Report of training workshops

in Rajasthan

On

Bio medical Waste management and Hazards of Mercury

Prepared by:	Funded by:	Supported by:
Toxics Link	RSPCB	DOH

ABOUT US

Toxics Link is an Indian environmental research and advocacy organization set up in 1996, engaged in disseminating information to help strengthen the campaign against toxics pollution, provide cleaner alternatives and bring together Groups and people affected by this problem.

In the field of medical waste management our objectives are focused on building all around capacity and creating an ecosystem for affecting on ground change. Our work on Bio medical waste management has spanned over 20 long years which includes a significant diverse body of work such as policy engagement, ongoing research on occupational safety, setting standards, training and capacity building of all stakeholders, creation of training modules, creating model healthcare facilities for waste management, audit and monitoring of systems and improving compliance to the waste rules and reducing hazards to healthcare professionals and society. Toxics Link has also been working with the healthcare facility to improve mercury management and facilitate and encourage shift from mercury based instruments to its alternates. It has been successful in getting state orders of mercury phase from the healthcare facilities in Delhi, Manipur, Karnataka and Punjab.

Toxics Link's years of experience and expertise had made it an information clearinghouse for Bio-medical waste for last 20 years. The organization has developed a wide array of IEC material on the issue of bio medical waste management including posters, brochures, booklets, training manuals, guidance documents, films and a multimedia training tool etc.

Research Team - Tripti Arora and Lavanya Padhi, Toxics Link

Advisory Team - Dr. Vijai Singhal, Chief Environment Engineer, Rajasthan State Pollution Control Board; Dr. RS Chhipi, Additional Director, Department of Health and Family Welfare, Rajasthan

ACKNOWLEDGEMENT

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We express our sincerest thanks to the entire team of the Health Department. Special thanks are due to Dr. RS Chhipi, Additional Director, Department of Medical, Health and Family Welfare for devoting his time and effort in organizing as well as conducting the workshops. He made himself available for all the workshops and promised redressal of many issues raised by the participants.

We would also like to thank all the Joint Directors for their contribution in not only the smooth conduct of the workshops but also in highlighting the importance of this issue at their level.

Thanks are also due to all the participants for their very active participation and also for taking part in the KAP Assessment.

List of Abbreviations

KAP- Knowledge Attitude Practice

RSPCB- Rajasthan State Pollution Control Board

SPCB- State Pollution Control Board

BMW- Bio-Medical Waste

MoH- Ministry of Health

CBWTF- Central Bio-Medical Waste Treatment Facility

Hg- Mercury

HIV- Human Immuno Deficiency Virus

HBV- Hepatitis B Virus

HCV- Hepatitis C Virus

IV- Intravenous

PHC- Primary Health Centre

CHC- Community Health Centre

BCMO- Block Chief Medical Officer

CMHO- Chief medical & Health Officer

NSI- Needle Stick Injury

PPE- Personnel Protective Equipment

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EXECUTIVE SUMMARY

In an effort to improve compliance of medical waste management in the country, Toxics Link has been working with state governments and local CSOs for past many years. The organisation has worked with almost 18 state governments either directly or in partnership with a local CSO.

The Rajasthan Pollution Control Board was very proactive and welcomed the idea of having a workshop on medical waste management in the state. Their strong support helped us initiate a project in coordination with them and the Department of Health. The project consisted of a series of seven workshops in the state, one in each of seven divisions.

The workshops were very well received by the participants and helped in identifying major issues that the Health Care Facilities (HCFs) are facing. Though the workshops were aimed at training the participants, a KAP assessment was also conducted to understand the knowledge they have as well as the practices that they are following.

During the workshop, the participants were informed about BMW Rules, the strategy of implementing an efficient BMW management in their districts/blocks/hospitals along with the case studies of successfully running systems in the country. The issue of Effluent Treatment Plant (ETP) installation and operation was also taken up. Lastly, the participants were informed about mercury hazards and their role in preventing them.

The participants found the information useful and mentioned that such workshops should be conducted on a regular basis and also for lower cadres.

Through the discussions and the Knowledge Attitude Practices (KAP) assessment, few issues which need immediate attention were found. These include-

- Lack of awareness among the healthcare staff,
- A high prevalence of recapping of the syringe,
- Restricted use of needle cutters as well as PPEs,
- Confusions about the segregation pattern,
- Lack of training sessions, infrastructure as well as monitoring.

Healthcare facilities are facing issues like lack of resources, untrained staff, lack of information and support from SPCB, no CBWTF connectivity or its inefficient waste collection frequency. The health department and SPCB should ensure linkage of CBWTF to all the HCFs and monitor them regularly in order to ensure efficient waste collection and transportation system. Model hospitals can be set up in each block in collaboration with selected HCFs, SPCB & DoH. Also, majority of the facilities are facing issues with installation of ETP, and guidelines for its installation and operation can be prepared at the state level.

Despite these issues, we saw some examples within the state, which can serve as models for other facilities.

Therefore, this report aims to highlight all the issues and has recommendations for all the HCFs in the state for them to become models.

1. Introduction

According to the BMW Management Rules 2016, "bio-medical waste" means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps. This waste imposes serious health hazards and has severe environmental and health implications. It is a major source of infectious waste and dangerous chemicals. Pathological waste, amputated body parts, sharps waste, vaccine waste, microbiological waste, expired and discarded medicine, cytotoxic waste etc needs good management protocols.

Out of all the waste generated in the hospital approximately only 15% of the waste accounts to the infectious and around 5% hazardous. Improper management of this waste leads to mixing of BMW with other municipal wastes, illegal retrieving of recyclables by rag pickers, foraging by animals, occupational and community exposure to infections. It also compromises patient safety, which is a big issue internationally. All these leads to spreading of deadly diseases like HIV, HBV, HCV and other communicable diseases.

As part of its efforts on increasing compliance of BMW in the country, Toxics Link engages with SPCBs and NGOs in different states and one of its engagements in Rajasthan led to the initiation of this project. It was initiated with the intent to build capacity of the personnel involved in medical waste management at all levels including healthcare facilities, centralised treatment facilities etc. The purpose of the project is to achieve environmentally sound management of medical waste in Rajasthan, with the intent that it can then act as a model for the entire country.

This project was aimed at conducting 1 workshop in each of the 7 state divisions i.e.

- Ajmer- 25th October, 2016
- Jaipur-26th October, 2016
- Bharatpur- 27th October, 2016
- Udaipur- 6th December, 2016
- Kota- 8th December, 2016
- Jodhpur- 20th December, 2016, and
- Bikaner- 22nd December, 2016

These workshops on **"BMW management and hazards of Mercury"** across Rajasthan (in collaboration with RSPCB and DoH) have been conducted with the aim of further strengthening hospital based BMW programmes in the state. The workshops also included KAP assessment as one of its activities.

The key stakeholders in the workshops were Rajasthan State Pollution Control Board, Department of Medical, Health and Family Welfare, senior health officials representing district and block level healthcare institutions, CBWTF representatives, an expert in the field of Bio-medical waste and Toxics Link.

Deliverables:

- Report on each workshop
- A compiled Report of all the workshops conducted in the state

The following outcomes are expected after the completion of the project:

- Preparation of an Action Plan for Districts/Hospitals in Liaison with the State Authorities.
- Knowledge Dissemination by the participants to their respective hospital staff.
- Development of in-house training mechanisms in hospitals.
- Development of a Waste Management policy at hospital level

- Formation of a waste management committee in participating hospitals

2. Workshop on BMW and Hazards of mercury

A whole day workshop on **"Bio medical waste management and hazards of mercury"** was organised in collaboration with State Pollution Control Board, Department of Medical, Health and Family Welfare in all the seven divisions at:

Ajmer- Rajiv Gandhi Vidhya Bhawan,
Jaipur- State Institute of Health and Family Welfare,
Bharatpur- Hotel Lakshya Palace,
Udaipur- Hotel Landmark,
Kota- Hotel Saraswati Palace,
Jodhpur- Dr. SN Medical College and
Bikaner- Swasthya Bhawan

PMOs, DPM, Deputy CMHO, BCMOs from all the government hospitals of the respective divisions, participated in the workshop.

IEC Material:

Each participant was provided with a kit inclusive of various IEC materials:

- Training Manual on Bio medical waste
- A step by step guide to manage the hospital waste (10 Commandments)
- Know-how booklet on medical waste for nurses
- A brochure on Mercury
- 1 CD containing movies on Bio medical waste and Mercury management
- 1 CD of the presentations of the BMW training manual
- Posters on medical waste management & occupational safety for nurses & ward boys
- Action Plan on how to implement BMW system in a healthcare facility

The workshops were divided into 3 sections viz, Inaugural, Technical Session I and Technical Session II.

Please refer individual regional reports for the registration sheets and detailed sessions.

