

A DESCRIPTIVE STUDY ON EVALUATION OF BIO-MEDICAL WASTE MANAGEMENT AT SANKARA EYE HOSPITAL, COIMBATORE.

Submitted by:

Ashima Gabgotra

Guided by:

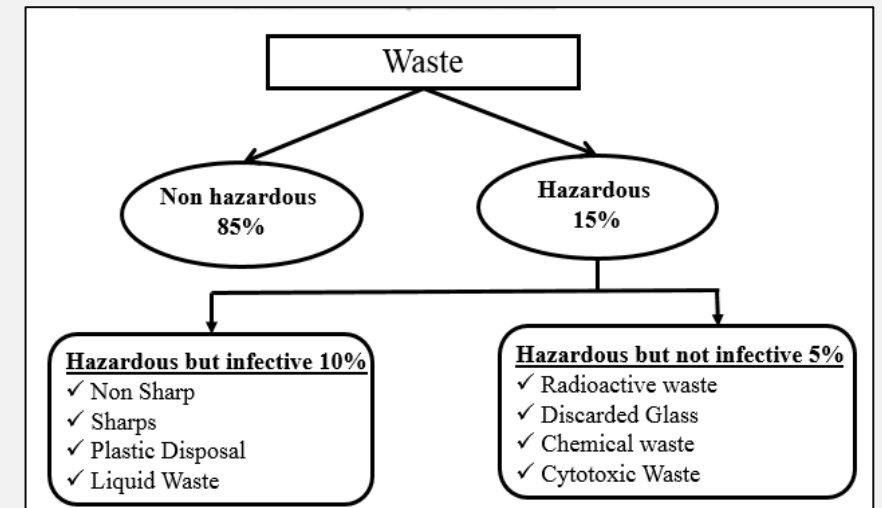
Dr. Pankaj Gupta

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INTRODUCTION

- Specific amount of waste is produced when healthcare activities are performed at different health care settings and such type of waste has the potential to harm both humans as well as the environment. This includes sharps, disposables, discarded wastes, syringes, anatomical waste, laboratory culture growths, body fluids, swabs etc. such type of waste is called as Bio-medical waste and the management of which is known as Bio-medical waste management.
- According to Bio-medical Waste (Management & Handling rules) 1998- Bio-medical waste is defined as the waste that is generated during the diagnosis, treatment or immunization of Human beings or animals, or in research activities pertaining thereto, or in the production or testing of biological or in health camps.



Problems related to Bio-medical waste management

- Unsatisfactory implementation of Bio-medical Waste Management & Handling rules
- Lack of segregation practices at source of waste generation
- Inadequate training among the healthcare providers
- Improper bio-medical waste management will give rise to uncomfortable smell, environmental pollution and growth of different vectors which may further cause transmission of diseases like AIDS, typhoid, cholera and hepatitis

Rationale

- Generation of hospital waste is an unavoidable outcome of hospital care services and practices. The amount of waste generated has increased with a swift growth of hospitals both in public as well as private sectors in order to meet the population demand. At the time of waste generation incomplete or almost no segregation is done.
- This waste carries both hazardous and infectious characteristics so it should be handled in a proper way. Therefore, regular assessment of waste management in healthcare settings could go a long way in solving this problem hence, it is imperative to have a scientific approach towards handling and managing hospital waste. So, the present study was carried out to evaluate the Bio-medical waste management practices in the hospital

Research Question

- How is the quality of Bio-medical waste management practices at Sankara eye hospital, Coimbatore?

Research problem

- Poor Bio-medical waste management in a hospital leads to increased rate of hospital infection which leads to dissatisfied patients. There is a strong evidence of transmission of hepatitis C & B and HIV/AIDS through bio-medical waste. Therefore, the problem statement for the study is decreased quality of BMW practices at the hospital.

Aim of the study

- The aim of the study was to evaluate the quality of Bio-medical waste management practices at Sanakara eye hospital, Coimbatore

Research objective

- To evaluate the current practices for Bio-medical waste management
- To determine the differences in Bio-medical waste management practices in the Paying and Non- paying sections of the hospital

RESEARCH METHODOLOGY

- **Study design**

This was a cross-sectional observation type of study which was conducted with the aim to evaluate the quality of Bio-medical waste management practices in the hospital.

