

Study on Knowledge, Awareness and Practices of
Biomedical Waste Management and Infection Control
Among Hospital Staff at Civil Hospital, Ropar (Government
of Punjab)

By

Jashanmeet K Hans

*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. Jashanmeet K Hans** student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **Punjab Health Systems Corporation, Civil Hospital Ropar** from **February 1st, 2018 to April 30th 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.

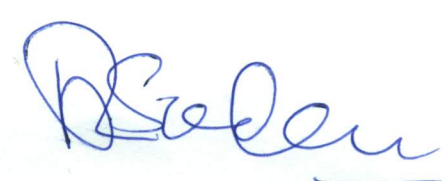


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TO WHOM IT MAY CONCERN **CERTIFICATE OF DISSERTATION COMPLETION**

This is to certify that Dr. Jashanmeet Kaur 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.

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation " **A Study on Knowledge, Awareness and Practices of Biomedical Waste Management and Infection Control among hospital staff** " submitted by **Dr. Jashanmeet K Hans** Enrollment No- **IIHMR-U/01/2016-18/0428** under the supervision of **DR. P.R Sodani** for award of MBA in Hospital and Health of the University carried out during the period from **1st FEBRUARY 2018** to **30TH H 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.ZX



Signature

THE IIMMR UNIVERSITY

CERTIFICATE BY SCHOLAR

This is to certify that all ethical issues have been considered while collecting data for my dissertation titled “A Study on Knowledge, Awareness and Practices of Biomedical Waste Management and Infection Control among hospital staff”



Signature of student

ACKNOWLEDGEMENT

I owe a great debt to all professionals at **Punjab Health Systems Corporation and Civil Hospital Ropar** for generously sharing their knowledge and time, which inspired me to do my best during this project study.

My heartfelt gratitude to **Dr. Parvinder Pal Kaur** (Assistant Director- PHSC), **Dr. Raj Rani (DMC- Ropar)** and **Dr. Anil Manchanda** (SMO District hospital Ropar) for showing their keen interest in the study and for sharing their views in spite of their very busy schedule. It has been my privilege to work under their dynamic supervision at the Hospital.

I am extremely grateful to the hospital clinical as well as support staff, for their valuable guidance throughout the entire course of study to its completion.

My sincere gratitude to **Dr. Ashok Kaushik** (Dean-Academics, IIHMR, Jaipur) for his relentless support and guidance. My regards go to my guide at institute **Dr. P.R. Sodani** for his very helpful attitude and valuable suggestions.

I would like to express my deepest gratitude to my parents for their moral support, which always inspired me to perform best. And finally credit goes to my best friend **Dr. Sinia Bhardwaj** who constantly supported and guided me throughout this study.

Sincerely,

Dr. Jashanmeet K Hans

MBA-HM (2016-2018)

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LIST OF ABBREVIATIONS

BMW	Bio medical waste
PPE	Personal protective equipments
HCF	Health care facility
CBWTF	Common biomedical waste treatment facility

PROJECT TITLE- A STUDY ON KNOWLEDGE, AWARENESS AND PRACTICES OF BIOMEDICAL WASTE MANAGEMENT AND INFECTION CONTROL AMONG HOSPITAL STAFF AT CIVIL HOSPITAL, ROPAR.

INTRODUCTION –

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

It is an emerging issue of major concern not only to the hospitals but also to the environment. The proper management of BMW plays a very important role in any hospital to avoid the adverse and harmful effects to the environment including human beings which are caused by ‘Hospital waste’ generated during the patient care. Hospital waste is a potential health hazard to the health care workers. The problems of the waste disposal in the hospitals and other health care institutions have become issues of major concern.

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 includes collection, transportation, operation or treatment of processing systems and disposal of wastes.

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 total amount of waste generated

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 ash

BMW 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

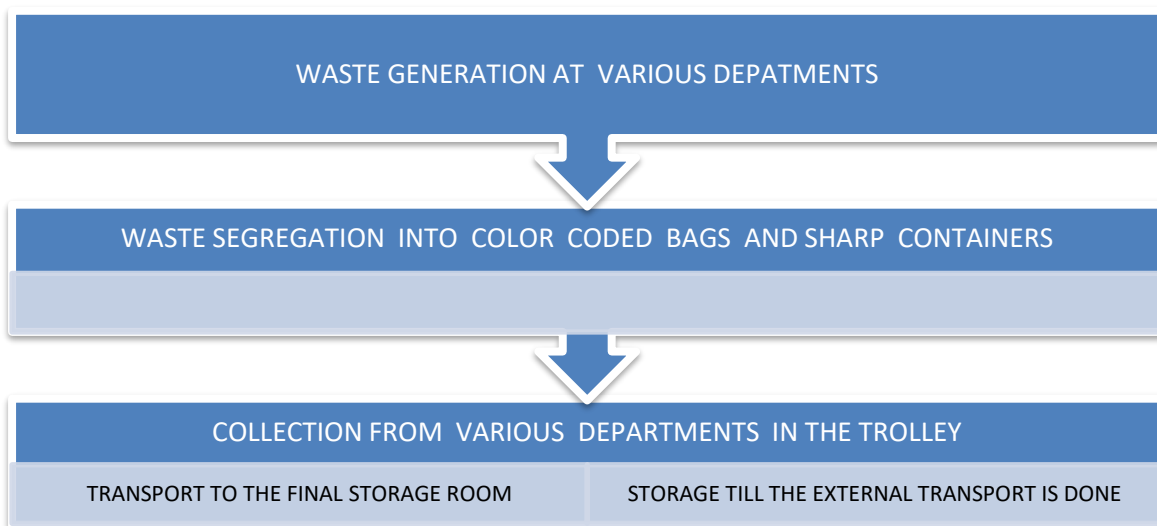
THE STUDY IS UNDERTAKEN ACCORDING TO THE BIOMEDICAL WASTE MANAGEMENT RULES 2016 AS THESE RULES ARE BEING CURRENTLY IMPLEMENTED IN THE HOSPITAL.

