (Hassan et al., 2008)

Both formal and informal sectors play a crucial role in the waste management process. In developing countries, informal waste recycling is often a job for the poor and underprivileged people only. These marginalized people do waste picking for their everyday survival. Wilson and others (2006) have categorized the informal waste recycling into four categories: itinerant waste buyers, street waste picking, municipal waste collection crew and waste picking from dumps. There are other variations on these fundamental categories. For instance, waste picking is given an additional opportunity if it is transferred to disposal via a transfer station. Involving informal people aim to

decrease the dependency on disposal and increase recycling (Wilson, Velis and Cheeseman, 2006).

Despite their critical role in urban waste management in low and middle-income countries, informal workers are disproportionately at risk for occupational illness. Waste pickers are frequently exposed to biological, chemical, and physical risks, such as sharp objects, toxic compounds, medical waste, and large loads. (Binion and Gutberlet, 2012). Among informal garbage workers - respiratory issues, musculoskeletal diseases, skin infections, gastrointestinal ailments, and injuries are quite prevalent. These conditions are frequently made worse by limited access to personal protection equipment and medical care. Frequent occupational injuries, poor hygiene practices, and significant socio-economic vulnerability among waste workers are common scenarios (Black et al., 2019). M Hasan and A Hussain (2023) have shown that an enormous amount of waste generation demands to meet a tremendous amount of workforce, community-based and individually informal labour intervention is essential. This sector is rising for the time being with creating thousands of jobs. Many scrap collectors and people in business also depend on these informal facilities as well. A huge number of labourers are involved in scrap collecting earn money by selling or supplying to the stores. Workers, van helpers, truck loaders, and wastes pickers at the landfill areas are also involved in the process of recycling and selling the used wastes items (Hasan and Hussain 2023:208-9).

Healthcare workers, waste handlers, and the broader community face significant risks due to inadequate handling, segregation, and disposal of hazardous materials. Scavenging from open dumpsters is considered the most harmful part of this whole process. In Bangladesh, the health risk is higher due to direct contact with waste, which is often a result of a lack of protective clothing, boots, hand gloves, and face masks. There are thousands of people whose livelihoods depend on recovering materials from waste. One of the biggest problems in solid waste management in underdeveloped nations is how to increase recycling rates, given the focus of the SDGs on waste management policies. A solution is needed for both the recycling process and the condition of these scavengers.

2.1 Methodology and the Research sites

a) Methodology

This study of this paper was conducted in the some selected hospitals, diagnostic centres, clinics and pharmacies and urban health centres in Dhaka City and nearby Savar Pouroshava following field research methods. Fieldwork conducted among the selected respondents to gather data. Employees and affiliated workers of the respective institutions of different categories of healthcare providers and the waste collector organizations have been selected. The simplified *purposive sampling* has been used to select the respondents from abovementioned categories. A Voluntary non-profit organization named PRISM (hereafter *organisation*) is responsible to collect medical wastes from the healthcare institutions (hospitals, clinics, diagnostics and pharmacies). Selected employees from PRISM are also included here. Besides, individual waste pickers and garbage collectors were selected as the respondents to understand the reality in the field. The respondents are considered as the primary sources of data. In addition to this 06 persons were selected

as respondents as experts (healthcare professionals and members of the management of the healthcare providers) to understand the risks, process and levels of hazards and waste management. The total number of respondents was twenty six (26) persons. The data was collected through in-depth interview and discussion with respective respondents. Observation and case study were supporting technique to explore out the reality. Besides, the waste disposal procedures of all facilities were observed. The relevant documents including published reports, papers and written documents consulted as the secondary sources of data.

b) Research Sites

The study was based on a multi-sited ethnographic fieldwork. The healthcare providers such as hospitals, clinics and diagnostic centre and pharmacies (hereafter *providers*) were selected from three places in Dhaka city - Shamoly, Dhanmondi, and Uttara. This study has an aim to include Savar as a suburban area that is growing with many healthcare providers. The classified representative and respondents included from all facilities. The fieldwork is conducted in four different institutions; one public medical college hospital (*Shahid Suhrawardy Hospital*), one private medical college hospital (*Dhaka Central Hospital*), one diagnostic centre (*Dhanmondi Diagnostic and Consultation Centre* and a pharmacy (*Kayesh Pharma*). The institutions were selected randomly to gather data as the representative of the healthcare providers in the city. Besides, two private hospitals in Saver area (*Enam Medical College Hospital* and the *Super Hospital Savar*) were selected as suburban fields.

