

Study of Bio-Medical Waste Management in Government
District Hospital Pathankot

By

Kanika Sharma

*Dissertation submitted for the partial fulfillment of the
MBA Hospital and Health Management*

Academic year, 2016-2018



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TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. KANIKA SHARMA** student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training under **Punjab Health Systems Corporation**, at **District Hospital Pathankot** from 1st Feb 2018 to 30th April 2018.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.



(Col.) Dr. Ashok Kaushik

Dean, Academics and Student Affairs

The IIHMR University, Jaipur



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Dated 1.5.18

TO WHOM IT MAY CONCERN **CERTIFICATE OF DISSERTATION COMPLETION**

This is to certify that Dr. Kanika Sharma student of MBA in Hospital and Health Management, IIHMR Jaipur has successfully completed three months dissertation in health facility as allotted under Punjab Health Systems Corporation, Punjab from 01.02.2018 to 30.04.2018.

During the dissertation the student's performance was satisfactory.

We wish her success in all her future endeavors.

(Varun Roojam) I.A.S.

Managing Director

Punjab Health Systems Corporation

-Cum-Secretary Health and Family Welfare, Pb.

THE IIMMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled, **A Study of Bio-Medical Waste Management in Government District Hospital Pathankot** and submitted by **Dr. Kanika Sharma** Enrollment No. **IIHMR-U/O1/2016-18/0432** under the supervision of **Dr. Seema Mehta** for award of MBA in Hospital and Health of the University carried out during the period from 1st Feb 2018 to 30th April 2018 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.

Kanika Sharma
Signature

THE IIMMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that all ethical issues have been considered while collecting data for my dissertation titled, **A Study of Bio-Medical Waste Management in Government District Hospital Pathankot .**

Kanika Sharma
Signature

Abstract

TITLE NAME: A STUDY OF BIO-MEDICAL WASTE MANAGEMENT IN GOVERNMENT DISTRICT HOSPITAL PATHANKOT

NAME OF THE AUTHOR: Dr. KANIKA SHARMA

Background and Objective of study

Government of India ministry of environment, forest and climate change, have published in the Gazette of India, notification the BMW Management Rules, 2016. However, the availability of resources has to be taken into consideration and HCPs education and awareness in the areas of difference needs to be highlighted before implementing BMW rule. The objective of this study is to assess the existing process of biomedical waste management in government District Hospital Pathankot and to determine the awareness and attitude of Healthcare staff regarding Bio-medical waste management and identify the gaps if any and give suggestions.

Methodology:

A Descriptive Cross Sectional study was conducted in a government district hospital Pathankot, (Punjab) from 1st Feb to 30th April 2018 by taking 60 sample Health care personnel directly involved in generating and managing bio-medical waste are taken for study. Patients and Attendants are excluded. A checklist was prepared to collect data from the different bio-medical waste generating centers of the hospital. A structured questionnaire is used for assessing the awareness, attitude and knowledge of the health care personnel. The questionnaire is prepared in English and regional language. The data is entered and tabulated in Microsoft Office Excel. The results are analyzed by using tables and graphs.

Results

Most of the times when waste bins were opened to check the status of segregation it was found that there was mixing of general and infectious waste. It was seen that overloading of bins and spillage of waste in wards. At most of the places the instructions for segregating the waste above the bins were missing and in case if present were in English creating a kind of language barrier to the sanitary staff. There was no separate and well defined route for waste collection from different departments by the waste handler and its transport to the storage center in the hospital. Daily records of quantum of waste

generated in different bins were not recorded properly by the staff. Usage of personnel protective equipments by the sanitary staff was unsatisfactory. Knowledge and awareness regarding BMW Management was found to be highest among doctors and nurses. Doctors and nurses were having the positive attitude with regards to their roles and responsibilities in management of waste and also were enthusiastic about the future participation. All the HCPs were having opinion about the waste management as a team work while 20% of HCPs believed that it is only government responsibility.

Conclusion

The process of BMW management in Govt. civil hospital Pathankot follows majority of rules as per new amended BMW Management rules, 2016. In order to improve the efficiency of BMW management process strict implementation of rules should be required. Periodic monitoring and evaluation of BMW management practices followed by workforce in department need to be checked by the appropriate authorities. There is need that each and every person involved with generating and managing BMW should be made accountable for any violation done from the rule and zero tolerance policy should be followed against any found guilty. For effective management of BMW conscious, coordinated and cooperative efforts among all the healthcare staff is required.

ACKNOWLEDGEMENT

I am using this opportunity to express my gratitude to all those who have supported me during the period of the dissertation and guided me to complete the dissertation. First and foremost I would like to thank (Col.) Dr. Ashok Kaushik (Dean Academics and Student Affairs, IIHMR University Jaipur) to provide such a great learning opportunity. I own my profound gratitude to Dr. Parvinder Pal kaur (Assistant Director, Quality Assurance) for guiding me, supporting me and always encouraging me during this period of Dissertation. I express my sincere thanks to Dr. Bhupinder Singh (Senior Medical Officer I/C, District Hospital Pathankot) for his cooperation and support in collecting data and providing necessary inputs required for the study. I would like to thank each and every staff of district hospital Pathankot for their cooperation and sharing their knowledge required for the completion of dissertation.

Finally I would like to extend my sincere regards to my faculty guide Dr. Seema Mehta (Associate Professor, IIHMR University) for her constant support, guidance and constructive feedback for the successful completion of dissertation.

Dr.Kanika Sharma

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1.1BACKGROUND

Government of India ministry of environment, forest and climate change, have published in the Gazette of India, notification the BMW Management Rules, 2016. There are Amendments highlighted in rule 2016 especially regarding chemical/liquid and sharp waste management. However, the availability of resources has to be taken into consideration and HCPs education and awareness in the areas of difference needs to be highlighted before implementing BMW rule. Efficient management of BMW is both a legal necessity as well as social responsibility as providing safe environment is also necessary. As per the BMW 2016, it needs to be implemented within 2 years of publication i.e. by 2018 by all health care facilities.

The rationale behind hospital waste management is that, injuries can occur from the sharps disposal if not properly handled; then again, patients with poor immunity systems can become infected with the hospital wastes if disposal is not properly implemented. Risk of infection is greatest amongst waste handlers and the general public who live in the vicinity of such landfill areas where such wastes are disposed. Hence, separate handling of the different category of wastes is important with color codes and proper training of hospital staff to ensure proper disposal and treatment of hospital wastes. By doing extensive literature review it has been found that there is lack of substantial amount of research studies regarding current status of biomedical waste management practices in government hospital with respect to latest Bio-medical waste management rules 2016.

Hospitals generate huge quantity of waste which is lethal to environment and the community including the waste handlers, patients, care providers and even animals. The amount of waste generated by the hospitals is increasing day by day with the increase in the number of new healthcare facilities both Govt. and private facilities. The Govt. of India from time to time revise the Bio-Medical waste management and handling rule to streamline the bio-medical waste management activities and to provide legal action

against health care workers and hospital administration who shows non-compliance to the current Bio-Medical Waste Management Rules, 2016

The following are the various differences observed between biomedical waste rule 1998 and 2016. In the previous biomedical waste management rule authorization is required by those who are having at least 1000 beds but now in current rule of 2016 every occupier generating BMW is required to obtain authorization. In current BMW rule only 4 categories of BMW instead of previous 10 categories with also deletion of schedule V in current rule.

According to Bio medical Waste management Rules, 2016

Biomedical waste means any waste, which 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, including categories mentioned in Schedule I appended to these rules; (<http://www.ppcb.gov.in/Attachments/Bio%20Medical%20Waste/BMW%20Rules%202016.pdf>)

“A modern hospital is a complex multidisciplinary system which uses thousands of items for delivery of medical care.¹ All these items consumed in the hospital leave some unused leftovers i.e. hospital waste. Hospital waste is a potential health hazard to the health care workers, flora and fauna of the area. This problem has now become the threat for public health. Public is under a constant risk due to multifaceted problems of hospital waste. In 2008, there were about 6 lakhs hospital beds, over 23,000 primary health care centres and more than 15,000 small and private hospitals¹. During last four years rapid mushrooming of hospitals in the public and private sector has increased the problem¹. (ARORA, 2013., p. 239) Increase in number of hospitals is the need of expanding population¹. In current scenario usage of disposables has magnificently increased the hospital waste. Unscientific disposal of hospital waste lead to the transmission of gastro-enteric infections, respiratory problems, hospital acquired infections, rising incidence of Hepatitis B, HIV, TB, transfusion transmitted diseases have compelled the authorities to think seriously about hospital waste management¹ Emission of toxins like ‘dioxins’ and ‘Furans’, HCl produced during incineration are generating a chain of secondary problems of Environmental Hazards”¹. (ARORA, 2013., p. 239) Medical waste has been identified by US Environmental Agency as the third largest known source of dioxin air

emission and contributor of about 10% of mercury emissions to the environment from human activities.

The average quantity of hospital waste generated in India ranges from 1.5 to 2.2 kg/day/bed whereas in developed countries it is 5.24 kg/day/bed. The problem of hospital waste is more of quality as compared to quantity. It is estimated that the total amount of hospital waste in Delhi is only 1.5% of the total municipal waste. Only a small percentage i.e. 15% to 20% of the hospital waste is contagious and require special disposal techniques but if this 10% mixes with rest of the waste, then 100% waste becomes contagious¹ (ARORA, 2013., p. 239)

“ Among all health problems, there is a particular concern with HIV/AIDS, Hepatitis B and C, for which there is a strong evidence of transmission through healthcare waste” (ARORA, 2013., p. 239).

“About 0.33 million tonnes of hospital waste is generated in India annually and the waste generation rate ranges from 0.5 to 2.0 kg per bed per day”. Insufficient knowledge among the HCPs is a serious concern as it leads to spread of diseases and various occupational hazards among them due to lack of knowledge, they were not able to follow correct practices of BMW management.

It becomes quite mandatory from the above discussed facts and studies that the effective management of biomedical waste is necessary step in order to prevent disease occurrence and also compliance to current biomedical waste management rule is also required to prevent legal action against the health providers and authorized institutions. Hence through knowledge among the health providers and Bio-medical waste handlers is required for the effective management of biomedical waste especially in light of current legislation governing it. Along with it proper waste management practices should be followed and positive attitude is also required to inculcate biomedical waste management practices as a part of daily routine without considering it as a extra burden on work.

1.2 AIM OF THE STUDY

There is significance of this study to check current status of biomedical waste management practices in Government District Hospital and its compliance latest biomedical waste management rules 2016. By conducting this study the level of awareness and attitude among health care staff working in Government Hospital regarding latest biomedical waste management rules 2016 can be evaluated. Further suggestions can be given based on the analysis and findings of study to improve efficiency of BMW management process.

1.3OBJECTIVE OF THE STUDY

- 1** To assess the existing process of biomedical waste management in government hospital and also to assess its compliance in government in light of current BMW Rule 2016.
- 2** To determine the awareness of healthcare staff along with their attitude and practices regarding Bio-medical waste management policy and procedures.
- 3** To identify the gaps if any and suggestions based on analysis of study for further improvement in bio-medical waste management and handling.

CHAPTER 2

SIGNIFICANCE OF THE STUDY

The study will be helpful in reviewing the status of Bio-medical waste management especially in a government hospital regarding compliance to the new BMW Rule 2016 as it was made mandatory to follow this fully within 2 years otherwise will be liable for punishment. As the HCP are the pillars of strength for the hospital not only in standardized health care delivery but also for preventing infections to themselves and to the patients. All this can be achieved through accurate knowledge regarding the bio- medical waste management and handling and by following the correct practices at respective workforce only if they have thorough and accurate knowledge about how to segregate the BMW till its final disposal. Moreover their attitude and perception towards their role and responsibilities in management of BMW is assessed through this study, only then the gaps if found can be addressed properly. This study will be helpful in determining the cognition of the healthcare work force towards the BMW activities and functioning and also their attitude in improving the condition. Ultimately the study can be used for refining the existing BMW Practices and for ensuring safe environment and preventing infections by creating standard operating procedures and following them. It will also help in finding the areas where more input is required for ensuring safe BMW management & handling.

CHAPTER 3

LITERATURE REVIEW

“Srivastav Shalini, Mahajan Harsh, Mathur B P Jan-March 2012, conducted a study in 650 bedded hospital in march to may 2009 with the purpose for assessing biomedical waste management practices and healthcare practices of personnel involved in biomedical waste management and handling. They concluded from their study that the segregation practices need to be more refined and the safety measures taken by health care workers was not satisfactory, it was basically due to un-awareness of health hazards which may occur because of improper waste management practices”⁵.

