The NEHU Journal, Vol III, No 2, July 2005

Management of Hospital Wastes in Shillong

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Introduction

Shillong city, the capital of Meghalaya, has grown in a haphazard manner like most Indian cities and continues to grow so. Some efforts were made recently by the Meghalaya Urban Development Authority to plan further growth of the city and its peripherals. But the present population of Shillong Urban Agglomeration is growing at a pace faster than the growth of urban amenities including health care facilities. There are six government hospitals and five private hospitals, two government dispensaries, and three private nursing homes in Shillong Urban Agglomeration, which are all located near or within residential and commercial areas. Besides there are various pathological clinics and private chambers, which too are located in such highly populated areas. While there is need for more medical amenities there are serious problems of biomedical waste management and disposal of the waste generated by present hospitals and nursing homes located in Shillong leading to serious threats to public health in the city.

Different categories of hospital waste require different modes of storage, treatment, segregation, handling and disposal, as per the guidelines provided by the Ministry of Environment and Forest, Government of India under the notification on Bio-medical Waste (Management and Handling) Rules 1998. But those guidelines have been ignored in Shillong. The changing scenario in health care centres, increase in the use of antibiotics, cytotoxic drugs, use of corrosive chemicals and radioactive substances are a major concern for public health in and around the city. This has been further endangered due to unscientific waste management practices like discharge of untreated hospital wastes, including chemical discharges, into the streams of the area, which results in severe water pollution in the surrounding

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environment. This has serious impact on human health since stream water is used by the people for various purposes.

The study of various waste management phases, i.e., segregation, storage, handling, transportation, disposal and treatment of biomedical wastes at the various health centres of Shillong Urban Agglomeration reveals that none of the biomedical waste management phases has been implemented. It is in total contradiction with the rules framed by the Ministry of Environment and Forests.

The aim of this paper is thus to provide an insight into the segregation, handling and disposal of the various categories of hospital wastes in Shillong.

Study Area

Shillong is located in the highest part of the plateau at an average altitude of 1500 metres above mean sea level, but in the water-shed zone. The Shillong range, located towards the south of the city and having an elevation of +1800 metres above mean sea level, is the source of a large number of springs and streams, which in turn are the sources of drinking water for the population living downstream. From this zone the streams are either flowing north to the Brahmaputra basin or south to the Surma basin of Bangladesh. Hence chemical pollution of these primary order streams at source leads to serious repercussions on the health of people living on the north as well as south of the city.

On examination of the topographic map of Shillong [No.78 0/14] it is observed that most of the hospitals/nursing homes of Shillong have a stream-side location. Analysis of the quality of the stream water made by the Shillong Pollution Control Board suggests prevalence of hospital waste. Further, fish, a biological indicator of pollution, is almost absent in the streams of Shillong.

Land is scarce in any urban area, but it becomes scarcer in a hilly area like Shillong because more than 75% of the total city area is characterized by moderately steep to steep slopes ranging between 10-20 degrees and above 20 degrees respectively. This creates hurdles in carrying out urban activities like garbage disposal and installation of incinerators.

Data Base and Methodology

The paper is based on both secondary and primary data sources. The secondary data regarding bio-medical waste disposal of different hospitals/

nursing homes of Shillong were collected from the annual reports submitted by various hospitals/nursing homes in 2003 to the Pollution Control Board, Government of Meghalaya, Shillong. The primary data are collected with the help of questionnaires filled in by the staff of hospitals/nursing homes located in Shillong Urban Agglomeration. The questionnaires were prepared on the basis of the guidelines on Bio-Medical Waste (Management and Handling Rules, 1998) of the Ministry of Environment and Forests, Government of India. The report included information on the quantity of different categories of bio-medical waste handled, the method of segregation, and disposal during the preceding year. The information collected from the reports submitted to the Pollution Control Board by the individual hospitals/nursing homes are compared here to get a better picture of the situation.