i) *Shaheed Suhrawardy Hospital* (established in 1963, a public hospital) is located in Sher-E-Bangla Nagar, Dhaka. This is a spacious hospital with 875 beds. A sufficient number of physicians are available for consultation and treatment with highly developed and advanced technological facilities of operation theatres (OTs). Patients can consult physicians at the outdoor through a nominal payment (bdt 10). With that payment, they are eligible for a general consultation and check-up. Because of its low cost, this hospital remains heavily crowded during the working hours of the days. The hospital has larger premise and a four storied building where there are about 28 departments, 46 units, 24 hours one stop emergency and casualty services, 24/7 indoor services as well as outdoor services. It also has ICU facilities, laboratories, and has the ability to do almost all general, specialised and critical operations.

ii) *Dhaka Central Hospital* (established in 2011) is a private hospital situated at Ring Road, Shyamoli in Dhaka. It is a combination of 6 buildings - one diagnostic centre, two buildings used as hospitals and another two buildings for medical college and one nursing centre. The hospital offers advanced medical care and emergency facilities. It is a 500-bed hospital with a few emergency ICUs. In each hospital building, the first floor is for the reception, emergency unit, X-ray room and ECG room. The 2nd, 3rd, 4th and 5th floors are used by physicians for regular checkups. 6th to 12th floors are wards and beds for patients who had to get admitted for treatment. The affiliated professional and staffs have separate uniforms by color of the uniforms. The nurses wear purple, ward boys and cleaners wear green outfits, the watchmen are in blue uniform and the physicians wear white coats.

iii) *Dhanmondi Diagnostic and Consultation Centre* is situated at Shat Mashjid Road,

Dhanmondi in Dhaka. It is a six storied building. Because of its prime location, this diagnostic centre remains busy throughout the year. For serious patients, they provide 'Sample collection from home' service. They provide various services such as blood culture, endoscopy, analysis of hormones, thyroid, digital X-ray, EET, ECG, etc.

iv) *Kayesh Pharma* (a private pharmacy) is a part of Nostrum Hospital, situated at Uttara Sector 7, Dhaka. It is a medium level pharmacy with a huge collection of medicine and basic surgical equipment. This pharmacy has three sales persons and an orderly liaison. Even though it's not a big or renowned pharmacy, it sells a larger amount of medicine every day because of the nearby hospital and medicine usually prescribed by doctors.

v) *Enam Medical College Hospital* (a private hospital) and the *Super Hospital Savar* (also a private hospital) have been selected as the suburban institutions. Both are located in the Savar Pouroshava, at the west zone of Dhaka district. Both hospitals have necessary department as complete healthcare provider. *Enam medical* is a popular medical institute in the Savar area. It is a complete hospital beside a medical college with all facilities. The *Super Hospital* is also a popular hospital at the centre of the Savar pouroshava. It has outdoor and hospital facilities for all types of patients with a fully-equipped diagnostic centre.

3. Medical Waste Management: Disposal Procedures

The *public hospital* is larger unit of healthcare institution in Dhaka city. It has sufficient number of employees for cleaning and disposing the wastes from different internal diagnostic labs, wards, OTs and nurse stations. This hospital has different departments on different floors. It has separate sections for orthopaedics, rheumatology, neurology, cardiology, paediatrician etc. In each section, there's a series of 4 different coloured trash bins placed in a sequence - red, yellow, green and black bin. In the red bin, all kinds of sharp objects like needles, glass, etc. are being dumped (picture 2). The yellow bin is for cannula, dressing pad, dressing gauze, cotton, blood set, blood bag etc. This bin is used for dumping all the elements that can be contagious. The green bin is for recyclable items, like - saline set, saline bags, syringe without needles etc. And the black bin is used for general garbage and papers. Alongside with it, syringes, saline bags, injections etc are also disposed of in the black bin. Even though the hospital physician, nurses and the patients follow these instructions and dump particular wastes in particular bins as instructed. But when the cleaners collect this garbage, they dump everything in one trolley (picture 3). There is scarcity of bins to dump wastes of different types. Bins were placed far distant from each other. It becomes difficult to maintain categorization of waste by patients and their attendants due to this distance. There are wastes lying around on the floor. In front of the general ward room (female) of the first floor, a bin was found covered with liquid blood (picture 1). Sometimes, raw wastes are dumped directly inside those bins. Not even the nurses or ward boys could tell from where the raw waste came in and why it was dumped in an uncovered bin. After pointing this bin out, the bin was taken from the room by the cleaners to clean it and keep it in the room again.