- **Study period**

This study was conducted from 3rd February 2020 to 2nd May 2020 during which both primary and secondary data were collected

- **Type of research**

This is a quantitative type of research

- **Sources of data**

Primary data collection was done with the help of an observation checklist

Secondary data was collected through Bio-medical waste (Management & Handling) Rules, 2016. Also, internet's various data sites like PubMed, google scholar, research gate etc. were used for the review of literature.

- **Sample size**

Patient care areas where in all the 5 (Black, Yellow, Red, Blue and Puncture proof transparent box) waste collection dustbins were located, were included in the study. A total of 14 departments in the hospital were selected out of which 7 departments each from the Paying and Non-paying sections were included. Therefore, the sample size for the study was 14.

The areas included in the study were as follows

S.No	PAYING SECTION	S.No	NON-PAYING SECTION
1)	Ground floor Operation Theatre	1)	Savitri Waney ward
2)	First floor Operation Theatre	2)	Krishna Arpanam ward
3)	Occuloplasty Operation Theatre	3)	Parmacharya ward
4)	Eye Emergency Area	4)	Laboratory
5)	Retina Consultation room	5)	Paediatric ward
6)	Cornea Consultation room	6)	A- SCAN room
7)	Cataract Investigation room	7)	Non-paying Operation Theatre

- **Data collection**

In this project, the observational research method was used for data collection. Each area of the hospital was visited from 10:00 AM to 1:00 PM in morning and from 1:30 PM to 6:00 PM in evening. A total of 5 visits each were made in every department.

Primarily, each department was studied under 4 broad categories: -

Basic requirements for BMW management, Collection and storage of waste ,Segregation of waste and Mutilation of recyclable waste

- **Sampling**

Convenience/Purposive sampling was used as per the location of all 5 dustbins

- **Inclusion and exclusion criteria**

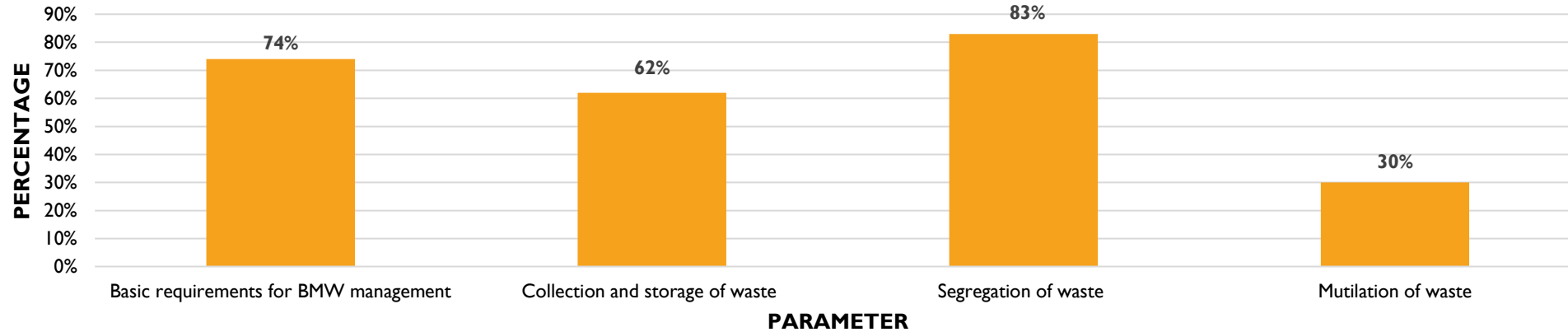
Inclusion criteria: only those patient care areas where 5 proper color coded dustbins were present, were selected. A total of 14 such areas from the entire hospital were selected.