The major salient features of BMW Management Rules, 2016 include the following:-

- (a) The ambit of the rules has been expanded to include vaccination camps, blood donation camps, surgical camps or any other healthcare activity;
- (b) Phase-out the use of chlorinated plastic bags, gloves and blood bags within two years;
- (c) Pre-treatment of the laboratory waste, microbiological waste, blood samples and blood bags through disinfection or sterilization on-site in the manner as prescribed by WHO or NACO;
- (d) Provide training to all its health care workers and immunize all health workers regularly;
- (e) Establish a Bar-Code System for bags or containers containing bio-medical waste for disposal;
- (f) Report major accidents;
- (g) The new rules prescribe more stringent standards for incinerator to reduce the emission of pollutants in environment;
- (h) Existing incinerators to achieve the standards for retention time in secondary chamber and Dioxin and Furans within two years;
- (i) Bio-medical waste has been classified in to 4 categories instead of 10 to improve the segregation of waste at source;
- (j) Procedure to get authorization simplified. Automatic authorization for bedded hospitals. The validity of authorization synchronized with validity of consent orders for Bedded HCFs. One time Authorization for Non-bedded HCFs;
- (k) No occupier shall establish on-site treatment and disposal facility, if a service of `common bio-medical waste treatment facility is available at distance of seventy-five kilometres.
- (l) Operator of a common bio-medical waste treatment and disposal facility to ensure the timely collection of bio-medical waste from the HCFs and assist the HCFs in conduct of training.

PROCESS FLOW OF BIO MEDICAL WASTE MANAGEMENT IN THE HOSPITAL-

Terminal numbers have been provided for each department.



LITERATURE REVIEW –

1. A study was conducted in dental teaching institutions in India. The results of the review showed that knowledge and awareness level of subjects was inadequate and there is considerable variation in practice and management regarding BMW among different studies. The authors recommend similar studies in different states and further research to provide accurate data for future decision-making.

(Source: Knowledge and awareness regarding biomedical waste management in dental teaching institutions in India- A systematic review, Journal of clinical and experimental dentistry)

2. A study was conducted in Srinagar that revealed that the knowledge of health care workers on BMW and constituents of medical waste. Although majority of the workers seems to be clear on the constituents, there was some confusion on certain constituents as medical waste. Chemicals, unused medicines and coloured containers are the constituents which made most of the confusions among the workers. The sanitary workers are not aware about the colour coding of containers. The doctors and nurses were found clearer to some extent about the knowledge and constituents of biomedical waste. The age group/gender doesn't have any connection with the knowledge of constituents of medical waste.

The study has also shown that more the qualified staff the more is the understanding/awareness or knowledge in the subject of wastes management. The average of all the surveyed HCU's in Srinagar, Doctors rated 88.2% and nurses rated 60.9% with regard to knowledge. Sanitary staff exhibited poor knowledge rated 37.1% about BMW and rules. This was indicative of the fact that the sanitary staffs were never given even a capsule training with regard to biomedical waste management practices.

In the regard to attitude towards scientific process doctors had scored an average of 80.3% in all the HCU's in Srinagar city and nurses scored 75.6% whereas sanitary staff have 60 % attitude towards the scientific process. The attitude of employees towards medical waste management and scientific process for different groups. It can be noted that the percentage of people who are highly concerned with the waste management are with high education groups

“(Source: STUDY OF KNOWLEDGE, ATTITUDE AND PRACTICES REGARDING MANAGEMENT OF BIOMEDICAL WASTE AMONG HEALTH CARE PROFESSIONALS AND SANITARY STAFF IN SRINAGAR CITY, INDIA KIFAYAT HUSSAIN, ANTOSH AGNIHOTRI, Gh.A. MIR

3. A study was conducted in a Secondary Care Hospital of Al Buraimi Governorate, Sultanate of Oman. It was concluded from the study that the staff knew about documentation related to rules and regulation of biomedical waste management which needed further strict implementation. Higher percentage of health care workers knew about diseases that are transmitted through mishandling of biomedical waste management. Also it was considered that biomedical waste management is a team work and majority of them followed universal precautions while handling biomedical waste. It was found during the study that nurses had better “satisfactory knowledge

(90.9%), attitude (94.5%) and practice (80%) scores toward the biomedical waste management in health care institutions as compared to other participants.

(Source: Knowledge, Attitude and Practice of Biomedical Waste Management among Health Care Personnel in a Secondary Care Hospital of Al Buraimi Governorate, Sultanate of Oman, Ahmed Yar Mohammed Dawood Al Balushi, Muhammad Muqeet Ullah, Amal Ali Al Makhamri, Fatma Sulieman Al Alawi, Mansoor Khalid & Hilal Masaud Al Ghafri)

OBJECTIVES OF THE STUDY-

1. To determine the knowledge and awareness among hospital staff regarding biomedical waste management policy and practice.
2. To determine their awareness regarding needle-stick injury and its prevalence among different categories of health care providers.
3. To assess the current practices of bio-medical waste management in the hospital.
4. To assess the practices of infection control in the hospital.

METHODOLOGY –

1. **STUDY DESIGN:** Cross sectional study
2. **SETTING:** Civil Hospital, Ropar, Government of Punjab
3. **DURATION OF STUDY:** February 2018 to April 2018 (3 months)
4. **SAMPLE SIZE:** A sample size of 100 staff members was taken – included 20 doctors, 25 nursing staff, 30 student nurses on training, 10 housekeeping staff and 15 laboratory technical staff.
5. **SAMPLING TECHNIQUE:** Simple random sampling
6. **SAMPLE SELECTION:** The inclusion criteria were all the healthcare professionals at the hospital (doctors, nurses, technical staff, and housekeeping staff etc.) who were available for the study and were willing to participate. The exclusion criteria were those who decided to exercise their right not to participate in the study.
7. **DATA COLLECTION INSTRUMENTS:** To collect the required data on KAP of biomedical waste management and infection control, the following study tools were prepared: 1) Questionnaire for Doctors 2) Questionnaire for Nursing and Technical Staff 3) Questionnaire for Housekeeping Staff 4) Observation Checklist
8. **DATA COLLECTION PROCEDURE:** Data was collected from the hospital staff from all departments and wards by interacting with them and observing the waste management practices. These interactions and observations were conducted by a self structured questionnaire and checklist.
9. **DATA ANALYSIS:** Data was analysed with the help of advance Microsoft Excel function.