The *private hospitals* process wastes in different categories; sharps and non-sharps objects, blood, blood bags, body fluids, dressing materials, surgically removed body

tissues, different chemicals used for disinfecting the equipment, pharmaceuticals and medical devices, etc. These wastes are not dumped in the same types of bins. They have three different coloured bins for different purposes. The black bin is used for dumping regular wastes, wastes that are generally produced such as food wastes, plastic bottles, medicine wrappers, glass bottles or vials, bandages, paper, etc. Everything that is sharp, like needles, scissor, injections, surgical equipment etc. is dumped in red bins. The contagious elements such as body fluids, blood, and used cotton are dumped into yellow bins. This colour code was selected by the hospital authorities, so that the cleaners do not dump and mix everything in one bin. The cleaners collect the waste from each bed area and the room. Then they dump those in the instructed bins. Their job is considered done after dumping in the larger bins.

The *diagnostics* processes used syringes, vials for collecting blood and urine samples, tube, blood stained cottons, bandages, face masks, gloves, and plastic wrapper of syringes or needles on a regular basis. These wastes are mostly produced and disposed inside the rooms where samples are collected. Other than medical waste, the patients were seen disposing paper, plastic water bottles, food wrappers, pens, sometimes food items in bins outside the laboratory. In front of the reception, there are steelmade covered bins placed for the patients to use. Inside each room, there were desks for taking blood samples. Each desk had a basket underneath them to dispose of the medical wastes. After taking the sample, the needles are kept on a separate box levelled as 'used needle' which they dumped separately and the rest of the wastes are dumped into the bin under their desks. If the cottons have blood, then they are collected in a polythene bag first. The slides, blood and urine vials are then transferred into the lab of that diagnostic centre. After being tested, they are dumped with the blood inside. One person from the managerial level looks after the management of that diagnostic centre. They emphasised the waste disposal through the voluntary organization called PRISM which has been assigned under the contract of the city corporations.

The *Pharmacy* receives all kinds of supplies from the company - from medicines, cotton pads, and sanitary napkins to all kinds of products. These are received through two different forms, on a daily and weekly basis. Products such as medicines for fever, cough, high pressure, diabetes, thyroid, antibiotics, and sanitary napkins are the most common selling products of the pharmacy. The most demanding products are listed separately and are supplied on a daily basis by the production company. The products which are less demanding are supplied on a weekly basis. Other than these two categories, there are some medicines which are expensive and are used by fewer patients. Sometimes they do not get sold at all. As a result, those products expire. They keep track of these items to know when those are going to expire. They separate them one month prior to expiry and keep those in a different shelf. After getting expired, those products are packed into an airtight box, labelled as 'Expiry products' and removed from the pharmacy. Those are sent to the hospital store room. The medicine suppliers take those expired medicines back on a quarterly or yearly basis. The medical waste produced in their pharmacy is the packets of medicines, first aid materials such as gauge, bandage, syringe, used cotton, napkins, etc. They do not dump it with regular wastes. They keep the waste in a sack and dump it in the hospital garbage area. The hospital has four kinds of bins. The wastes from

pharmacy are dumped in the bin labelled 'General waste'. Due to the lack of space in the pharmacy, they cannot wait until supplier's collection of the expiry items. As temporary solution, they most dump with other wastes to hospital. Thus, in some cases, a huge number of tablets and capsules are also dumped as general wastes.

The medical wastes collector organization PRISM sends a vehicle and employees every day to collect the wastes. Before their arrival, the wastes are collected from different bins around the corners by the hospital or diagnostics workers and are kept in larger bins. Sometimes, cleaners/workers collect the plastic bottles separately to sell those items. The prism workers wear fully protection vests, masks and hand gloves. Collecting these wastes is not their only or main task. Their main tasks are to clean the centre, collecting the wastes, and dumping them according to the requirements. The workers collect these dumping on a regular basis. The final cleaning of the large bins is performed by the workers of the city corporations.