2.1. Discussions:

i. Authorization:

- Facilities are facing the problem in getting the authorization, as SPCB has made registration online.
- There is confusion among the hospital management about the criteria required for getting the authorization.
- Major concerns were raised regarding submission of authorization fee to SPCB through E-mitra. Many participants complained about the following issues that they are facing with the E-mitra portal:
  - Requirement of submission of a PAN card copy.
  - Transferring the money online through Debit/Credit Card
  - Problems of transferring the money through NIFT/RTGS from the same bank.
  - Applying for refund.
- The hospitals complained about the lack of support from SPCB's end and asked SPCB to extend support to them to handle authorization issues.
- According to BMW Rules, 1998, clinics treating more than 1000 patients were not required to take any authorization, however, this clause has been changed and now the new rules mention that non-bedded occupiers need to get one time authorization. The

department seemed to be reluctant in implementing this clause as of now.

ii. Training:

- Difficulties in conducting training of the outsourced staff, due to their high turnover rate were also discussed. Dr Priyank responded and acknowledged this as a major issue that even the private hospitals are facing. He mentioned that even though it is an existing problem and continue to be so in the near future, we only have training and re-training as a solution.
- Facilities pointed out towards the need of frequent training programmes for the staff especially for the lower cadre.

iii. Monitoring:

- The facilities reported irregular monitoring at the SPCB's end and mentioned that frequent and strict monitoring should be conducted.
- SPCB should also monitor the CBWTFs regularly as they do not collect the waste timely.

iv. Issues with the CBWTF:

- The state is also facing shortage of CBWTF and the issue of irregular waste collection by the connected CBWTFs; some facilities also mentioned that the vehicle comes just once in a month. SPCB mentioned that it requires a written complaint from the hospitals in order to take an action against it.
- The discrepancy in the fee taken up by the different CBWTF was identified to be one of the major issues. For eg: in Kota, Rajdeep Enterprises was charging very high fee in comparison to other CBWTF in the region.
- There were also queries on the guidelines for the vehicles run by CBWTF. Vehicles must be labelled carefully. Driver of the vehicles are also exposed to the waste he is carrying. Therefore, he must be protected and a separation provision must be made in the vehicle.
- Some of the facilities despite of falling in the distance range of the CBWTF are not connected to it due to varied reasons. For eg: In Jodhpur division, the CBWTF is just covering two districts and is not connecting the HCFs which lie under 150km range since they fall under different districts.

v. Budget:

- Queries were raised regarding budget head for authorization fee, registration fee for the CBWTF as well as for infrastructural requirements. Dr Chippi addressed the issue of budget allocation for authorization, and explained that this can be procured from the health department and budget for CBWTF fee and for infrastructure has to be taken up from RMRS (Rogi Kalyan samiti).

vi. Effluent Treatment Plant:

- Hospitals are facing problems with the installation of ETP/STP's as they lack the basic knowledge of how to go about addressing the issue of land requirement, project plan and budgeting for the installation.
- Issues about cost of ETP installation were raised, since some hospitals were given very high cost by private companies, and hence difficult for the hospitals to install a treatment equipment at such high cost.

vii. Deep Burial pits:

- A large number of facilities mentioned that new burial pits design should be sent to each CHC or they can be constructed at the district level at each PHC/CHC as previous pits are filled/damaged due to dumping of waste without following a standard procedure.

viii. Other Concerns:

- Query on the disposal of the liquid waste generated in X-ray room, developer and fixer

solution of the X-ray film was raised which was addressed by Dr Priyank who clarified that since it doesn't have any toxic composition, after recovery of silver it can be discarded in the liquid waste stream.

- The supply of vaccines for immunization is intermittent. For example, in Ajmer a query was raised by a participant saying that the vaccine for Hepatitis B should be administered in two or three doses to ensure complete immunization. But, they have received only one set of dose of the vaccine, the booster dose which has to be administered within 3 months of the first dose has not yet been supplied.
- In most of the divisions, the hospitals are supplied with bleaching powder in 50kg bags. The issue is this, that the whole amount cannot be used in one go, so the facilities have difficulty in storing the bleaching powder for a long period because the effective chlorine available for disinfection reduces with time, hence more amount of bleach has to be used to acquire desired disinfection.
- Issues like lack of infrastructure, manpower and trained staff were repeatedly discussed.
- One of the hospitals complained that the bags they receive for waste collection are of poor quality and thus, procurement of bags of the desired quality is a necessity.
- The participants also suggested that since the burden on yellow bag has now increased, the bags must be made stronger enough to carry the weight. The carrying capacity of the yellow bag must be sufficient.
- There has also been a complaint of municipality not taking the general waste from HCFs. This must be resolved mutually within SPCBs and municipality.
- One of the concerns regarding the new rules raised by the hospitals and the Department of Health was that since these rules have made major changes in the colour coding and have also included bar-coding and some other new provisions, the hospital staff are not trained or well equipped to implement them as a whole. Some of the CBWTFs are refusing to collect the wastes as the price for the BMW treatment is not revised since 2003, though it has the responsibility to collect the waste at the price finalised by Rajasthan state government.

2.2. Recommendations:

i. **Authorization**-

The HCFs are facing difficulties in operating the SPCBs online portal- E mitra. SPCB should guide these facilities on how to use this and also should help them in case of some queries.

ii. **Monitoring-**

- Since many hospitals complained about irregular waste collection by CBWTF, it is imperative that a regular check is done by SPCB.
- Many healthcare facilities have never been visited by the SPCB for monitoring compliance.

iii. **Waste water treatment**-

- The issue of ETP/STP was addressed by Dr Chippi by co-ordinating with Dr. Vijay Singhal, Chief Environmental engineer who said that a budget will be made for the installation of the ETP/STPs in the healthcare centres depending upon their capacity.
- Guidelines on the installation and operation of an ETP should be prepared at the state level.

iv. **Communication Gap-**

Since a communication gap was observed between the HCFs and SPCB, a mailing list can be prepared by the Regional Office, SPCB to provide information to the HCFs.

v. **Model Hospitals**-

- Model hospitals can be set up in each block in collaboration with selected Healthcare facilities, State Pollution Control Board and Department of Health and Family Welfare.
- Nodal person of the waste management committee of the other hospitals be allowed

to visit the model hospital so as to get the idea of the proper management.

vi. **Injection Safety-**

- Injection Safety and PEP policy has to be implemented in the healthcare facilities.
- Regular supply of vaccines should be made available for the hospitals based on their requirements. New staff should get the vaccination done before induction.
- Recapping should be banned. Advisories should be issued; IEC and training materials should include this component.
- Manual needle cutters should be made available in each trolley so that needles are cut immediately after use.

vii. **Issues with CBWTFs**

- **Linkage to CBWTFs-** Mapping of all the healthcare facilities in the area should be done. A region specific roadmap should be prepared and CBWTF linkage with all the facilities should be worked out. A timeline should then be given to implement the system in all the facilities.
- **CBWTF Charges-** Since, differences of fee taken by CBWTF were identified as one of the major issues, the state should make the prices uniform and stop the agency in charging unnecessary fee from the hospitals.

viii. **Open Burning of Medical waste**

Open burning of medical waste should be completely banned. Strict action should be taken against the facilities that are still following this practice.

2.3. Future Engagements

Toxics Link intends to follow up with the Department of Health as well as the State Pollution Control Board to see if the facilities have prepared and shared their action plans. The team also intends to follow up on the progress of the issues identified in the workshop.

3. KAP Assessment:

KAP assessment was conducted during the workshops to know the current scenario of waste management practices of various health care facilities. The participants of the workshop were mainly doctors and policy makers at district level. The survey was done keeping in mind certain aspects associated with the bio-medical waste management practices and mercury usage. The focus was largely on awareness levels regarding policy, segregation practices, colour coding, transportation, labelling, storage, occupational safety (w.r.t. needle stick injury and subsequent reporting systems) etc.

Existence of Common Bio-Medical Waste Treatment Facilities (CBWTFs), its connectivity with the healthcare facilities and the waste collection frequency were also evaluated. The KAP assessments were done pre and post the workshop to analyse the effectiveness of the workshop.

The KAP forms were given to the participants before the workshop. The pre workshop form was collected before the start of the sessions, the post workshop forms were collected at the end of all the sessions. Fig1 represents the participants from different facilities from all the seven divisions in terms of number of beds. A total of 400 participants were there in all the workshops, out of which 226 responded. The remaining respondents who had submitted only one form either pre or post have not been taken into account.

Here, one respondent might represent an array of facilities.

Of the total ***226 respondents, around 45% were from less than 50 bedded facilities, 13% from 50-100, 14% were from 100-300 bedded facility, 6% from 300-500 bedded facility, 2% and 1% from 500-100 and >1000 bedded facility respectively.***

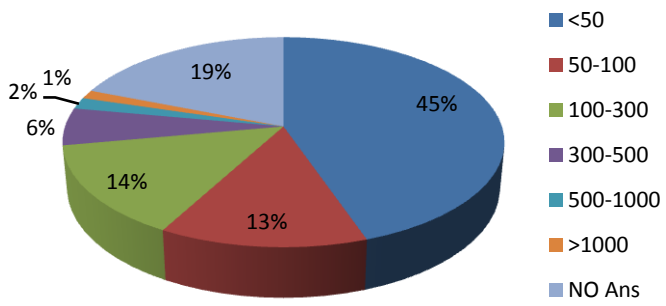


Fig 1: Bed strength of the facilities

a) Policy Awareness:

Knowledge about policy is vital for everyone because BMW Rules 1998 is a national law. Awareness about the Bio-Medical waste (Management and Handling) Rules, 1998 is the starting point for all the healthcare personnel. Even after 18 years of its existence, only ***66% of the respondents were aware of it*** (Fig 2 a). Fig 2(b) represents the awareness level in the respective seven divisions of the state.