Results-

A self structured questionnaire was developed for the doctors, nurses, student nurses on training, laboratory technicians and housekeeping staff.

The questionnaire was developed in the framework to assess the knowledge, awareness and practices of biomedical waste management and to assess the infection control measures among the hospital staff. The data was collected by interacting with the staff by asking them questions from the questionnaire.

Along with the questionnaire, an observation checklist was also developed and the practices of bio medical waste management and handling and infection control measures were observed through the checklist.

Data was analysed with the help of Advanced Microsoft Excel Function.

Knowledge and awareness of Bio medical waste management among hospital staff -

10 questions were included for this framework in the questionnaire, and the result was made with the assumption that those who answered 8 or more questions correct have good knowledge and awareness of bio medical waste management.

After the analysis of the data collected through questionnaires, the results showed that the 70% of the doctors had proper knowledge and awareness about bio medical waste management.

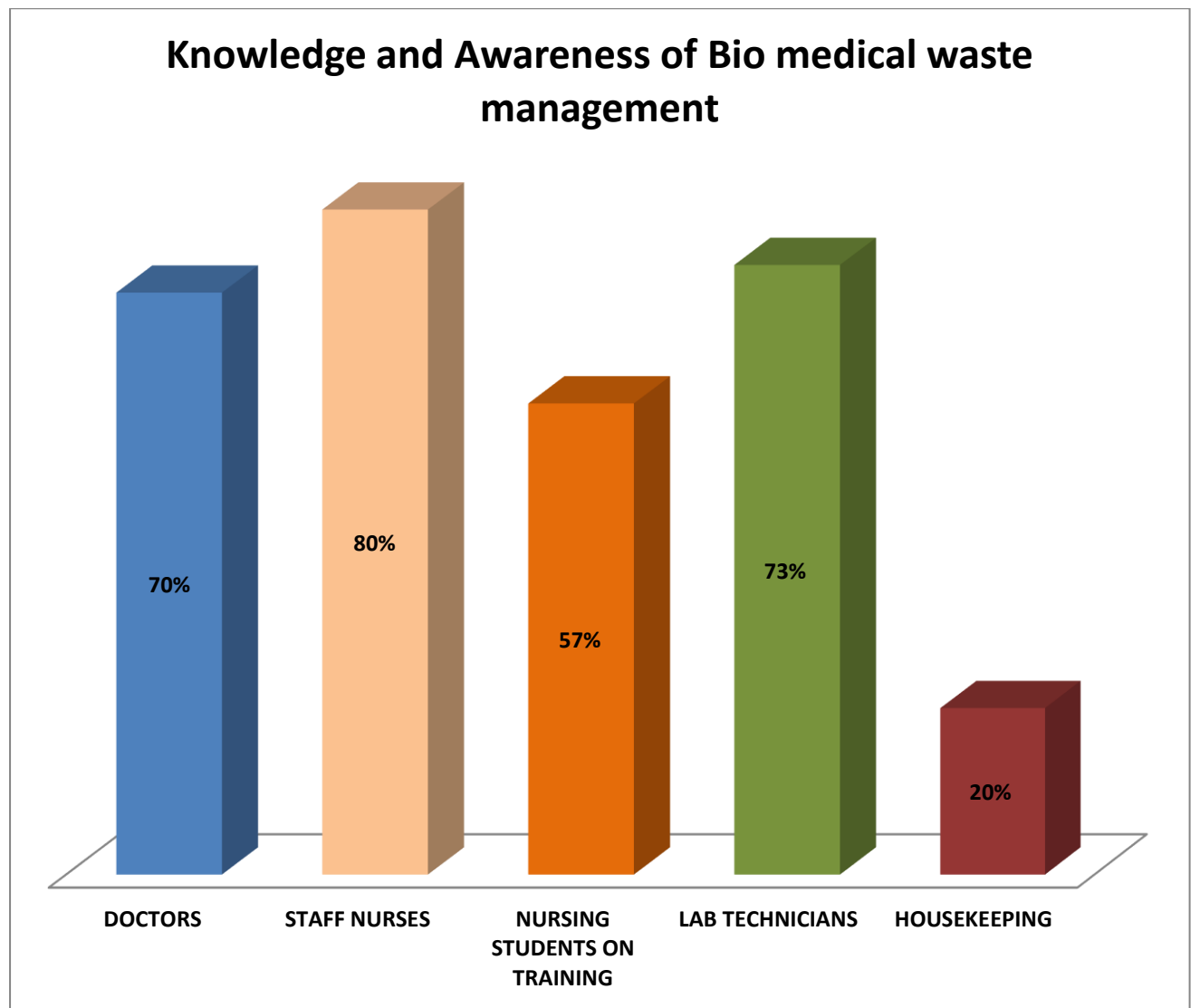
80% of the staff nurses had proper knowledge and awareness of bio medical waste management.

57% of the nursing students on training had proper knowledge and awareness of bio medical waste management.

73% of laboratory technicians had proper knowledge and awareness of bio medical waste management.

20% of the housekeeping staff had proper knowledge and awareness of bio medical waste management.

Graphical Representation of the knowledge and awareness of bio medical waste management among doctors, staff nurses, nursing students on training, laboratory technicians and housekeeping staff.