If any hospital, diagnostics and any type provider is being established, they had to take approval from PRISM that they were dumping their medical waste properly. Without this, they were not permitted to start the hospital's operation as per rule of the city corporations. To give an approval, the *organisation* visit those institutions, teach the cleaners how to properly clean and disinfect the floors, bins or wastes areas, large bins and surroundings. After giving the cleaners proper training, they provide a certificate. This organisation sends specialized technical persons wearing proper PPE and collects the contagious elements in zip locked small bags. This is done under the contract between the parties (city, healthcare providers, and organisation). The service is worry-free throughout the year.

They collect the waste directly from the bins. All they have to do is collecting those from small bins to the coloured bin. Thus, they do not face any trouble in this matter. While collecting the wastes, they put recycle items in a green container. Mostly saline bags and saline injecting sets are recycled. The employees separate the plastic items before dumping in the coloured bins. They sell those plastic items in local shops. In most cases, they do not disinfect the items before selling.

In every *provider* institution, there are trolleys or small sheds where all wastes are stored or dumped (picture 4). It includes both the contagious items, plastic bottles, and the recyclable items. Some of the item such as plastic bottles and all recyclable items are either recycled or sold. In some cases it is observed that those items are kept together to carry them out to the nearest secondary transfer station. The cleaners also know that those items should not be mixed up. But if they collect waste from each coloured bin at a time, it is very time consuming. Thus, they go for this shortcut. These wastes are later collected by both organisations and the city. But *organisation* does not collect the wastes from them unless it's separated according to the city's colour code and placed in those colours instructed bins. For this reason, the workers of this secondary transfer station sorts up the *providers'* wastes immediately after its arrival. They separate the plastic bottles coming from the hospital; collect them in a large bag to sell afterwards (picture 5).

After separating the plastics, the workers separate the medical waste according to the hospital colour code. There are same coloured bins in the transfer station. They put the

waste in each bin according to the instructions, for example; they put contagious items in the yellow bin and needles in the red bins; So that when *organisation* comes, they collect the wastes instantly. Sometimes the workers do not even care which bin should be used to dump which item. No matter what the bins are filled up with, the top of each bin should be with the instructed items only. Means, even if they put random waste in the lower part of the red bin, the upper part of the red bins are always filled up with glass, needles or sharp objects only. When the workers come to collect the waste, they rarely check the bins before putting items in the vehicle. Even, if they check and find different, they have no other choice to collect '*as is*'. The workers have no choice to check that the wastes were placed accordingly or as to be instructed or not. They only collect the red, yellow and green coloured bins and its wastes from them. The wastes from the black bin are collected by city and are dumped in landfill located at the outside of the city.

4.

Irregularities are the most common thing when it comes to medical waste management; let it be private or public hospital. In these hospitals, the daily produced wastes are blood, sharps and non-sharps objects, blood bags, body fluids, syringes, vials for collecting blood and urine samples, tubes, blood-stained cotton, bandages, face masks, gloves, plastic wrappers of syringes or needles dressing materials, surgically removed body tissues, different chemicals used for disinfecting the equipment, pharmaceuticals, medical devices, etc. These wastes are not dumped accurately. There are four coloured bins for different wastes. In the red bin, all kinds of sharp objects like needles, glasses, etc. are being dumped. In both public and private hospital, it was observed that the wastes are mixed and dumped in the bins in an unusual way. For example; the yellow bin is for cannula, dressing pad, dressing gauze, cotton, blood set, blood bag, etc. This bin is used for dumping all the elements that can be contagious. But it was common that other items were kept in the yellow bin. The green bin is for recyclable items, like - saline sets, saline bags, syringes without needles, etc. In both institutions, wastes are thrown without thinking the appropriateness. The items that should not be in green are often found here. Similarly, the black bin is used for general garbage and papers. Alongside it, syringes, saline bags, injections, etc are also disposed of in the black bin. In most cases, black bin contains everything that could be thrown. This bin goes to the general garbage landfill area of the city which is really dangerous for public health and landfill workers.

Some cleaners try to collect plastic bottles, syringes, intact medicines, and saline bags, to sell those separately. Even though the hospital physician, nurses, and patients follow these instructions and dump particular wastes in particular bins as instructed but when the waste collectors collect this garbage, they dump everything in one trolley. After dumping they segregate the remaining bottles and other plastic waste (which has a high risk of being contagious) for selling and to earn some extra money. In this kind of trolley, both the contagious items, plastic bottles which they sell afterward, and the recyclable items which are recycled and sell afterward - are placed all together to carry them out to the nearest secondary transfer station. The case of a public hospital worker Hanif (48) described some of the features that present the real picture as below.