A cross-sectional study was conducted by (Nidhi Sharma, 2017, p. 18893) About Awareness and Practices of Health Care Waste Management among Medical Practitioners and Hospital Staff in a Medical College Hospital, Jabalpur It was observed in their study that the knowledge and practices in doctors and nursing staff was good. The attitude of the study subjects toward separation of infectious and non-infectious waste, proper disposal and implementation of rules was positive. Majority 84% were in favour of implementation. (Nidhi Sharma, 2017, p. 18893) Only 62% study subjects committed that they will co-operate in hospital waste management team (Nidhi Sharma, 2017, p. 18893) the attitude of attenders and housekeeping staff was found to be almost similar³.

Most of them thought it is an extra amount of work and were not very keen in implementing and attending training programs. The nurses (91.5%) had a better attitude toward separation of wastes, proper disposal, implementation of rules and co-operation in program (Nidhi Sharma, 2017, p. 18893) Doctors and nurses have better knowledge than other staff regarding healthcare waste management but the practices related to health care waste management were better in nurses³.

Knowledge regarding the colour coding and waste segregation at source was better in nurses and lab technician⁷. Anita Pandey, Sanjiv Ahuja, Molly Madan, Ajay Kumar Asthana(2016) ,conducted an observational study of the BMW management at an 1100 bedded Chhatrapati Shivaji Subharti Hospital (CSSH), a tertiary care teaching hospital in Meerut City was carried out by the Infection Control Team (ICT) and Hospital management. The observational study was carried out for a period of five months from January 2016 to May 2016. The approval from the Institutional Ethical and Research Committee was obtained before conducting the study. The ICT surveyed different areas of the hospital such as Wards, ICUs, Emergency, Operation theatre, Laboratories, and Central Sterile Supply Department (CSSD) to observe the process of segregation of the waste at the site of generation. The emphasis was to see whether the segregation of BMW at the site of generation was carried out in separate colour coded bags as per the hospital protocol. The awareness was assessed with help of prepared questionnaires it was found that 90% of the HCWs have good knowledge but the segregation practices were followed by only 35%. There is mixing of general waste with infectious waste which is a matter of serious concern.

CHAPTER4

METHODOLOGY

4.1 STUDY LOCATION: This study was conducted in a government district civil hospital Pathankot, Punjab. It is a 150 bedded District Hospital with all the basic facilities.

4.2 STUDY DESIGN: Cross sectional descriptive study

4.3 DURATION OF STUDY: 3 months from 1st Feb to 30th April 2018

4.4 SAMPLE SIZE: Doctors- 15

Nurses -15

Paramedical staff other than nurses-15

Sanitation staff (Sweepers) -15

Total sample-60

4.5 SAMPLING TECHNIQUE: Purposive sampling

4.6 SAMPLE SELECTION:

Inclusion criteria: Health care personnel directly involved in generating and handling bio-medical waste are taken for study. HCP who have consented for participation

Exclusion criteria: Patients and Attendants are excluded. Those who were not available at the time of study and all those who have not given consent for participation.

4.7 STUDY TOOLS: A checklist was prepared to collect data from the different bio-medical waste generating centers of the hospital. The checklist has all the essential steps

concerning Bio-Medical waste management process. A structured questionnaire is used for assessing the awareness and knowledge of the health care personnel. The questionnaire is prepared in English and regional language.

4.8 METHOD OF DATA COLLECTION:

PRIMARY DATA: The primary data is collected directly from observations at the site of Bio-medical waste generation in the hospital using the checklist. The different areas of the hospital are surveyed to assess the process of biomedical waste generation, segregation, collection, transport, storage and disposal to the CWTF.

A prepared structured questionnaire with individual interviews is used to assess the awareness, knowledge, attitude and perception of HCP regarding the legislation, policy, segregation, collection, storage, safety and responsibility of BMW management and handling covering the basic parameters of the rule 2016. The information derived from the interviews is also verified by observing Health Care staff regarding BMW management practices at their workplace on alternate days for 3 months.

SECONDARY DATA:

It is collected by the hospital records, SOPs of the study hospital, literature review, articles, journals and websites available on internet.

4.9 DATA ANALYSIS TECHNIQUE

The data is entered and tabulated in Microsoft Office Excel. The Statistical method used for the data analysis was estimation of simple percentage. The results are analyzed by using tables and graphs.

CHAPTER 5

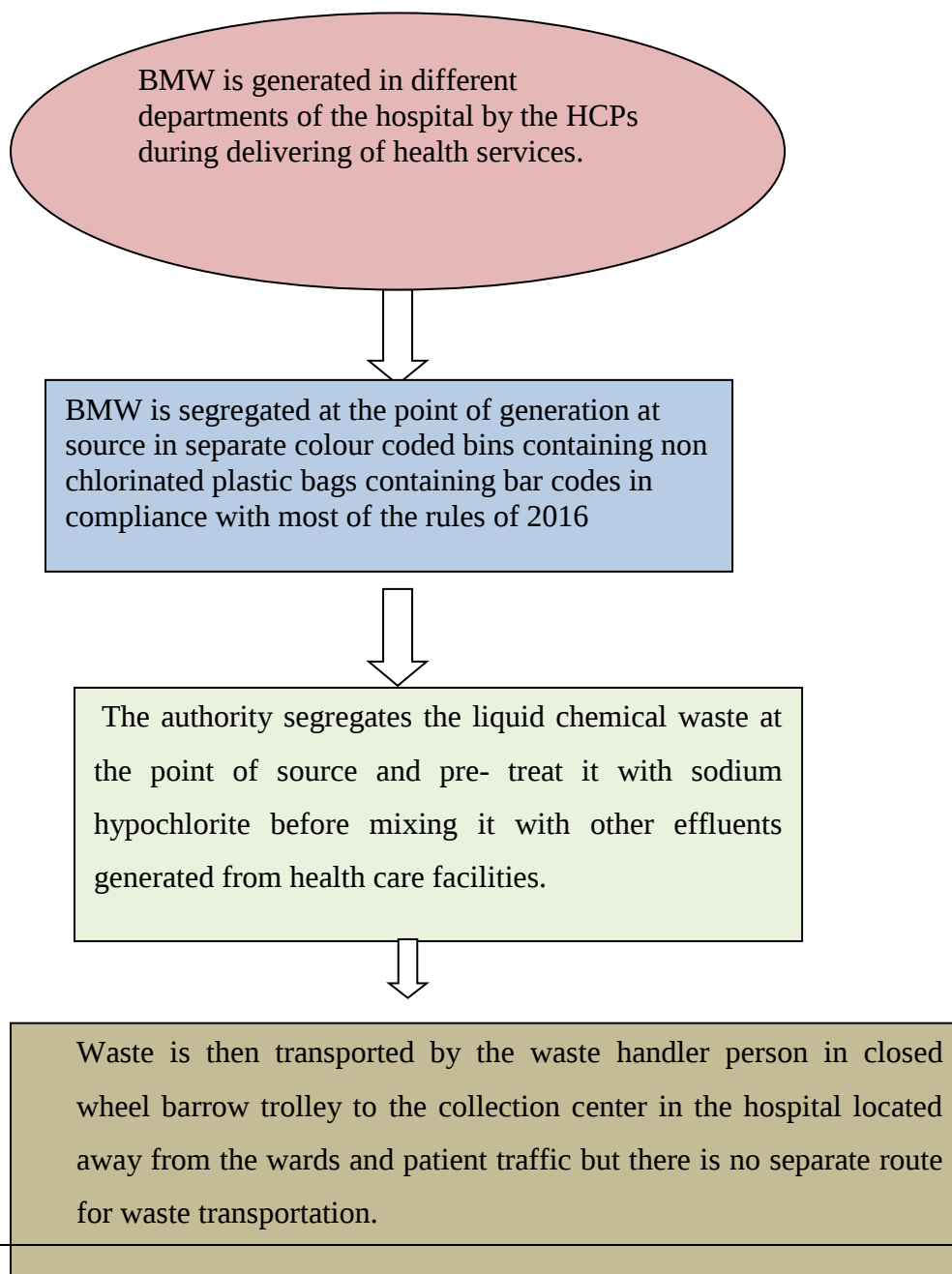
ETHICAL CONSIDERATIONS

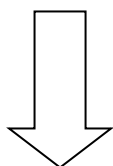
The permission for conducting the study was taken from senior medical officer in charge of the hospital. The respondents were explained the purpose of the study and verbal consent is obtained from them prior the interview. All the respondents were assured that their confidentiality will be maintained.

CHAPTER6

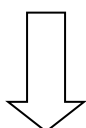
CURRENT PROCESS OF BMW MANAGEMENT IN GOVERNMENT CIVIL HOSPITAL PATHANKOT

Process of waste management in civil hospital Pathankot is evaluated by the help of checklists and directly observing the practices followed by the workforce





Collection room has well ventilation and also provided with lock for security for preventing pilferage of recyclables.



TRANSPORTATION FROM STORAGE CENTRE IN HOSPITAL TO OUTSOURCED AGENCY M/S bio-medical waste treatment plant private limited(herein after called as service provider)



Hospital does not itself disposes of bio-medical waste it is outsourced with proper agreement with common bio-medical treatment facility(CBWTF) named as M/S bio-medical waste treatment plant private limited(herein after called as service provider)

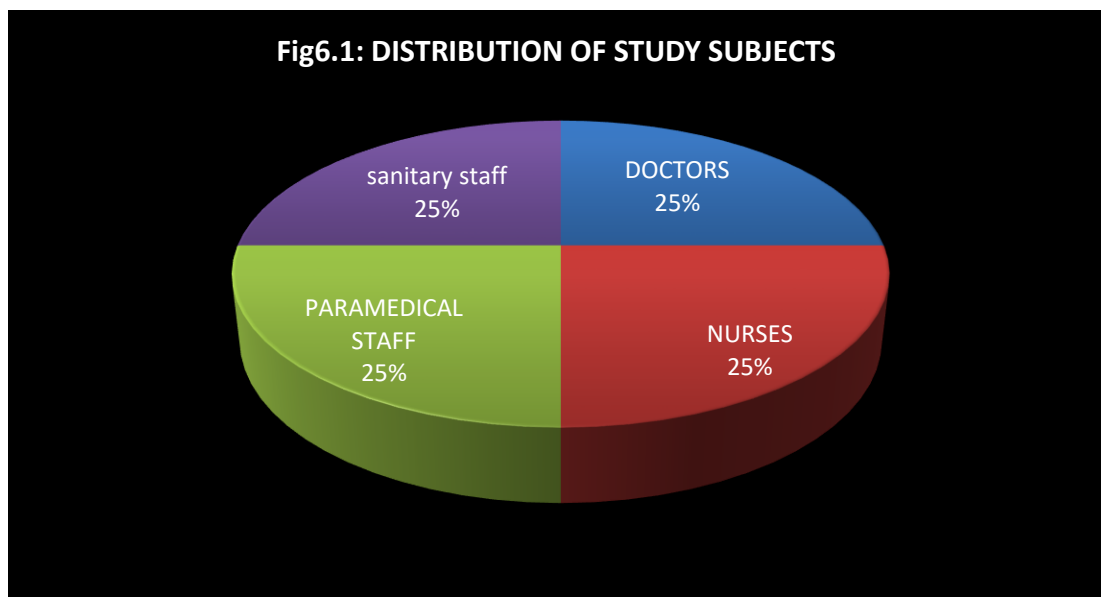
Fig 1: Current Process of BMW Management at District Hospital Pathankot

CHAPTER 6

DATA ANALYSIS

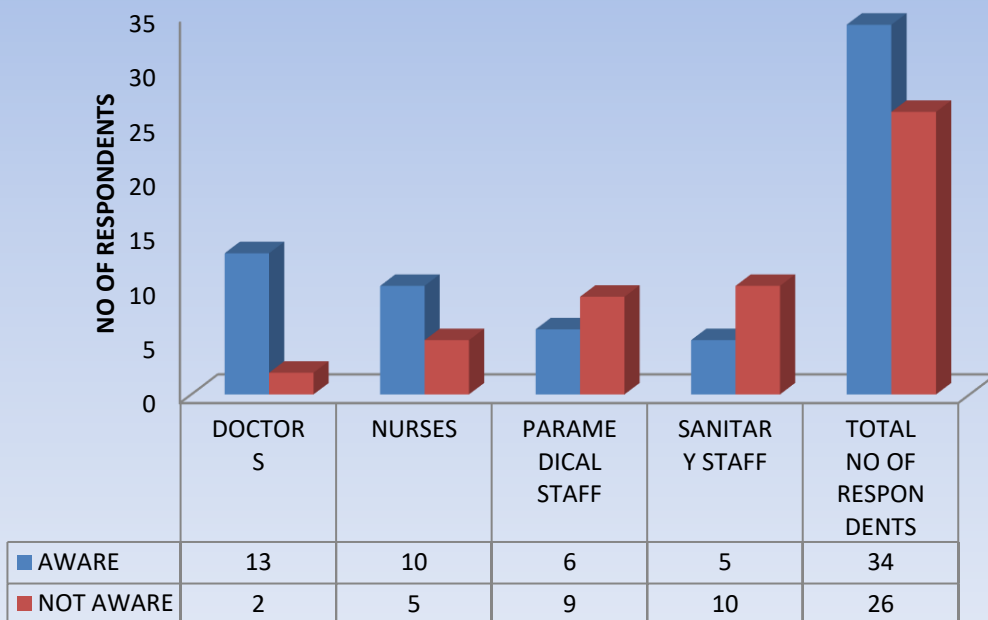
A) ANALYSIS OF DATA COLLECTED FROM INTERVIEWS AND BY QUESTIONNAIRES.