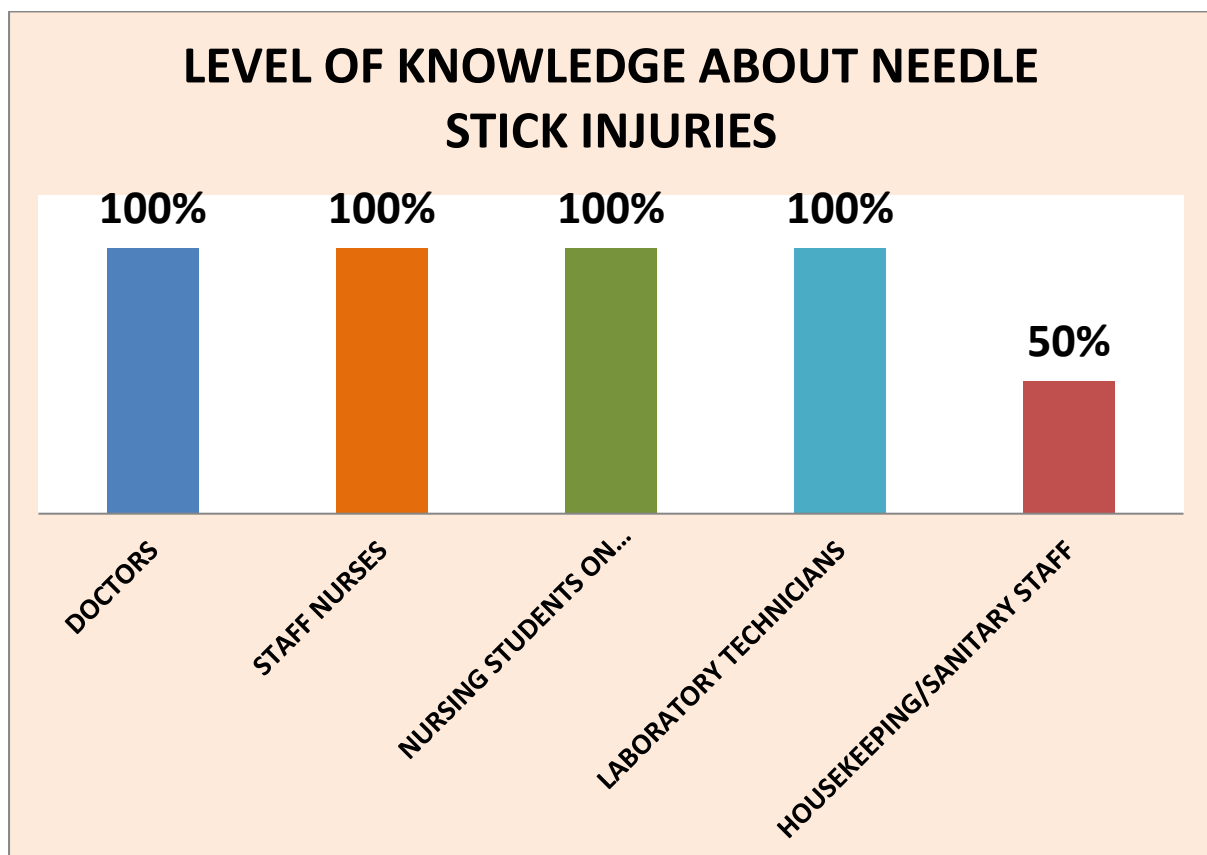


Level of knowledge among nurses, doctors, lab technicians and housekeeping on needle sticks injuries-

5 questions were included for this framework in the questionnaire, and the result was made with assumption that those who answered 4 or more questions correct have proper knowledge on needle stick injuries.

After the analysis of the data collected through questionnaire, the results showed that 100% of doctors, 100% of staff nurses, 100% of nursing students on training, 100% of lab technicians and 50% of housekeeping staff had proper level of knowledge on needle stick injuries.

Graphical Representation of level of knowledge on needle stick injuries among doctors, staff nurses, nursing students on training, lab technicians and housekeeping staff



OBSERVATION CHECKLIST to assess the current practices of bio medical waste management in the hospital-

- Maintenance of records - **YES**
- Needle shredders are provided/present in each department -**YES**
- Color coded containers provided- **YES**
- Segregation properly done- **YES**
- Whether bio medical waste regularly lifted by common biomedical waste treatment facility (CBWTF)- **YES**

- Whether discarded medicines/expired medicines stored separately in yellow bag- **YES**
- Pre-treatment to Microbiology / Blood Bags etc. with autoclave -**YES**
- Final treatment to liquid waste -**NO**
- Non-chlorinated bags used- **YES**
- Whether final storage room/tank provided with Lock-key - **YES**
- Bar-code sticker pasted on color coded bag/container- **YES**
- Training to health-workers provided and record maintained- **YES**
- Immunization to health-workers provided – **doctors, staff nurses and lab technicians provided with the immunization except for few of the nursing students and no housekeeping staffs was immunized.**
- PPEs used by health workers during handling BMW- **YES**
- BMW Committee constituted in the hospital- **YES**
- Cutting of gloves before disposing into color coded bins- **NO**

Major Gaps observed after the comparison of the assessment of Current Practices of bio medical waste management and the observation checklist-

1. The HCF is cutting/shredding syringes to stop its reuse with needle shredder, however, in one of the ward it was observed that the needle shredder provided was unable to cut the needles.
2. The hospital has not adopted the practice of cutting of gloves and glucose bottles before disposing in the color coded bins.
3. The hospital has not provided arrangement for the treatment of liquid waste generated from operation theatre, labour room, dialysis section and laboratory. The entire quantity of liquid waste is being discharged into sewer without any treatment imparted to it.
4. The hospital has not provided color coded bins at the final storage room.