We have many rules and regulations described in the paper and contact with the city corporation and the garbage collecting organisation. In every ward and floor, there are many bins with the instruction tag and marks. Our staffs and nurses try to follow the rules carefully. Since it is the public hospital and no one can imagine the crowd and busy conditions in the hospital. None of our staffs or cleaners has any time to read or follow the instruction keenly. They are given a general order as instructions and mostly based on common sense. Nurses know better and they try to dump the wastes accordingly but other staffs are not serious to do it because of their hurry or laziness. Moreover, many of us are not thinking about the consequences of unwanted disposal pattern. They think that the cleaners will take those hazardous items soon and there will be no problem of health in the meantime, so, ignorance became a common practice here.

Secondly, everything is dumped in the trolley and larger bins at outside of the hospital premises. So, the hospital people and the patients are secured from any kind of contagious affect. More important factor is that the attendants of the patients never listening anyone. They do not know the rules because they come for one, two or few days to serve the patients, then, leave when the patients are discharged. They do not care about any hazard or problem. This is because of their unawareness on the one hand and they think it as the duty of the hospital authority or staff to clean every mess created by them. After all, the public hospitals are run by the government, so, everyone is the kinglike here. Nobody care about anything or anybody. No matter how dangerous are those wastes are. The staffs mind it as ordinary garbage as they have in their houses. That is also another problem. Most of the cleaners believe that their task is ending after dumping all wastes into the larger bin outside the hospital. Thereafter, it is the responsibility of the city or organisations, how they will collect, classify or dump to the landfill area (Hanif, 48, from field interview).

There is similar feature with minor differences are found in the private hospitals. A cleaning lady Masura (39) works in current location for six years and total three private hospitals for last eleven years. She shared her experiences and told that in practice. All private hospitals are same but situation is gradually developing. Masura (39) described the conditions as below.

Our main duty is to keep the floors and bins clean. Anytime the manager, supervisor or doctor, or any officers go through the floors or areas and if they find any dirt on the floor and/or larger amount of wastes in the bins, that goes upon us as undone duty. Our cleaners of staffs are scolded, punished or decreased duty hours. Bins of all nursing stations, wards, floor corners, pathways, balconies, and entry and exit points must keep clean, whatever the situation. That is why; every one finds us moving around with a broom, brush, tray, containers and polythene bag in hand. This is to show the hospital as a cleanliest one around the locality. In the diagnosis and nursing areas, the wastes are kept according to the instructions but when it is collected by the cleaners, it become difficult to maintain the classification of wastes due to the lack of time, available containers and pressure to work faster than usual, etc. The cleaners are running one after another bins and then to the floor, and again redo the similar round. So, he or she gave importance on the collection of the wastes and keep the bin empty quickly rather than classifying the wastes and keep separated from each other.

After collecting the wastes from all sources and bins, our cleaners leave everything into the outside larger bin for collecting by the city workers or designated organisations. Our cleaning staffs think their duty is done by dumping into that bin. It is the responsibility of

the city or the agency to clear the bins sooner. Sometimes, we observe the bins are fully loaded or overloaded. It happens if the agencies do not collect the garbage or there are excessive patient load in the hospital for any known or unknown causes. We do not care about the contagious or hazardous material in wastes or any consequences of the medical wastes. Our duty is to clean the bins and areas. Our concern is not the materials and there danger level. But as we are working in the hospital, we think that all hospital wastes are health hazardous. We see our physicians, nurses, and wards supervisors are following those rules. That does lighten our jobs. So, we just empty the bins, broom the floors, mop the wards, and dispose all seen garbage from every corners of the building. Sometimes we clean the surroundings of the hospital building.

In the diagnostics, the situation is very close to the private healthcare providers but little better. Because they do not have any ward. There laboratory facilities are different from hospital OTs and wards. They do not need to care about the patient's attendants and too many outsiders except patients. Mizan (38), a cleaning assistant who works for the diagnostics centre for four years, explained his observation and activities in the centre. The experience and description of Mizan (38) is given below.