Bio-medical waste management rules 2016, were notified on March 28th, 2016, but ***48% of the respondents were not aware & 17% were partially aware of it*** even after 7 months of its notification (Fig 3 a)**.** Fig3 (b) represents the awareness level in the respective seven divisions of the state.

30% respondents were reluctant to say whether they are following the proper waste management according to the rules or not.

Only ***42% of the respondents are following the waste management*** in their facilities according to BMW Rules 1998.

28% of the respondents say that their facilities still don't have any waste management system (Fig 4).

As far as overall comparison of the awareness of biomedical waste management rules is concerned KOTA division seems to be ahead of rest of the six divisions Fig 2(b) &3(b).

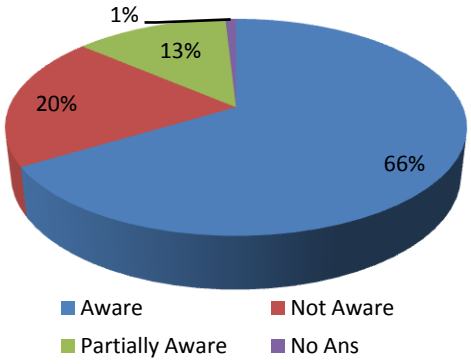


Fig 2(a): Awareness of BMW 1998 rules

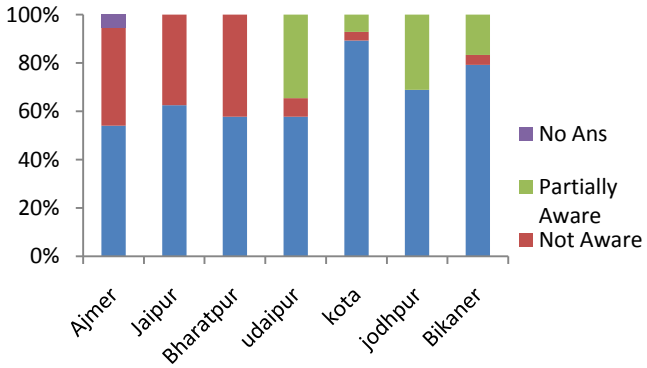
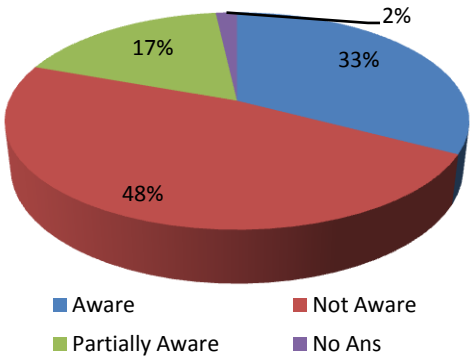


Fig 2(b): Awareness of BMW 1998 rules in the state



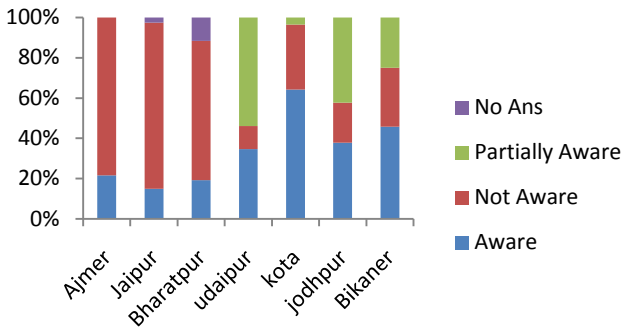


Fig 3(a): Awareness of BMW 2016 rules Fig 3(b): Awareness of BMW 2016 rules in the state

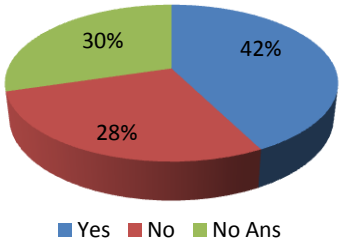


Fig 4: Implementation of BMW management Rules

b) Mercury:

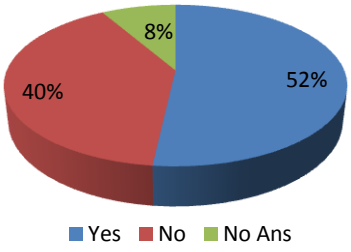
India has signed the Minamata Convention on mercury in October 2014. According to the convention, mercury measuring instruments will be phased out by 2020. Slowly India is trying to curb the usage of mercury from various sectors and even the healthcare sector is trying to limit the use of this metal through various orders. So we have included this in our KAP analysis to survey the awareness level of hazards of mercury and the policy related to the same.

52% of the respondents were aware of the policy by IMA (fig 5).

Only 35% were aware of the Minamata Convention on mercury (fig 6).

Only ***15% of the respondents have taken mercury phase out initiatives in their facilities (Fig 7).***

The facilities mostly take these initiatives by replacing broken/damaged mercury equipments by digital/aneroid ones.



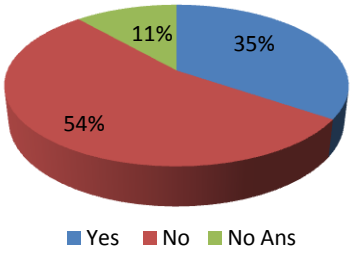


Fig 5: Awareness about mercury phase out policy Fig 6: Awareness about Minamata Convention

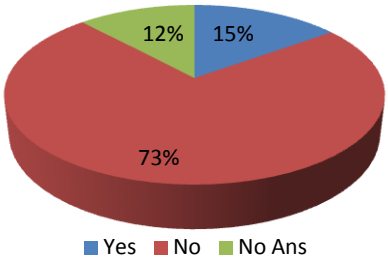
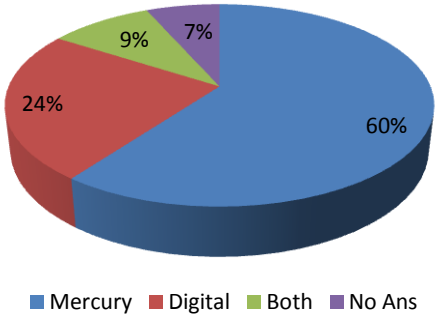


Fig 7: Hg Phase out from the facilities

Around ***24% of the respondents are using digital thermometers*** and ***9% are using both Hg as well as digital thermometers (Fig 8a).*** Fig 8(b) depicts that Ajmer and Jodhpur divisions use high percentage of digital thermometers and Ajmer is also ahead compared to other divisions in use of both digital as well as Hg thermometers.



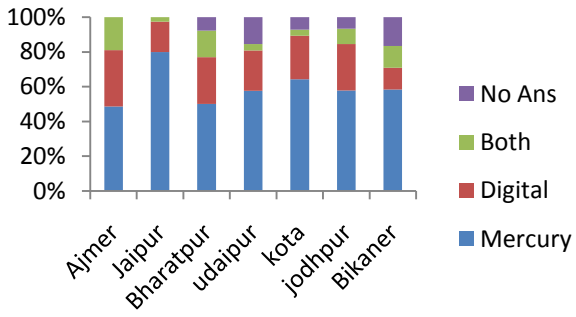


Fig 8(a): Types of thermometers used

Fig 8(b): Types of thermometers used in the state

The facilities are now slowly replacing Hg thermometers to alternatives, thus they were found to be using both proportionately. Though the digital/aneroid Sphygmomanometer gives the standard results, the Hg Sphygmomanometer is considered as the gold standards.

Hence, ***Hg sphygmomanometers usage is more i.e. 73% (Fig 9 a). Fig 9(b) suggests that hg sphygmomanometers are more in use in Jodhpur division.***

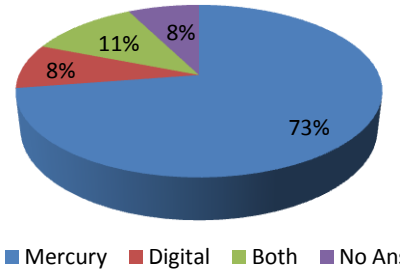


Fig 9(a): Types of BP instruments used

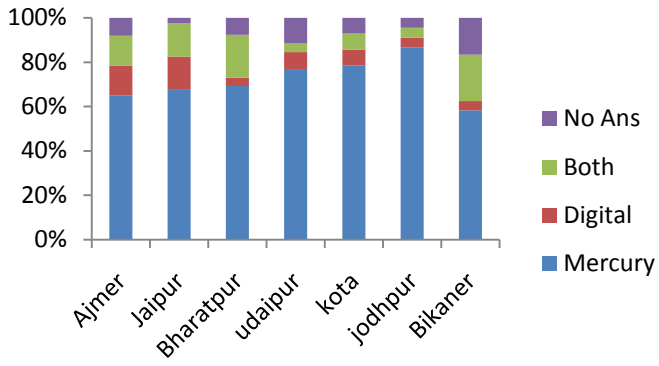


Fig 9 (b): Types of BP instruments used in the state

Though mercury is regarded as one of the 10 most harmful elements by WHO, the awareness is very less among the public as well as the health care staff. It is critical to sensitize the staff regarding the self harm and chronic impacts caused due to prolonged usage of mercury. Health care staff are exposed to high levels of mercury vapours as we are in a tropical country, especially Rajasthan's temperature is high as it is falls under one of the great deserts of India. Our focus was to make them realise the issue and take it a step ahead.