Distribution of study subjects

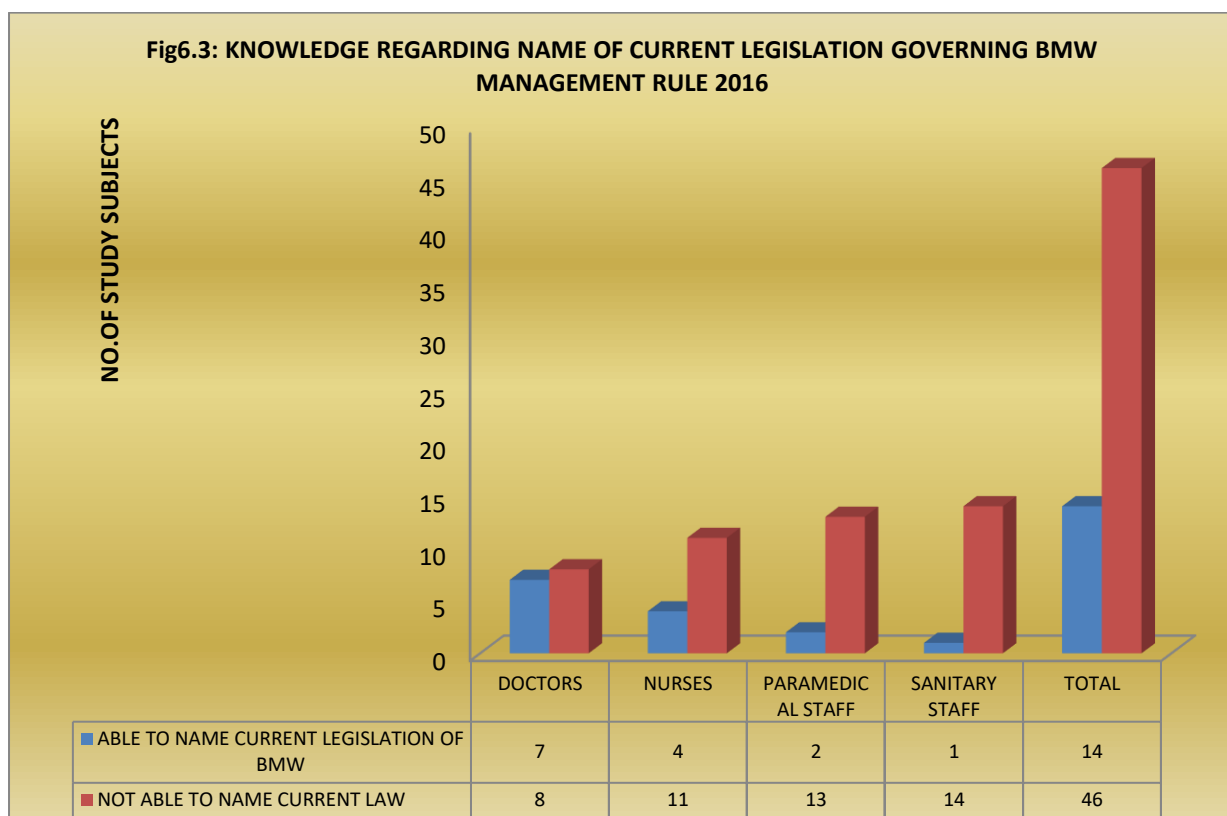


The above fig represents the distribution of respondents taken for study. Equal no. of doctors, nurses, paramedical staff and sanitation staff participated in study. Only those respondents who consented for participation in study were taken for study.

FIG 6.2 Represents the level of awareness of respondents regarding any law governing BMW management



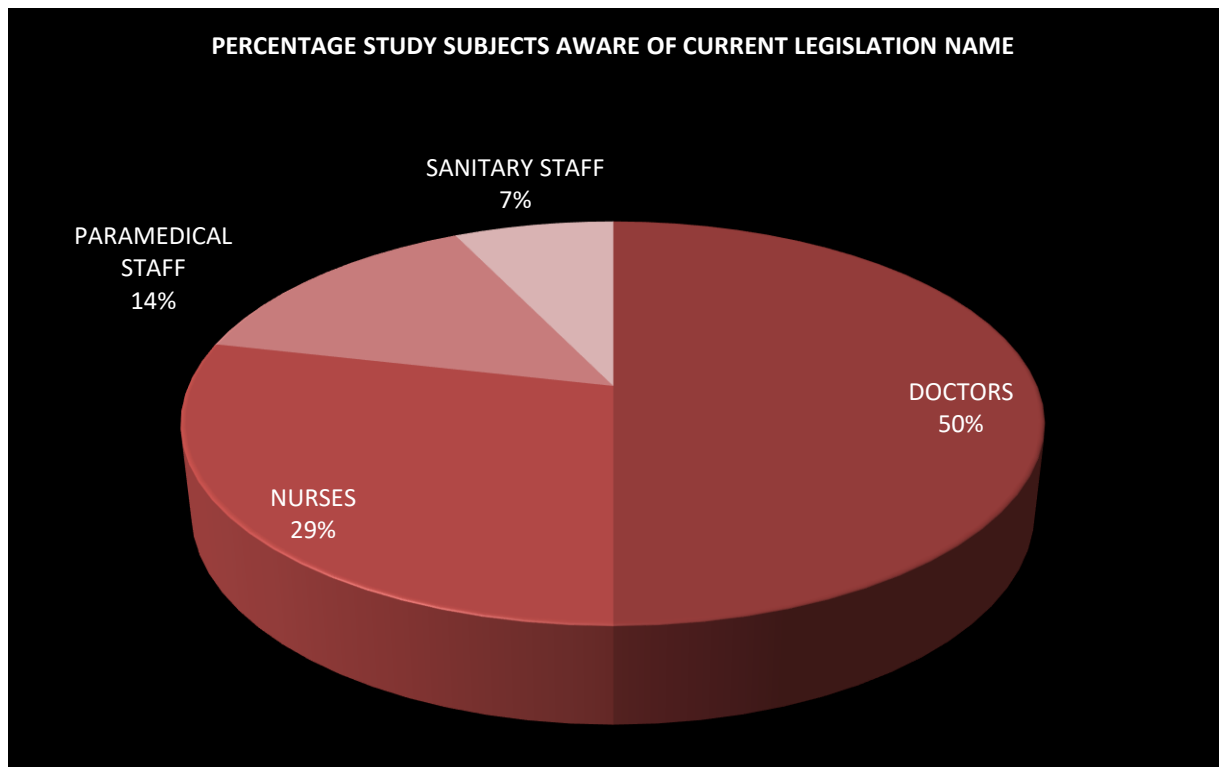
The above fig represents the level of awareness of respondents about the current rule. Out of 15 doctors who participated in the study 13 were aware of it. While only 5 sanitary staff out of 15 were aware of it. It was seen that sanitary staff had least awareness about the current law applicable to BMW.



ANALYSIS

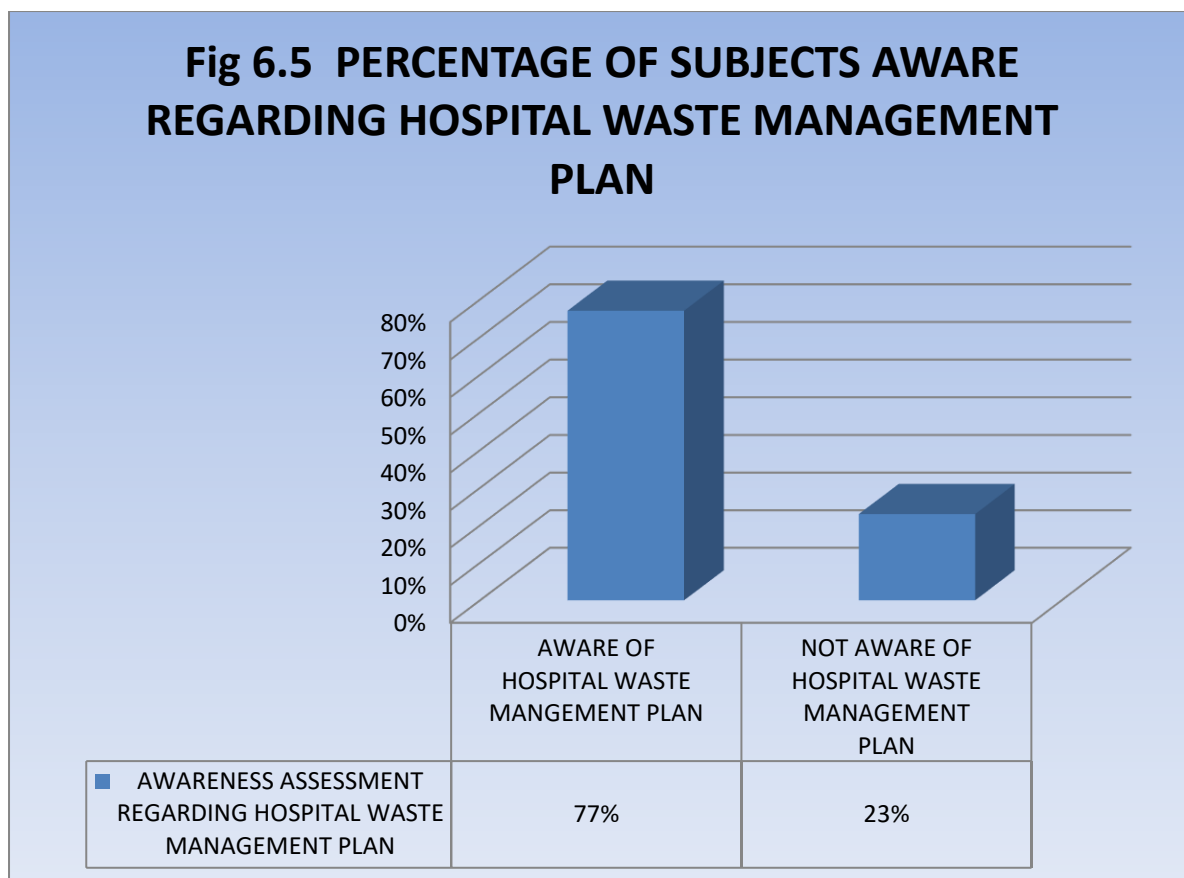
When the respondents were asked to name the current legislation applicable for Bio-medical waste management only 14 respondents out of total 60 were able to name the law where as 46 respondents were not able to name the current law applicable to it. As it was seen in graph 2 that total of 34 respondents were aware of the fact that there is a law governing it, but when those total 34 respondents were asked to name it only 14 were able to name correctly the law and only 1 sanitary staff was able to name the law, while 7 doctors were able to name it correctly.

