

BIO MEDICAL WASTE MANAGEMENT

Title

Assessment of Knowledge on Biomedical waste Management among Healthcare workers

Presented By

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INTRODUCTION

The healthcare services while providing services, curative, promotive or preventive inevitably create waste which may be hazardous to health. "Bio-medical waste" means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals research activities pertaining thereto or in the production or testing of biological or in health camps.

It is estimated that annually about 0.33 million tones of hospital waste is generated in India and, the waste generation rate ranges from 0.5 to 2.0 kg per bed per day and this biomedical waste encompasses wastes like anatomical waste, cytotoxic wastes, sharps, which when inadequately segregated could cause different kinds of deadly infectious diseases like Human immunodeficiency virus(HIV) hepatitis C and B infections, etc. and also cause disruptions in the environment, and adverse impact on ecological balance.

In developing countries, legislation and good practice guidelines define medical waste and state the various possible way to collection, transport, storage and disposal of such wastes. Furthermore, the best available technologies are used for the development of alternatives for the disposal of medical waste with minimum risk to human health and the environment. In developing countries such as India, however medical Waste Materials have not received sufficient attention.

The BMW (management and Handling) Rules, 1998(The Gazette of India 1998) ratified under the environmental protection Act 1986 is a very important piece of legislation for the management of hospital waste. In accordance with “Biomedical waste (Management and Handling) Rules”, BMW has to be stored separately from other waste. The treatment method are incinerator, autoclaving, microwaving, chemical treatment, deep burial and disposal in a secure land fill (or combination of these method).

Table 1: Waste segregation pattern followed in the hospital.

Colour	Container	Category
Blue (Sharp waste)	Blue plastic bag in plastic bin	Broken glasses, needles, syringes, scalpels blades etc.
Red (Infectious Non sharp waste)	Red plastic bag in plastic bin	Soiled cotton, gauzes, catheters, IV tubing etc.
Yellow (Organ and tissue waste)	Yellow plastic bag in plastic bin	Human tissues, organs, body parts, placenta, pathological and surgical waste, microbiology and biotechnology waste.
Black (General waste)	Black bag in plastic bin	General paper waste; and also kitchen waste, that is disposed separately.

ABOUT THE ORGANISATION

The Ranthambore Savika Hospital in Sawai Madhopur, Rajasthan, one of the oldest and most reputed hospital in SWM. The hospital established in 1994 and again re-established in 2013. It was expanded with the aid of funds from Prakratik Society which is NGO working around Ranthambore National Park. The hospital was managed by the NGO Prakratik society. There are staff of 120 excluding management department to look after the hospital. The hospital superintendent is the hospital management committee for all the hospital activities included waste management.

Currently the hospital has 65 bedded hospital the hospital provides various type of facilities. The hospital treats different category of people starting from ministers and government servants as well as the common people including poorest to the poor.

PRAKRATIK NGO:

The Prakratik Society's programs include: education, both formal and informal, an English-language-medium school, grades K-12 and environmental education through nature camps, environmental awareness competitions, a mobile library, and film screenings in neighbouring schools and villages; healthcare, the Ranthambore Savika Hospital as well as health-care outreach; family planning and family counselling; alternative energy sources (biogas), agro-forestry to green de-nuded land in the area, artificial insemination to improve local cattle breeding stock, a legal cell to help prosecute poachers of leopards and tigers and collaboration with other local NGOs such as the area's well-known Tiger Watch. Prakratik also has a big new hospital in the city of Sawai Madhopur That is Ranthambore Savika Hospital.