Assessment of Infection Control practices among Doctors, staff nurses, nursing students on training, laboratory technicians and housekeeping/sanitary staff-

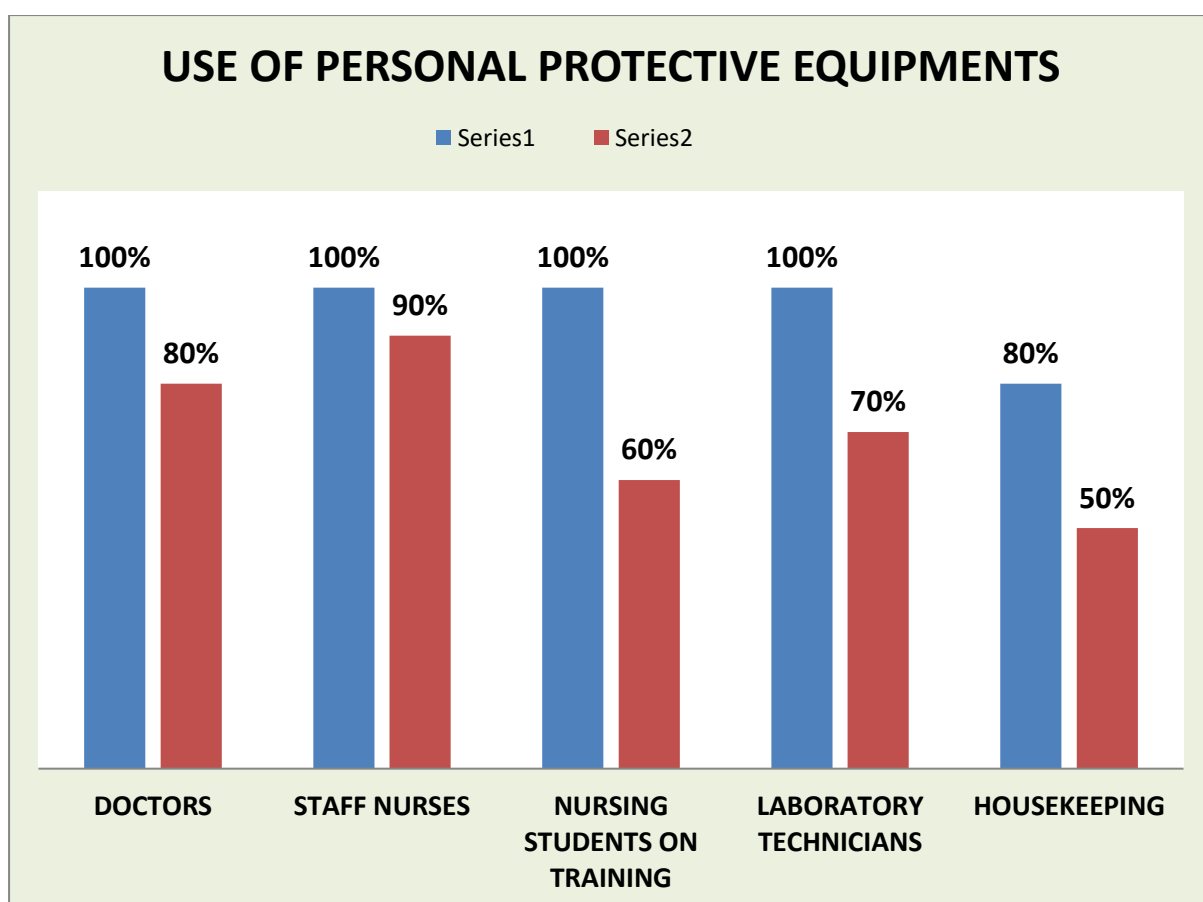
A questionnaire with 4 questions and observation checklist was made for the comparison.

After collecting the data the results showed-

- When the staffs was asked that is personal protective equipments important to be used, 100% of doctors, 100% of staff nurses, 100% of nursing students on training,

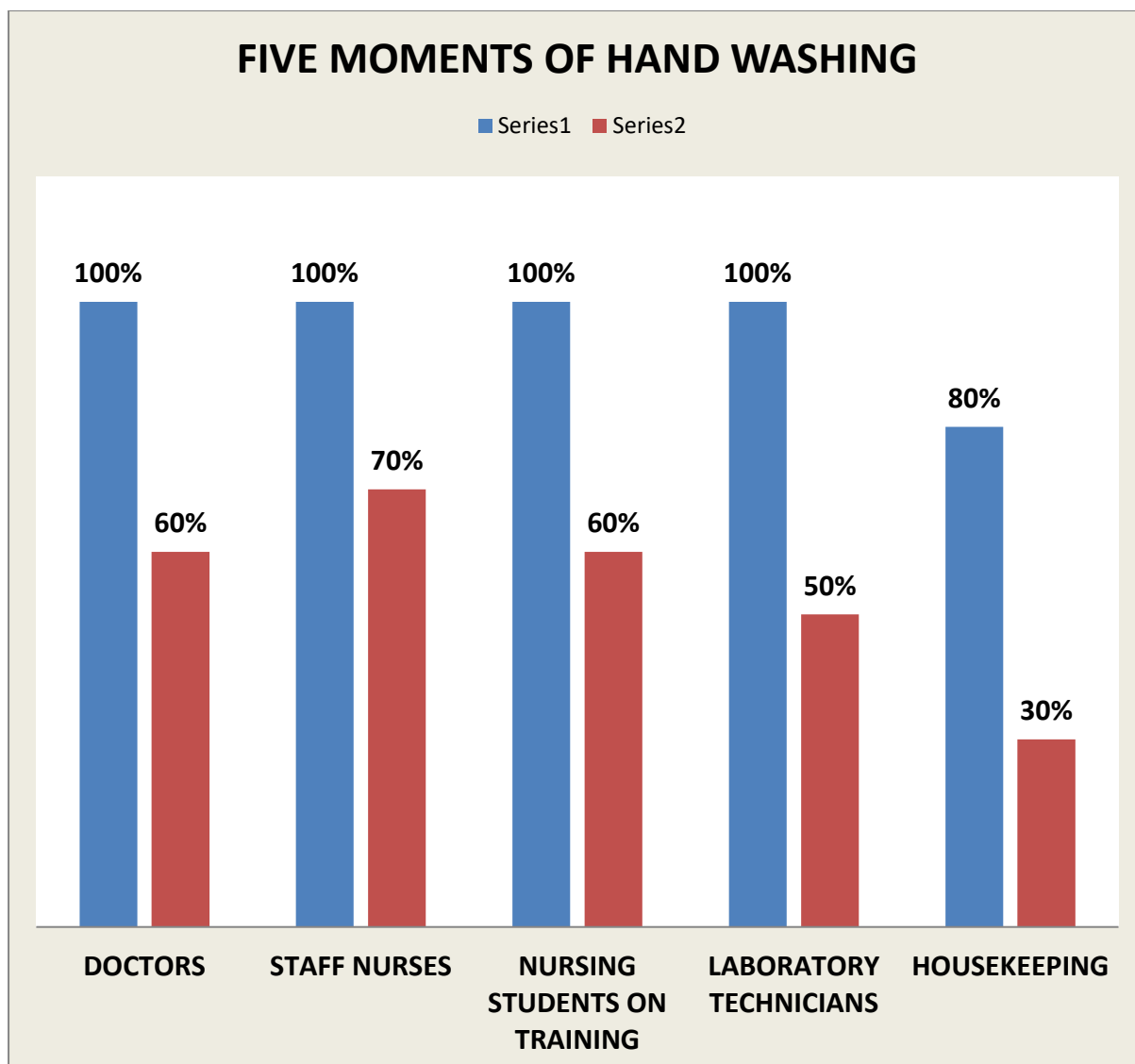
100% lab technicians answered it as yes and 80% of housekeeping staff/ sanitary staff answered it as yes. But on observation for the use of personal protective equipments the result was as follows-