Fig 6.4



Analysis of fig 6.4: out of the total 14 respondents who were able to name the law the major percentage of respondents were doctors (50%), whereas least percentage belongs to sanitary staff as most of them were not able to name it

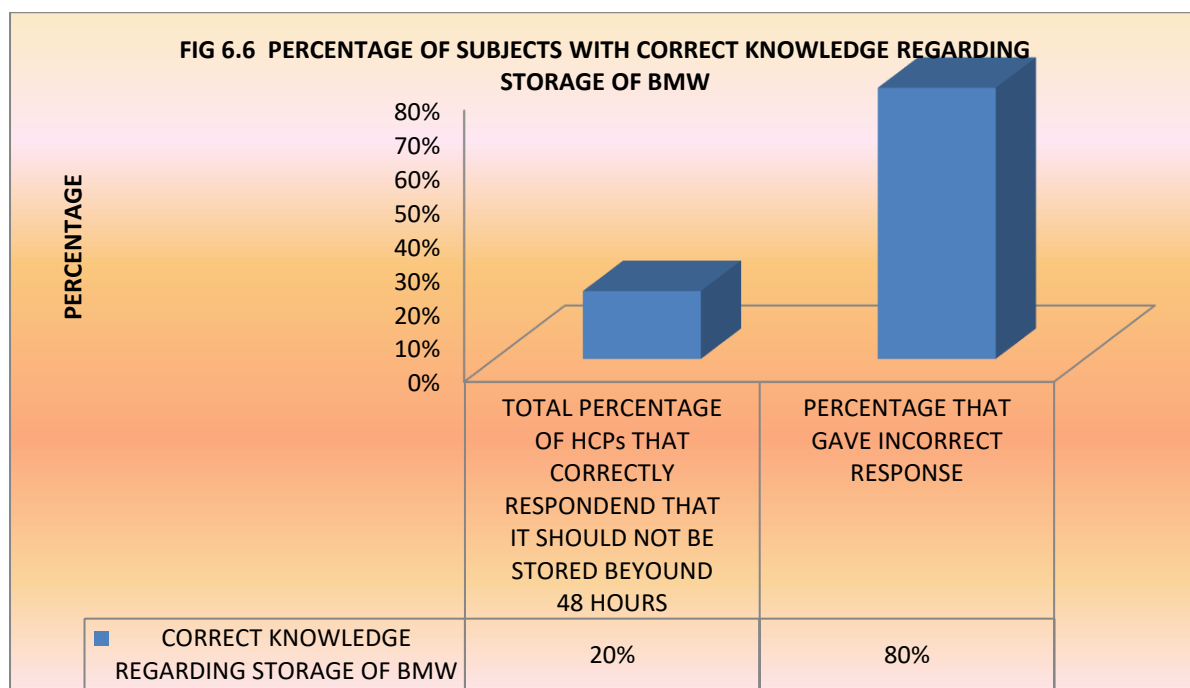
Fig 6.5 Total percentages of subjects who were aware and not aware of their hospital waste management plan out of total respondents involved in the study.



Analysis

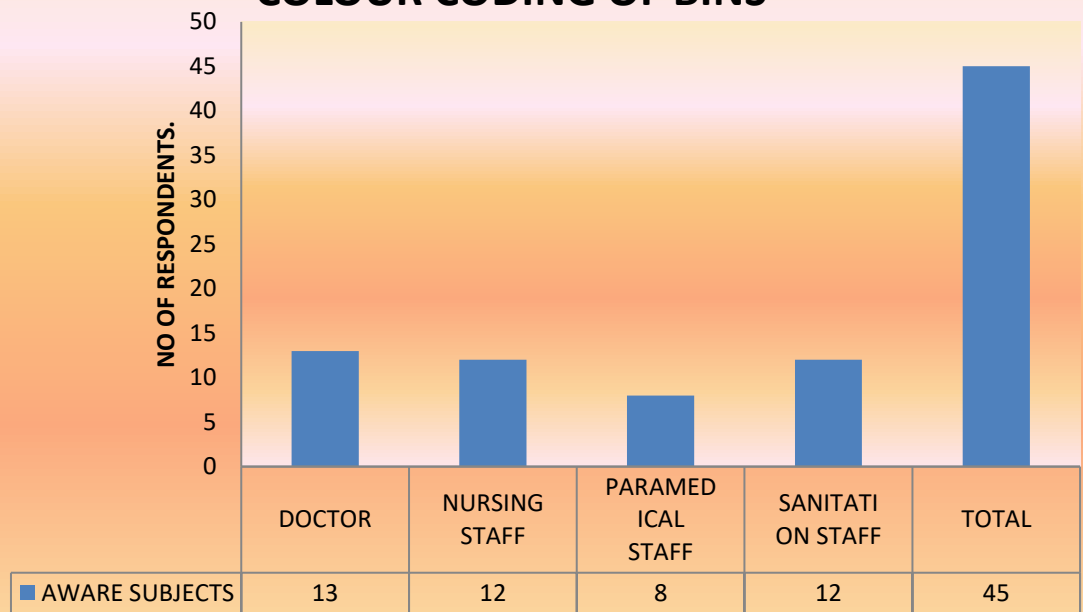
Hospital waste management plan is known only to 76 percent of respondents out of the total 60 respondents who participated in the study.

FIG 6.6



It was seen that only 12 (20% of the HCPs) out of total 60 respondents who participated in the study were aware of the fact that BMW should not be stored beyond 48 hours. Whereas 80 % of HCPs were unaware of storage period for BMW, it can be a serious issue as it can lead to overloading of bins and spillage of waste.

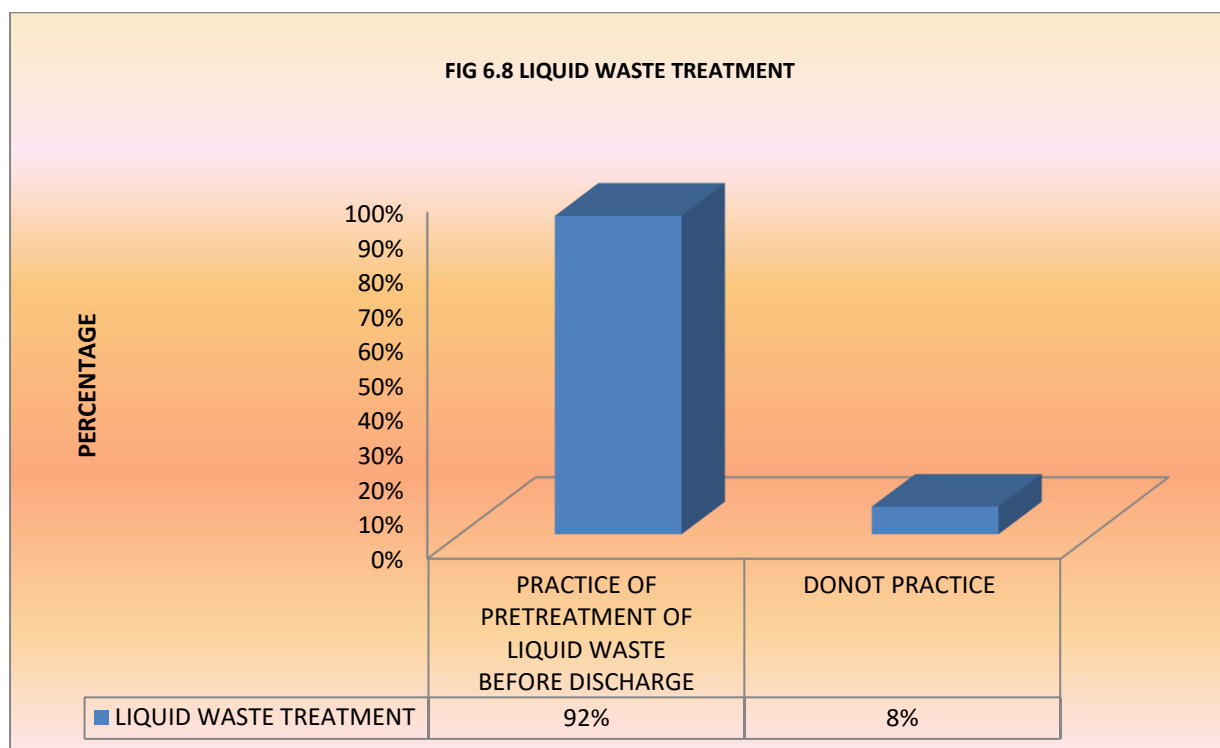
FIG 6.7: KNOWLEDGE ABOUT THE CORRECT COLOUR CODING OF BINS



ANALYSIS

The above fig represents the fact that the knowledge regarding the correct colour coding of bins was same in nurses and sanitary staff while doctors had highest knowledge regarding it paramedical staff had the least. It is a serious problem if Health care staff were not aware of the correct colour coding of bins they would not be able to practice the correct segregation of waste in respective bins, it will ultimately hamper the process of effective management of waste

FIG6.8: Practices followed for liquid waste treatment.

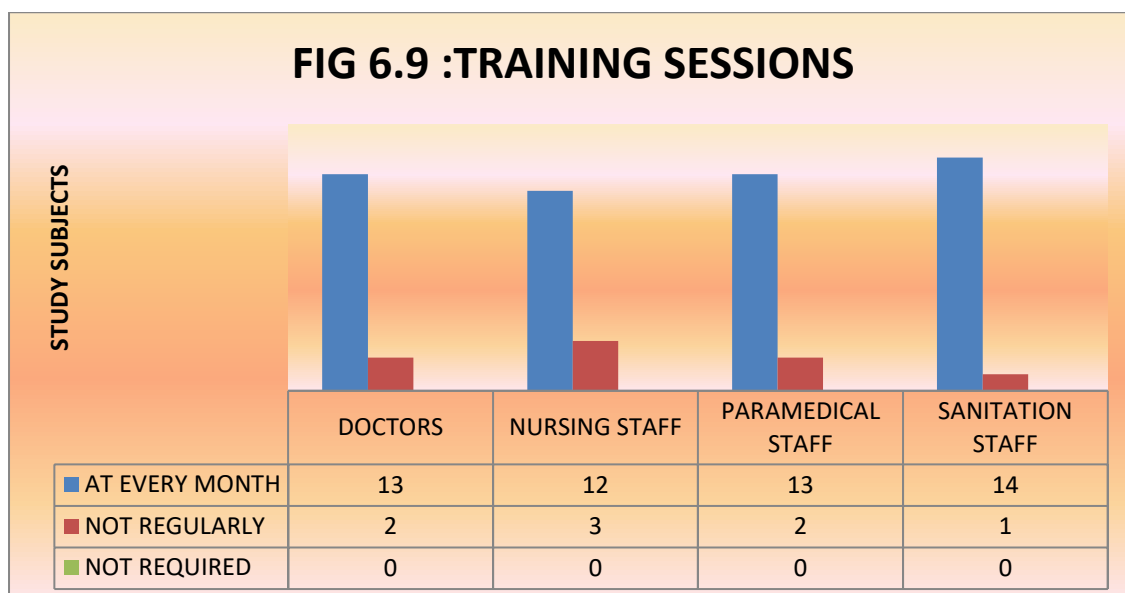


Analysis: 92% of the respondents practice the pretreatment of liquid waste before its discharge in sewage while 8% of the respondents agreed that they don't follow such practices.

TABLE NO 1 (N=60) Practice of maintaining of records

PROPER MAINTAINING OF BMW RECORDS WITH REPORTING OF INJURIES CAUSED DUE TO BMW	PROPERLY MAINTAINED	NOT PROPERLY MAINTAINED	NO RECORDS
DOCTORS	6	5	4
NURSING STAFF	11	2	2
PARAMEDICAL STAFF	8	3	4
SANITARY STAFF	3	5	7
TOTAL	28	15	17
PERCENTAGE OF RESPONDENTS	47%	25%	28%

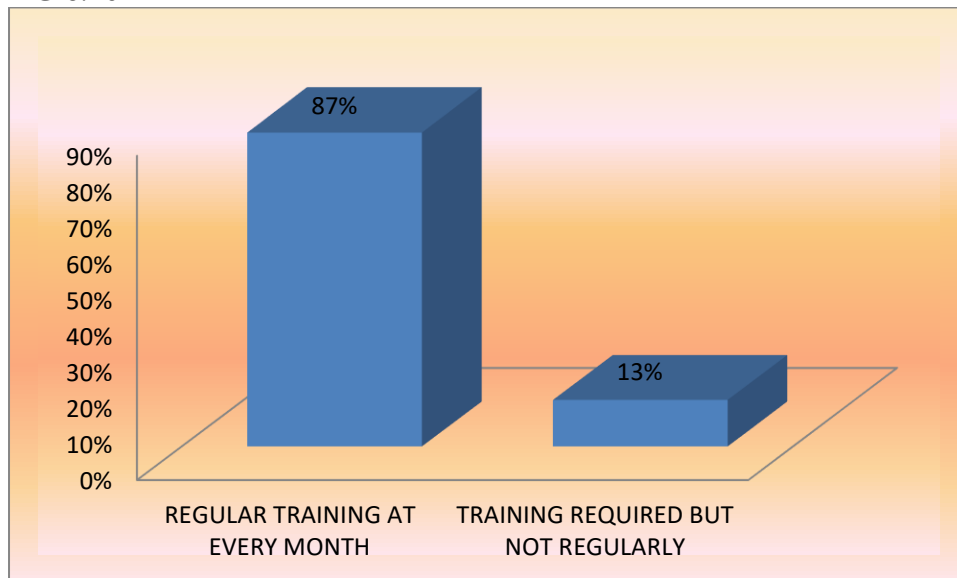
From above it is seen that 28% of the HCWs don't practice the maintenance of BMW records and even were not aware of the fact that their hospital has the provision for records maintenance regarding injury reporting and BMW records. While 47 % of the HCPs follow the practice of proper maintenance of records and were well aware of their hospital records maintenance process and were able to show the records also to verify the practice of maintaining records and reporting for needle stick injury while those 25 % who agreed on the fact there is records maintenance but proper documentation of records was not there.