Though the awareness level on mercury hazards was found to be quite good i.e. 76% (Fig 10 a), Fig 10(b) depicts that respondents of Jodhpur division are more aware about the mercury hazards as compared to the other divisions of the state.

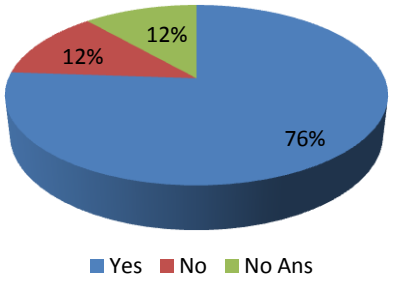


Fig 10 (a): Awareness about Hg hazards

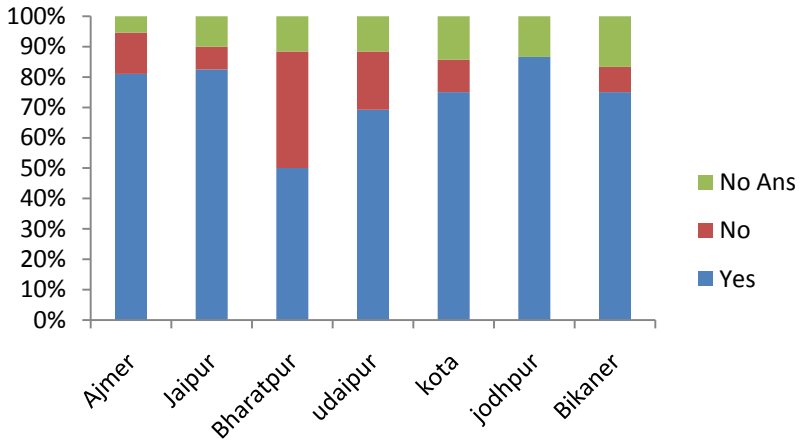


Fig 10(b): Awareness about Mercury hazards in the state

Only 51% of the respondents knew how to handle a mercury spill (Fig 11).

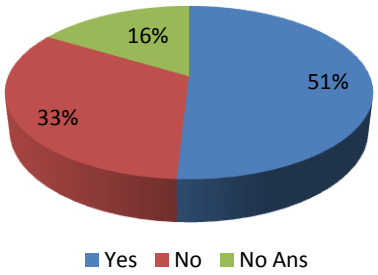


Fig 11: Awareness about Hg spill management.

c) Segregation:

Segregation is an essential part of the whole waste management cycle, if this doesn't happens in the first step all the other successive process would be meaningless.

According to the KAP assessment, ***93% of respondents of the state were following the segregation system in their facilities.***

d) Storage Area:

Though all the facilities are following the segregation system, but it is sad to know that the facilities of ***13% of the respondents still do not have a storage area (Fig 12).***

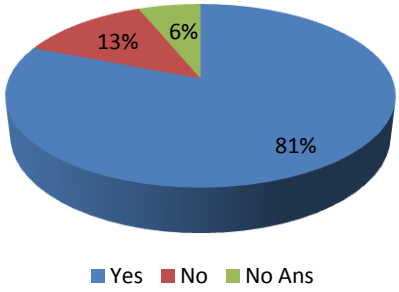


Fig 12: Hospitals with storage facility

e) Connectivity with CBWTF:

The state currently has 9 functional CBWTF's. Although according to KAP assessment, ***60% of the respondents said that their facilities are connected to the CBWTF (Fig 13 a),*** yet during the discussions in the workshops, a large number of participants complained about lack of CBWTF connectivity and specially mentioned that its reach is only up till the CHC level.

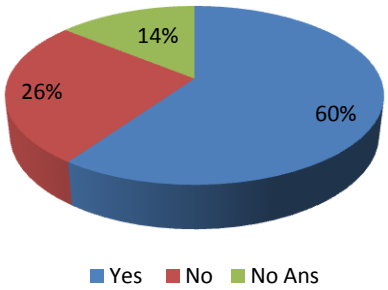


Fig 13(a): Connectivity with CBWTF

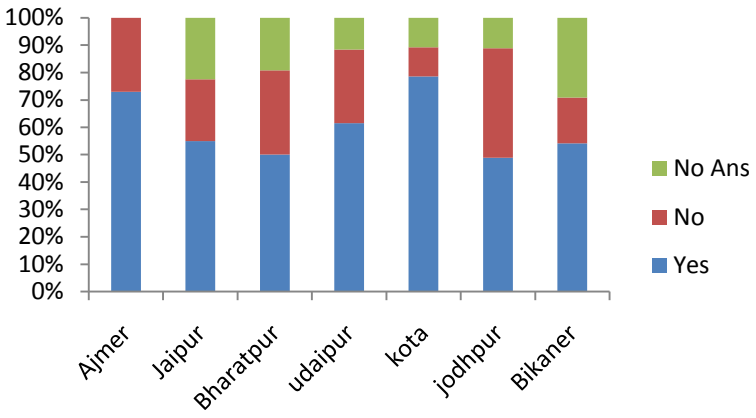


Fig 13(b): CBWTF connectivity in 7 divisions of Rajasthan

f) Frequency of waste collection by CBWTF:

Ideally the waste should be collected by the treatment facility on a daily basis and none should be stored beyond 48 hours.

But, the assessment says that the ***collection frequency is ranging from 24hrs to >72hrs***.

The collection frequency in the facilities of ***19% of the respondents is 24hrs,*** in ***19% it is 48 hours,*** in ***12% the frequency is once in 72 hours and*** in a surprising ***8% the waste is collected even later than 72 hours*** (Fig 14).

This clearly indicates the lack of responsibility on the CBWTF side and questions the kind of methods that the hospitals must be adopting for storing the waste for such a long duration of time. This also raises concerns on the spread of infections from this waste in the hospital premises.

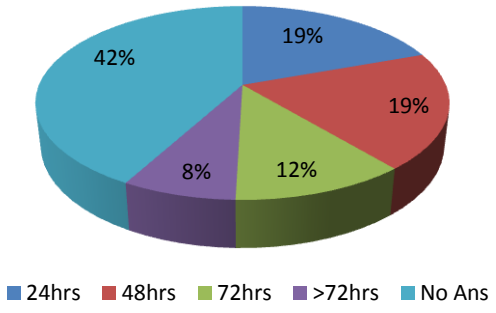


Fig 14(a): Frequency of waste collection by CBWTF

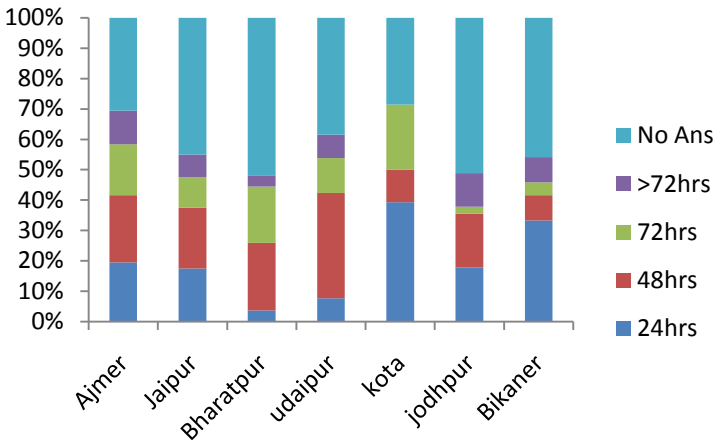


Fig 14(b): Frequency of waste collection in 7 divisions of Rajasthan

g) Waste Disposal Practices by hospital:

The facility that does not have the CBWTF connectivity for the collection and treatment of the segregated waste has to dispose the waste by other methods. The biomedical waste management rules 1998 and 2016 both have the option of deep burial for those who lack the CBWTF collection.

30% of the respondents said that facilities under their jurisdiction do deep burial.

According to CPCB annual report, 2014, Rajasthan do not have any on-site incinerators in their HCFs, but in our survey around ***6% of the respondents mentioned that they have onsite incinerators***, this clearly reflects that these facilities are openly burning their medical waste. This calls for a strict action from the government bodies against these facilities.

44% of the respondents did not answer this question (Fig 15).

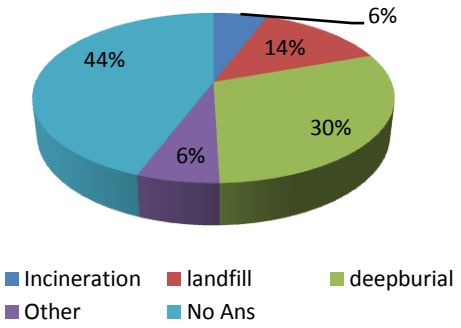


Fig 15: Waste disposal practices

h) Occupational Safety:

Occupational safety is the safety of the staff at the workplace. Here in health care facilities, the major concern is about the spread of infections, inhalation of toxic vapours, etc. Protective gear like masks, gloves, boots; and immunization against communicable diseases has been made part of the Rules.

Our KAP analysis focused on:

Prevalence of recapping the syringe:

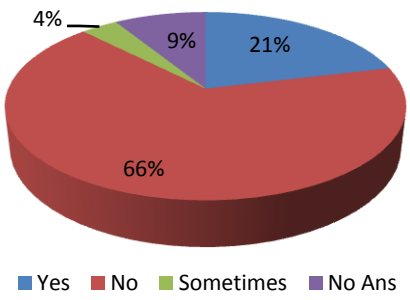


Fig 16(a): Recapping of the used needle

More than ***77% of the respondents think that needle stick injury is a concern*** which should be taken seriously.