80% of doctors, 90% of nurses, 60% of nursing students, 70% of lab technicians and 50% of housekeeping were actually using the personal protective equipments.



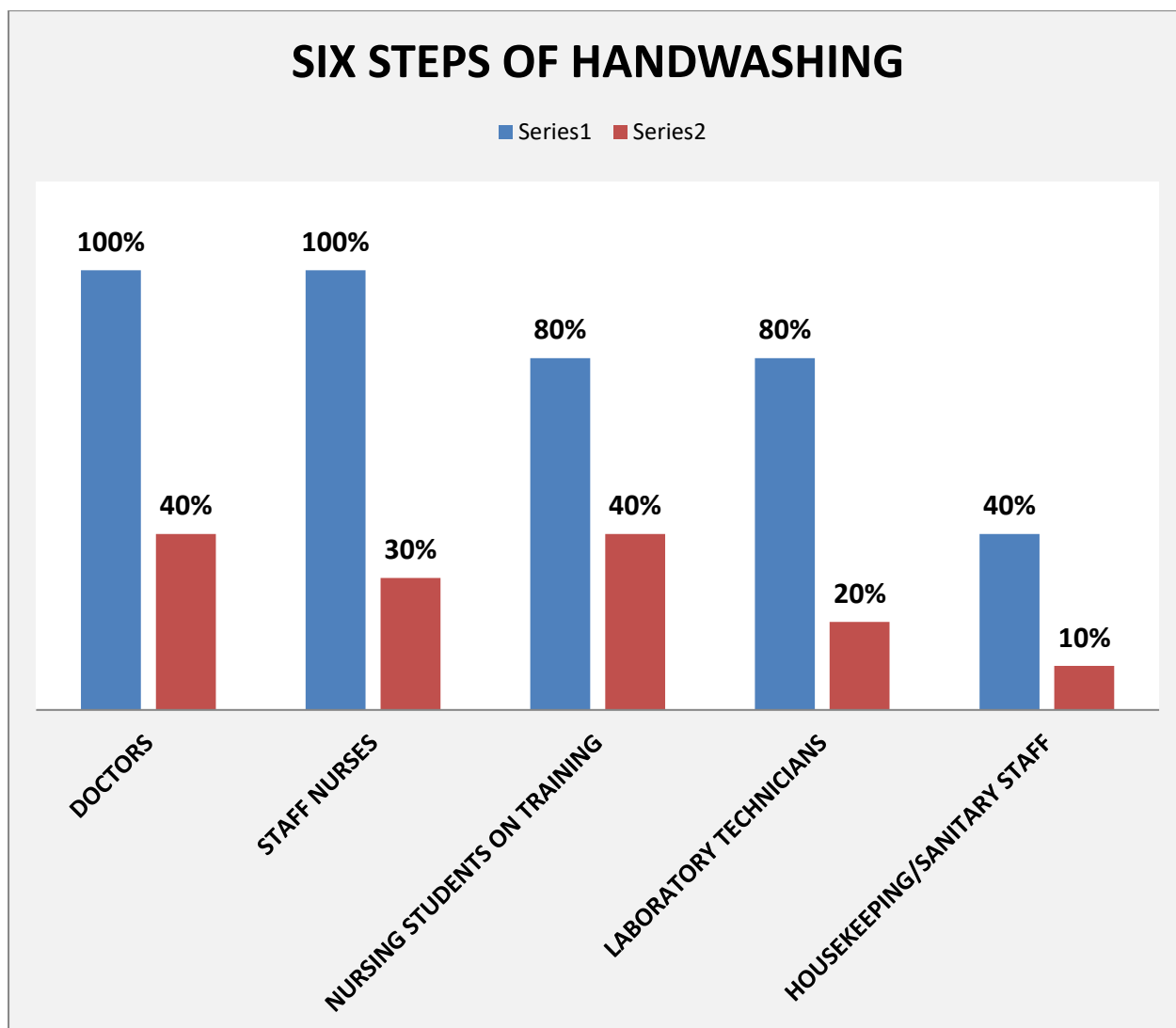
- When the staff was asked that do you follow five moments of hand washing, 100% of doctors, 100% of staff nurses, 100% of nursing students, 100% of lab technicians and 60% of housekeeping staff answered yes. But on observation,

60% of Doctors, 70% of Staff nurses, 60% of nursing students for training, 50% of lab technicians and 30% of housekeeping/sanitary staff were actually following it.