Exclusion criteria: areas where all 5 of these dustbins were not present, were not selected

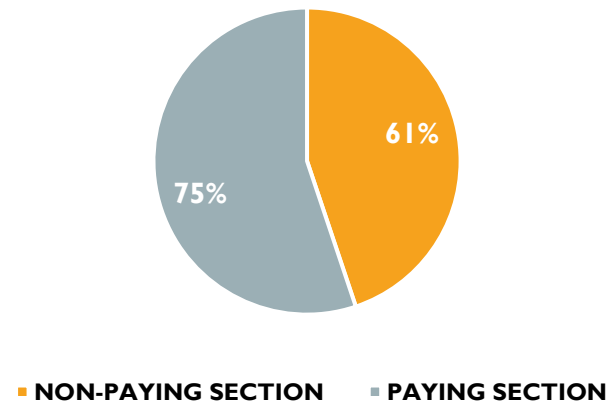
RESULTS

OVERALL DATA

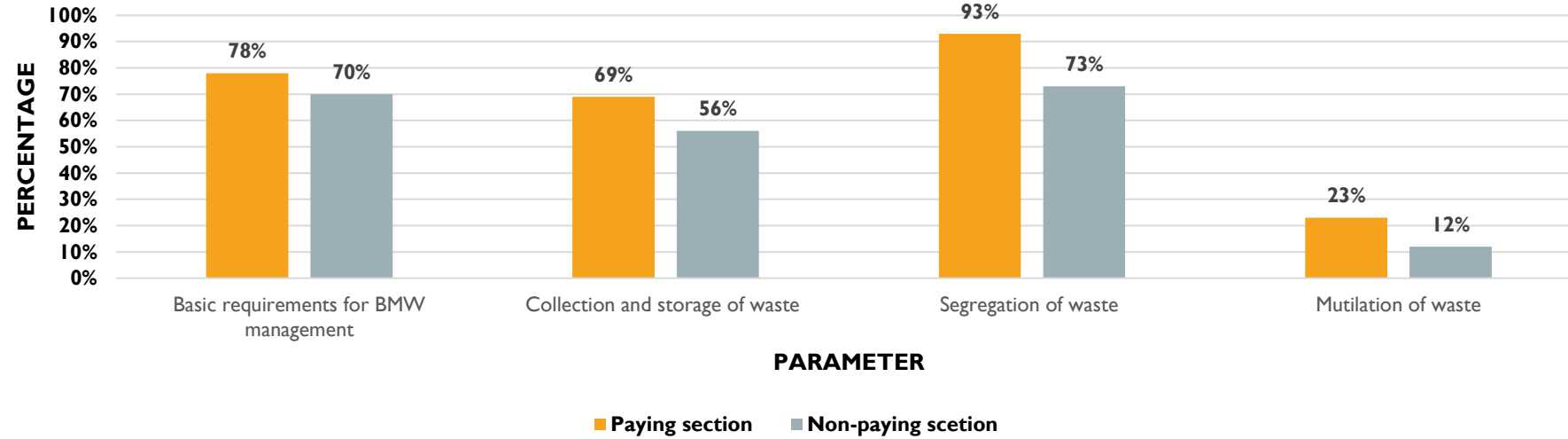
CATEGORY WISE ANALYSIS



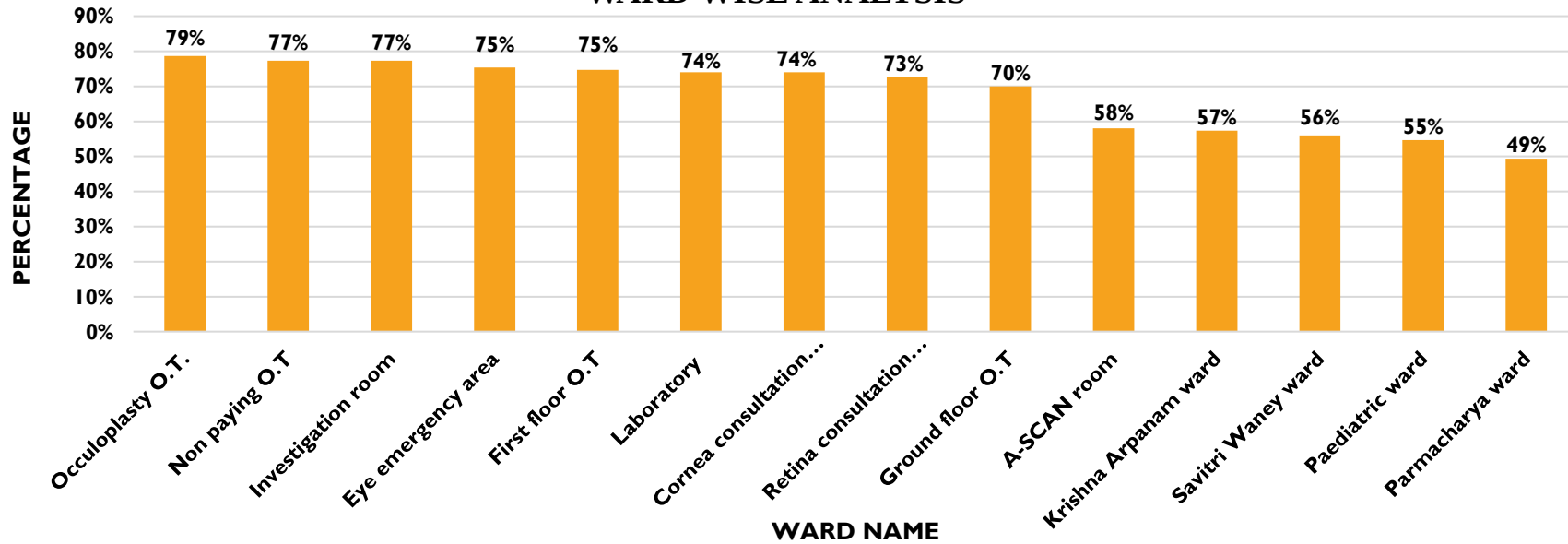
OVERALL HOSPITAL ANALYSIS



CATEGORY WISE ANALYSIS OF PAYING AND NON-PAYING SECTION



WARD WISE ANALYSIS



SECTION ANALYSIS

- Paying section

Mean percentage score of different categories

Category of BMW managemnt	Ground floor O.T	First floor O.T	Occuloplasty O.T.	Eye emergency area	Retina consultation room	Cornea consultation room	Cataract investigation room
Basic requirements for BMW management	81%	87%	81%	71%	76%	81%	79%
95% Confidence Interval	72% to 90%	72% to 90%	72% to 90%	62% to 84%	65% to 85%	72% to 90%	66% to 88%
Collection and Storage	68%	50%	73%	73%	68%	85%	73%
95% Confidence Interval	53% to 83%	35% to 67%	61% to 89%	55% to 83%	52% to 82%	65% to 91%	59 to 87%
Segregation of waste	100%	92%	100%	84%	84%	92%	100%
95% Confidence Interval	100% to 100%	71% to 93%	100% to 100%	69% to 99%	69% to 99%	70% to 92%	100% to 100%
Mutilation of recyclable waste	40%	33%	40%	47%	53%	47%	60%