But it is sad to know that ***21% of the respondents say that recapping happens in their facilities (Fig 16a). Fig 16(b) shows that in Jaipur division prevalence of recapping of the syringe is more.***

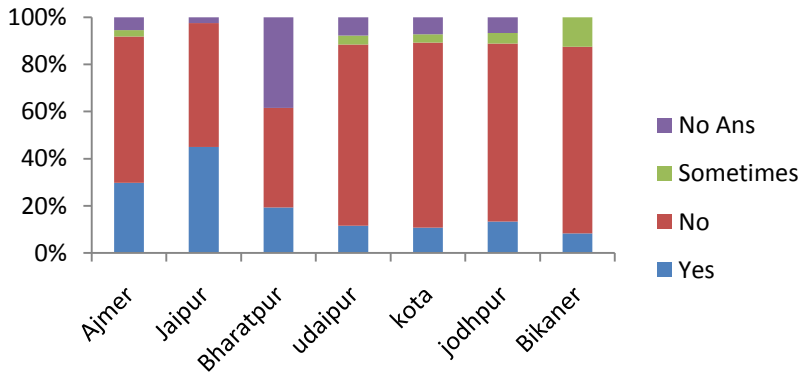


Fig 16(b): Prevalence of recapping in 7 divisions of Rajasthan

This increases the chances of acquiring a needle stick injury and thus, the transmission of blood borne pathogens.

Reporting needle stick injury:

Since needle stick injury is major concern across the country, yet we find the staff reluctant to report these injuries,

However, our assessment showed that ***about 69% of the respondents mentioned that their staff reports the needle stick injuries (Fig. 17a). Fig 17(b) depicts that the respondents of Jodhpur division are more active in reporting the needle stick injury.***

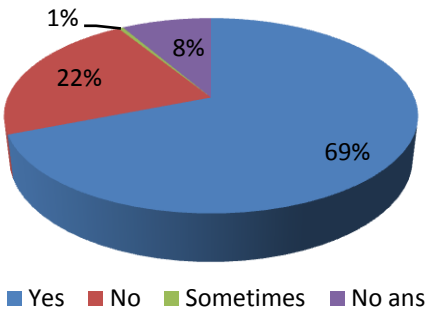


Fig 17(a): Reporting of Needle Stick injuries

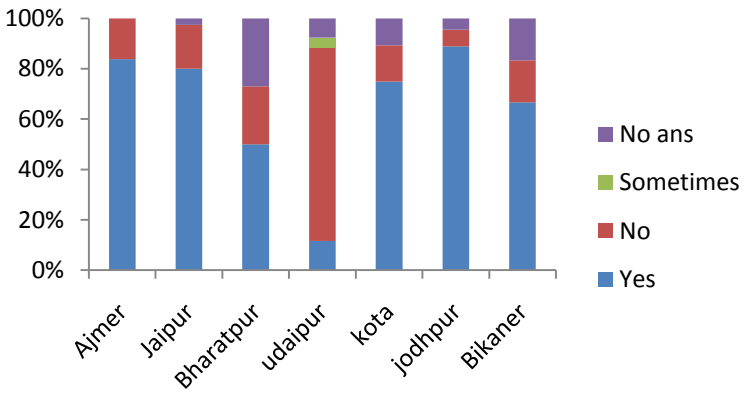


Fig 17(b): Reporting of needle stick injury in the 7 divisions of Rajasthan

Types of needle cutters used:

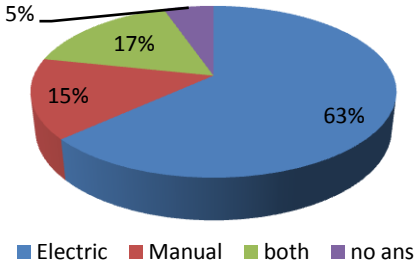


Fig 18: Different type of needle cutters used

The facilities in Rajasthan majorly use electric needle cutters. ***90% of the respondents mentioned that they use needle cutters in their facilities***; ***63% of them use electric needle cutters and only 15% use manual cutters; however 17% use both types*** (Fig 18).

Since electric cutters are not portable and irregular electric supply in certain regions is also a major factor because of which the staff does not use them as required. There are cases where staff collects the syringes and decides to destroy them in one go because of these issues, thus, they recap them, leading to injuries. Therefore, it is highly recommended that manual needle cutters should be used to ensure on site destruction.

Availability of Personal Protective Equipments (PPEs) in the HCFs:

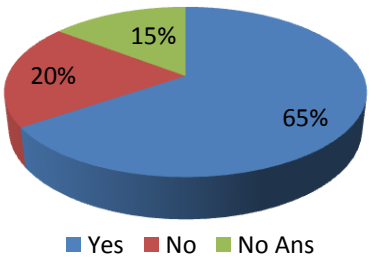


Fig 19: Availability of PPE

The use of masks, Gloves, Shoes are included in the Personnel Protective Equipments (PPE).

65% of the respondents have provided PPE's in their facilities for their staff (Fig 19).

Vaccination of the staff:

Sero prevalence of Hepatitis B in India is very high and healthcare workers are at a risk of acquiring blood borne diseases occupationally. Thus the new Rules recommend that all the healthcare staff should be vaccinated against Hepatitis B.

Yet, only ***62% of the respondents mentioned that they were providing vaccination to their staff (Fig 20).***

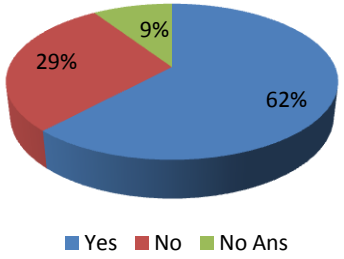


Fig20: Staff vaccination against Hepatitis B

i) Capacity Building/Training:

Training of the staff at different levels is again an essential component of ideal waste management practices in any hospital.

83% of the respondents have a provision of providing training to their staff.
66% of the respondents provide training material and 91% have awareness posters displayed in their facilities (Fig 21).

Everyone feels that training is needed for the nursing staffs and Safai Karamcharis, as they are the ones who work on ground. Most of the participants felt that training should be two to three times per year as the staff turnover rate is high.

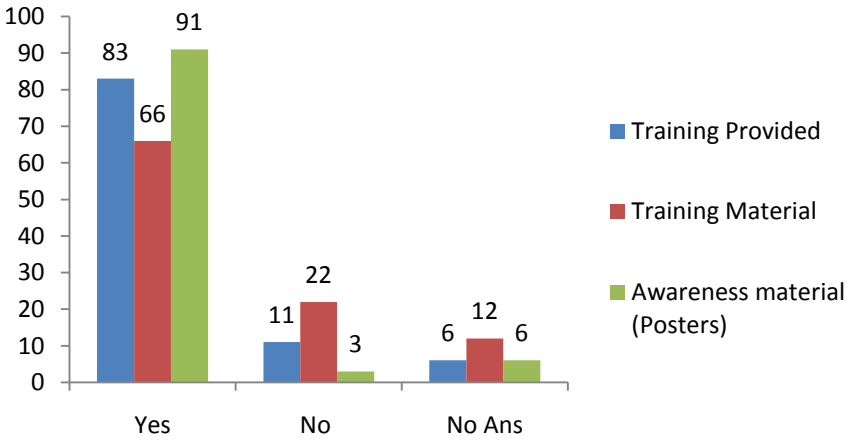


Fig 21: Capacity building, Materials and Awareness posters

j) Monitoring, Records & Infrastructure:

In the assessment, ***66% of the respondents mentioned that their facilities are monitored by the facility administrators themselves***.

18% respondents acknowledged that their facilities have been visited by the PCB and

5% felt that regular monitoring was happening in their facilities by hospital administrators as well as the PCB (Fig 22).

As far as monitoring frequency is concerned,
55% of the respondents feel that monitoring is done on a monthly basis. 15% report quarterly monitoring, 2% half yearly, 3% annual and 25% didn't give any response (Fig 23).

Record maintenance is one of the major requirements of the BMW Rule, yet ***60% of the respondents said that facilities under them maintain the records*** of the daily waste generation and collection.

In the workshop, participants reported a lack of Infrastructure for BMW management i.e. color coded bags, bins, trolleys, needle cutters, PPE, training material, posters etc.

