

To Assess the Knowledge Attitude Practices of Bio-Medical
Waste Management Among Doctors, Nurses and Non-
Medical Staff of Burn and Plastic Surgery Department

By

Trishla Jain

*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. Trishla Jain** student of MBA Hospital Management from The IIHMR University, Jaipur has undergone dissertation at **Guru Teg Bahadur Hospital, Dilshad Garden, Delhi** from **13th Feb 2018 to 14th May-2018**.

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

The Internship is in fulfillment of the course requirements.

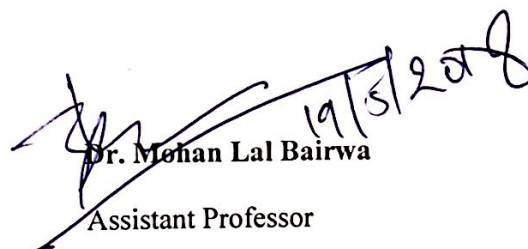
I wish her all success in all her future endeavors.



Dr (Col) Ashok Kaushik

Dean, Academics and Student Affairs

The IIHMR University, Jaipur



Dr. Mohan Lal Bairwa

Assistant Professor

The IIHMR University, Jaipur

Government of NCT of Delhi
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Guru Teg Bahadur Hospital and University College Of
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F.NO.PA to HOD/B&P/GTBH/2018/218-219

Dated: 15/05/18

To Whom It May Concern

This is to certify Mrs. Trishla Jain from IIHMR Jaipur has successfully completed dissertation " TO ASSESS THE KNOWLEDGE ATTITUDE PRACTICE OF BIO-MEDICAL WASTE MANAGEMENT AMONG DOCTORS,NURSES AND NON-MEDICAL STAFF OF BURN AND PLASTIC SURGERY DEPARTMENT". Duration of her dissertation was from February 13th to may 12th ,2018.

Her performance was satisfactory and we wish her success in the future.


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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation **"To assess the knowledge attitude practices of Bio-medical waste management among Doctors, nurses and Non-medical staff of Burn and Plastic Surgery Department"**, submitted by **Dr. Trishla Jain** Enrollment No- **0514** under the supervision of **Dr. Mohan Lal Bairwa** for award of **MBA in hospital and Health management** of the **LIHMR University** carried out during the period from **13th FEBRUARY 2018** to **14th MAY 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.



Signature

ABSTRACT

TITLE:- TO ASSESS THE KNOWLEDGE ATTITUDE PRACTICES OF BIO-MEDICAL WASTE MANAGEMENT AMONG DOCTORS, NURSES AND NON MEDICAL STAFF OF BURN AND PLASTIC SURGERY DEPARTMENT, GURU TEGH BAHADUR HOSPITAL, DILSHAD GARDEN, DELHI

BACKGROUND-

In the persuasion of aim of reducing health problems, eliminating potential risks, and treating sick people, health care services inevitably create which itself may be hazardous to health. The waste produced in the course of healthcare activities carries a higher potential for infection and injury than any other type of waste. Inadequate and inappropriate knowledge of handling of healthcare waste may have serious health consequences and a significant impact on the environment as well. It is estimated that yearly that about 0.33 million tons of hospital waste is generated in India and the waste generation rate ranges from 0.5 to 2.0 kg per bed per day. Whenever, generated, the safe and reliable method for handling of biomedical waste is essential. Effective management of bio medical waste is not only legal necessity but also social responsibility.

OBJECTIVES-

- To assess the knowledge, attitude and practices of bio-medical waste management among medical and housekeeping staff.
- To identify the existing lacunae and problems in management in bio-medical waste.

METHODOLOGY-

Study setting- GURU TEG BAHADUR HOSPITAL, DELHI

Study design- descriptive and analytical

Study duration- 13th February to 14th may

Sampling size- 15 nursing staff, 5 non medical staff, 19 doctors (5 senior residents, 14 junior residents).

Sampling technique- convenience sampling

Tools- structured questionnaire, one to one interviews, comparative analysis and statistical analysis.

RESULTS-

- Regarding the current practices of bio-medical waste management 96% of the staff got training for bio-medical waste management but only 75% of the staff is interested in attending training sessions again.
- 98% of the staff is aware about the risk associated with the bio-medical waste.
- As far as the plan for bio-medical waste is concerned 100% staffs is aware about it; but only 60% of the staff knows about the proper segregation bio-medical waste.

- In general 90% of the staff knows about the legislatures associated with bio-medical waste but only but only 35% of staff knows about the environmental pollution law.
- Only 65% of the staff knows about the different categories of waste.
- 98% of the staff is aware about the storage of the bio-medical waste but only 50% of the staff knows about the end treatment of the bio-medical waste.
- According to 70% of the staff safe management is not an issue at all, and 85% of the staff thinks that safety of the waste handlers is must.
- When asked that is handling a waste is an extra burden to work only 10% felt so, rest consider it as daily or routine practice that needs to be followed.
- 100% of the staff is aware about the registers and colour codes maintained for the daily bio-medical waste entry and disposal.
- 65% of the staff is aware about the equipment used for destroying the needles after use.
- 100% of the staff is aware about the bio-hazard symbol labelled on bags, on the other hand about 92% knows about the discarding of waste in colour coded bags.
- Regarding the categories 75% gave the correct answer that means the whole staffs does not know about the different categories of bio-medical waste management.
- Only 80% of the staff believes that by immunization they can be protected against the bio-medical hazard.

CONCLUSION-

- Concluding from the results, the importance of training regarding biomedical waste management cannot be overemphasized; lack of proper and complete knowledge about biomedical waste management impacts practices of appropriate waste disposal.
- More emphasis should be laid on attitude change of the staff depicting their concern for their co-staff which may lead to fatal infectious diseases and the record maintenance should be done as a part of duty not as a burden.

ACKNOWLEDGEMENT:

With immense pleasure I express my heart full gratitude to the director of IIHMR Jaipur, Dr. S.D. Gupta, and Dean, and my mentor Dr. Mohan Lal Bairwa for having given me this opportunity to undergo training.

I am extremely indebted to all the professionals at Guru Teg Bahadur Hospital for sharing generously their knowledge and precious time which inspired me to do the best during dissertation. I owe a great debt to the chief medical officer Dr. Sunil Kumar Gautam for providing me an opportunity to work as a trainee in their organization. I would like to thanks Dr. Dhirendra Suman, (MBBS, MS, DNB in plastic surgery) without his help it would not have been possible for me to understand the department and the process to the extent as I have now. I am highly grateful to all the staff of Burn and Plastic surgery department for their cooperation which enabled me to complete my special dissertation in the department.

I am also grateful to all the department heads and staffs for giving me time in spite of their hectic schedule. Without their active cooperation and participation it would not have been possible to accomplish my task.

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ABOUT GURU TEG BAHADUR HOSPITAL

Guru Teg Bahadur Hospital (or **GTBH** or **GTB Hospital**) is a 1,700-bed hospital is the prestigious and largest Hospital of Govt of NCT of Delhi in the Trans-Yamuna Area (East Delhi). GTBH was established in 1979 (fully functional in 1987) with 350-bed capacity which has now been expanded to 1700-bed capacity. The hospital is located in Dilshad Garden and very close to DTC Bus Terminal of Nand Nagari and Dilshad Garden.

It is a **teaching hospital associated with the University College of Medical Science, University of Delhi** and, therefore, also serves as a training center for undergraduate and post-graduate medical students.