ANALYSIS

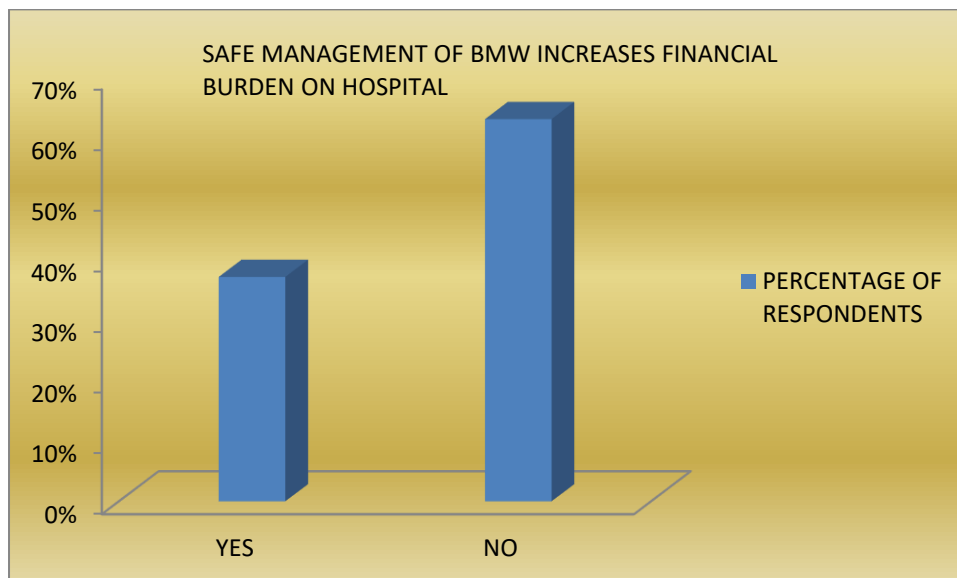
About 86% of the total respondents were of the opinion that the regular training sessions should be conducted at least every month. From the total 15 respondents of sanitary staff 14 were willing to have BMW training sessions at monthly interval, while other staff almost had the same perception regarding monthly training sessions. However very negligible number of respondents did not agreed for regular training. But none of them felt that no training is required. Hence the health care staff had the positive attitude towards the participation in future training sessions.

FIG 6.10

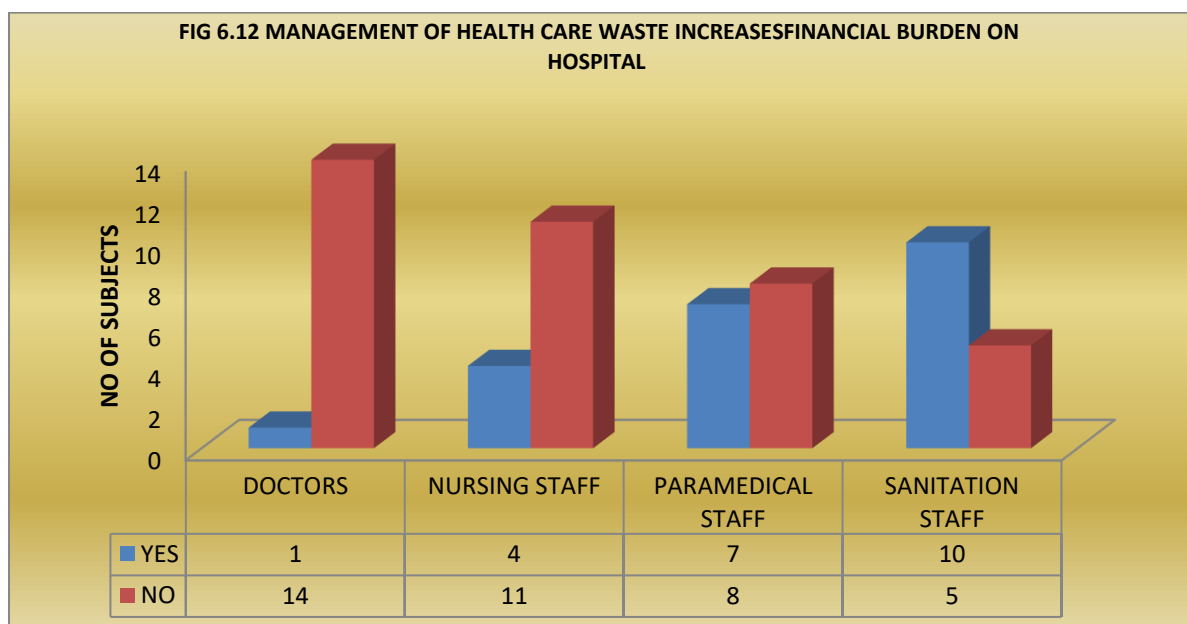


87% of HCP were willing to make BMW as part of monthly training whereas 13 % want training but not regularly at every month.

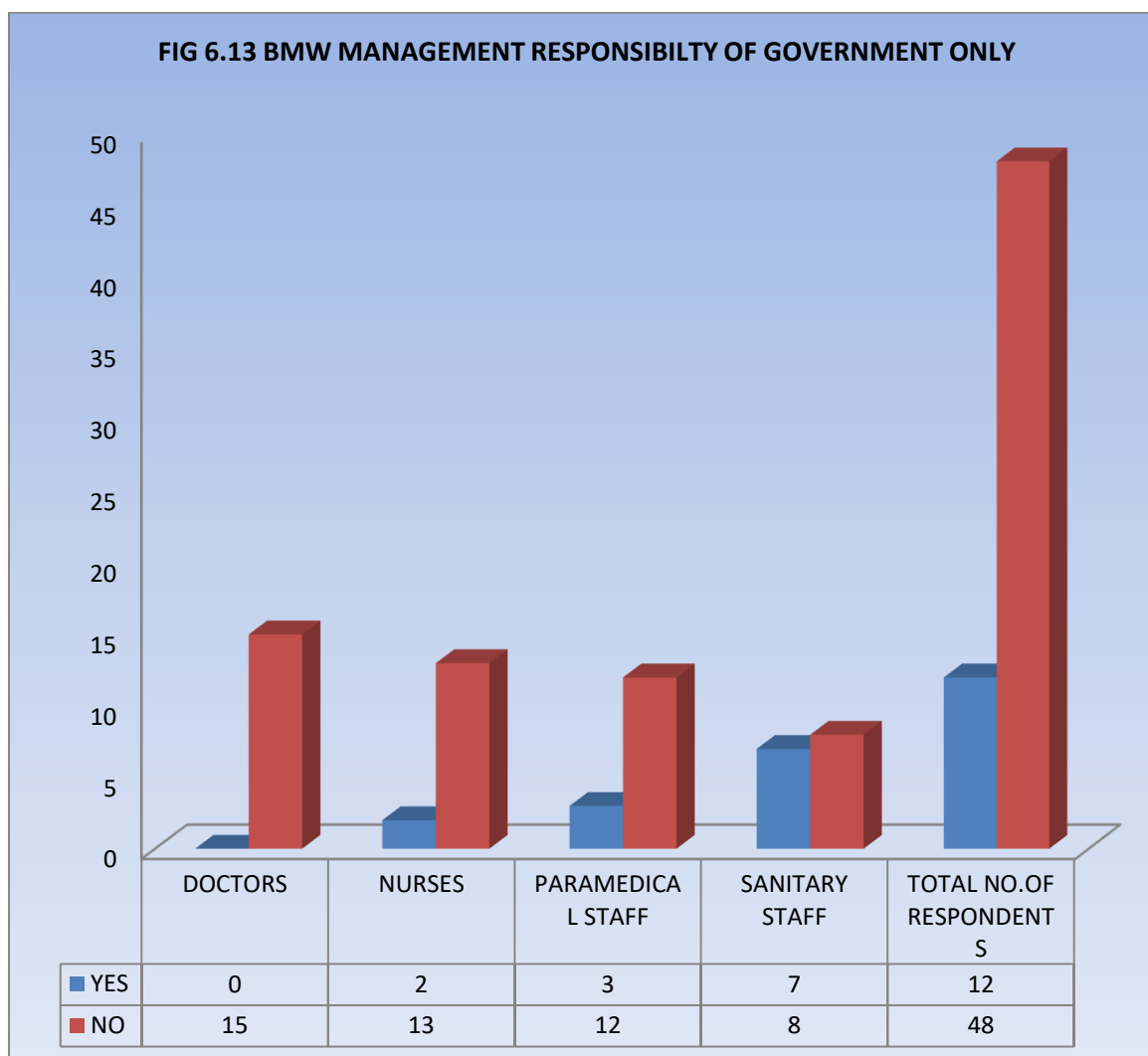
FIG 6.11



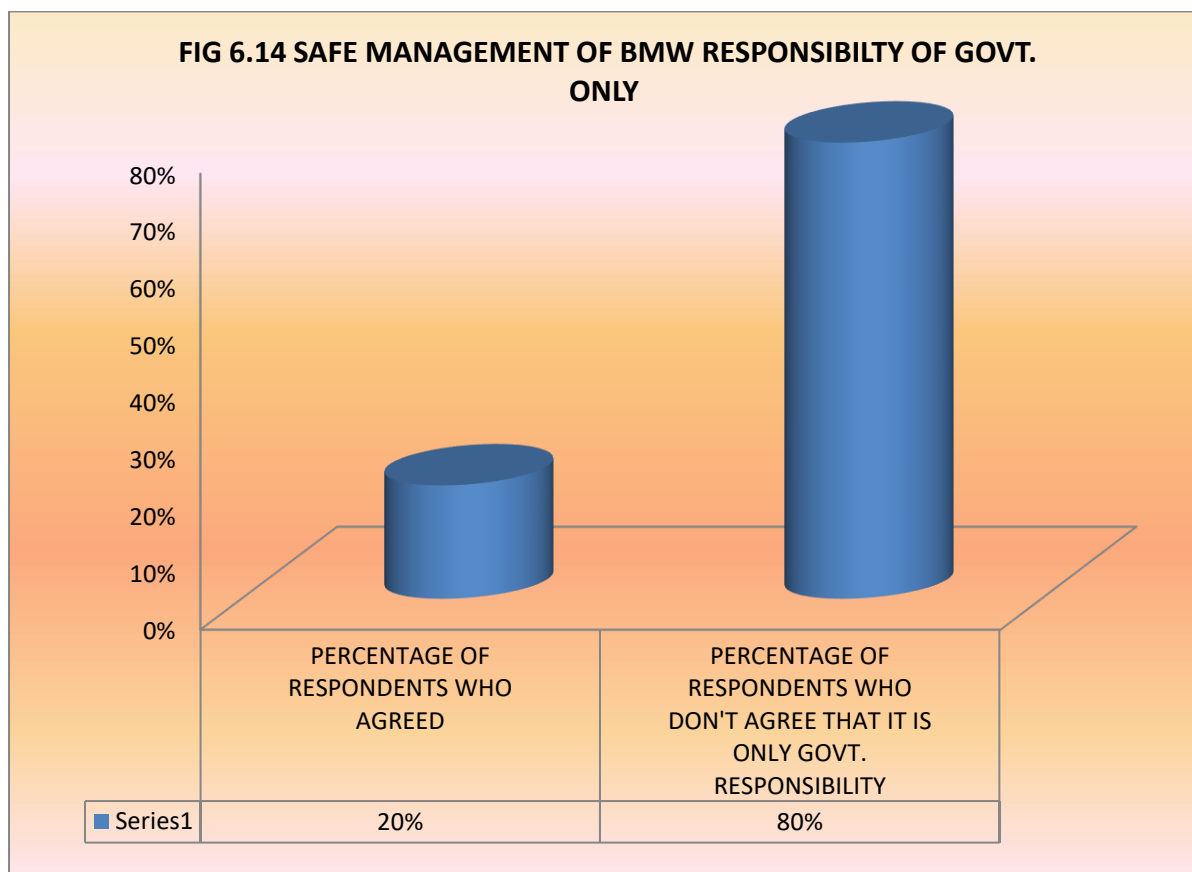
In the above FIG, 37 % of the respondents were of the opinion that the safe management of health care waste increases financial burden on the hospital.