KAP showed that only ***52% of the respondents have the required infrastructure in their facilities.***

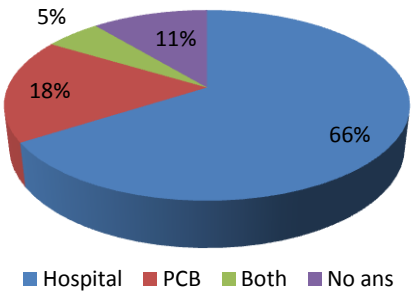


Fig 22: Monitoring agencies

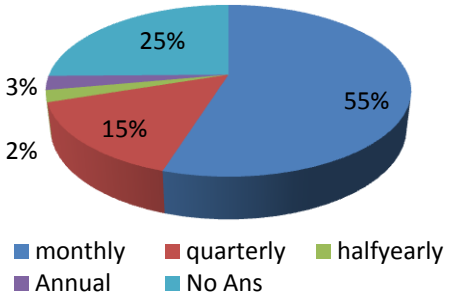


Fig 23: Monitoring frequency

k) Attitude and Behaviour:

There should be proper policy from the higher authority like SPCB, stringent monitoring, supply of the necessary requirements, infrastructure, CBWTF connectivity, authorization and regular training.

l) Comparison between Pre and Post KAP survey:

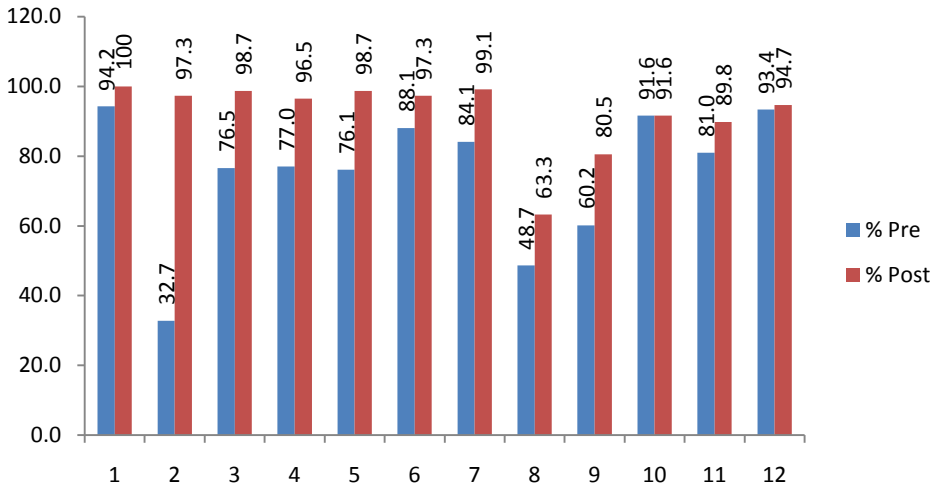


Fig 24: Comparison between Pre and Post KAP survey

Fig 24 shows remarkable improvement in the knowledge acquired from the workshop regarding Biomedical waste management rules 2016, importance of labelling the container, needle stick injury, awareness about the hazards of mercury, importance of capacity building, record maintenance, financial aspects.

Legend (Fig 24)

1) Do you think it is important to know about BMW generation, hazards and legislation?
2) Are you aware of the Bio-Medical Waste Management Rules, 2016?
3) Do you think that labelling the container before filling it with waste is of any clinical significance?
4) According to you is needle stick injury a concern?
5) Are you aware of the hazards associated with mercury?
6) Do you provide any training to the staffs regarding handling of BMW?
7) Do you think it is important to maintain records of daily waste generation/collection?
8) Safe management efforts by the hospital increase the financial burden on management?
9) Safe management of health care waste is an extra burden on work?
10) Would you like to attend voluntary programs that enhance and upgrade your knowledge about BMW management?
11) Do you think it is important to report to the SPCB about a particular institution if it is not complying with the rules for Bio-Medical Waste Management?
12) Are you interested in improving the existing BMW management in your setup?

m) Summary:

KAP assessments were conducted pre and post the workshop to analyse the awareness levels, the current BMW management system adopted and the attitude that the participants have. The assessment clearly pointed towards a lack of awareness about BMW Rules (48% not aware) which were notified in year 2016, shockingly a large number of respondents were not even aware about 1998 rules (20% not aware, 13% partially aware). Even those who had knowledge about the 1998 rules, not everyone has implemented a BMW management system in their facilities (42% has implemented).

Though we found the region to be mainly using mercury instruments, but since they have both mercury and digital instruments available in their facilities, they are found to be using both types (9% thermometers and 11% BP instruments). A large number of respondents (76%) were aware about mercury hazards and majority of the respondents knew how to handle a mercury spill (51%). Also, quite a good number of respondents were aware about Minamata Convention (35%), some of them also informed to be taking some phase out initiatives in their facilities (15%). Though majority of the respondents (60%) mentioned that they are connected to the CBWTF, yet the waste collection frequency by the CBWTF was found to be poor (refer regional reports).

Even though majority of the respondents said that they are connected to a CBWTF, yet a large number of them (30%) mentioned that they adopt deep burial as a treatment option for their waste, this might be due to low frequency of waste collection. And a surprising 6% of the respondents mentioned that they incinerate their waste and since according to CPCB, 2014 report there are no on-site incinerators in any HCF in the state, this number might respond to open burning. Although a large number of respondents feel that needle stick injury is a concern, yet 21% of them agreed that recapping of needle often occurs in their facilities. Large number of respondents (69%) mentioned that their staff reports needle stick injuries. Though the respondents agreed on the importance of PPE during the workshop, yet 20% of them do not use any.

It is good to know that a large number of respondents (83%) have a provision of providing training to their staff. Lack of monitoring from SPCB was very well highlighted in this assessment, with only 18% of the respondents mentioned that SPCB has visited their facilities

for monitoring purposes.

Lack of infrastructure is also of a major concern, as only 52% of the respondents have required infrastructure for BMW management in their facilities.

The improvement in the knowledge of the respondents pre and post the workshop, came up very well as a remarkable improvement can be seen regarding Biomedical waste management rules 2016, importance of labelling the container, needle stick injury, awareness about the hazards of mercury, importance of capacity building, record maintenance and financial aspects.

ANNEXURE

ANNEXURE I: Agenda for the Workshop

Workshop

On

Bio Medical Waste Management

and Hazards of Mercury

9.00-9.30	**Registration**	
09:30 – 10:00	**KAP analysis**	
Inaugural Session		
10:00 – 10:15	Welcome Address	State Pollution Control Board
10:15-10:30	Inaugural Address	Department of Medical, Health and Family Welfare
10:30-10:45	Overview of the workshop	**Shri Satish Sinha,** Associate Director, Toxics Link
10.45- 11:00	**Tea Break**	
Session I: Bio Medical Waste Management in Health Care		
11:00– 11:30	Current Scenario of Bio-medical Waste in Rajasthan: BMW at a glance	**Dr. R.S. Chippi**, Additional Director, Department of Medical, Health and Family Welfare
11:30 – 11:50	Rules, 2016	Tripti Arora, Toxics Link
11:50– 12:30	Lessons Learnt in Biomedical Waste Management at a Tertiary Care Hospital	Dr. Priyank Tyagi
12.30-1.00	Implementing Waste Management System in a Hospital	**Tripti Arora**
1:00 – 1:30	**Lunch Break**	
1:30-2:00	Phasing out mercury from the Healthcare sector	**Satish Sinha** Associate Director, Toxics Link
2:00-2:30	Economics of hospital waste management Handling Liquid waste: Case studies in a Tertiary Care hospital	**Dr. Priyank Tyagi**
2:30 – 2:50	**Movie on BMW**	
2:50 – 4:10	**Session II: Discussion/Strategy for the district/ hospital: Creation of a Action Plan** Moderated By ROPCB, DoH, Toxics link	
4.10	**Tea Break**	

ANNEXURE II: Presentation summary

Technical Sessions:

1. **Dr RS Chhipi, Additional Director, Department of Health and Family Welfare**
   Dr Chhipi presented the **"Current Scenario of Bio-medical Waste in the State".** In his session he focused on the importance of Bio-medical waste management, categorisation of BMW according to Rules, 2016, safe management and disposal practices and majorly emphasised on occupational safety. As a doctor, each of us should understand the risks involved with the improper disposal of Bio-medical waste and do our responsibilities judicially. He specifically stressed on injection safety by saying 21 million of HBV infections, 2 million HCV, 260,000 HIV spread through needle stick injury every year. Hence it is important to cut needle and disinfect before final disposal. He made everyone in the workshop take an oath that from now on **'won't let any uncut needle go out from the hospital premises and will make sure that no needle will ever be reused'**. To manage this, the hospitals should always have 4-5 spare needle cutters at all times in their facilities. He also sensitized the participants about how unsafe management of medical waste will affect the doctors and their families first. He mentioned that 60% of the disposables coming as waste from hospitals is repacked and sent for reuse without disinfection and proper recycling. Patient safety is one such issue he focused on by saying it is very common in developing countries than the developed countries that the patients are being harmed in the hospitals when they come for treatment. He also inquired about the immunization and vaccination procedure and status from all the participants and guided them on how to ensure 100% staff immunization. He concluded his session by elaborating on the duties of the health care facilities for ensuring clean health care in which he emphasised on the need of continuous training as well as monitoring. He inquired about connectivity with the CBWTF and asked the participants about the issues that they are facing in either connecting to a CBWTF or in working with it. He also mentioned that the change in attitude is the key to establishing an efficient BMW system in the facilities. In his interactive session, he took a note of all the problems that the HCFs are going through and ensured them that an appropriate solution will be given to them soon.