In the centre, we collect wastes from collection counters and lab areas. There are many sections in the diagnostics. The technicians collect blood, urine, saliva, etc. at the general outdoor counters, and biopsy materials, some other specimen at the internal counters. The first group of wastes are the used tools such as napkins, syringe, cottons, tubes, tissue, gauge, bandage, blades etc. from the collection counters and the parts of the wound, skin tissue, biopsy materials, different types of gels, antibacterial and antifungal ointments, films, waste papers, clothes, mask, and gloves, from the internal counters.

The second group of wastes are the post lab-used materials. Some of the items are very dangerous and our technicians handle those. After receiving the wastes from the technicians and supervisors, we keep them in bags and dump into the larger bins out the centre. We dump the bag with the first group of wastes in the larger bin. All others are just dumped in the bin as usual. All our cleaners consider their job is done if they complete dumping in the outside bins. Though there are instructions of the city to classify all wastes but it is very difficult for the cleaners to follow that. We get limited time to do lots of work. Sometimes, we keep wastes in dark store room inside the building that nobody can see the wastes. Even, cleaners put some bags in that room temporarily if they cannot manage time to cover all corners on time.

By any means, we have to keep the floors and lab area clean. The patients will never finds ant dirt at the reception counter, specimen collection area, and the places where outsiders have access or visible to the outsiders. The city collects the wastes every day. If they do not come to collect, the waste pile up and smells bad and spread bad smells everywhere. Our centre sprays bleach to kill the germ in the bins and the area.

The cleaners understand that the different types of medical wastes should not be mixed up. When the workers come to collect the waste, they do not check the wastes thoroughly whether they are placed according to the instructions or not. But if they collect waste from each coloured bin once at a time, it require a longer time than they are allocated to perform the duty. That is why; they go for the quick and shortcut process. The *organisation* is not bound to collect the waste from the *providers* unless the wastes are separated according to the hospital color code and placed in those color-instructed bins. For this reason, the workers of this secondary transfer station sort up the hospital wastes

after its arrival. But their experience is not good at all. They found mixed wastes in most cases. At that point, the workers have no choice to clean up the transfer station or garbage area. Sometimes, the workers do not even care which bin should be used to dump which item. No matter what the bins are filled up with, the top of each bin should be with the instructed items only.

Even though the workers wear full protective vests while they coming with garbage truck, the cleaners do not wear their masks or even have hand gloves on while touching the contagious medical elements. They are reluctant to consider the threats these elements expose. Because the hospital authorities or the government do not provide them sufficient safety equipment and they cannot buy for their financial condition. They are working in a risky environment daily. This condition is similar in all providers and organisation areas. In the public hospital, the number of gloves, masks and other safety equipment come from the government channel. The cleaning workers receive those items if the supervisors or authority provide them. Halim (34), a cleaner, who works for the public healthcare provider, said-

'We get one pair of glove per day for cleaning garbage bins and area. If that glove torn and damages, there is no additional set for us. Then we are bound to work with that one or without any glove. We understand the health risk but no way. We cannot buy those from our own pocket'.

Similar voice came from Mala (28), a cleaner in the private hospital-

We get gloves and masks through our supervisors. If the first one damages, we are suppose to get used glove. Sometimes, the glove looks clean but used by the nurses or doctors. The supervisor collects and keeps it for us. Even, we are not sure that the glove that is given as 'new' is really new or used.

A worker (Nobin, 34) from the diagnostics explain his frustration as –

Masks are needed for all works here but we get one per day. We use one mask for multiple times. I open and reset it very frequently. It becomes dirtiest at the end of the day. Actually, it has no meaning to used dirtiest one again and again. About glove! We used it unless it torn or rip. Sometimes, we do our works without gloves. We are habituated now. We understand the health risk but we have to keep our job'.

Many respondents described the changes in their works. They were used to separate the item according to the instruction and following colour code. Gradually, they found scarcity of safety equipment in wastes collection and dumping process. It was common to get hurt and bleeding from the minor wound. They were given tetanus injection periodically or sometimes. But it could not ensure their recovery. In many cases they faced severe health risk such as hurt by needle and syringe, contaminated by the wastes. Gradually, they practices to keep themselves safe from such hazards by dumping together. They argued that all of those items will be dumped in one place or in a larger bin finally, so, small avoidance will not create any significant problem.