It is the first Delhi Government tertiary care hospital in Trans-Yamuna (East Delhi) area, catering to the East Delhi population as well as patients from adjacent states

The hospital is providing health care facilities to the needy population of East Delhi and adjoining areas of other states with an average daily OPD attendance of about 4000 patients. The hospital is equipped with

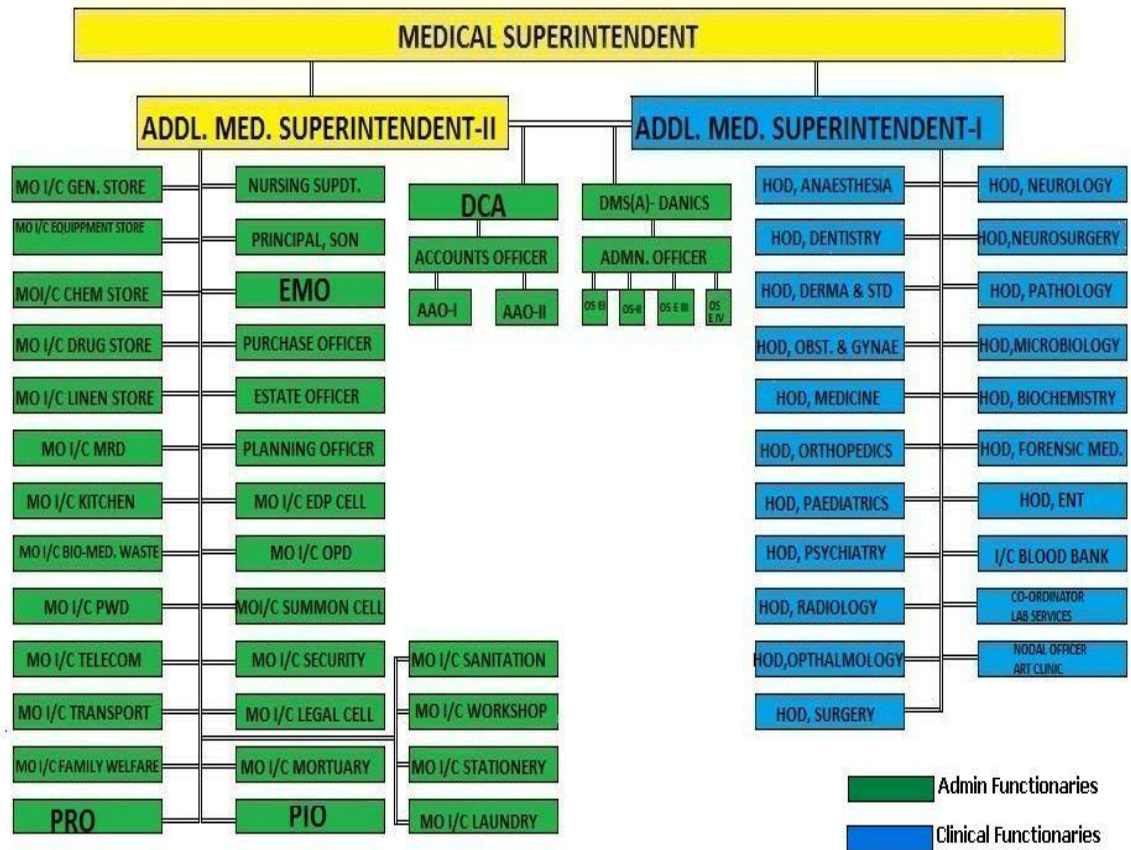
- Round the clock emergency service in common clinical disciplines.
- Neurosurgery facilities for road side accident and other trauma victims.
- Burn care facilities.
- Thalassemia day care center.
- CT-Scan.
- Hemo-dialysis and Peritoneal dialysis.

The hospital is in the process of computerization. OPD and IPD registration, Blood Sample collection centers, Admission and Enquiry, Lab investigation services and Medical Record Data have already been computerized and integrated through LAN.

FACILITIES

- Anti-Retroviral Treatment (ART) for HIV & AIDS treatment [\[2\]](#)
- Out Patient Clinics (Outpatient department or OPD)
- Inpatient care (admissions)
- Emergency services
- Critical care
- Suraksha Clinic
- Specialist care
- Laboratory services
- Imaging services
- Medico legal aid
- Nodal Center under National Programs
- Teaching facilities
- Examination services

ORGANISATION SETUP: GTB HOSPITAL, GOVT. OF NCT OF DELHI, DELHI-110095, INDIA



INTRODUCTION-

In the persuasion of the aim of reducing the health problems, eliminating potential risks, and treating sick people healthcare services inevitably create which itself may be hazardous to health. The waste produced in the course of healthcare activities carries a higher potential for infection and injury than any other type of waste. Inadequate and inappropriate knowledge of handling of healthcare waste may have serious health consequences and a significant impact on the environment as well. It is estimated that yearly that about 0.33 million tons of hospital waste is generated in India and the waste generation rate ranges from 0.5 to 2.0 kg per bed per day.(1) Whenever, generated, the safe and reliable method for handling of biomedical waste is essential. Effective management of bio medical waste is not only legal necessity but also social responsibility.

Though legal provisions [biomedical waste (management and handling) rules 1998] (2) exist to mitigate the impact of hazardous and infectious hospital waste on the community, still these provisions are yet to be fully implemented. The absence of proper waste management, lack of awareness about the health hazard from bio-medical waste, insufficient financial and human resources and poor control of waste disposal are the most critical problems connected with the healthcare waste. (3) The hazardous impact of bio medical waste on the public and the environment is enhanced manifold if adequate and appropriate handling of these wastes is not adopted. The hospital waste management has various ramifications as it not only affects the health of the patients but also the healthcare workers (doctors, nurses) and general public.

Although there is an increased global awareness among healthcare workers about the hazards and the appropriate management techniques but the level of awareness in India is found to be unsatisfactorily (4-6)

The rule makes it mandatory for the healthcare establishment to segregate, disinfect and dispose their waste in eco-friendly manner. Clearly, statutory safeguards for bio-medical waste management practise in Indian hospitals have not achieved the desired standards. Literature search shows poor result for knowledge attitude and practices of bio-medical waste management among staff and have reported that there is urgent need to train and educate all the staff in order to adopt an effective waste management practice.

Safe management of healthcare waste becomes very important when it comes to environmental conservation and health of the community

CATEGORIES OF WASTE-

The bio medical waste management and handling rules 1998 have been revised in a year 2000

[Waste Category No.]	Waste Category [Type]	Treatment and Disposal [Options]
Category No.1	Human Anatomical Waste (human tissues, organs, body parts)	Incineration /deep burial
Category No.2	Animal Waste (animal	Incineration /deep burial

	tissues, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges, discharge from hospitals, animal houses)	
Category No.3	Microbiology & Biotechnology Wastes (Wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of bio-logical, toxins, dishes and devices used for transfer of cultures)	Local autoclaving /microwaving /incineration.
Category No.4	Waste sharps (needles, syringes, scalpels, blades, glass etc. that may cause puncture and cuts. This includes both used and unused sharps)	disinfection (chemical treatment) /autoclaving/ microwaving and mutilation /shredding
Category No.5	Discarded Medicines and Cytotoxic drugs (wastes comprising of outdated, contaminated and discarded medicines)	incineration /destruction and drugs disposal in secured landfills
Category No.6	[Soiled] Waste (Items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, lines beddings, other	incineration autoclaving/microwaving
Category No.7	Solid Waste (wastes generated from disposable items other than the waste 5 [sharps] such as tubing's, catheters, intravenous sets etc	disinfection by chemical treatment autoclaving/ microwaving and mutilation/shredding
Category No.8	Liquid Waste (waste generated from laboratory and washing, cleaning, house-keeping and disinfecting activities)	Disinfection by chemical treatment and discharge into drains.
Category No.9	Incineration Ash (ash from	disposal in municipal landfill

	incineration of any biomedical waste)	
Category No.10	Chemical Waste (Chemicals used in production of biological, chemicals used in disinfection, as insecticides etc.)	Chemical treatment and discharge into drains for liquids and secured landfill for solids

PROBLEM STATEMENT-

Biomedical waste management has emerged as an issue of major concerns not only to hospitals, nursing home authorities, but also to the environment and law enforcement agencies, media and the general public. Biomedical waste is forming approximately 1 to 2 percent of municipal solid waste stream. Some of these waste are potential threat to the human health and environment. The greatest risk of biomedical waste is from the sharp components and infections of the waste because of the healthcare workers and the people associated with handling are often getting needle prick injuries and can contract HIV or AIDS, Hepatitis B, risks in hospitals and healthcare settings are very high.