Both secondary and primary data were analyzed and compared after categorizing the wastes and after a thorough understanding of the amount, nature and method of bio-medical waste management by the city's hospitals/ nursing homes. The amount of wastes generated is calculated according to the standard norms, i.e., per bed per patient per day basis assuming that each patient would generate on an average about 1 kilogram of waste per day of which 25% consist of infectious, pathological and anatomical waste (Kerac 1992). It is estimated that at least 2281 kg of biomedical wastes are generated daily by the different hospitals/nursing homes and out of this about 565 kg are highly infectious wastes (Table 3). Thus every week about 15,967 kg of waste is generated out of which 3955 kg are highly infectious.

Table 1. Type of Wastes Generated by the Hospitals/Nursing Homes in Shillong

Category of waste	Type of wastes
1	Human anatomical wastes (human tissues, organs, body parts, etc.)
3	Microbiology and biotechnology wastes (wastes from laboratory, cultures, stocks, specimens, live or accentuated vaccines, etc.)
4	Sharp wastes (needles, syringes, scalpel, blades, glass, etc.)
5	Discarded medicines and cytotoxic drugs (wastes comprising of outdated, contaminated and discarded medicines)
6	Solid waste items (items contaminated with blood, body fluids, cotton, dressings, soiled plaster, linens, etc.)
7	Solid wastes (tubes, catheters, intravenous-sets, etc.)
8	Liquid wastes (waste generated from lab washing, cleaning, etc.)
9	Incineration ash (ashes from incineration of any biomedical waste)
10	Chemical wastes (chemical waste generated by use of disinfections)

Source (a) Annual Report submitted to the Pollution Control Board in 2003

Table 2. Amount of Different Categories of Wastes Generated by the Hospitals/Nursing Homes in Shillong

Category of waste	Amount of waste *	Amount of waste**	Discrepancy
1	57.75 kg/week	59 kg/week	-1.25 kg/week
3	37 kg/month	30 kg/month***	+7 kg/week
4	81.5 ,,	87.5 ,,	6 kg/month
5	18 ,,	N.A.	N.A.
6	307 ,,	372 ,,	65 kg/month
7	199 ,,	N.A.	
8	11,065 Lt/day	N.A.	
9	40 kg/month	N.A.	
10	193 Lit/month	N.A.	

Sources: *(a) Annual Reports submitted to the Pollution Control Board in 2003.*

(b) Information gathered through field investigation.

* According to the annual report.

** According to field investigation.

*** This figure is from one hospital only since other hospitals have no information.

Information on waste generated by the hospitals/nursing homes in Shillong were limited since only ten of them had submitted their annual reports for the year 2003 to the Pollution Control Board and the present authors could gather information only from seven hospitals/nursing homes in Shillong.

In Table 1, Category 2 is not included because this category relates to veterinary hospitals, animal houses and experimental animal remains used in research centres in and around Shillong, which is not our concern in this paper.

Table 3. Important Hospitals/Nursing Homes of Shillong and Their Estimated Quantity of Infectious and Other Bio-medical Wastes Generated Per Day.

Names of major hospitals/nursing homes	Estimated quantity of bio-medical waste generated in kg/day *	Estimated quantity of infectious waste generated in kg per day **
R.P. Chest Hospital	217	54.25
Civil hospital	400	100
Ganesh Das Hospital	400	100
K.J.P.Synod Hospital	350	87.50
Military Hospital	297	74.25
Nazareth Hospital	350	87.50
Woodland N.H	120	30
Bethesda N.H	30	7.50
Sanker Hospital	65	16.25
NEIGRIHMS	30	7.5
Park View/S.M.C	22	5.50

Sources: *Manual on Hospital Waste Management 2000, Central Pollution Control Board.*

*Assuming bio-medical waste generation as 1kg per bed per day.

