

## Introduction:

Bio-medical waste is the any waste, which is generated during the diagnosis, treatment or immunisation of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps.

According to various estimates and surveys around 80-90 per cent of hospital waste is general waste and 10-20 per cent is infectious/ hazardous. Of this, 15-20 per cent is pathological and infectious waste, one per cent is sharps waste, three per cent chemical/pharmaceutical and less than one per cent is special waste such as radioactive, cytotoxic drugs, etc. These percentages may be higher or lower depending on the type of hospital (for example, teaching, research and large general hospitals will have higher quantities of these wastes, while rural and small speciality hospitals may have much lower quantities).

All individuals exposed to hazardous healthcare waste are potentially at risk. This includes people within healthcare establishments and those outside these sources who either handle such waste or are exposed to it as a consequence of careless management. The main groups at risk include doctors, nurses, patients, visitors, workers in support services allied to hospitals like the laundry, workers in waste disposal facilities, etc. The hazards associated with scattered, small sources of healthcare waste should not be overlooked; this can include waste generated by home based healthcare.

Infectious waste may contain pathogens in sufficient concentration to cause disease. Infectious waste would include cultures and stocks of infectious agents from laboratory, pathological waste (tissues, organs, body parts, human foetus, and animal carcass from research facilities, blood and body fluids) and sharps waste. Pathogens in waste can invade the body through various routes, including a puncture, abrasion or a cut in the skin, through the mucous membrane or by inhalation/ingestion. Body fluids can act as transmission vehicles for various pathogens. Infectious waste from hospitals is problematic because laboratories harbour not just resistant strains, but also concentrated cultures of microorganisms. Existence of bacteria resistant to antibiotics and chemical disinfectants contributes to the hazards. It has been demonstrated that plasmids from laboratory strains contained in healthcare waste were transferred to indigenous bacteria via the waste disposal system. Hence proper biomedical waste management is the need of the hour.

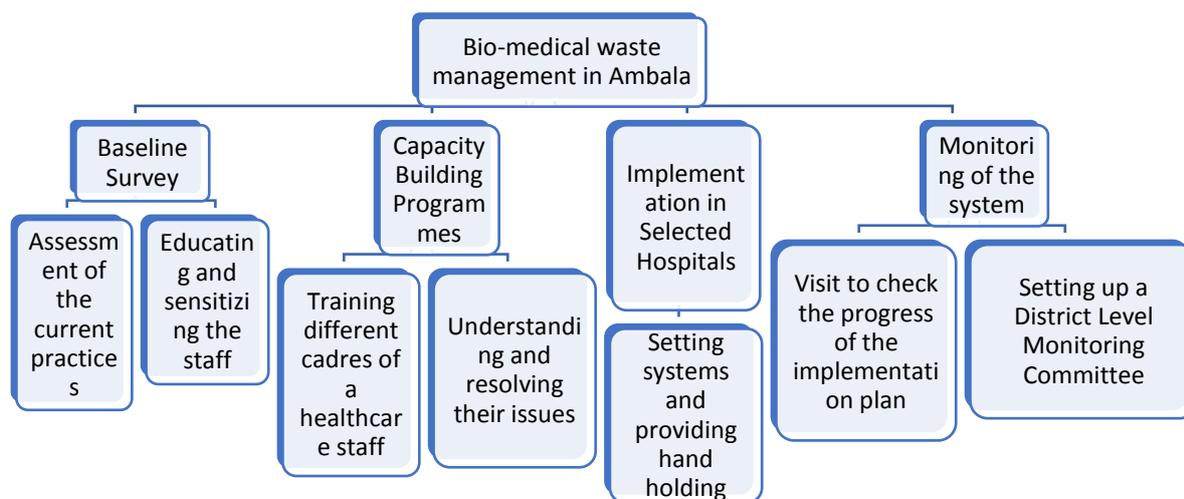
The problems arise due to the improper segregation and mixing of hospital waste with the municipal waste. The bio-medical wastes generated from health care units depend upon a number of factors such as waste management methods, type of health care units, occupancy of healthcare units, specialization of health care units, ratio of reusable items in use, availability of infrastructure and resources and the final disposal methods.

### **Ambala:**

Ambala is a city in Ambala district in the state of Haryana, India, located on the border with the Indian state of Punjab and in proximity to both states capital Chandigarh. Ambala has two sub-areas: Ambala Cantonment also known as (Ambala Cantt) and Ambala City, approximately 3 km apart. Coming to the hospitals, the city has over 350 hospitals both government and private. This accounts for a huge pile of biomedical waste generation. And if this waste is not managed properly, it can lead to serious life threats in the form of diseases. Hence to address the issue, a project is being taken up by Recity in collaboration with Toxics Link.