OBJECTIVES-

- To assess the knowledge, attitude and practices of biomedical waste management among medical and housekeeping staff.
- To identify the existing lacunae and problems in management in bio-medical waste.
- To assess the current status of solid waste management in the hospital.

LITERATURE REVIEW-

Biomedical waste management has recently emerged as an issue of major concern not only to hospitals, nursing home authorities but also to the environment. the bio-medical wastes generated from health care units depend upon a number of factors such as waste management methods, type of health care units, occupancy of healthcare units, specialization of healthcare units, ratio of reusable items in use, availability of infrastructure and resources etc.¹

The proper management of biomedical waste has become a worldwide humanitarian topic today. Although hazards of poor management of biomedical waste have aroused the concern world over, especially in the light of its far-reaching effects on human, health and the environment.²

Now it is a well established fact that there are many adverse and harmful effects to the environment including human beings which are caused by the “Hospital waste” generated during the patient care. Hospital waste is a potential health hazard to the health care workers, public and flora and fauna of the area. The problems of the waste disposal in the hospitals and other health-care institutions have become issues of increasing concern.³

Definition

According to Biomedical Waste (Management and Handling) Rules, 1998 of India “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 biologicals.”⁴

The Government of India (notification, 1998) specifies that Hospital Waste Management is a part of hospital hygiene and maintenance activities. This involves management of range of

activities, which are mainly engineering functions, such as collection, transportation, operation or treatment of processing systems, and disposal of wastes. ⁴

One of India's major achievements has been to change the attitudes of the operators of health care facilities to incorporate good HCW management practices in their daily operations and to purchase on-site waste management services from the private sector. (Bekir Onursal, 2003)

World Health Organization states that 85% of hospital wastes are actually non-hazardous, whereas 10% are infectious and 5% are non-infectious but they are included in hazardous wastes. About 15% to 35% of Hospital waste is regulated as infectious waste. This range is dependent on the total amount of waste generated (Glenn and Garwal, 1999).⁵

Classification of Bio-Medical Waste

The World Health Organization (WHO) has classified medical waste into eight categories:

- ‘ General Waste
- ‘ Pathological
- ‘ Radioactive
- ‘ Chemical
- ‘ Infectious to potentially infectious waste
- ‘ Sharps
- ‘ Pharmaceuticals
- ‘ Pressurized containers

Sources of Biomedical Waste

Hospitals produce waste, which is increasing over the years in its amount and type. The hospital waste, in addition to the risk for patients and personnel who handle them also poses a threat to public health and environment.

Major Sources

- Govt. hospitals/private hospitals/nursing homes/ dispensaries.
- Primary health centers.
- Medical colleges and research centers/ paramedic services.
- Veterinary colleges and animal research centers.
- Blood banks/mortuaries/autopsy centers.
- Biotechnology institutions.
- Production units.

Minor Sources

- Physicians/ dentists' clinics
- Animal houses/slaughter houses.
- Blood donation camps.
- Vaccination centers.
- Acupuncturists/psychiatric clinics/cosmetic piercing.
- Funeral services.
- Institutions for disabled persons

Problems relating to biomedical waste

A major issue related to current Bio-Medical waste management in many hospitals is that the implementation of Bio-Waste regulation is unsatisfactory as some hospitals are disposing of waste in a haphazard, improper and indiscriminate manner. Lack of segregation practices, results in mixing of hospital wastes with general waste making the whole waste stream hazardous. Inappropriate segregation ultimately results in an incorrect method of waste disposal.

Inadequate Bio-Medical waste management thus will cause environmental pollution, unpleasant smell, growth and multiplication of vectors like insects, rodents and worms and may lead to the transmission of diseases like typhoid, cholera, hepatitis and AIDS through injuries from syringes and needles contaminated with human.⁶

Various communicable diseases, which spread through water, sweat, blood, body fluids and contaminated organs, are important to be prevented. The Bio Medical Waste scattered in and around the hospitals invites flies, insects, rodents, cats and dogs that are responsible for the spread of communication disease like plague and rabies. Rag pickers in the hospital, sorting out the garbage are at a risk of getting tetanus and HIV infections. The recycling of disposable syringes, needles, IV sets and other article like glass bottles without proper sterilization are responsible for Hepatitis, HIV, and other viral diseases. It becomes primary responsibility of Health administrators to manage hospital waste in most safe and eco-friendly manner⁶.

The problem of bio-medical waste disposal in the hospitals and other healthcare establishments has become an issue of increasing concern, prompting hospital administration to seek new ways of scientific, safe and cost effective management of the waste, and keeping their personnel informed about the advances in this area. The need of proper hospital waste management system is of prime importance and is an essential component of quality assurance in hospitals.

Need of biomedical waste management in hospitals

The reasons due to which there is great need of management of hospitals waste such as:

1. Injuries from sharps leading to infection to all categories of hospital personnel and waste handler.
2. nosocomial infections in patients from poor infection control practices and poor waste management.
3. Risk of infection outside hospital for waste handlers and scavengers and at time general public living in the vicinity of hospitals.
4. Risk associated with hazardous chemicals, drugs to persons handling wastes at all levels.
5. “Disposable” being repacked and sold by unscrupulous elements without even being washed.
6. Drugs which have been disposed of, being repacked and sold off to unsuspecting buyers.
7. Risk of air, water and soil pollution directly due to waste, or due to defective incineration emissions and ash³.

Biomedical Waste Management Process

There is a big network of Health Care Institutions in India. The hospital waste like body parts, organs, tissues, blood and body fluids along with soiled linen, cotton, bandage and plaster casts from infected and contaminated areas are very essential to be properly collected,

segregated, stored, transported, treated and disposed of in safe manner to prevent nosocomial or hospital acquired infection.

1. Waste collection
2. Segregation
3. Transportation and storage
4. Treatment & Disposal
5. Transport to final disposal site
6. Final disposal

Medical wastes should be classified according to their source, typology and risk factors associated with their handling, storage and ultimate disposal. The segregation of waste at source is the key step and reduction, reuse and recycling should be considered in proper perspectives. We need to consider innovative and radical measures to clean up the distressing picture of lack of civic concern on the part of hospitals and slackness in government implementation of bare minimum of rules, as waste generation particularly biomedical waste imposes increasing direct and indirect costs on society. The challenge before us, therefore, is to scientifically manage growing quantities of biomedical waste that go beyond past practices. If we want to protect our environment and health of community we must sensitize our selves to this important issue not only in the interest of health managers but also in the interest of community.

METHODOLOGY-

- **Study setting-** GURU TEG BAHADUR HOSPITAL, DELHI
- **Study design-** descriptive and analytical
- **Study duration-** 13th February to 14th may
- **Sampling size-** 15 nursing staff, 5 non medical staff, 22 doctors (2 specialist, 6 senior residents, 14 junior residents).
- **Sampling technique-** convenience sampling
- **Tools-** structured questionnaire, one to one interviews, comparative analysis and statistical analysis.
- **Data collection tools-** interview and questionnaire for objective 1
- To fulfill objective 2, process mapping of BMW in GTB followed by comparison with WHO standards.

ETHICAL CONSIDERATION-

The necessary explanation about the purpose of the study and the verbal consent was obtained from each respondent. It was assured that the confidentiality of their responses will be maintained, and the information used is solely for the study purpose only

RESULTS AND DISCUSSIONS-

Distribution of participants-

- Participants are firstly being distributed on the basis of their profession.
- Like- specialist HOD, specialist, senior residents, junior residents, head nurse (nursing in charge), nurses, non medical staff (housekeeping staff).
- So in total there were 42 staff in the department
- 2 specialists, 6 senior residents, 14 junior residents, 15 nurses, 5 non medical staff.

Analysis of patient feedback

42 staff was interviewed for feedback using structure questionnaire.