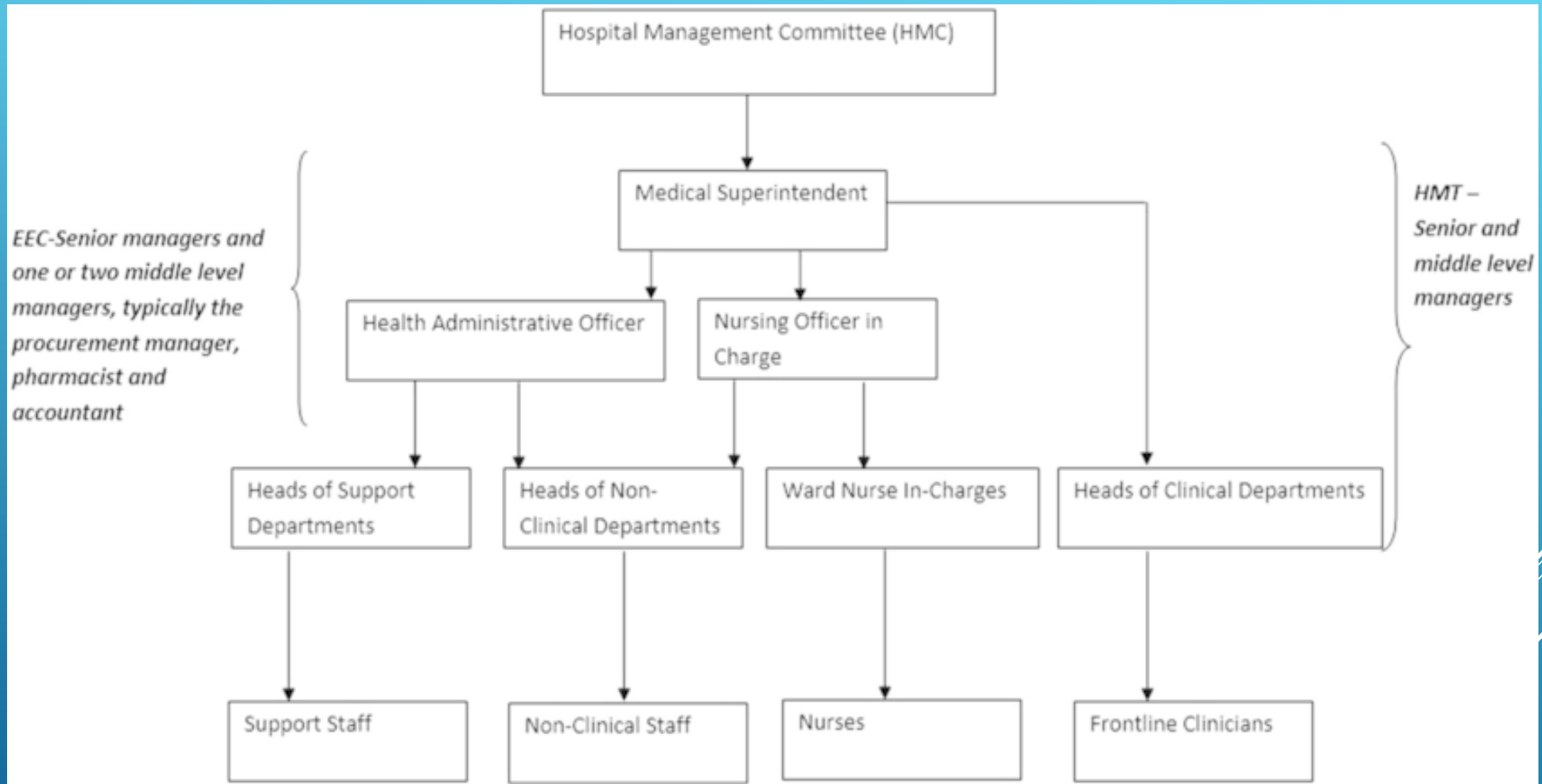


Figure 1: Ranthambore Savika Hospital Organogram

PROBLEM STATEMENT

A major issue related to current BMW management in many hospitals is that hospitals are disposing of waste in a haphazard, improper and indiscriminate manner. Lack of segregation practices, result in mixing of hospital wastes to general waste making the whole waste stream hazardous. Inappropriate segregation ultimately results in an incorrect method of waste disposal.

Inadequate BMW management thus will cause environmental pollution, growth and multiplication of vectors like insects, rodents and worms and may lead to the transmission of disease like typhoid, cholera, hepatitis and AIDS through injuries from syringes and needle contaminated with human. Various communicable disease which spread through water, sweat, blood, body fluids and contaminated organs, are imported to be prevented.

OBJECTIVES

- To assess the levels of knowledge, attitudes and practices among doctors, staff nurses, laboratory technicians and house-keeping staff in the Ranthambore Savika hospital.
- To assess the gaps in knowledge, attitudes and practices among these health care workers in the Ranthambore Savika hospital.

PROCESS

This observational and cross-sectional study was conducted among all the health care workers at Ranthambore Savika Hospital from 19th feb to 7th May 2019. A total of 120 health care workers consented to participate in the study which consisted of 67 nursing staff, 23 doctors, and lab technicians (16), Group IV employees (14) and interviewed using a structured questionnaire in the Hindi and English language. Various information on knowledge, attitude and practice of biomedical waste management were elicited from the study group. The data analyzed using percentage method.

METHODOLOGY

Source of data - Data was collected by through structured questionnaire consist 40 question on knowledge, attitude and practice of BMW management.

Study type – observational and cross sectional study

Study duration – 19th feb to 7th May 2019

Study area – Ranthambore Savika Hospital, Sawai madhopur Rajasthan

Sample size – 120(all) participants including doctors, staff nurses, laboratory technicians and class IV employees.