When the staff was asked that do you follow six steps of Hand washing, 100% of the doctors, 100% of staff nurses, 80% of nursing students, 80% of laboratory technicians and 40% of housekeeping/ sanitary staff answered yes.

But on observation, only 40 doctors, 30% staff nurses, 40% nursing students, 20% lab technicians and 30% of sanitary staff were actually following it.

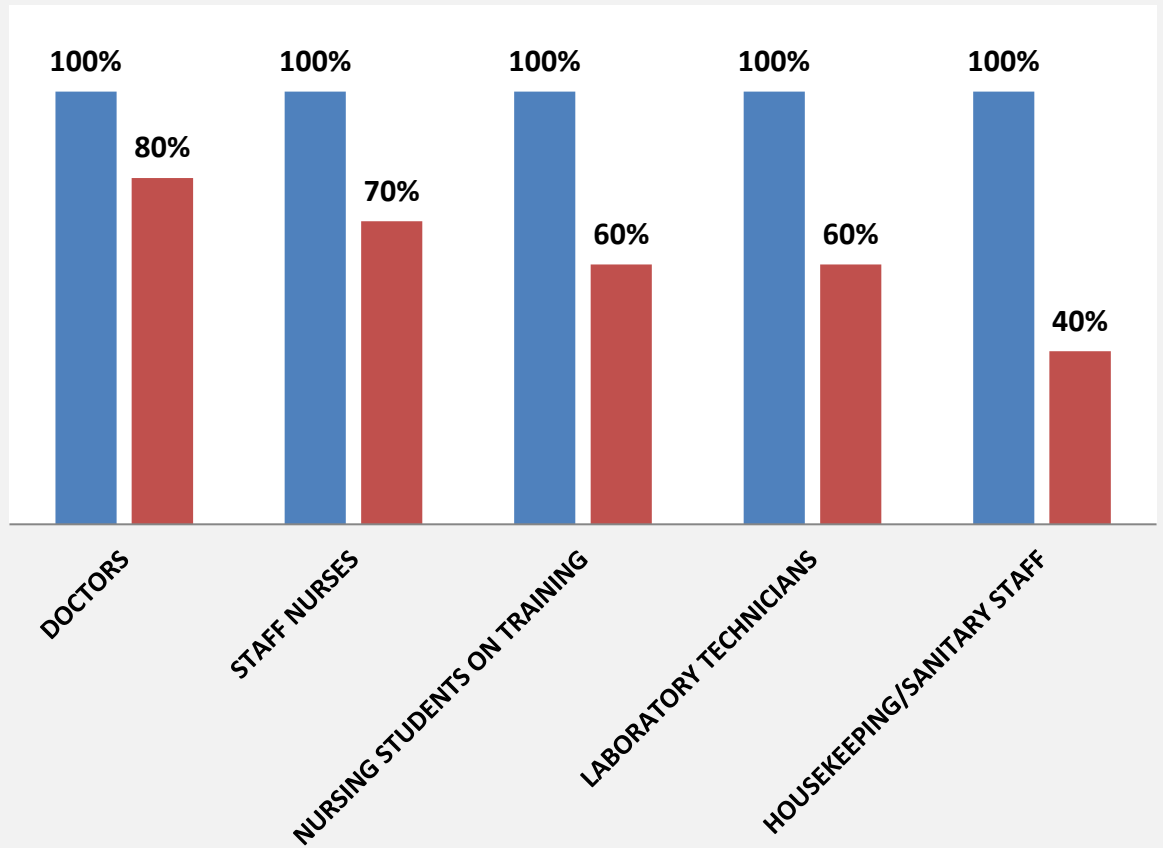


- When the staff was asked that is it important to use fresh gloves before every new patient procedure, 100% of doctors, 100% of staff nurses, 100% of nursing students, 100% of laboratory technicians and 100% sanitary staff answered yes.

But on observation, only 80% Doctors, 90% staff nurses, 80% nursing students, 70% lab technicians and 70% sanitary staff were actually following it.

USE OF FRESH GLOVES FOR EACH NEW PATIENT PROCEDURE

Series1 Series2



Discussion-

A cross sectional hospital based study was conducted among 100 healthcare providers including Doctors, Staff Nurses, Nursing students on training, laboratory technicians and housekeeping/Sanitary staff.

All the participants have heard about Bio medical waste management and infection control measures.

About 70% of doctors, 80% of staff nurses, 57% of nursing students, 73% of lab technicians and 20% of housekeeping had proper knowledge and awareness about Bio medical waste management.

About 100% of doctors, 100% of staff nurses, 100% of nursing students, 100% lab technicians and 60% of housekeeping had proper knowledge of needle stick injuries.

On observation major gaps observed by comparison with the assessment of current practices of bio medical waste management were,

- The HCF is cutting/shredding syringes to stop its reuse with needle shredder, however in one of the ward it was observed that the needle shredder provided was unable to cut needles.
- The hospital has not adopted practice of cutting of gloves and glucose bottle before disposing in the color coded bin
- The hospital has not provided arrangement for the treatment of liquid waste generated from operation theatre, labour room, dialysis section and laboratory. The entire quantity of liquid waste is being discharged into the sewer without any treatment imparted to it.
- The hospital has not provided color coded bins at the final storage room.

CONCLUSION AND RECOMMENDATIONS-

- A cross sectional hospital based study was conducted among 100 healthcare providers including Doctors, Staff Nurses, Nursing students on training, laboratory technicians and housekeeping/Sanitary staff.
- Nearly about all the participants have heard about Bio medical waste management and infection control measures. But there is lack of proper and complete knowledge about bio medical waste management practices.
- Doctors, nurses and laboratory technicians have better knowledge and awareness than the housekeeping/sanitary staff regarding BMW management.
- Regarding practices related to BMW management, Housekeeping staff were ignorant on many counts especially in regard to needle stick injuries.