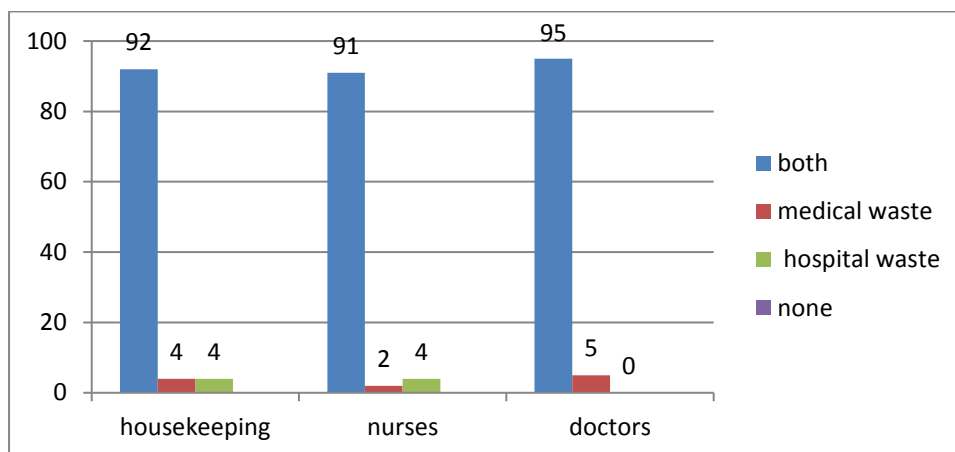


Figure 24 what do you understand by bio medical waste

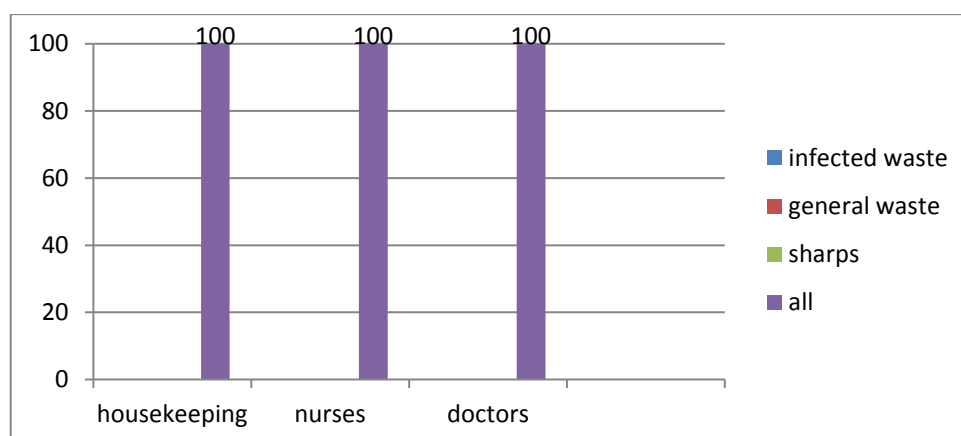


Figure 25 what type of waste is generated in hospital?

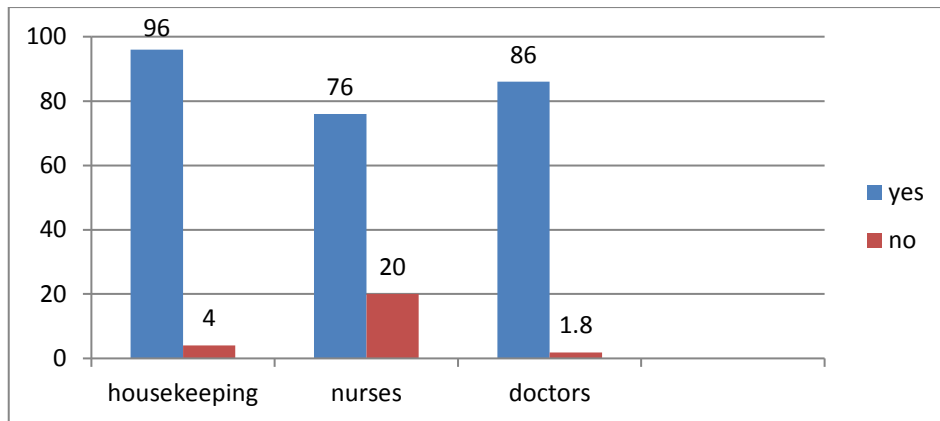


Figure 26 are you aware of any legislation applicable to bio medical waste?

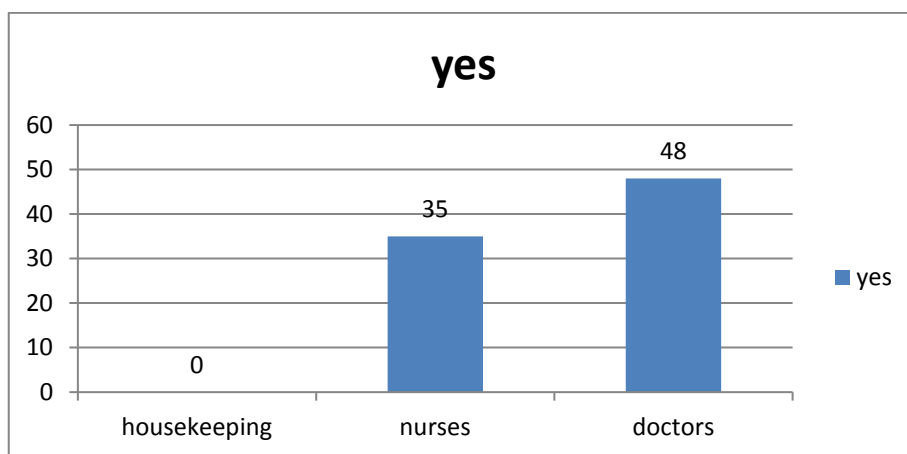


Figure 27 if yes, then write the name of act applicable?

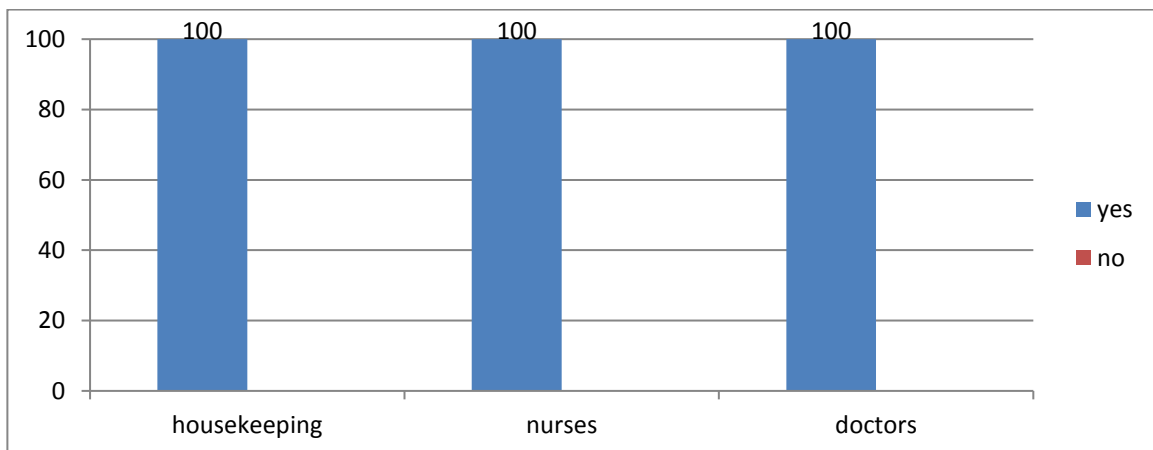


Figure 28 do your department has any waste management plan?