2. **Ms Tripti Arora, Program Officer, Toxics Link, New Delhi:**
   She talked about Bio-Medical Waste Management Rules, 2016. She briefed the audience about the major provisions of the new rules. She explained that according to the provisions of BMW rules 1998, no waste could be stored beyond 48hrs. The new Rules have changed this clause. Now only the waste that has to be incinerated cannot be stored beyond 48hrs, the other wastes can be stored. She said that BMW rules 2016 emphasize on using bar coding system for the biomedical waste collection and transportation. This helps in maintaining a data base for the generation, collection, disposal and treatment of the biomedical waste and also aims to regulate the pilferage of the waste once it is out of the hospital premises. It was also informed that the hospitals now have to make five years record of the waste generated in their hospital and make it available on their websites. As it is a new concept, participants were having confusion of 'why bar-coding is so important?' She explained by talking about a scam exposed by India Today where the hospital management in one of the hospitals of Delhi was selling bio-medical waste openly. . If bar-coding is done, everyone in the loop, including hospitals and the CBWTF would know if there is any pilferage, or any theft that has happened mid way to the CBWTF. The BMW Rules, 2016 has the provision for the hospital to make an uninformed visit to the CBWTF to see whether the waste given by the hospital is treated properly. The retention time of flue gases in the incinerator has been increased from 1s to 2s. Apart from these, the major thing that has been changed in the BMW Rules, 2016 is that ten categories of the waste have been reduced to four categories of wastes to avoid confusion. She emphasized that the expired/cytotoxic drug which was earlier discarded in the black bag should now be disposed in the yellow bag for incineration or it should be returned to the supplier. The soiled mattress should not be chemically disinfected, but in turn it should be mutilated and discarded in the yellow bag for incineration. Importantly, the waste collection

bags should be non-chlorinated to reduce the emission of carcinogenic gases like dioxins and furans. The CBWTF should be located within 75kms from the healthcare facility; previously the distance was 150kms. A district level monitoring committee should be formed which should conduct meeting every six months, every year the report has to be submitted to the CPCB. She concluded by mentioning the penalties/liabilities that the hospitals have under EPA, in case of non-compliance of BMW Rules.

She started another presentation by saying 'why it is important to manage our bio-medical waste'. It is a known fact that Bio-Medical waste contains sharps waste, which can spread deadly disease once it comes in contact with a healthy person, cytotoxic and radioactive drugs which is used in the treatment of cancer and imaging is mutagenic, mercury from broken thermometers and sphygmomanometers which releases toxic fumes. She added that only 15-20% of our healthcare waste is infectious, less than 10% is hazardous. She emphasized how segregation is important to have an ideal waste management system. She briefed that all the incinerable waste should be put into the yellow bag, disinfected recyclables in red bag, broken glass wares and metallic implants in blue color cardboard box, and finally the sharps goes into a while color translucent puncture proof container. The uncared and unattended hospital waste irreversibly affects the staff, which are in the lower hierarchy, which includes Safai Karamcharis and rag pickers. She also insisted that improper management of the healthcare waste is because most people are unaware of the self harm caused by these wastes. Awareness is just a first step towards it, along with that regular systematic training sessions are needed for each and every healthcare worker. As health care workers spend most of their hours and days in the hospital, it important for them to take action before it is too late. She emphasised on the importance of perception of self harm and emphasised majorly on occupational safety. She explained a step by step strategy of implementing a waste management system in a healthcare facility and presented an Action Plan.

Ms Tripti presented a case study of King George's Medical University (KGMU), Lucknow, where they are efficiently managing their waste in a 3,750 bedded public hospital. The key for their success is continuous and rigorous training, sensitization of the healthcare staff about the self harm and most importantly, frequent monitoring. They made innovations in their infrastructure like designing trolleys of different sizes according to varied needs of the staff and needle cutters screwed to the trolley, so that the nursing staff does not have to worry about carrying the needle cutter everywhere. Ms Tripti concluded her presentation by saying that by managing the hospital waste of KGMU hospital resulted in reduction of incinerable waste and huge cost benefits, hospital became fuel efficient and recycling led to revenue generation. Hence, by first doing a small baseline survey of the hospital to find out how much waste is generated, calculating the requirements, infrastructure etc; the facility can chart out the action plan for implementation of BMW system.

3. **Dr Priyank Tyagi**

Dr Priyank Tyagi has worked in Sir Ganga Ram Hospital and Apollo Hospital, New Delhi. As an able administrator his focus has been on occupational safety, waste management and quality control. He was invited to share his expertise in the areas of Biomedical Waste Management and wastewater treatment technologies in the workshop. He started his presentation on **"Lessons Learnt in Bio-medical Waste Management"** by giving the statistics that out of the country's municipal waste stream generated 1% to 1.5% is the biomedical waste. Though it has been generated in small amount it has the potential to contaminate the entire waste stream. Hence it is important to segregate the waste at the point of generation. This step ensures the effective management and respective treatment of medical waste. He said in Apollo Hospital an online course platform was developed which had various domains. Among them one specific study was biomedical waste management, which was questionnaire based assessment involving staff of all cadre from doctors to nursing staffs. The results of the survey depicted lack of awareness and pointed out towards the need of regular training. He emphasized that there is no need of taking out time especially for

monitoring; instead during the regular rounds if something is not in place, it can be corrected with a small demo session. He highlighted the importance of IEC material, specially the display of posters throughout the facility. He mentioned that, only if the higher cadre staff takes the issue seriously, the people in the lower cadre will automatically understand its importance. He talked about the importance of waste audit, which will ensure the efficient resource utilization, pay back and revenue. He said that when Ganga Ram hospital was starting Bio-medical waste management in their premises; they had planned for a CBWTF visit, because the proper management of the waste in the hospital would go waste if the CBWTF was not treating the waste properly. He said that the CBWTF has few issues like lack of trained manpower, poor equipment maintenance, there is no proper record maintenance and it is solely profit driven. He said the new rules have made it transparent that hospitals can visit the CBWTF without prior notice.

He started the next presentation on **"Economics of Waste Management"** by explaining the three important steps in waste management: minimizing the amount of waste generated (source reduction), Recovering and recycling the waste materials, Disposing waste safely and effectively. He stated that private economics in the waste management stream includes capital costs, running costs, revenues and taxes. He also mentioned the various stages and costs in the management of health care waste.

He further talked about **"Waste Water management"** in which he explained that the effluent coming out of a healthcare facility should meet the EPA standards. The hospital liquid waste majorly consists of infectious and chemical wastes from the laboratories, pharmaceutical/cytotoxic compounds, blood components etc, thus treatment of this waste water is one of the major concerns. The healthcare facilities were having issues as to how to go about having ETP in their setup. Dr Priyank who was involved in the installation of ETP in Sir Ganga Ram shared his knowledge. He said before starting the ETP construction, a hospital has to take a survey of how much waste water is being generated per day. He stated that the hospital should take advice from various consultancies to compare the cost, to have a better picture about the advanced technologies. He spoke about a few treatment technologies which have been predominantly used in our country along with the operation and maintenance cost of ETP which was installed in Sir Ganga Ram hospital. He also stated that the ETP tends to fail if installed as one unit for treating the entire waste water that is generated per day. Instead two or three units can be installed in parallel so that if one gets filled the next unit can simultaneously start working. He concluded his session by sharing few waste water treatment technologies, its uses, advantages and disadvantages.

4. **Mr Satish Sinha, Associate Director, Toxics Link:**
"Hazards of Mercury" is a controversial subject because mercury is used in the healthcare industry for ages, for eg: Hg thermometer is in use since 17^{th} century, sphygmomanometer from 18^{th} century and dental amalgam was in use even before the invention of thermometers and sphygmomanometers. Hence, it is difficult to convince everyone to the single thought that mercury is toxic. Mr Satish Sinha started his presentation by talking about the sources of mercury. He added by saying chlor alkali industry uses tons of mercury as a catalyst, burning of coal releases tons and tons of mercury vapors into the atmosphere. As everyday dentists and dental assistants are continuously exposed to Hg vapours in their work environment, it is hard to make everyone believe that mercury vaporizes in the room temperature and actually harms oneself. He showed a one minute video of how mercury vaporizes in the room temperature. He emphasized that mercury can travel long distance and hence it is a global pollutant. He stated that mercury could affect the developing nervous system of the foetus and a newly born baby. He said people were not aware that mercury is a hazardous element of concern. It came to light in a place called Minamata in 1956. The Chlor alkali factory named Chisso was releasing its effluent containing mercury to the Minamata bay, when people started getting nervous disorders and eventually died. Till date we can see the aftermath effects of the Minamata accident.

Minamata accident caused a massive disaster which was world known, Mr Sinha emphasized that one such similar incident happened in Kodaikanal, Tamil Nadu. Hindustan Unilever's thermometer factory was releasing the mercury in the nearby land, where workers and public were constantly facing kidney ailments. After finding the causes behind the deaths, the factory was shutdown in 2001. Mostly dentists in India are practicing amalgam fillings, alternative filling is secondary. Dental students and dental assistants extensively use hand mixing technique for preparing amalgam fillings. May be now the alternative fillings are common, but there is a need to achieve 100% usage of the alternatives in place of amalgam fillings. Mr. Sinha said that the developed countries have already taken phase out steps in eliminating mercury usage from various sectors. A worldwide treaty has been negotiated and Toxics Link was part of all the INCs. The treaty says mercury production and usage will stop by 2020; India signed the treaty in 2014. He mentioned the steps that are being taken by the Indian government to curb the usage of mercury from various sectors. India successfully banned the usage of mercury from chlor alkali industries; many states like Manipur, Punjab, Delhi and Karnataka have taken initiative to stop the usage of mercury in the healthcare sector. The main problem associated with the resistance to the shift is that mercury thermometer and sphygmomanometer are considered as gold standards. Here, Toxics Link is playing an important role by pushing for standards in thermometers and sphygmomanometers by associating with Bureau of Indian Standards (BIS). He also stated that a mercury spill should not be handled lightly as it can vaporize, and in a closed environment it can even be life threatening if left unattended. It is essential to have mercury spill management kit in all the wards which uses mercury. He concluded his presentation by showing an animated clip of mercury spill management.