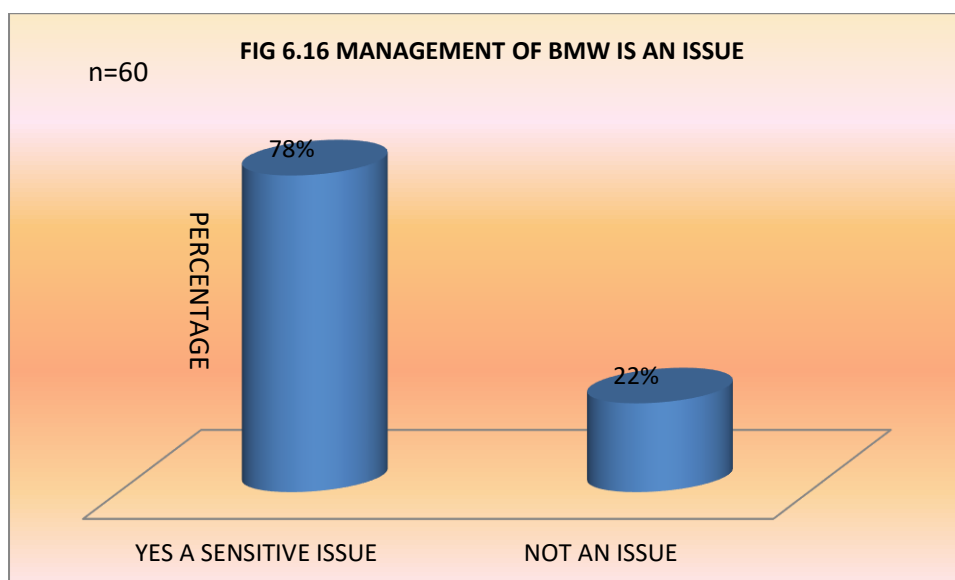
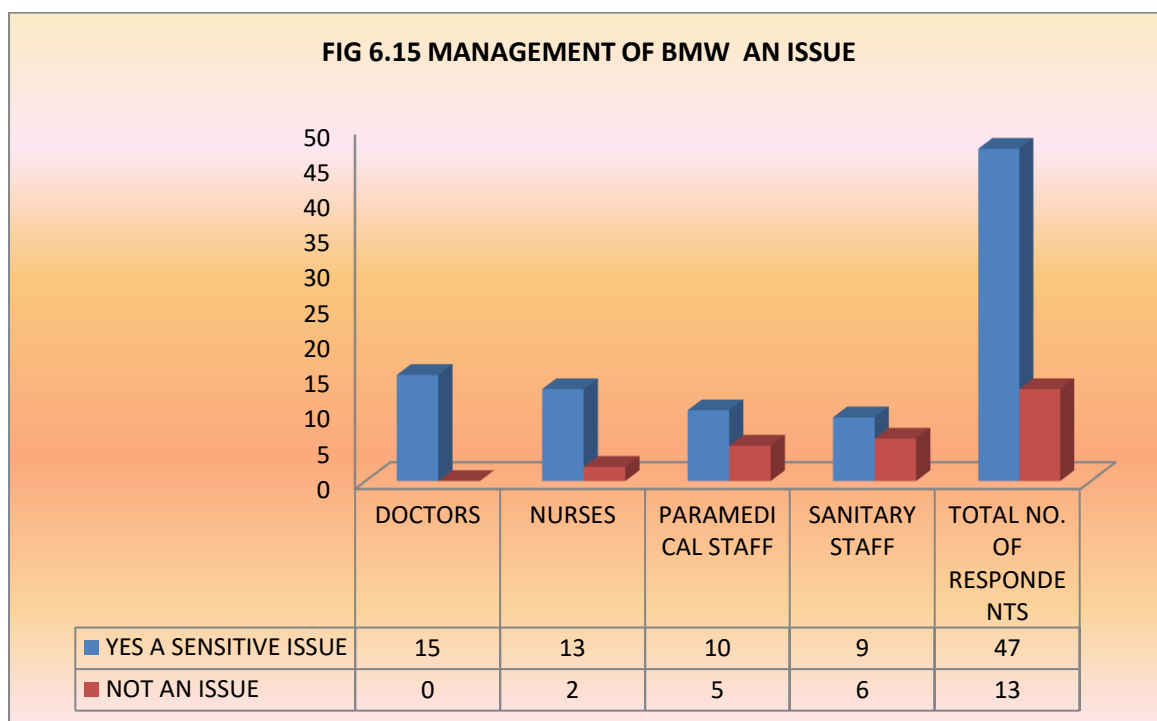
It is quite clear from the above graph that most of the sanitary staff and paramedical staff other than the nurses were having the perception that the safe management of health care waste increases the financial burden on the hospital. Only one doctor responded out of 15 that it increases the financial burden and only 4 nurses shared the same opinion out of 15 nurses.



From the above it is seen that none of the doctor agreed that the management of BMW is responsibility of Govt. only, doctors had the positive attitude towards their contribution and responsibility in managing it

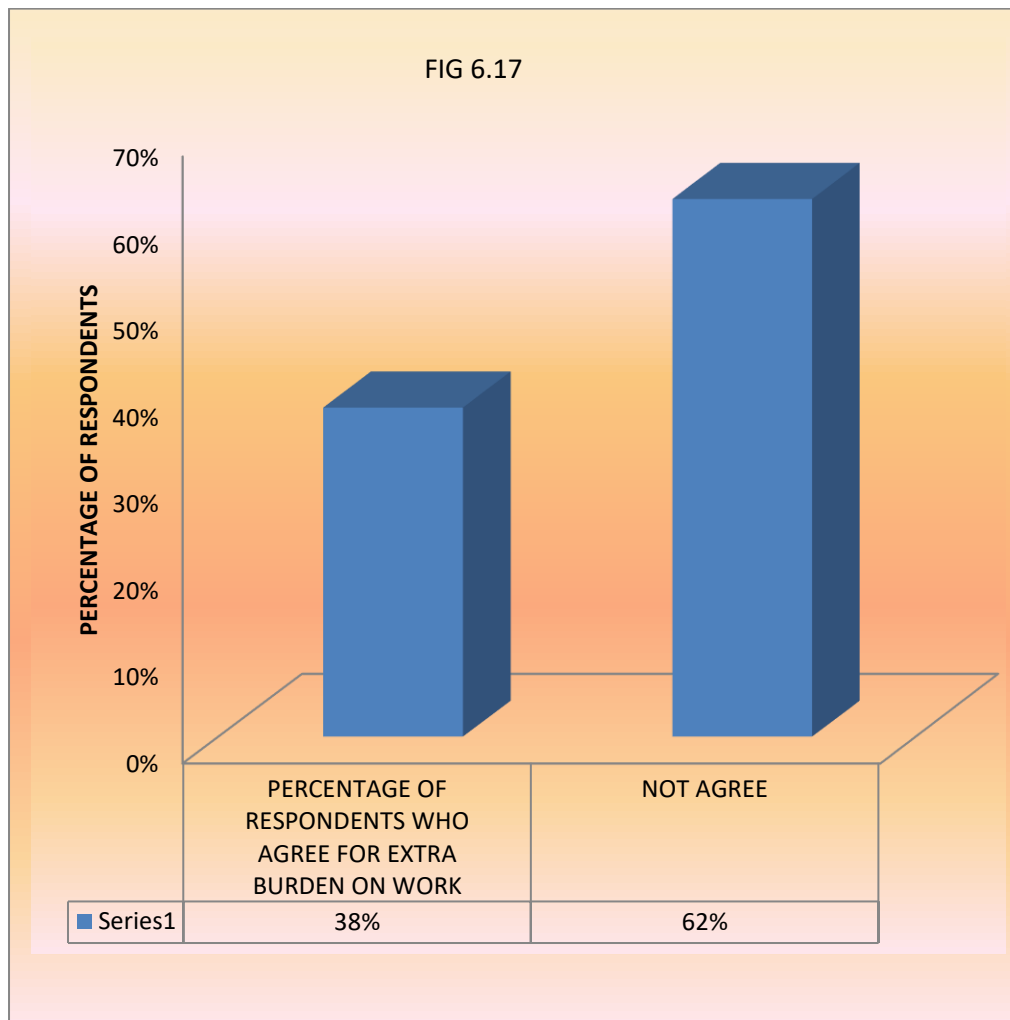


Out of total 60 health care staff who participated in the study. 20% of the HCPs were having the perception that safe management of BMW is the sole responsibility of government. 80 percent had the perception that it is not the sole responsibility of government. Hence the attitude of 20% of the respondents regarding their responsibility in waste management was not clear in fact they were having the perception that it is the responsibility of government only.



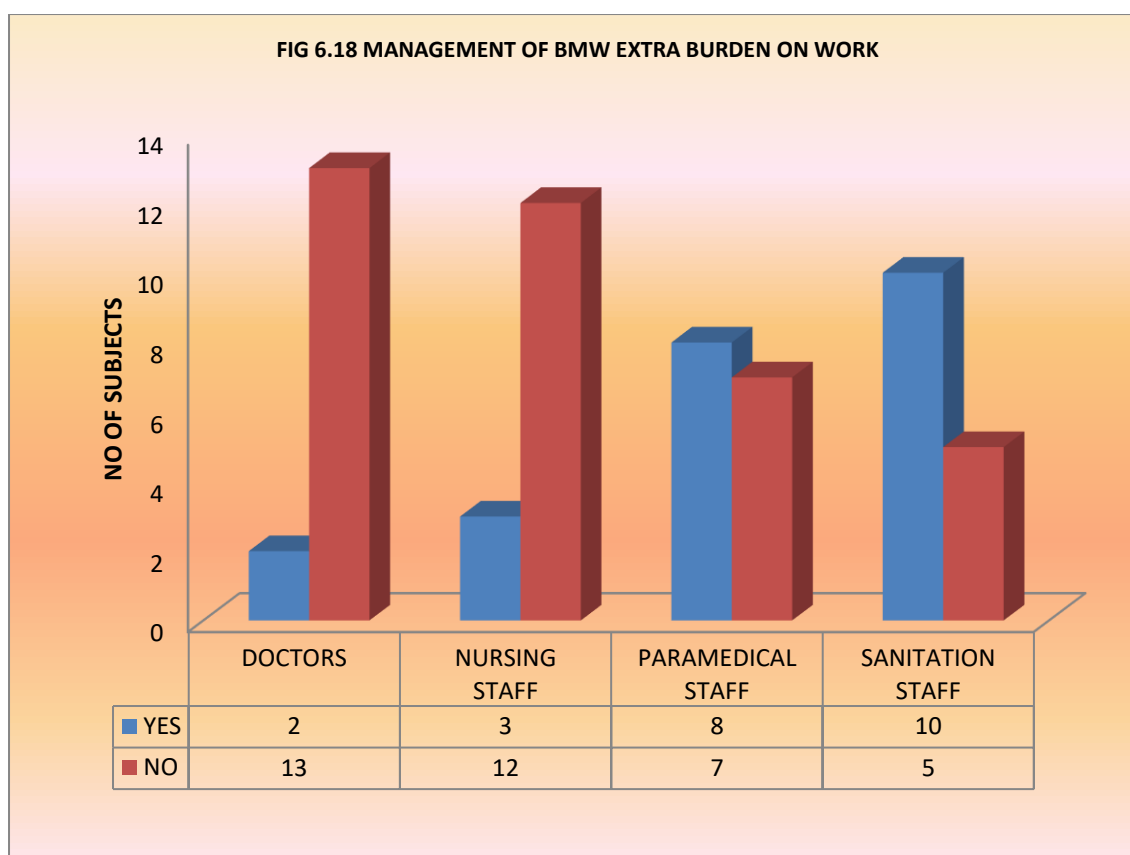
As out of 60 subjects who participated in the study 47 respondents i.e. 78% of the HCPs believed that safe management of BMW is a sensitive issue. But 22% of the HCPs did not considered it as a critical issue

FIG6.17 Represents the Percentage distribution of respondents regarding their attitude for the management of BMW as extra burden on work or not



ANALYSIS

From the above graph it can be seen clearly that out of total 60 study subjects 23 respondents that is 38 % of the respondents felt that the safe management of the BMW is an extra burden on their work, whereas 62% of respondents felt that its safe management is a part of their duty and it is their responsibility to effectively participate in its management.