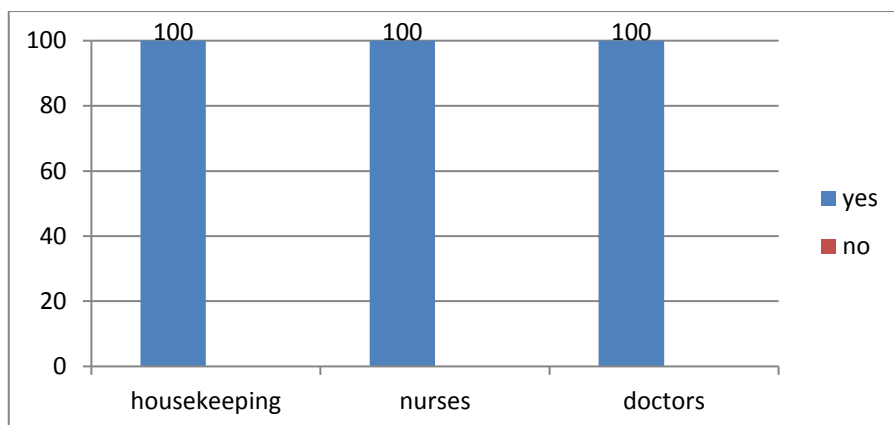


Figure 29 do you colour code the waste

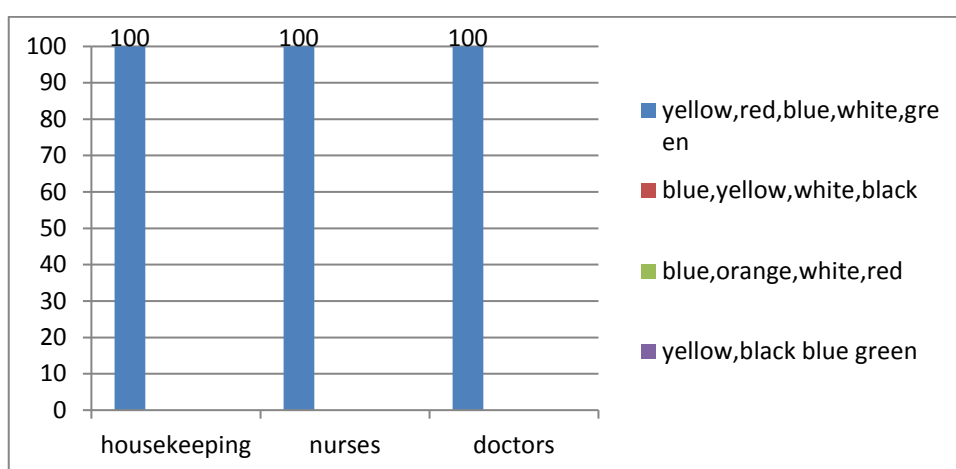


Figure 30 colour codes used are?