### **The project:**

Toxics Link has been working on the issue of biomedical waste since 2 decades and in continuation to its effort, in June 2017, we started to work on biomedical waste management in Ambala as a part of “OYE! Ambala” awareness campaign. Municipal Corporation of Ambala launched this campaign for strengthening the Municipal Solid Waste & Bio-medical waste management system. Recity Network Pvt. Ltd implemented the program and the Bio Medical Waste Management vertical was managed by Toxics Link. The project was conducted in 4 phases and aimed to reach out to maximum healthcare facilities and Common Bio-medical Waste Treatment Facility (CBWTF). The purpose of the project was to sensitize healthcare fraternity about the issue of biomedical waste, making them aware about the requirements of the new BMW Rules 2016, training them in how to implement it, working with them in implementation, and monitoring the changes in practice thus incorporated.



Flow chart depicting the framework of the project

### Baseline survey:

Toxics Link team conducted a survey in 14 healthcare facility in Ambala to assess the ground situation of the biomedical waste management. A questionnaire was filled and the interactions with the doctors, nurses and cleaning staff of the hospitals were done. The study concluded that there are number of gaps in medical waste management system in Ambala and a couple of hospitals are non-compliant to the current rule. Major reasons for this were:

- Lack of awareness and concern about the issue
- Strategy for implementing the system
- Poor availability of infrastructure and training among healthcare facilities.
- Poor waste collection frequency by CBWTF
- Improper record keeping and reporting.
- Absence of a monitoring mechanism

To address these issues, Toxics Link Team conducted a capacity building programme which was followed by the implementation and monitoring.

### Capacity Building:

Capacity building programme was aimed at building awareness on all issues of biomedical waste management rules 2016. It was conducted in 11 sessions from 27<sup>th</sup> July to 1<sup>st</sup> August

2017. A total of 84 healthcare facility participated in the programme and 74 doctors and 139 nurses and 31 cleaning staffs were trained.

**Presentations:** The presentation in each session was tailor made to the need of the attending audience. For doctor's session, the presentation included the new BMW Rules 2016, changes in the new rules and reason for the same, policy level implications, roles and responsibilities of the hospital, administrative staff, nursing staff and cleaning staffs etc. The second presentation included the implementation strategies for the new rules and ramifications of the non compliance. It also included step by step guidance for implementing rules in a small, medium and large facility. Case studies of implementations were also discussed. For nurse's session, the presentations included the new BMW Rules 2016 and its impact on the nurses, responsibilities of the nurses in carrying out and maintaining correct segregation practices. This was followed by the presentation on the implementation strategies of BMW Rules in a ward and a step by step guidance for the same. The importance of PPE (personal protective equipments) was also highlighted and a sense of motivation was created by perception of self harm. A small interactive game session was held with all nurses to identify which category of waste will go in which colour bin. For ward boy's session the presentations mainly focused on the need of personal protective equipments and waste handling practices. Perception of self harm and self protection was instilled in the cleaning staff members. After the presentations, a demonstration session was held for the cleaning staff to educate them about the tying practices and the need of PPE. Each session was followed by a small talk on mercury toxicity and its spill management

**Knowledge Attitude Practice Survey:** In each doctors session a short KAP survey was conducted. Same KAP forms were given before and after the sessions .This was to assess the knowledge and attitude of doctors towards biomedical waste management. Before and after KAP form assessment revealed that all the participants were positively influenced by the programme and wanted the programme to be repeated at regular intervals. They also showed interest to implement the effective BMW management in their own set up.

**Discussion:** After the presentations, each session was left open for discussion to address the queries and problems faced by the doctors, nurses and sanitation staffs. Discussion was quite interactive and a lot of issues hindering the compliance came to light. They expressed their concerns on the frequency of waste collection and the general waste management system in

Ambala. Based on the interaction in the sessions, 19 hospitals which included both government and private hospitals were identified for implementation. Most hospitals with large bed strength were covered in implementation program. A variety of hospitals were chosen which included eye hospitals, maternity hospitals, general hospitals etc.

### **Implementation:**

Out of the 84 hospitals that attended the capacity building, Toxics Link Team visited 19 hospitals and implementation of the biomedical waste management system was carried out. During the implementation, each ward of the hospital was visited, surveyed and observed for the practices of biomedical waste segregation, collection, storage and record keeping. Where ever needed suggestions were given and implemented to improve the segregation practices. The hospitals were also assisted with the policy document and fixing rules and responsibilities in each ward for the better practices. IEC Materials which included posters were distributed. The staff and the doctors were trained for the new BMW Rules 2016. Sanitation staff was also sensitized and advised regarding the use of Personal Protective Equipment. A policy document was made and was given to the senior doctors. Various formats for fixing roles and responsibilities, placement of bins, waste collection, transportation and monitoring was given to them to be put in the policy and/or in various wards. The team interacted with the entire staff of the hospital i.e. doctors, nursing and cleaning staff. On the spot training sessions were conducted in many locations throughout the hospital. At each step, the infrastructure and IEC material was put and suggestions about their placements were given. The cleaning staff was taught about the importance of PPE and immunization and they were also taught about the cleaning of blood spill and mercury spill. The importance of accident reporting was explained to all the staff. The CBWTF was also sensitised on their role and responsibility and also advised to make necessary changes in frequency of collection, upkeep of collection vehicle and proper record keeping of waste being collected from each hospital. The CBWTF has incorporated the required changes and there is significant improvement in the method of waste collection and transportation to the CBWTF.