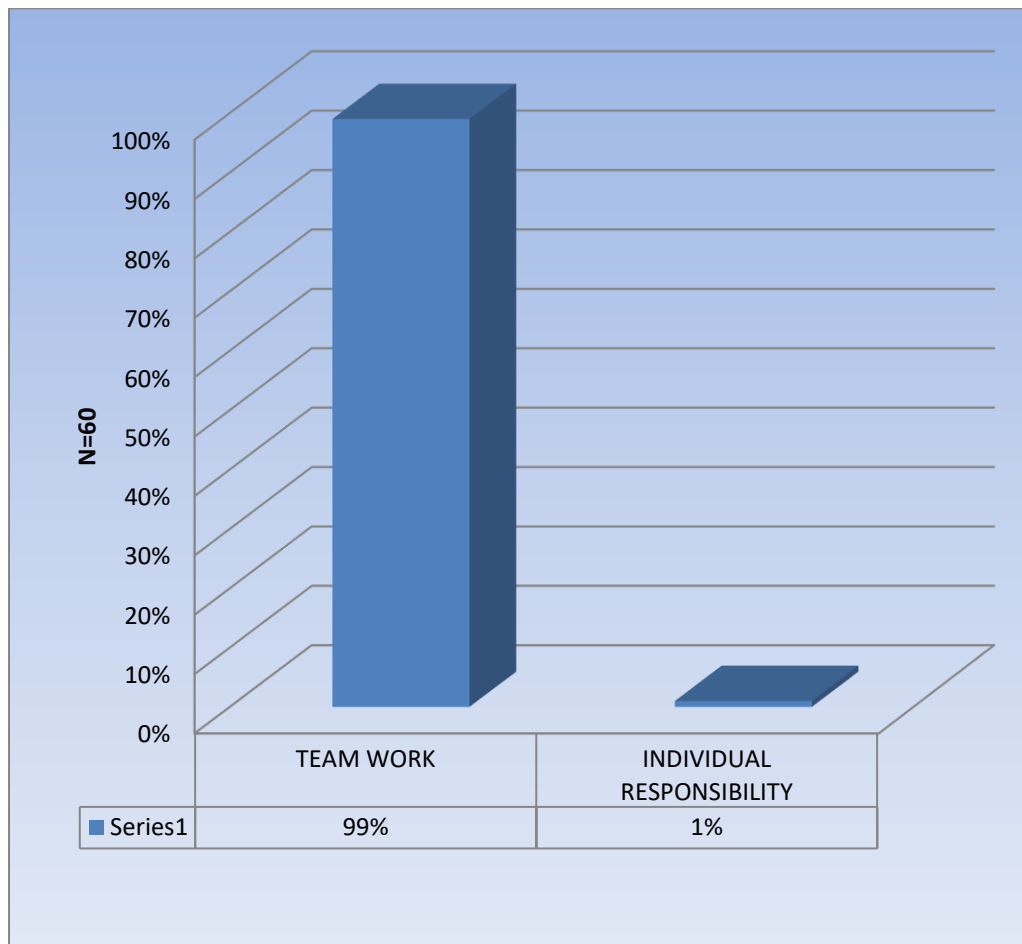


ANALYSIS

It was seen that Out of total 23 respondents who felt it extra burden major percentage around 43% is contributed by sanitation staff.

From the above graph it is quite evidentiary that the doctors and nurses has positive attitude and perception towards their responsibility in BMW management and they don't consider it extra burden on work where as substantial number of paramedical staff other than nurses consider it as extra burden on their work as they have to manage BMW along with their work. Sanitary staff also shared the same opinion as paramedical staff and their perception regarding its management seems to them an extra burden on their work.

FIG 6.19



When the respondents were asked about the management of waste, 99% of the respondents

Agreed that it is team work and only 1% of respondents out of 60 respondents believed that it is an individual responsibility.

CHAPTER 8

RESULTS OF STUDY

The data is collected through direct observations in all the areas of the hospital by carefully observing the practices followed at the departments regarding waste management. The hospital training records were also observed and old records and SOPs from the hospital were also studied to collect the data

After analyzing the data collected through questionnaires and interviews of the healthcare personnel various gaps were observed. It becomes quite mandatory to address these gaps in order to effectively manage the BMW process in hospital and to ensure safe protective hospital environment and also to decrease the chances of occupational hazards associated with ineffective BMW management.

Through the checklist it was observed that all the departments of the hospital were provided with colour coded bins for segregation of waste at source of generation in non chlorinated plastic bags but most of the times when bins were opened to check the status of segregation it was found that there is mixing of general and infectious waste . During the surprise rounds in the department it was seen that overloading of bins because waste bins were not emptied when it is 3/4th fill and the waste handler used to collect waste only once a day, that eventually leads to spillage of waste in wards due to overloading of bins.



Image no 1: spillage of waste and overloading of bins



Image no2: mixing of infectious and general waste



Image no3: No Proper Use of PPE and Overloading of Waste Trolleys



Image no 4: General Waste is collected in Wrong Bin in Laboratory

Most of the sanitary staff and paramedical staff were not having correct vision of their roles and responsibilities.

There might also be the possibility that the authority has not provided them orientation training at the time of their induction regarding their roles and responsibilities.

Their roles and responsibilities were not well communicated to them at regular intervals.

Communication gap between the administration and the sanitary staff

There should be frequent interactions between the higher authorities and staff in which the roles and responsibilities of each and every staff is communicated without any ambiguity.

It was seen that most of the bins were not placed at the proper location .Most of the bins were located at the corridors especially in wards due to its placement at the corridors most of the patients and visitors used to put general waste in wrong bins which leads to mixing of general waste with infectious waste. The security personnel were not playing their role in monitoring the activities of visitors and forbidding them to put waste in wrongly.

At most of the places the instructions for segregating the waste above the bins were missing and in case if present were in English creating a kind of language barrier to the sanitary staff for reading it, so they were not able to follow that practice of proper segregation.

The study had also thrown light on the fact that there is no separate and well defined route for waste collection from different departments by the waste handler and its transport to the storage center in the hospital. The BMW handler used to collect the waste only once a day that too at the peak hours following the same route as the patient, general traffic which can lead to risk of nosocomial infection if there is spillage due to overloading of bins in the wheel barrow trolley.

Daily records of quantum of waste generated in different bins were not recorded properly by the staff. Training sessions were provided twice a year but the performance and monitoring of activities concerning BMW by the authorities were not done. No evaluation of practices of BMW management followed by the HCWs was done by the hospital administration.

Usage of personnel protective equipments by the sanitary staff was quite unsatisfactory. Knowledge regarding the legislation governing BMW, Segregation of bins was found to be higher among doctors followed by nurses whereas paramedical staff other than nurses and sanitary staff were not even aware of the basic facts regarding BMW Management. Doctors and nurses were having the positive attitude with regards to their roles and responsibilities in management of waste and also were enthusiastic about the future participation. All the HCPs were having opinion about the waste management as a team work while 20% of HCPs believed that it is only government responsibility.

CHAPTER9

CONCLUSION

The process of BMW management in Govt. civil hospital Pathankot follows majority of rules as per new amended rules of BMW Management rule 2016. Proper segregation practices are done in colour coded bins containing non chlorinated bags with bar codes on it. With regards to knowledge about the segregation, legislation, storage of waste and overall basic rules of BMW 2016, it was found that doctors and nurses had the good knowledge and awareness as compared to other paramedical staff and sanitary staff. Doctors and nurses shared a positive attitude regarding their role and responsibilities in waste management and their perception for future training sessions was also positive. Besides they had good understanding regarding the criticality of Issue of BMW management. In order to improve the efficiency of BMW management process strict implementation of rules should be required. Periodic monitoring and evaluation of BMW management practices followed by workforce in department need to be checked by the hospital administration for ensuring safe hospital environment. There is need that each and every person involved with generating and managing BMW should be accountable for any violation done from the correct rule and zero tolerance policy should be followed against any violation found by the hospital administration during daily rounds of the departments. For effective management of BMW conscious, coordinated and cooperative efforts are required between doctors, nurses, hospital administrators, all paramedical staff and sanitary staff.

CHAPTER 10

LIMITATION OF STUDY

The study was limited to the process of generation, segregation, collection and transportation of waste to the storage center. The final waste disposal process was not taken into consideration as it was outsourced to an enterprise located far away from the hospital premises and also due to time constraints.

CHAPTER 11

SUGGESTIONS

Proper maintenance of records by all the departments should be done.

It must involve team work not only individual responsibility

Training sessions need to be conducted at monthly interval in local language with provision for compulsory attendance by the staff.

Behavioral modification programmes should be started in hospital in order to build positive attitude towards BMW management among the HCPs.

Roles and responsibilities of the staff should be clearly defined without any ambiguity.

Performance evaluation of staff by administration of hospital at regular intervals

Separate route for collecting and transportation of waste should be made.

Bins should be emptied daily when it is 3/4th full in order to prevent spillage of waste

Surprise rounds by the hospital administration of all departments for checking the practices followed by the staff.

Special sensitization programmes should be organized for the sanitary staff due to their more involvement in handling waste.

Visitors and patients should also be made aware of the their role in maintaining hygienic environment in hospitals

Installation of IEC materials just above the bins guiding the correct segregation of waste to be placed in respective bins

Careful watch by the security personnel and ward boys posted at the critical locations about ensuring that general waste is not mixed with infectious waste by the visitors and patients, as bins are located at accessible position to the general crowd.

The hospital authorities should identify the good performing staff and shall give them awards for their contribution in management of waste, it will also serve as role model for others so that they will also be participating in future.

All sorts of communication barrier should be removed between the hospital authorities and sanitary staff for improving performance of sanitary staff and avoid confusion.

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Annexures

Checklist

S.No	Necessary Requirements	Yes/ No
1	Colour Coded Bins For Biomedical Waste In Every Department Of Hospital	
2	Biohazard Sign In Every Bin And Colored Plastic Bag	
3	Puncture Proof Containers For Sharps	
4	Syringe Cutters	
5	Personnel Protective Equipments For Staff Handling Bio Medical Waste	
6	Has The Hospital Got Authorization From Ppcb?	
7	For The Renewal Of Authorization By Ppcb, Have All Necessary Actions In This Regard Been Taken By The Hospital Authorities?	
8	Establish A Bar Code System For The Bags To Be Sent Out Of The Premises.	
9	Is The Hospital Maintaining & Sending Detailed Record Of The Waste Generated Under Various Categories To Ppcb, Patiala?	
10	Availability Of Sodium Hypochlorite For Disinfecting Waste	
11	Biomedical Waste Record Register	
12	Post Exposure Prophylaxis Kit With Pathologist/ICN	
13	Provision Of Training At The Time Of Induction And Thereafter At least Once In A year	
14	Is The Color-Coded And Segregation Protocol Displayed At Strategic Places In The Hospital?	
15	Immunization Of Health Care Workers And Those Handling Biomedical Waste For Protection Against Hepatitis B And Tetanus	
16	Is The Record Of The Amount Of "Waste Generated" And "Waste Disposed Off" Maintained In The Hospital? Generation And Segregation	
17	Waste Segregated At The Site Of Infection	
18	Human Anatomical Waste, Animal, Waste, Microbiological Waste ,Soiled Waste, Contaminated Linen, Bedding And Mattresses,Chemical Solid Waste ,Discarded Medicines And Cytotoxic Drugs and Blood Bag Collected In Yellow Bin	
19	All Plastic And Contaminated Recyclables In Red Non Chlorinated Plastic Container	
20	Waste Sharps Including Metals In White Puncture Proof Container	
21	All Glassware In Cardboard Box With Blue Colored Marking	
22	General Waste In Green Container	
	Collection And Storage	
23	Bins Are Emptied When 3/4 th Filled	
24	Separate Room For Biomedical Waste Storage Collection Center	
25	Bins Cleaned And Disinfected Properly After Disposing Of Waste	
	Transportation	
26	Wheel Barrows Used For Transporting Waste To Collection Centre	
27	A Predefined Route To Carry Biomedical Waste To Collection Centre	
28	Waste Transported In Closed Containers	

	Management And Treatment Of Waste	
29	PPE Worn By Hospital Staff While Handling BMW	
30	Pre-Treatment Of Chemical Liquid Waste With 10% Sodium Hypochlorite	
31	Use Of Cardboard With Blue Colored Marking For Discarded /Broken Glassware	
32		
33	Shredding And Mutilation Of White Category Waste	
34	Disinfection Of Blue Category Waste	
35	Mixing Of Biomedical Waste With General Waste	
36	Bar Code Stickers On Colour Coded Bags	
37	Barrel And Plunger Detached And Syringes Chemically Disinfected With 1% Sodium Hypochlorite At The Source Of Generation	
38	Blood Bags Disinfected With 5% Sodium Hypochlorite For At Least 1 Hour	
39	Microbiology, Biotechnology and Clinical Laboratory Waste pre-Treated To Sterilize With Non Pre-Treat To Sterilize With Non Chlorinated Chemicals On-Site As Per National Aids Control	
40	Infectious Waste Chemically Disinfected Before Disposal	
	Disposal	
41	Proper Agreement With CBMWTF For Disposal	