95% Confidence Interval	14% to 64%	8% to 58%	15% to 67%	27% to 79%	27% to 79%	21% to 73%	34% to 86%

Individual parameter analysis of Paying section

Sno	Parameter	N*	Mean score	Percentage Mean score
1)	BMW record register available?	0	0	0%
2)	Is a calibrated weighing machine for BMW management available ?	0	0	0%
3)	Is the stored waste disposed in less than 48 hours ?	0	0	0%
4)	Are used hypodermic needles destroyed?	0	0	0%
5)	Are personal protective equipments like gloves, mask, cap etc worn by cleaners ?	12	0.34	34%
6)	Are the bins cleaned with soap and disinfectant solution regularly?	16	0.46	46%
7)	Are the waste bags well labelled and tied ?	19	0.54	54%
8)	Are used needles found re-capped?	19	0.54	54%
9)	Are used needles found bent ?	20	0.57	57%
10)	Are the bins overfilled?	23	0.66	66%
11)	Is it available in that area? (GREEN DUSTBIN)	32	0.91	91%
12)	Is it scurely covered with yellow colored bag ? (YELLOW DUSTBIN)	32	0.91	91%
13)	Is it available in that area ? (YELLOW DUSTBIN)	33	0.94	94%
14)	Is it securely covered with black colored bag ? (GREEN DUSTBIN)	33	0.94	94%
15)	Is a different box available? (WHITE BOX)	33	0.94	94%