** Assuming infectious bio-medical waste generation as 250 gm/bed/day.

Discussion

The data on waste generated under each category, compiled on the basis of fieldwork and reports of the Pollution Control Board, Government of Meghalaya submitted by these hospitals/nursing homes is provided in Table 2, although all hospitals/nursing homes of Shillong did not submit their annual reports in 2003. Secondly, the primary data on the wastes disposed, generated and treated by the hospitals/nursing homes on the one hand and the data available in the annual reports of hospitals, etc. do not tally well although the discrepancy is not very stark. Such discrepancies could be due to misreporting of the facts either to the Board or to us. The discrepancies in Category 4 and 6 are possibly due to the fact that most of the hospitals/nursing homes did not segregate the waste materials as per the categories mentioned. It was also observed during our investigation that most of the hospitals/nursing homes were ignorant about the government guidelines laid down about collection, segregation, storage and disposal of the waste under different categories. Such discrepancies might have also occurred due to overlapping of various wastes and the inadequate information provided by the hospital staff while interviewing. Some of the information received from them was not even correct.

The hospital authorities are found to be very casual in segregating the waste materials. The waste generated is not treated or segregated before throwing it into the streams of the city. As a result contamination of the stream water is unavoidable. Most people use stream water for bathing and washing cloths etc. Thus the bio-medical wastes generated by the hospitals and thrown into the streams are a serious threat to the health of the people living down streams. Though there are no studies reported on the consequences of such contaminated water on the health problems of the downstream inhabitants, the very records of hospitals in the East Khasi Hills District show that most patients suffer from water-related ailments like diarrhea, cholera, jaundice, gastroenteritis and typhoid. The reports of the Directorate of Health Services, Govt. of Meghalaya reveal that 99.9 percent of the patients in the hospitals of the East Khasi Hills District suffer from water-borne diseases. The patients' data for 2003 available from the government hospitals of Meghalaya shows that about 36,181 were treated for acute diarrhea, gastroenteritis, cholera etc. The 2001 and 2002 data from the same source also shows that 99.9 percent of the patients suffered from such diseases.

Thus it is clear that unless some drastic steps are taken Shillong, which

supports 96.37 percent of the total urban population in Meghalaya, will experience more serious health problems of its inhabitants. Moreover, the population living downstream in Ri-bhoi district will have worse situation than that of the East Khasi Hills District, though currently no data is available to buttress this claim.

Tables 2 and 3 do not provide the complete picture of the waste generated in Shillong Urban Agglomeration. When we look at the Civil Hospital in Shillong, which has about 400 beds, the average waste generated by this hospital alone is about eight truckloads of waste every month, which is dumped in the open areas in the outskirts of the city.

In Shillong there are only 3 hospitals, which have incinerators. These incinerators are both commissioned and maintained by the Meghalaya Pollution Control Board. However it could not be ascertained if the incinerators installed conformed to the specifications laid down by the apex court. During our field investigation the investigators were not shown any of the deep burial sites nor any of the shredding machineries for disposal of the used needles, syringes and blades etc.

Most of the hospitals/nursing homes have a dumping ground from where the waste is collected by the municipality staff. The municipality authority has identified some landfill areas for hospital waste dumping. But these places are not useable since land acquisition process is yet to be completed due to local land rules. Therefore the solid wastes that are collected from the hospitals/nursing homes by the municipality are dumped in the municipality incinerator at Mawiong on the Guwahati-Shillong Road. In this place a bio-compost plant has been established.

Segregation and Storage of Wastes

The study reveals that the Military Hospital is the only hospital in Shillong, which maintains the colour code, and which follows the guidelines laid down by the Ministry of Environment and Forest Biomedical Waste (Management and Handling) Rules 1998. The rest of the hospitals/nursing homes are openly violating the above rules. Most of the hospitals lack infrastructure facilities to either handle medical waste or make any serious effort to have such facilities due to the lackluster attitude of the government about implementing such rules.

Different categories of bio-medical wastes need different modes of storage, treatment and disposal as laid down under the rules. But during our field visit it was found that in some medical institutions in the city biomedical wastes were dumped together with general municipal waste. This may have a serious consequence on the health of the people living in the vicinity of those hospitals/nursing homes. The ever increasing volume of infectious medical waste will be the source of various ailments in and around the city where such hospitals are located. Further the workers never wear protective gears while collecting and transporting infectious wastes. Such workers will act as carriers of infectious diseases to the common people.

Conclusion

The study reveals that management and handling of the bio-medical wastes generated by the hospitals/nursing homes in Shillong is a serious concern. Hospital waste management requires a holistic approach. Public awareness and co-operation among various health care centres, technocrats, bureaucrats, financial institutions and NGOs are much needed for a concerted effort to manage the medical waste.