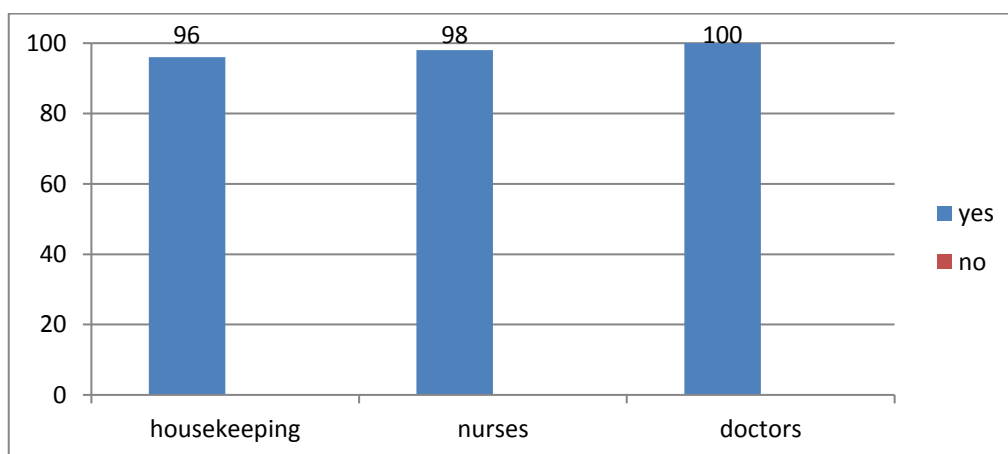


Figure 31 does infectious waste bag labelled with bio hazard symbol

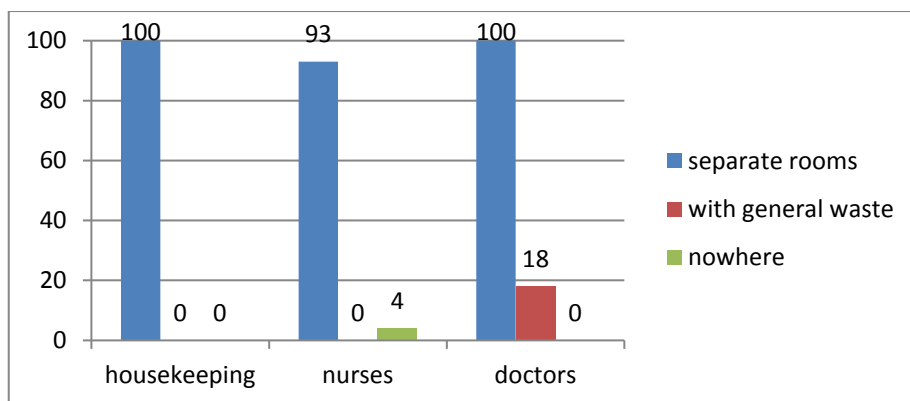


Figure 32 where do you store bio medical waste

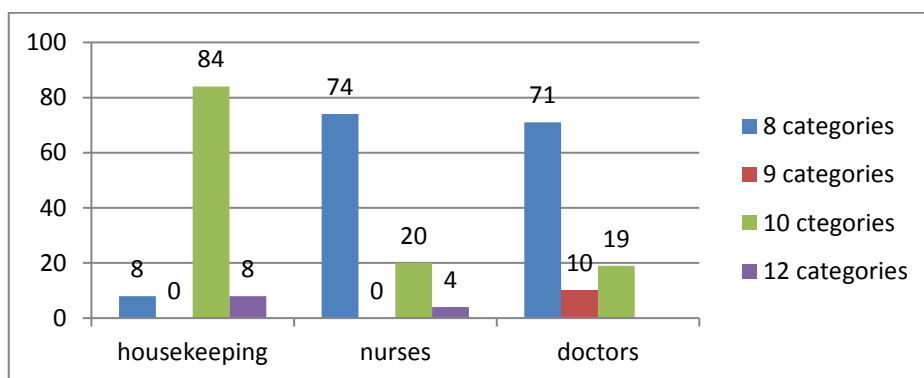


Figure 33 categories of bio medical waste

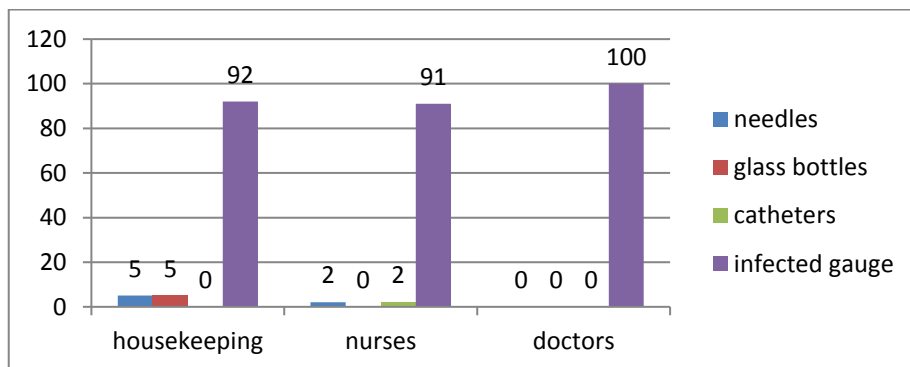


Figure 34 yellow bag is to discard

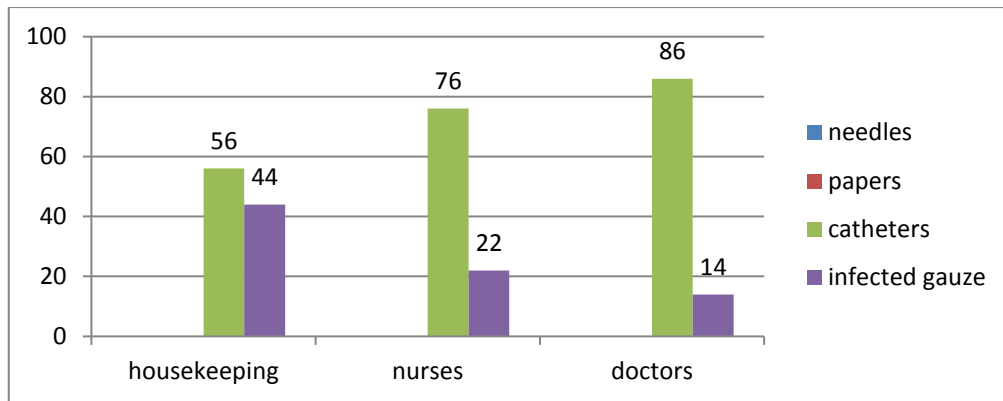


Figure35 red bag is to discard

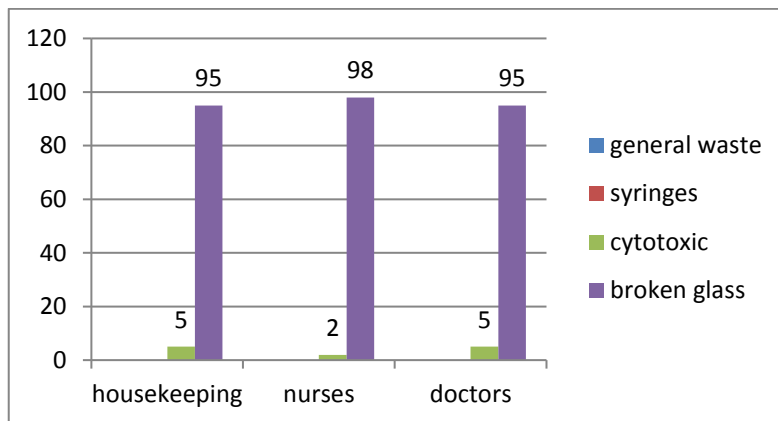


Figure36 blue bag is to discard

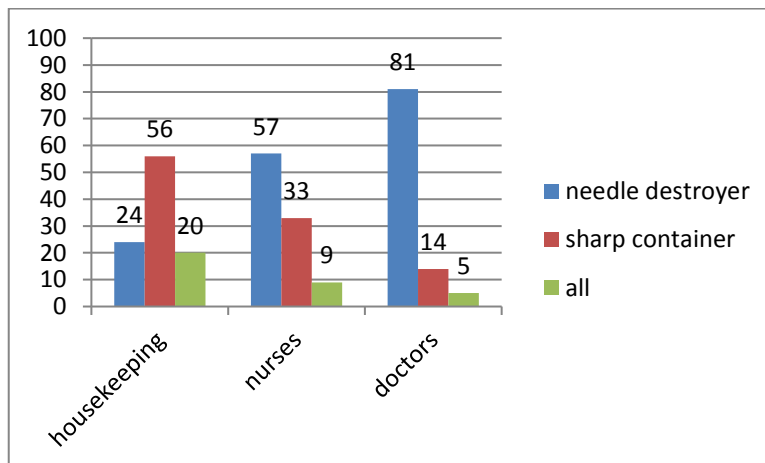


Figure 37 equipment used for destroying needles and syringes?

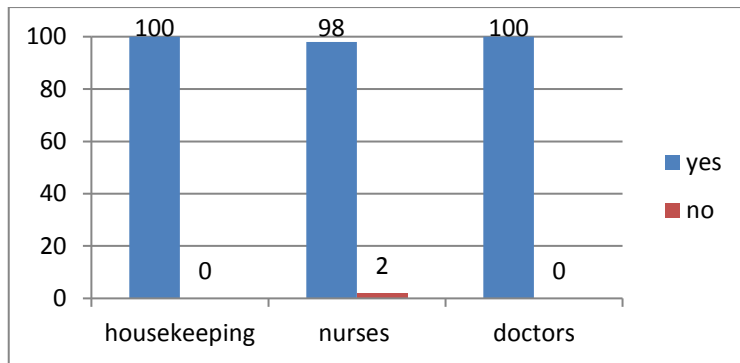


Figure 38 do the department maintain register for waste disposal

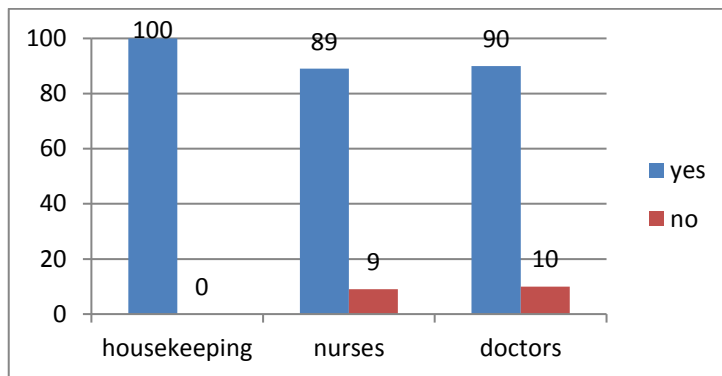


Figure 39 have you undergone any training programme on hospital waste management?

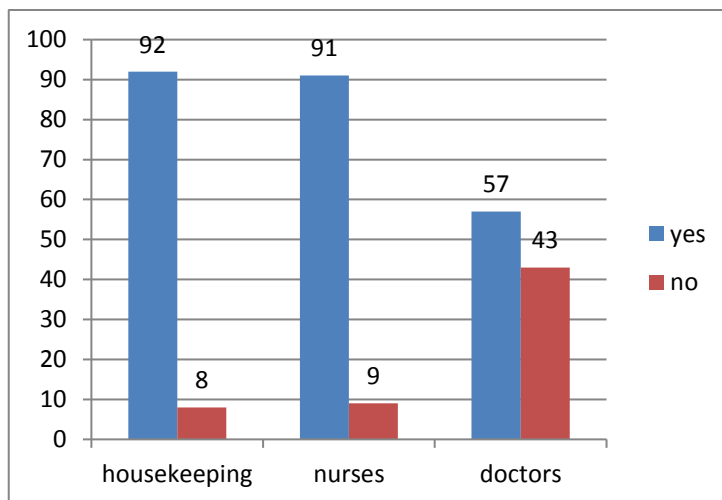


Figure 40 would you like to attend a program on hospital waste management?