Sno	Parameter	N*	Mean score	Percentage Mean score
16)	Is it puncture, leak and tamper proof ? (WHITE BOX)	33	0.94	94%
17)	Is it available in that area? (BLUE DUSTBIN)	34	0.97	97%
18)	Is it securely covered with blue colored bag ? (BLUE DUSTBIN)	34	0.97	97%
19)	Is it available in that area ? (RED DUSTBIN)	35	1	100%
20)	Is it securely covered with red colored bag ? (RED DUSTBIN)	35	1	100%
21)	Are posters to guide users displayed near the waste bins?	25	1	100%
22)	Is bio hazard symbol imprinted over the bags?	35	1	100%
23)	Are the bags non chlorinated ?	35	1	100%
24)	Is there any separate room for the storage of all the collected waste ?	35	1	100%
25)	Is the room properly ventilated?	35	1	100%
26)	Does green bag contain only general waste ?	35	1	100%
27)	Does yellow bag contain only cotton dressings, tissues used for wiping eyes, contaminated linen, discarded medicines, ear buds , cap & mask ?	35	1	100%
28)	Does red bag contain only eye drop vials, IV sets and IV fluid bootles, plastic syringe without needle , gloves, Vacutainers and laboratory cultures ?	35	1	100%
29)	Does blue bag contain glassware (broken/discarded), Vials/ampules ?	35	1	100%
30)	Is the container for sharps, needles, scalpels and blades puncture proof and is it covered ?	35	1	100%

- Non-paying section

Mean percentage score of different categories

Category of BMW managemnt	Savitri Waney Ward	Pediatric Ward	Krishna Arpana ward	A- scan room	Parmacharya ward	Non paying O.T.	Laboratory
Basic requirements for BMW management	66%	73%	69%	66%	57%	81%	83%
95% Confidence Interval	55% TO 77%	63% to 83%	58% to 80%	56% to 78%	45% to 69%	73% to 89%	73% to 91%
Collection and Storage	55%	50%	55%	58%	53%	68%	55%
95% Confidence Interval	39% to 71%	34%to 66%	40% to 72%	38% to 78%	33% to 73%	54% to 80%	40% to 72%
Segregation of waste	60%	44%	68%	72%	64%	100%	100%
95% Confidence Interval	45% to 83%	24% to 64%	45% to 83%	54% to 90%	45% to 83 %	100% to 100%	100% to 100%
Mutilation of recyclable waste	0%	0%	0%	0%	0%	47%	40%
95% Confidence Interval	0% to 0%	0% to 0%	0% to 0%	0% to 0%	0% to 0%	26% to 76%	14% to 66%

Individual parameter analysis of Non-paying section

Sno	Parameter	N*	Mean score	Percentage Mean score
1)	Are the bins cleaned with soap and disinfectant solution regularly?	35	0	0%
2)	BMW record register available?	35	0	0%
3)	Is a calibrated weighing machine for BMW management available ?	35	0	0%
4)	Is the stored waste disposed in less than 48 hours ?	35	0	0%
5)	Are used hypodermic needles destroyed?	35	0	0%
6)	Are the waste bags well tied ?	35	2	6%
7)	Are used needles found bent ?	35	5	14%
8)	Are used needles found re-capped?	35	8	23%
9)	Are personal protective equipments like gloves, mask, cap etc worn by cleaners ?	35	14	40%
10)	Are the bins overfilled?	35	15	43%
11)	fluid bottles, plastic syringe without needle , gloves, Vacutainers and laboratory cultures ?	35	22	63%
12)	Does blue bag contain glassware (broken/discarded), Vials/ampules ?	35	22	63%
13)	Are posters to guide users displayed near the waste bins?	35	25	71%
14)	Does yellow bag contain only cotton dressings, tissues used for wiping eyes, contaminated linen, discarded medicines, ear buds , cap & mask ?	35	26	74%
15)	Does green bag contain only general waste ?	35	27	77%