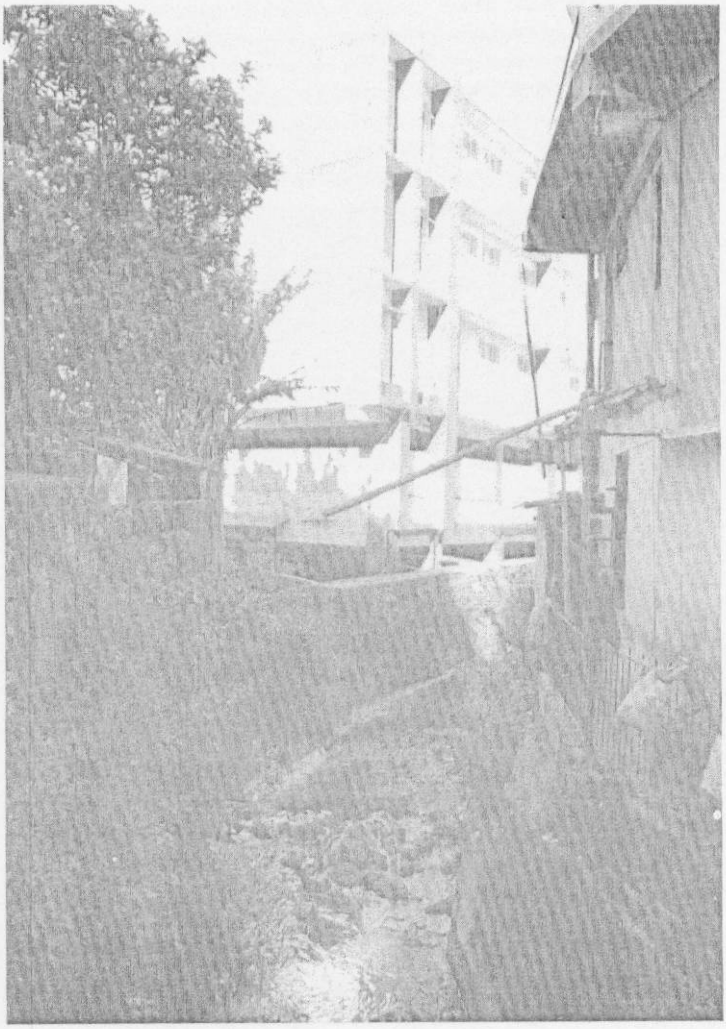
There are evidences to show that hospitals situated in the midst of a busy residential and commercial area of the city dump their waste on the streets and open dustbins of the locality. This has now been stopped due to community pressure. Hence the community holds the hope for proper implementation of the Bio-medical Wastes (Management and Handling) Rules 1998, which will greatly reduce the problem of pollution of the streams and streets of Shillong. It is also essential for employees of every hospital/nursing homes to have proper knowledge, training, and infrastructure needed to segregate, disinfect and dispose off the infectious waste as per the guidelines of the above rules.

Thus the study suggests that a public health catastrophe can be avoided by managing waste disposal system, creating public awareness and making every hospital/nursing home to follow the guidelines laid down by the government of India strictly.

There has been a proposal from the State Pollution Control Board to set up a central incinerator. This is expected to cater to the need of treatment of biomedical wastes of all the nursing homes/hospitals of the city.

There are certain genuine reasons why there are no incinerators in most of the city hospitals/nursing homes. They are located in highly populated, residential or commercial areas. It is not advisable to build incinerator in the lower elevations where some hospital/nursing homes are located. Installation of incinerators in such locations may result in health hazards due to emission of harmful smoke. Therefore, the idea of installing a central incinerator at the highest point of the city is welcome and should be implemented at the earliest.

Contaminated solid waste dumped in the stream by Woodland Nursing Home.



Contaminated liquid waste released from Bethany Hospital into the adjacent stream.

A rag-picker carrying infectious waste from the dustbin of Civil Hospital without any protective kit.

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