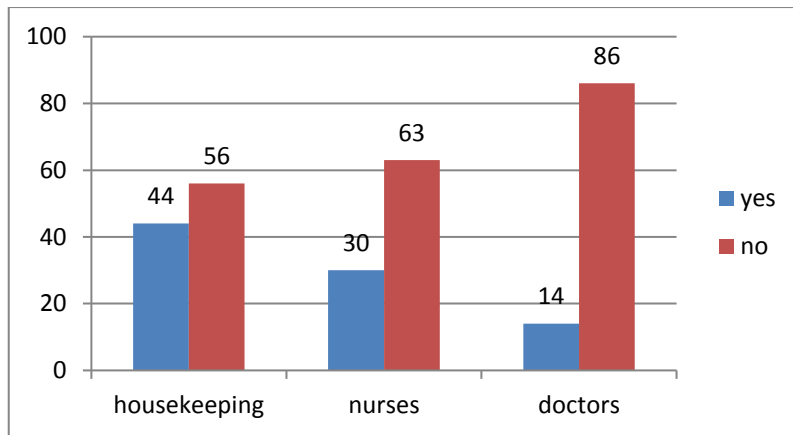


Figure 41 safe management of healthcare waste is not an issue to all

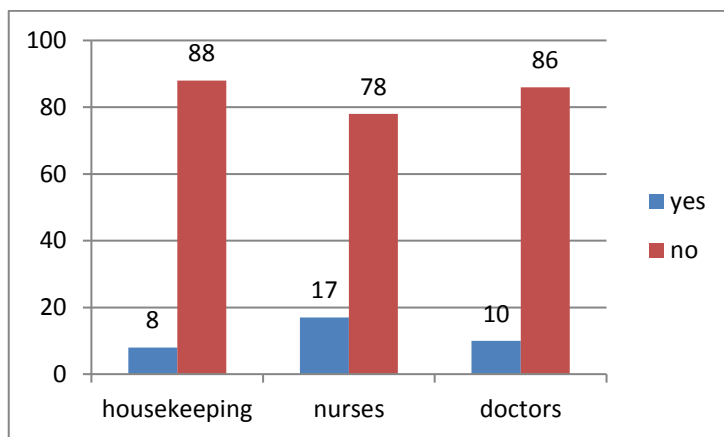


Figure 42 safe management of healthcare waste is an extra burden on work

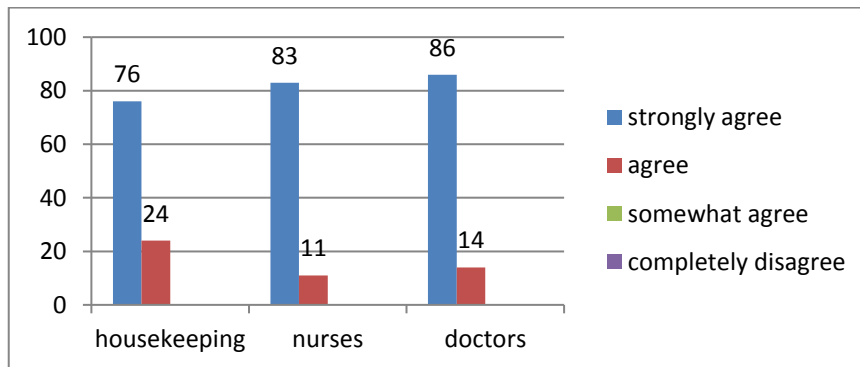


Figure 43 occupational safeties of waste handlers is must?

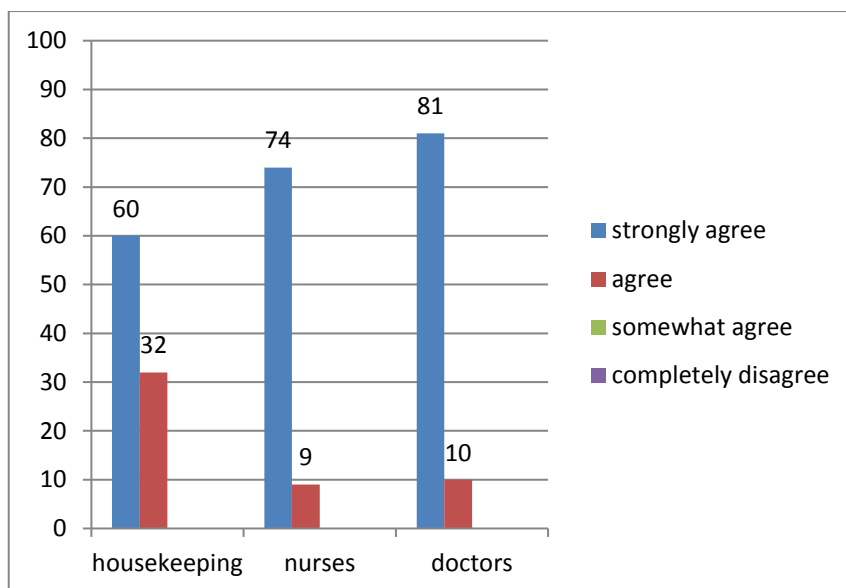


Figure 44 immunization prevents transmission of hospital acquired infections?

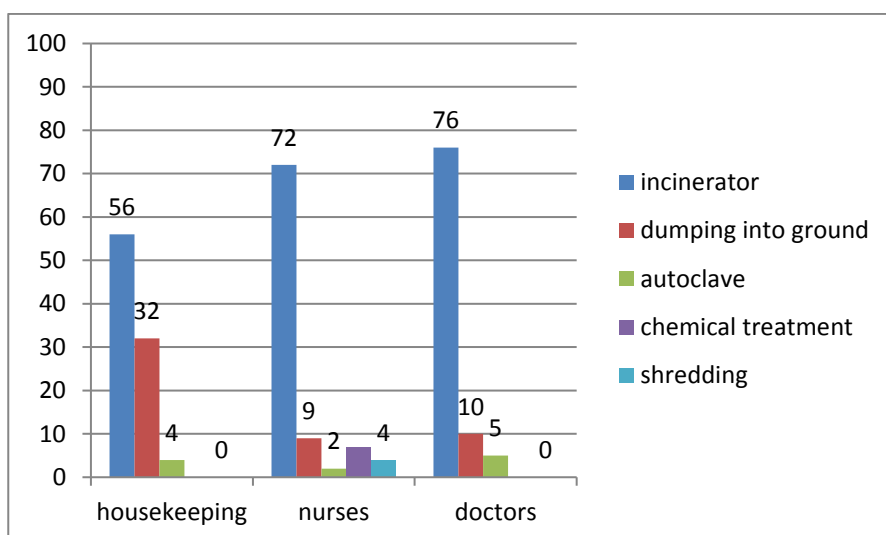


Figure 45 yellow bag waste will be disposed by?

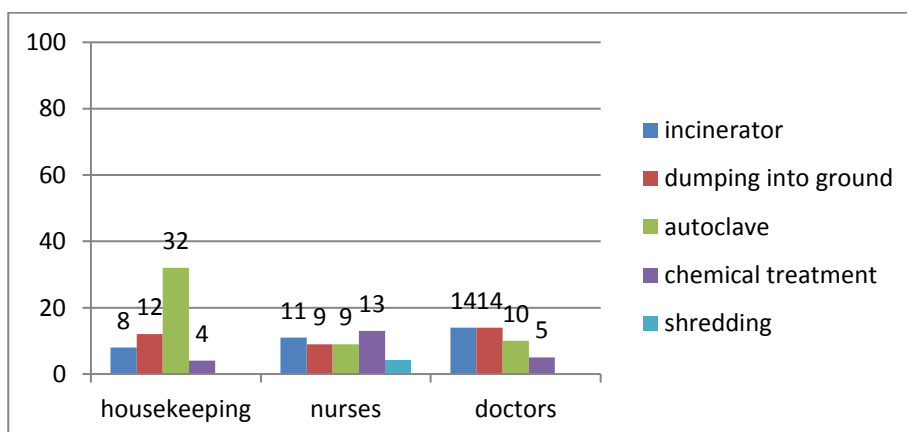


Figure 46 red bag waste will be disposed by?

SURVEY INTERPRETATION-

- Regarding the current practices of bio-medical waste management that 92.7% of staff got training for biomedical waste management but only 80% are interested in attending the training sessions again.
- 97.33% of the staff is aware about the risks associated with bio-medical waste.
- As far as the plan for BMW is concerned 100% staffs are aware about it; but only 44.6% of the staff knows about the proper segregation of the bio-medical waste.
- In general about 86% staffs are aware about the legislature associated with BMW but only 23.3% of the environment pollution law.
- Only 51% of the staff was aware about the different categories of waste.
- The best part is that more than 97.66% of the staff safe management is not issue at all and 81.66% of the staff thinks safety of waste handlers is a must.
- 98% of the staff is aware about the storage of the bio-medical waste but only 50% of the staff knows about the end treatment of the bio-medical waste.
- According to 70% of the staff safe management is not a issue at all, and 85% of the staff thinks that safety of the waste handlers is must.
- When asked that is handling a waste is an extra burden to work only 10% felt so, rest consider it as daily or routine practice that needs to be followed.
- 100% of the staff is aware about the registers and colour codes maintained for the daily bio-medical waste entry and disposal.
- 65% of the staff is aware about the equipment used for destroying the needles after use.
- 100% of the staff is aware about the bio-hazard symbol labelled on bags, on the other hand about 92% knows about the discarding of waste in colour coded bags.
- Regarding the categories 75% gave the correct answer that means the whole staffs does not know about the different categories of bio-medical waste management.
- Only 80% of the staff believes that by immunization they can be protected against the bio-medical hazard.