Sno	Parameter	N*	Mean score	Percentage Mean score
16)	Is it securely covered with blue colored bag ? (BLUE DUSTBIN)	35	28	80%
17)	Is it securely covered with yellow colored bag ? (YELLOW DUSTBIN)	35	29	83%
18)	Is it securely covered with black colored bag ? (GREEN DUSTBIN)	35	30	86%
19)	Is it securely covered with red colored bag ? (RED DUSTBIN)	35	30	86%
20)	Is a different box available? (TRANSPARENT BOX)	35	30	86%
21)	Is it puncture, leak and tamper proof ? (TRANSPARENT BOX)	35	30	86%
22)	Is the container for sharps, needles, scalpels and blades puncture proof and is it covered ?	35	30	86%
23)	Is it available in that area? (GREEN DUSTBIN)	35	31	89%
24)	Is it available in that area? (BLUE DUSTBIN)	35	31	89%
25)	Is it available in that area ? (YELLOW DUSTBIN)	35	32	91%
26)	Is it available in that area ? (RED DUSTBIN)	35	34	97%
27)	Is bio hazard symbol imprinted over the bags?	35	35	100%
28)	Are the bags non chlorinated ?	35	35	100%
29)	Is there any separate room for the storage of all the collected waste ?	35	35	100%
30)	Is the room properly ventilated?	35	35	100%

Level of significance in difference of scores

S.no.	Category	Level of significance of differences in scores
1)	Basic requirements for BMW management	Not significant (p value: 0.52)
2)	Collection and storage	Not significant (p value: 0.99)
3)	Segregation of waste	Significant (p value: 0.0064)
4)	Mutilation of waste	Not significant (p value: 0.068)

S.no	Category	Area	Level of significance using unpaired t-test
1)	Segregation of waste	Paediatric ward v/s Non-paying Operation Theatre	p value 0.0046
		Paediatric ward v/s laboratory	p value 0.0046

FINDINGS

Basic requirements for BMW management

- ✓ Basic infrastructure for proper management of waste at the source of generation was well established in the hospital
- ✓ Adequate number of posters to guide users about waste management were located near waste collection points
- Usage of personal protective equipment like gloves, mask and head mask by the house keeping staff was unsatisfactory



Collection and storage

- ✓ All the bags that were used in the hospital had Biohazard symbol imprinted over them and they were non chlorinated
- The bins were not cleaned with soap and disinfectant regularly, once the bags were full, they were emptied and without cleaning the dustbin a new bag was kept inside it.
- Dustbins were properly washed only when deep cleaning was done
- The bags were not tied once they were full and were fitted inside one another
- The dustbins were observed to be overfilled which often lead to littering



Segregation of waste

- The waste segregation practices were not followed particularly in the non-paying section of the hospital
- Mixing of infected waste with general waste was observed



Mutilation of waste

- Hypodermic needles were not destroyed and were found re-capped after each use
- Rarely the needles were found bent

CONCLUSION

The current study was done to assess the practices followed for bio-medical waste management in different areas of the hospital with the help of an observation checklist. It was found that more importance needs to be given to the categories of ‘mutilation of waste’ and ‘segregation of waste’. Additionally, in the non-paying section better practices are to be followed by the staff for ‘segregation of waste’ specially in Paediatric ward and Savitri Waney ward. In order to work upon the gaps that were found in the study hospital administrators need to prepare and process a plan to provide adequate training to the healthcare workers.

RECOMMENDATIONS

- Establishing a bar code system for waste bags or containers which are to be sent out of the hospital premises
- Electrically operated needle cutters can be used to mutilate needles and nozzle of used syringes
- BMW bins should be marked to indicate the level till where they should be filled so as to avoid spillage of waste
- Specific labels can be put on the waste bins to specify the type of waste to be put into them
- A checklist can be placed at every ward, and the time when the waste is collected at source it should be marked by the ward in charge. And by the end of every week these lists can be collected and then analysed by the committee
- A manual can be prepared specifying the DO'S and DONT'S of waste management which can be circulated in all the waste generation areas. This manual should follow the recent norms as set by the Central Pollution Control Board for Bio-medical waste (Management & Handling)
- Compulsory training should be frequently conducted for the staff who are directly or indirectly associated with management and handling of waste



Thank
you