Questionnaire in regional language

- 1) ਮੈਂ ਸਿਵਲ ਹਸਪਤਾਲ ਪਠਾਨਕੋਟ ਵਿਖੇ ਬਤੌਰ (ਅਹੁਦਾ).....ਕੰਮ ਕਰ ਰਿਹਾ/ਰਹੀ ਹਾਂ।
- 2) ਆਪਣਾ ਨਾਂ ਲਿਖੋ.....
- 3) ਕੀ ਤੁਹਾਨੂੰ ਮੈਡੀਕਲ ਵੈਸਟ generation and legislation ਬਾਰੇ ਪਤਾ ਹੈ।
- 4) ਨਵੇਂ Bio Medical Waste (Management & Handling) Rule ਕਦੋਂ ਬਣੇ ਅਤੇ ਲਾਗੂ ਹੋਏ ਸਨ।
- 5) ਬਾਇਓ ਮੈਡੀਕਲ ਵੈਸਟ ਕੀ ਹੈ,
 - 1) ਸੁੱਟਣ ਵਾਲਾ ਜਨਰਲ ਵੈਸਟ
 - 2) ਸ਼ਿਰਫ਼ ਕੈਮੀਕਲ ਵੈਸਟ
 - 3) ਉਹ ਵੈਸਟ ਜੋ ਕਿ ਮੈਡੀਕਲ ਕੰਮਾਂ ਜਿਵੇਂ ਡਾਇਗਨੋਸਿਸ, ਇਲਾਜ ਅਤੇ ਬਿਮਾਰੀ ਤੋਂ ਬਚਾਓ ਦੌਰਾਨ ਮਰੀਜ਼ਾਂ ਤੋਂ ਜਨਮਦੇ ਹੋਏ।
- 6) ਕਿਸ ਤਰ੍ਹਾਂ ਦੇ ਕਲਚ ਕੋਡ ਬਿਨ Biomedical Waste ਨੂੰ ਵੱਖ ਕਰਨ ਲਈ ਵਰਤੇ ਜਾਂਦੇ ਹਨ।
 - 1) ਪੀਲਾ, ਸਫ਼ੈਦ, ਨੀਲਾ ਅਤੇ ਕਾਲਾ
 - 2) ਪੀਲਾ, ਸਫ਼ੈਦ, ਕਾਲਾ ਅਤੇ ਲਾਲ
 - 3) ਪੀਲਾ, ਲਾਲ, ਨੀਲਾ ਅਤੇ ਸਫ਼ੈਦ
- 7) ਬਾਇਓਮੈਡੀਕਲ ਵੈਸਟ ਮੈਨੇਜਮੈਂਟ ਹੈਂਡਲਿੰਗ ਨਿਯਮ (Bio- Medical Waste Management Handling Rules) ਅਨੁਸਾਰ ਕਿੰਨੇ ਸਮੇਂ ਤੋਂ ਜ਼ਿਆਦਾ Bio- Medical Waste ਨੂੰ ਸਟੋਰ ਨਹੀਂ ਕਰਨਾ ਚਾਹੀਦਾ।
 - 1) 24 ਘੰਟੇ
 - 2) 48 ਘੰਟੇ ਤੋਂ ਘੱਟ
 - 3) 48 ਘੰਟੇ ਤੋਂ ਜ਼ਿਆਦਾ
- 8) ਪੀਲੇ Plastic ਬੈਗ ਵਿੱਚ ਕਿਸ ਤਰ੍ਹਾਂ ਦਾ ਵੈਸਟ ਪਾਇਆ ਜਾਂਦਾ ਹੈ।
 - 1) ਤਿੱਖਾ (ਸ਼ਾਰਪ)
 - 2) Infection ਯੁਕਤ ਵੈਸਟ
 - 3) ਗੰਦਾ Recyclable Waste (ਰੀਸਾਈਕਲੇਬਲ)
- 9) Expire ਖਰਾਬ ਦਵਾਈਆਂ ਕਿਸ Container ਵਿੱਚ ਪਾਉਣੀਆਂ ਚਾਹੀਦੀਆਂ ਹਨ।
 - 1) ਕਾਲੇ Bag
 - 2) ਨਿਲੇ Bag
 - 3) ਪੀਲੇ Bag
- 10) ਕੈਮੀਕਲ ਲੀਕੂਇਡ ਵੈਸਟ Chemical Liquid Waste ਨੂੰ ਕਿਵੇਂ Discharge ਕਰਨਾ ਹੈ।
 - 1) ਆਮ ਤਰੀਕੇ ਵਾਂਗ Discharge ਕਰਨਾ ਹੈ।
 - 2) ਲੋਕਲ Sewage ਵਿੱਚ ਸਿੱਧਾ Discharge ਕਰਨਾ ਹੈ।
 - 3) ਪਹਿਲਾਂ Pretreat ਕਰਨਾ ਹੈ ਫਿਰ Discharge ਕਰਨਾ ਹੈ।
- 11) ਕਿਹੜਾ Chemical Bio -Medical Waste ਨੂੰ Treat ਕਰਨ ਲਈ ਵਰਤੋਂ ਕੀਤਾ ਜਾਂਦਾ ਹੈ।
 - 1) 10% Chlorine
 - 2) 10% Sodium Hypochlorite
 - 3) Detergent Soap. ਹੱਥ ਧੋਣ ਵਾਲਾ ਸਾਬਣ
- 12) ਤਿੱਖਾ Waste ਕਿਸ ਵਿੱਚ ਪਾਇਆ ਜਾਂਦਾ ਹੈ।
 - 1) ਲਾਲ ਡੱਬਾ
 - 2) ਸਫ਼ੈਦ ਆਰ-ਪਾਰ ਦਿਖਣ ਵਾਲੇ ਡੱਬਾ
 - 3) ਕਾਲੇ Container ਡੱਬਾ
- 13) Infection ਯੁਕਤ Waste ਨੂੰ ਕਿਵੇਂ Dispose ਕੀਤਾ ਜਾਂਦਾ ਹੈ।
 - 1) ਆਟੋਕਲੇਵ
 - 2) ਕੈਮੀਕਲ Treatment
 - 3) ਬਹੁਤ ਜ਼ਿਆਦਾ Temp. ਤੇ ਭਸਮ ਕਰਨਾ
- 14) ਪਰਸਨਲ ਪਰੋਟੈਕਟਿਵ ਐਜ਼ਾਰ ਕੀ ਹੁੰਦੇ ਹਨ।
 - 1) ਦਸਤਾਨੇ, ਬੂਟ ਅਤੇ ਮੂੰਹ ਦਾ ਮਾਸਕ
 - 2) ਦਸਤਾਨੇ, ਗਮਬੂਟ, ਮੂੰਹ ਦਾ ਮਾਸਕ
 - 3) Heavy duty, gloves, safety glasses mask
 - 4) Heavy Duty gloves, Safety glass ਮਾਸਕ ਅਤੇ ਗਮਬੂਟ
- 15) ਕੀ ਤੁਹਾਨੂੰ ਲਗਦਾ ਹੈ ਕਿ ਹਸਪਤਾਲ ਦੇ ਵੈਸਟ ਦੀ ਸੁਰੱਖਿਅਤ ਤਰੀਕੇ ਨਾਲ ਸਾਂਭ ਸੰਭਾਲ ਕਰਨਾ ਤੁਹਾਡੇ ਕੰਮ ਵਿੱਚ ਬੋਝ ਵਾਧੂਦਾ ਹੈ।
 - 1) ਹਾਂ।
 - 2) ਨਹੀਂ।
- 16) ਕੀ ਬਾਇਓਮੈਡੀਕਲ ਵੈਸਟ ਨੂੰ ਵੱਖ-ਵੱਖ ਕੈਟਾਗਰੀਆਂ ਵਿੱਚ ਵੰਡਣਾ ਚਾਹੀਦਾ ਹੈ।

- 1) ਹਾਂ।
2) ਨਹੀਂ।
- 17 ਕੀ ਸੁਰੱਖਿਅਤ ਤਰੀਕੇ ਨਾਲ ਬਾਈਓਮੈਡੀਕਲ ਵੈਸਟ ਨੂੰ ਸਾਭ-ਸੰਭਾਲ ਕਰਨ ਲਈ ਹਸਪਤਾਲ ਉੱਤੇ ਵਿੱਤੀ ਬੋਝ ਵੱਧਦਾ ਹੈ।
1) ਹਾਂ।
2) ਨਹੀਂ।
- 18 ਸੁੱਟੇ ਹੋਏ ਟੁੱਟੇ ਕੱਚੇ (ਸੀਸ਼ਾ) ਨੂੰ ਕਿਸ ਤਰੀਕੇ ਨਾਲ ਡਿਸਇੰਨਫੈਕਟ ਕੀਤਾ ਜਾਂਦਾ ਹੈ।
1) ਆਟੋਕਲੇਵਿੰਗ।
2) ਮਾਈਕਰੋਵੇਵ/ਹਾਈਡਰੋਕਲੇਵ।
3) 10% ਸੋਡੀਅਮ ਹਾਈਡਰੋਕਲੋਰਾਈਟ।
4) ਉਪਰੋਕਤ ਸਾਰੇ।
- 19 ਕੀ ਸੁਰੱਖਿਤ ਤਰੀਕੇ ਨਾਲ ਬਾਈਓਮੈਡੀਕਲ ਵੈਸਟ ਮੈਨਜ਼ਮੈਂਟ ਨੂੰ ਲਗਾਤਾਰ ਟ੍ਰੇਨਿੰਗ ਦਾ ਅੰਗ ਬਣਾਉਣਾ ਚਾਹੀਦਾ ਹੈ।
1) ਹਰ ਮਹੀਨੇ।
2) ਹਾਂ ਪਰ ਲਗਾਤਾਰ ਨਹੀਂ।
3) ਕੋਈ ਲੋੜ ਨਹੀਂ।
- 20 ਕੀ ਬਾਈਓਮੈਡੀਕਲ ਵੈਸਟ ਮੈਨਜ਼ਮੈਂਟ ਦੌਰਾਨ ਲੱਗੀ ਸੱਟ ਦਾ ਰਿਕਾਰਡ ਰੱਖਣਾ ਚਾਹੀਦਾ ਹੈ।
1) ਹਾਂ।
2) ਨਹੀਂ।
- 21 ਕੀ ਤੁਹਾਨੂੰ ਹਸਪਤਾਲ ਦੇ ਵੈਸਟ ਮੈਨਜ਼ਮੈਂਟ ਪਲਾਨ ਦਾ ਪਤਾ ਹੈ।
1) ਹਾਂ।
2) ਨਹੀਂ।
- 22 ਸੁਰੱਖਿਅਤ ਤਰੀਕੇ ਨਾਲ ਬਾਈਓਮੈਡੀਕਲ ਵੈਸਟ ਨੂੰ ਮਨੈਜ਼ ਕਰਨਾ ਇੱਕਲੀ ਸਰਕਾਰ ਦੀ ਜ਼ਿੰਮੇਵਾਰੀ ਹੈ।
1) ਹਾਂ।
2) ਨਹੀਂ।
- 23 ਹਸਪਤਾਲ ਵੈਸਟ ਮੈਨਜ਼ਮੈਂਟ ਕੀ ਇੱਕ ਸਿਹਤ ਨਾਲ ਜੁੜਿਆ ਹੋਇਆ ਕੋਈ ਮੁੱਦਾ ਹੈ।
1) ਹਾਂ।
2) ਨਹੀਂ।
- 24 ਡਿਸਇੰਨਫੈਕਟ ਕੀਤਾ ਹੋਇਆ ਹੈ ਸੀਸ਼ਾ ਦਾ ਸਮਾਨ ਕਿਸ ਵਿੱਚ ਪਾਇਆ ਜਾਂਦਾ ਹੈ।
1) ਸਫੇਦ ਕੰਨਟੇਨਰ ਵਿੱਚ।
2) ਨੀਲਾ ਵਿੱਚ।
3) ਕਾਲੇ।
4) ਗੱਤੇ ਦਾ ਡੱਬਾ ਜਿਸ ਵਿੱਚ ਨੀਲੀ ਟੇਪ ਲੱਗੀ ਹੋਈ ਹੈ।
- 25 ਕੀ ਬਾਈਓਮੈਡੀਕਲ ਵੈਸਟ ਨੂੰ ਮੈਨਜ਼ ਕਰਨ ਦੀ ਜ਼ਿੰਮੇਵਾਰੀ ਇੱਕਲੇ ਬੰਦੇ ਦੀ ਹੈ ਜਾਂ ਪੂਰੇ ਹਸਪਤਾਲ ਦੀ ਟੀਮ।
1) ਹਾਂ।
2) ਨਹੀਂ।