ANNEXURE III: KAP Forms

KAP Analysis- Pre-Workshop

Name of the person: Designation:

Name and address of the health care facility:

Email-id: Phone no:

General information:

1. Type of the institution

☐ Public ☐ Private ☐ Trust

2. What is the total number of beds you have in your hospital?

☐ <50 ☐ 50-100 ☐ 100-300 ☐ 300-500 ☐ 500-1000 ☐ >1000

3. Is your healthcare facility authorized by the Pollution Control Board for generation of BMW?

☐ Yes ☐ No ☐ Not sure

Policy Awareness:

4. Do you know about BMW (Bio-Medical waste) Rules 1998?

☐ Yes ☐ No ☐ Not completely

5. Do you think it is important to know about BMW generation, hazards and legislation?

☐ Yes ☐ No ☐ No opinion

6. Are you aware about the Bio-Medical Waste Management Rules, 2016?

☐ Yes ☐ No ☐ Not completely

7. If yes, have you implemented them in your facility yet?

☐ Yes ☐ No

8. Are you aware of the MoH Guidelines on Mercury which calls for phase out of amalgam, Hg thermometer, Hg BP apparatus?

☐ Yes ☐ No

9. Are you aware that India has signed the Minamata Treaty, which calls for a phase out of mercury use from the planet?

☐ Yes ☐ No

10. Have you taken any mercury phase out initiative in your facility? If yes, please mention your initiatives.

☐ Yes ☐ No ☐ May be in future

Waste management system in the hospital:

11. Is there any waste management policy in your hospital?

☐ Yes ☐ No

12. Is there a waste management committee for managing the BMW? If yes. mention the number of members.

☐ Yes ☐ No

13. If no, is there

☐ Yes ☐ No

Waste generation, segregation and categorization:

14. Is there any waste segregation system being followed in the hospital for different types of wastes generated?

☐ Yes ☐ No

15. Do you know about colour-coding for different categories of BMW? If yes, please mention the colour codes being followed in your facility.

☐ Yes ☐ No

16. What would be the average amount of BMW generated per bed/ day? Or total BMW generated in the hospital premises?

☐ <0.25kg ☐ 0.25-0.5kg ☐ 0.5- 1Kg ☐ >1kg

17. Which bag is used for sorting and storing of municipal waste?

☐Black ☐White ☐Green ☐Any other

18. Do you segregate any other waste in the hospital like mercury waste, lead etc. ?

Yes ☐ No

19. How do you dispose the expired /discarded medicines?

☐ Return it to the supplier ☐ Discard it in yellow bin

20. Do you think that labeling the container before filling it with waste is of any clinical significance?

☐Yes ☐ No

Waste storage, disposal & collection:

21. Is there any separate storage area for BMW inside the Healthcare facility?

☐ Yes ☐ No

22. Are you connected to a CBWTF (Central BMW Treatment Facility)? If yes, please specify the name and location of the CBWTF?

☐ Yes ` ☐ No

23. If yes, please specify the place & distance from the hospital.

☐ <75km ☐ >75km

24. What is the waste collection frequency?

☐ 24hrs ☐ 48hrs ☐ 72hrs ☐ >72hrs

25. If no, how do you dispose the collected waste?

☐ Incineration ☐ landfill ☐ Deep burial ☐ Any other

Occupational safety:

26. According to you is needle-stick injury a concern?

☐ Yes ☐ No ☐ Sometimes

27. Do you re-cap the used needle?

☐ Yes ☐ No ☐ Sometimes

28. Do you discard the used needle immediately?

☐ Always ☐ Never ☐ Sometimes

29. Do you use needle cutters for cutting the needle after use?

☐ Always ☐ Never ☐ Sometimes

30. If yes, what type of needle cutter you use?

☐ Electric ☐ Manual

31. If no, do you have any reason for not adopting?

☐ Lack of time ☐ Staffs are reluctant

32. Are the hospital staffs immunized for Hepatitis B virus?

☐ Yes ☐ No

33. Is the waste handling staff provided with PPE (Personnel Protective Equipment)?

☐ Yes ☐ No

34. In case of needle stick injury, should the staff report the event?

☐ Yes ☐ No

35. Do you feel that the hospital should have an Injection safety policy and a PEP Policy (post exposure Prophylaxis)?

☐ Yes ☐ No

Mercury:

36. What kind of thermometers do you use in your facility?

☐ Mercury ☐ Digital

37. What kind of BP instrument do you use?

☐ Mercury ☐ Aneroid/ Digital

38. Do you follow any protocol for handling mercury wastes?

☐ Yes ☐ No

39. Are you aware of the hazards associated with mercury?

☐ Yes ☐ No

Capacity Building:

40. Do you provide any training to the staff regarding handling of BMW?

☐ Yes ☐ No

41. What do you think the frequency of these training sessions should be

☐Once a year ☐Twice a year ☐ any other, please specify

42. Do you provide them with any training material?

☐ Yes ☐ No

43. Do you have any awareness materials like posters being displayed in the hospital on medical waste?

☐ Yes ☐ No

44. Do you feel the need of a capacity building program in your facility?

☐ Agree ☐ Disagree

Monitoring:

45. Is there any regular inspection done regarding BMW management?

☐ Yes ☐ No

46. If yes, what is the monitoring frequency?

☐ Monthly ☐ Quarterly ☐ Half yearly ☐ Annual

47. Who is the monitoring agency?

☐ Hospital management ☐ Pollution Control Board

48. Does anyone from the hospitals visit the CBWTF (Centralized Bio-medical waste treatment facility)?

☐Yes ☐No

Records:

49. Do you maintain any records of daily waste generation/collection?

☐ Yes ☐ No

50. Do you think it is important to maintain records of daily waste generation/collection?

☐ Yes ☐ No

Infrastructure:

51. Does your hospital have adequate infrastructure for segregation, collection, treatment and disposal of waste? If no, what is needed?

☐ Yes ☐ No

Attitude and behavior:

52. Safe management efforts by the hospital increase the financial burden on management.

☐ Agree ☐ Disagree ☐ cannot comment

53. Safe management of health care waste is an extra burden on work.

☐ Agree ☐ Disagree ☐ cannot comment

54. Would you like to attend voluntary programs that enhance and upgrade your knowledge about BMW management?

☐ Yes ☐ No

55. Do you think it is important to report to the State Pollution Control Board about a particular institution if it is not complying with the Rules for biomedical waste management?

☐ Yes ☐ No

56. Are you interested in improving the existing BMW management in your setup?

☐ Yes ☐ No

Note: If you have any doubts or queries regarding BMW management in your setup. Please drop your queries at info@toxicslink.org. Visit us at www.toxicslink.org for IEC material and posters.

Any suggestion/ comments-

KAP Analysis- Post workshop

Name of the person:

Name and address of the health care facility:

Policy Awareness:

57. Do you think it is important to know about BMW generation, hazards and legislation?

☐ Yes ☐ No ☐ No opinion

58. Was the information about BMW Rules, 2016 helpful to you?

☐ Yes ☐ No

Waste segregation

59. Do you think it is important to segregate waste at source?

☐ Yes ☐ No

60. Do you think that labeling the container before filling it with waste is of any clinical significance?

☐ Yes ☐ No

61. Do you think the hospitals should focus on:

☐ Bio-medical waste ☐ Municipal waste ☐ E-waste ☐ Lead waste

Capacity Building:

62. Do you feel the need of a capacity building program in your facility?

☐ Yes ☐ No

63. Do you think it is important to sensitize your staff about mercury hazards?

☐ Yes ☐ No ☐ Not sure

64. Would you be interested in organizing a training program or a workshop in your facility to increase the knowledge to your staff?

☐ Yes ☐ No

Occupational safety:

65. Is needle-stick injury a concern?

☐ Yes ☐ No

Records:

66. Do you think it is important to maintain records of daily waste generation/collection?

☐ Agree ☐ Disagree

Attitude and behavior:

67. Safe management efforts by the hospital increase the financial burden on management.

☐ Agree ☐ Disagree ☐ Cannot comment

68. Safe management of health care waste is an extra burden on work.

☐ Agree ☐ Disagree ☐ Cannot comment

69. Would you like to attend voluntary programs that enhance and upgrade your knowledge about BMW management?

☐Yes ☐ No ☐ Cannot comment

70. Do you think it is important to report to the State Pollution Control Board about a particular institution if it is not complying with the Rules for biomedical waste management?

☐Yes ☐ No ☐ Cannot comment

71. Would you like to switch over to mercury free equipments?

☐ Yes ☐ No ☐ Yes, but time consuming

72. Do you think that there is a need to eliminate mercury from the healthcare set up?

☐ Yes ☐ No ☐ Not possible

73. Did you find the workshop useful?

☐ Yes ☐ No ☐ Satisfactory

74. If no, please let us know the shortcomings.

75. Are you interested in improving the existing BMW management in your setup?

☐ Yes ☐ No

Any suggestions/Comments:

Note : If you have any doubts or queries regarding the BMW management in your setup. Please drop your queries at info@toxicslink.org. And all the IEC materials and posters are made available at our website. Kindly check if any further information is required.