Comparison with WHO standards-

WHO STANDARDS

1. Duties of the operator should be listed
2. BMW is divided into 4 categories
3. Chemical pre-treatment is done with 10% sodium hypochlorite
4. Outsourcing is strongly recommended (area should be within 75kms)
5. Waste sharp/metals are to be discarded in transparent puncture proof box

GTBH MANAGEMENT

1. There is no such listings, as well as there is lack of hoardings and posters as well.
2. BMW is divided in 4 main categories
3. The pre-treatment is done with 10% sodium hypochlorite
4. Outsourcing is done as the area is within the 20kms to the hospital
5. Wastes like needles blade scalpels etc., are being discarded in puncture proof box

WHO COLOUR CODE FOR BIO MEDICAL WASTE

Cat.	Type of Bag/ Container used	TYPE OF WASTE	Treatment /Disposal options
Yellow 	non-chlorinated plastic bags Separate collection system leading to effluent treatment system ←	a) Human Anatomical Waste b) Animal Anatomical Waste c) Soiled Waste d) Expired or Discarded Medicines e) Chemical Waste f) Micro, Bio-t and other clinical lab waste g) Chemical Liquid Waste	Incineration or Plasma Pyrolysis or deep burial*
Red 	non-chlorinated plastic bags or containers	Contaminated Waste (Recyclable) tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles) and gloves.	Auto/ Micro/Hydro and then sent for recycling. not be sent to landfill
White 	(Translucent) Puncture, Leak, tamper proof containers	Waste sharps including Metals	Auto or Dry Heat Sterilization followed by shredding or mutilation or encapsulation
Blue 	Cardboard boxes with blue colored marking	Glassware	Disinfection or auto/ Micro/hydro and then sent for recycling.



BIO-MEDICAL WASTE

DO YOU KNOW ?

Symbol for Bio-hazard

- ☞ The Government has notified Bio-Medical Waste Management Rules, 2016 which are applicable to all.
- ☞ Defaulters are liable to be Prosecuted / Fined up to Rs. 1,00,000 (Rupees One Lakh) and 5 Years of Imprisonment.
- ☞ Bio-medical waste should be segregated at the source of generation in colour coded bags/containers.

YELLOW CONTAINER	RED CONTAINER	WHITE SHARP CONTAINER	CARDBOARD BOXES WITH BLUE COLORED MARKING
Human Anatomical Waste - Tissues - Organs - Body parts - Placenta - Fetus below viability along with MTP CERTIFICATE from Obstetrician Animal Anatomical Waste - Experimental animal carcasses - Body parts organs, tissue - Waste generated from animal used in experiments Soiled Waste - Contaminated with blood body fluids - Dressing, plaster casts, cotton swabs - Blood Bags containing residual blood/Blood components/ Discarded/Expired Medicines - Antibiotics/ cytotoxic drugs alongwith glass/ plastic ampoules, vials. Discarded Linen - Mattresses & beddings contaminated with blood / body fluids Chemical Waste - Used in production of biological & used or discarded disinfectant	Chemical Liquid Waste - Silver X-ray film developing liquid - Discarded formalin - Infected Secretions - Body fluids - Liquids from Laboratories - Floor Washing Liquid - Liquid from Housekeeping - Liquid from disinfecting activities (Separate collection system leading to ETP) Microbiology/ Biotechnology/ Clinical Lab Waste After Treatment - Blood Bags - Lab Cultures Stock - Specimen of micro organism - Live/attenuated vaccines - Human/animal cell culture - Residual toxins, dishes devices used for culture	Recyclable Contaminated Waste - Disposable tubing bottles - IV Tubes sets - Catheters - Urine bags - Syringes without needles - Vacuainers with their needle cut - Gloves	- White sharp container translucent, puncture proof, leak proof tamper proof - Metal sharp Needle - Syringes with fixed needles - Needles from needle tip cutter - Scalpel, Blade - Any Metal sharp
- Broken, discarded Contaminated glass - Medicine vials/ ampoules except those contaminated with cytotoxic waste - Metallic implant			



INCINERABLE



AUTOCLAVABLE





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Department of Bio-Medical Waste Management

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GOVERNMENT OF NCT OF DELHI

Room No. 509 & 322 Contact No. 011-22599474

CONCLUSION-

- Concluding from the results, the importance of training regarding biomedical waste management cannot be overemphasized; lack of proper and complete knowledge about biomedical waste management impacts practices of appropriate waste disposal.
- More emphasis should be laid on attitude change of the staff depicting their concern for their co-staff which may lead to fatal infectious diseases and the record maintenance should be done as a part of duty not as a burden.

RECOMMENDATIONS-

- High visibility could be achieved through hoardings near the bio-medical waste disposal bins.
- There should be proper display of posters regarding the right way of disposing, storing and transporting bio-medical waste.
- A regular audit should be done on how feedback calls are answered and recorded.
- Training should be carried out more often, specially housekeeping staff as they are ones who handles the waste and also there should be proper orientation program for the newly appointed staff regarding the disposal of the BMW, as they tend to do more mistakes.

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APPENDIX-

BIO MEDICAL WASTE MANAGEMENT QUESTIONNAIRE

Q1: What do you understand by bio-medical waste?

1. Hospital waste
2. Medical waste
3. Both
4. None

Q2: What type of waste is generated in burn and plastic surgery department?

1. General waste
2. Sharps
3. Infected waste
4. 4chemicalwaste
5. All

Q3: What is the average quantity of waste is generated in burn and plastic surgery department?

1. 1-5kg
2. 6-10kg
3. 11-15kg
4. 16-20kg

Q4: Are you aware of any legislation applicable to biomedical waste?

Yes/no

Q5: If yes, then write the name of act applicable:

.....

Q6: Do the department have any waste management plan?

Yes/no

Q7: Find out the correct sequence of waste management program?

1. Collection-Treatment-Storage-Transport-Disposal
2. Generation-Segregation-Collection-Storage-transport-treatment-disposal
3. Segregation-collection-treatment-transport-disposal

Q8: a) Should waste be segregated? Yes/no

b) If yes, who does the segregation?

1. Sisters
2. Doctors
3. Housekeeping
4. Professionals
5. All

6. None

Q9: a) Do you colour code the waste? Yes/no

b) Colour codes used are?

1. Yellow, red, black, white
2. Blue, yellow, white, black
3. Blue, orange, white, red
4. Yellow, black, blue, green

Q10: does infection waste bag labelled with bio-hazard symbol? Yes/no

Q11: where do you store bio-medical waste?

1. Separate drums
2. With general waste
3. Nowhere

Q12: what are the risks associated with mismanagement of bio-medical waste?

1. HIV AIDS
2. Hep B
3. Hep C
4. None
5. All

Q13: categories of bio-medical waste:

1. 8
2. 9
3. 10
4. 12

Q14 yellow bag is to discard?

1. Needles
2. Glass bottles
3. Catheters
4. Infected gauge

Q15 blue bag is to discard?

1. Needles
2. Papers
3. Catheters
4. Broken glass

Q16 sharp container is to discard?

1. Body parts
2. Needles
3. Catheters

4. Infected gauge

Q17 equipment used for destroying needles and syringe:

1. Sharp container
2. Needle destroyer
3. Syringe pump
4. All

Q18 in which section we discard infected fluid and blood samples

1. 1% savlon
2. 1% hypochlorite
3. Alcohol 70%
4. All

Q19 How the final disposal of various items is done?

- | | |
|---------------------|------------------------|
| a) Yellow bag | 1. autoclave |
| b) Blue bag | 2. Dumping into ground |
| c) Sharp containers | 3. shredding |
| d) Black bag | 4. incinerator |
| e) Broken glass | 5. Chemical treatment |

Q20 do the department maintain register for waste disposal? Yes/no

Q21 have you undergone any training program on hospital waste management? Yes/no

Q22 would you like to attend a program on hospital waste management? Yes/no

Q23 safe management of health care waste is not an issue to all? Yes/no

Q24 safe management of health care waste is the responsibility of government? Yes/no

Q25 waste management is a team work/no single class of people is responsible for safe management? Yes/ no

Q26 safe management of healthcare waste is an extra burden on work? Yes/no

Q27:

		Strongly agree	agree	Somewhat agree	Completely disagree
A)	Occupational safety of waste handlers is must				
b)	Hep. B immunization prevents transmission of hospital acquired infections				