### **Monitoring:**

During Monitoring, 25 hospitals were covered in a given time frame. The hospitals thus visited were checked for the parameters like waste segregation, waste collection, intramural transportation, record keeping, and use of PPE etc. As and when needed a small capacity building session were held at the hospital premises to encourage the staffs of the hospital to

follow the new BMW 2016 Rules. Some Hospitals did exceedingly well and were identified as model hospital based on the effective biomedical waste management practices.

Model hospitals in Ambala city	Model hospitals in AmbalaCantt
Leelawati hospital	Railway hospital
P C Sharma Eye hospital	Civil hospital cantt.
Narain hospital	Saket hospital
Bansal eye care hospital	

**Ideal practices by the hospital:**



Figure 1: BMW segregation according to the rules



Figure 2: Innovative tray from Leelawati hosp



Figure 3: Waste transportation trolley



Figure 4: BMW segregation railway hospital



Figure 5: BMW storage at PC Sharma eye hosp



Figure 6: BMW segregation at Bansal Eye Hosp



Figure 7 & 8: CBWTF vehicle before implementation / labelled vehicle after implementation

### Impact of the project:

1. The healthcare staff members of Ambala who attended the capacity building programme and the hospitals where the implementation and hand holding was done, understand and recognise the need for better compliance and expressed their eagerness to invest in improving overall management of BMW.
2. Currently over 60% of the biomedical waste generated in the city is being segregated as per the norms prescribed. (This is based on the total bed strength of Ambala covered in the project.)
3. The infrastructure required for implementing the segregation practices has also been upgraded in hospitals where implementation was carried out.
4. Many hospitals have also started to maintain internal records of their waste generation apart from the daily collection sheet provided by the CBWTF. They have also set up systems to monitor the process.
5. The waste collection by the CBWTF also suggests significant improvement with better frequency of collection and record keeping. The vehicle now collects waste every alternate day from the facility and the sanitation staff wears proper PPE as

reported by many hospitals visited during the monitoring and also by individual interaction of the Toxics Link Team with the sanitation staff of CBWTF.

6. Most hospitals that were part of the project are now handing over segregated waste to CBWTF and dumping of biomedical waste in municipal bins has been very significantly reduced.
7. There are a few hospitals that are not connected to CBWTF which is against the current rules and the list of such hospitals has been sent to the Haryana Pollution Control Board for necessary action.
8. Formation of the district level monitoring committee has also been initiated by sending a letter to District Magistrate for the same.

Due to the continuous capacity building, training, hand holding in the implementation process by the Toxics Link Team, a lot of other hospitals have also got motivated and have started to follow BMW Rules 2016 on their own. One such hospital which was discovered during the monitoring phase is Bansal Eye Hospital. This shows the ripple effect of the project. To replicate this effect, a motivation programme was also organised for hospitals to come and see the model practices being followed and to implement the same in their respective settings.

### **Conclusion and Way Forward:**

To sustain the positive changes brought about in the biomedical waste management system in Ambala, regular training and monitoring is needed. No doubt the hospitals involved in the project have initiated steps for proper biomedical waste management but the momentum thus gained needs to be continued. The hospitals covered during the project need regular monitoring and the small hospitals that remained untouched during the project need guidance for setting up the optimal biomedical waste management practices. A follow up on the progress thus made would help a great deal. State Pollution Control Board and district monitoring committee have major role to play in this. State Advisory Board can be approached for the monitoring of the hospitals and for the formation of the district monitoring committee. This way, under the guidance of the Advisory Board, the district monitoring committee will become functional and continuous monitoring in the district can be achieved. State pollution control board can conduct regular training for the new BMW Rules 2016 and registration process for the hospitals can be supervised. They can also conduct regular inspections for the hospitals and discuss the report of such hospitals periodically. SPCB can also hold the meeting of the district monitoring committee at regular intervals. Indian

Medical Association Ambala can also conduct meeting and training for the BMW Rules 2016. CBWTF also needs to be monitored on regular basis, by the SPCB and also by the hospitals. The hospitals can visit the CBWTF unannounced and report the activities, if found suspicious.

Success of this project is an example that with proper motivation, infrastructural support and technical guidance the menace of the biomedical waste mismanagement can surely be curbed down. With the support of the municipality and motivated healthcare fraternity of Ambala, Toxics Link managed to bring the transition in BMW management scenario in Ambala in just 3 months. It would be interesting to see if the same model being replicated in other cities as well. The point worth pondering is that, if a small city like Ambala can be so forthcoming for managing its biomedical waste properly, why can't others?