- Also injury reporting was low across the housekeeping staff
- After the assessment of infection control practices it was analysed that doctors, nurses and other health professionals were aware of all the infection control measures but on observation less number of staff were actually practising them.
- On comparing the Observation checklist and assessment of practices, it was analysed that the gloves and glucose bottles were not being cut before disposal and on observation again it was found that mainly the nursing student on training posted in different departments and wards were not cutting the gloves before disposal.

RECOMMENDATIONS-

The importance of training regarding biomedical waste management needs emphasis.

Regular monitoring is required at all levels specially for the nursing students on training and the housekeeping staff.

Enhancement should be done to the already existing infection control committee to supervise all the aspects of biomedical waste management.

Training on implementation of bio medical waste management and handling rules 2016 should be done as a refresher.

INSTRUMENTATION-

Questionnaire for Doctors for assessment of knowledge and awareness of Biomedical waste Management-

1. In which year the Bio medical waste management rules were first proposed?
2. Implementation in the biomedical waste (Management and Handling) rules was made in which year?
3. According to Biomedical waste (Management and Handling) rules, waste should not be stored beyond how many hours?
4. Who regulates the safe transport of Bio medical waste?
5. The use of chlorinated plastic bags, blood bags and gloves should be phased out within how many years?
6. According to Biomedical waste (Management and Handling) rules 2016, the waste has been classified in how many categories?
7. According to Biomedical waste (management and handling) rules 2016, Installation of In-house incinerator is allowed or not?
8. Chemical pre-treatment is required for which type of wastes?
9. Accident reporting in case of any major accident while handling biomedical waste should be done to the prescribed authority within how many hours?
10. Do you think it is important to know about bio medical waste generation and legislation and do you know about the color coding segregation of bio medical waste and do you follow the correct practice in your hospital?

Questionnaire on Knowledge of Biomedical Waste Management for Nurses and Student Nurses on Training-

1. Which diseases can be transmitted by improper handling of biomedical waste?
2. Do you know about the color coding segregation of Bio medical waste?
3. Do you according to 2016 rules bio medical waste has been classified into how many categories?
4. Needles, syringes with fixed needles, scalpels, blades, or any other contaminated sharp object that may cause puncture and cuts should be disposed off in which color codes bin?
5. Gloves even the soiled one to be disposed off in which color coded bin?
6. The pre-treatment of liquid waste should be done with how much percentage of sodium hypochlorite solution?
7. The blue color coded bins to be made of?
8. Mutilation or shredding of needles is to be done to prevent?
9. What are the treatment or disposal options for discarded or expired medicines?
10. The color code of biomedical waste to be autoclaved and disinfected is?

Questionnaire for Housekeeping for assessment of knowledge and awareness of bio medical waste management-

1. Do you think it is important to wear protective gears (gloves, masks, gum boots) while handling bio medical waste management?
2. Are aware of the diseases or hazards that can occur by improper handling of bio medical waste?
3. How are the sharps managed?
4. Syringes without needles should be disposed off into which color coded bag?
5. Needles and syringes with fixed needles should be disposed off into which color coded bag/container?
6. Items contaminated with blood should be disposed off into which color coded bag?
7. What is the collection method from the point of generation?
8. How is the waste carried from the point of generation to the final disposal site?
9. Are you aware to who to report on getting a needle stick injury and what measures to adopt immediately on getting the injury?
10. Waste should not be stored to the final disposal site for more than how many hours?

Assessment of Practices of Bio medical waste management-

1. Are you following the color coding of Bio medical waste management?
2. Do you think it is important to report the needle stick and sharps injuries?
3. Do you think that wearing personal protective equipments is necessary while handling Bio medical waste?
4. Do you think you have adequate knowledge about Bio medical waste management?
5. Do you think you require any more trainings regarding proper management of bio medical waste management?
6. For enhancement and up gradation of your knowledge about bio medical waste management, would you like to attend any voluntary programmes / trainings?
7. Do you think that liquid waste should be pre treated with sodium hypochlorite solution?
8. Do you think the gloves and glucose bottles should be cut before disposal into color coded bins?
9. Do you think needle stick injury a matter of concern and are you aware of the consequences of needle stick injury?
10. Do you recap the used needle and discard it immediately after use?

Questionnaire on assessment of Level of knowledge among nurses, doctors, lab technicians and housekeeping on needle sticks injuries-

1. Is needle stick injury a matter of concern?
2. Do you think that it is important to recap the used needle?
3. Do you think that it is important to discard the used needle immediately?
4. Are you aware of the consequences of needle stick injury?
5. How do you think the needle stick injuries can occur?

Questionnaire on assessment of infection control practices among doctors, nurses, lab technicians and housekeeping-

1. Do you feel it is important to use personal protective equipments?
2. Do you follow five moments of hand washing?
3. Do you follow six steps of hand washing?
4. Do you feel it is important to use fresh gloves before each new patient procedure?
5. Do you know the correct method of wearing gloves?

OBSERVATION CHECKLIST-

- Maintenance of records
- Needle shredders are provided/present in each department
- Color coded containers provided
- Segregation properly done
- Whether bio medical waste regularly lifted by common biomedical waste treatment facility (CBWTF)
- Whether discarded medicines/expired medicines stored separately in yellow bag
- Pre-treatment to Microbiology / Blood Bags etc. with autoclave
- Final treatment to liquid waste
- Non-chlorinated bags used
- Whether final storage room/tank provided with Lock-key
- Bar-code sticker pasted on color coded bag/container
- Training to health-workers provided and record maintained
- Immunization to health-workers provided
- PPEs used by health workers during handling BMW
- BMW Committee constituted in the hospital

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