Medical waste management has been explored from the stakeholders' viewpoint. It was

found that a prolonged delay to collect medical waste has definite impact over the health situation of the community. The city corporation, public hospital, private hospital, diagnostic centre and the pharmacy try according to their capability to organize, categorize and classify their wastes but in all cases, it was visible to use a minimal level of logistic and manpower. The public hospital has less care about the proper classification of the garbage. Most of the employees try to handover their duties to others' shoulder. Thus, the waste collectors are playing the most significant role to collect the waste. In some cases, wastes are prolonged than usual but do not take too long time. The private hospitals are very quick step taker in collecting their waste. They consider it as a part of their duties. They have to show the cleanliness rather than consciousness or awareness. In many cases it was observed that they mix the waste in inappropriate patterns due to speedy collection. Here, working hour, target load and faster work ability get importance than the quality work for waste management.

In the diagnostic centre, the situation is more visible and understandable. Quick service and neat working space seem important here. Thus, in terms of waste collection, they are very faster and categorized accordingly. This sincerity is in most cases, are limited to the outsiders and outdoors space only. It was observed that they mix and fill the waste without proper categorization in the larger bin to transport to city transportation truck. To the employees, it is important to clear the garbage from the front areas as quick as possible rather than accurate classification and control the quality of management. The pharmacy has limited number and amount of waste to dispose. Thus, they have less work. In most cases, they sent the waste item to the suppliers. Probably, this is the reason that pharmacies are out of danger except expiry medicines.

5. Conclusion

Medical waste is considered one of the most hazardous types of wastes among the garbage. It cannot be kept for a prolonged time due to its' harmful and contagious character. The public and private healthcare providers are conscious and aware about the important of the disposal of those wastes. To conduct those activities, there are different patterns in different provider institutions. The public healthcare provider's practices the disposal procedure in light of instructions of the city authority. But they have scarcity of instrument, manpower and efficient workforce. Many of its workers are though efficient but they have insincerity to perform the duty accurately. Moreover, the crowd of the patients and their attendants prevent the workers to complete their job on time. In some cases, it was found that the equipment that they need in waste disposal are not made available to them. In few cases, the workers explained their job is limited to the dumping into the bins only.

The private providers gave importance on the show up rather than real sense cleaning. Here the number of workers is definitely fewer than the necessity to perform the duty on time and quality purposes. The workers have to work fast to keep their job which prevent them to classify and categorize the wastes in different group and place into the bin. Dumping to the outside of the hospital building seemed the end of their work. Tools and equipment shortage are also a factor for lack of services and quality of waste management here. The diagnosis centre has lesser but very vital wastes. The collection

counters, laboratory, and testing/analyzing sections produce varieties of wastes. Many of those wastes are infectious, contagious or hazardous to the health like public and private providers. The workers try to clean up all wastes as quick as they can to show up the cleanliness of the facilities. They are also facing the lack of safety equipment. Time limitation is also a factor for them for categorization of wastes and quality work.

To collect and dispose the medical wastes from public hospitals, the city corporation and the collection organisations have lack of coordination work and scheduled activities. The employees from both sides are also unaware about the procedures and consequences of the hazardous materials and insincere about proper management. The authorities recruit enough staff in the waste management purposes and need to be trained up for work more efficiently and to keep their performance at a satisfactory level. The private hospital should care of the disposal procedures from the very beginning to the end of their processing responsibilities. The employees are needed to be aware at that level for each of the categories of medical waste. The public and private hospital should care those wastes accordingly because of the possibility of spread out infectious and contagious diseases. The diagnosis centre is needed to be monitored by the proper authorities in this case. It is observed that their quick service tendency creates a huge gap in quality level disposal of medical waste. Moreover, in every case, the health authorities and local government need to coordinate at the management, policy and execution levels which can ensure the proper management of the medical wastes.

Annexure:

Pictures: Patterns of the medical waste collection



Picture 1 – Bins used in hospitals and clinics, usually in front of the general wards



Picture 2 - Different coloured bins for different kinds of medical waste.



Picture 3 - Trolley used for collecting the wastes from the coloured bins.



Picture 4: Dumping site outside the hospital (this is common in every hospital, diagnostics and healthcare provider centre, PPEs, medicines, packets, used items, different types of medical wastes are visible)



Picture 5: Separated plastic items collected from the hospital waste only (Medical plastic items collected in a large sack. Those sacks contain the plastics disposed of in every morning of that day.)



Picture 5: Medical waste disposed into the nearby wetland

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