Analysis plan – analysis with tabulation and graphical representation

ANALYSIS OF THE STUDY

Table :2- Knowledge of BM waste generation, hazard and legislation among the healthcare workers

Knowledge of BMW generation, hazards and legislation	Doctors	Nurses	Group VI employee	Lab technician
Know about BMW generation and legislation?	23(19.1%)	66(98.5%)	11(78.5%)	16(100%)
Agency(ies) regulates waste generated at health care facilities? State/Private	23(19.1%)	62(S) (92.5%)	6 (S) (42.8%)	10(S) (62.5%)
It is important to know about BM waste generation, hazards and legislation?	23(19.1%)	67(100%)	10(71.4%)	16(100%)
Biomedical Waste (Management & Handling) Rules were first proposed in 1998	18(15%)	64(95.5%)	4(28.57%)	12(75%)
Amendments to the Biomedical Waste (Management & Handling) Rules were made in 2016	23(19.1%)	53(79.1%)	1(7.14%)	4(25%)
Which statement describes one type of BM waste: Waste that is saturated to the point of dripping with blood or body fluids contaminated with blood.	23(19.1%)	67(100%)	10(71.4%)	10(62.5%)
According to the Biomedical Waste (Management & Handling) Rules, waste should not be stored beyond: 48hours	22(18.3%)	66(98.5%)	1(7.14%)	3(18.7%)
One gram of mercury is enough to contaminate the following surface area of a lake: 20acres	9(7.5%)	32(47.7%)	0(0%)	1(6.25%)
Who regulates the safe transport of medical waste? Pollution Control Board of India	17(14.1%)	48(71.6%)	6(42.8%)	5(31.25%)
Do you need a separate permit to transport biomedical waste? Yes	21(17.5%)	62(92.5%)	9(64.2%)	12(75%)

Among 120 health care workers, a total of 120 were consented to participate in the study, of which 67 were nursing staff, 17 doctors, 6 house surgeons, 14 Class IV employees and 16 were laboratory technicians.

96.6% (116) knew about BM waste Generation and legislation and knew that it is important to know about the BMW generation, hazardous and legislation. 81.7% (98) knew that biomedical waste management and handling rules promulgated in the year 1998, of which (64) nursing staffs, (18) doctors, (4) Class IV employees and (12) lab technicians correctly answered, which show that nurses are more aware of rules than doctors and others. (81) correctly answer that amendments to BMW (Management & Handling) Rules were made in 2016, the result show that doctors are more aware of update than others departments. (92) correctly opined that biomedical waste should not be kept at hospital setting beyond 48 hrs, of which (66) nursing staffs, (22) doctors, (1) class IV employee and (3) were lab technicians respectively. (42) were know that 1gram mercury is enough to contaminate the following surface area of a lake: 20acres. (76) knew that pollution control board will regulate biomedical waste management and handling practices, of which (48) nursing staffs, (17) doctors, (6) class IV employee and (5) were lab technicians.

TABLE- 3: Level of awareness on BMW management practice among health care workers:

Level of Awareness	Doctors	Nursing staff	Group IV employees	Lab Technician
Do you know about Colour-coding segregation of BM waste?	23(100%)	67(100%)	8(57.14%)	11(68.7%)
Do you follow Colour-coding for BM waste?	23(100%)	67(100%)	10(71.42%)	14(87.5%)
Is the waste disposal practice correct in your hospital?	23(100%)	66(98.5%)	6(42.8%)	16(100%)
Objects that may be capable of causing punctures or cuts, that may have been exposed to blood or body fluids including scalpels, needles, glass ampoules, test tubes and slides, are considered biomedical waste. How should these objects be disposed of? Sharps Container	19(82.6%)	64(95.5%)	2(14.2%)	7(43.7%)
Documents with confidential patient information are to be disposed of into the paper recycling bins. True/False	23(100%)	67(100%)	12(85.7%)	13(81.25%)
The Colour code for the BM waste to be autoclaved, disinfected is: Red, Blue and White	16(69.5%)	53(79.1%)	4(28.5%)	2(12.5%)
The approximate proportion of infectious waste among total waste generated from a health care facility is: 10-20%	7(30.4%)	32(47.7%)	5(35.7%)	3(18.75%)
The Colour code for disposal of normal waste from the hospital is: Black	20(86.9%)	66(98.5%)	13(92.8%)	6(37.5%)
All the following steps should be followed after an exposure with infected blood/body fluid and contaminated sharps EXCEPT: Pricked Finger should be kept in antiseptic lotion.	23(100%)	50(74.6%)	1(7.14%)	3(18.75%)
All of the following statements about hazardous waste containers are true, except for: Any type of container, including food containers, can be used to contain hazardous waste.	23(100%)	62(92.5%)	10(71.42%)	4(25%)

76.6% (92) correctly answer that Objects that may be capable of causing punctures or cuts, that may have been exposed to blood or body fluids including scalpels, needles, glass ampoules, test tubes and slides, are considered biomedical waste. How should these objects be disposed of? Sharps Container 39.1% (47) correctly opined that around 10-20% of the waste generated from the hospitals is infectious waste, in that (32) nursing staffs, (7) doctors, (5) Group IV employee and (6) were lab technicians. Overall the percentage shows that nursing staff is more awareness about BMW management than any other departments.

Majority of them 87.5 % (105) opined that general waste generated at hospital settings should be disposed in Black colour bins of which (66) nursing staffs, (13) Group IV employees, (20) doctors, and (6) laboratory technicians opined correctly. (table-2).

TABLE -4: Attitude / Behaviour assessment towards BM waste:

Attitude/behaviour assessment	Doctors	Nurses	Class VI employee	Lab technician
Safe management of health care waste is not an issue at all.	23(yes) (100%)	67(100%)	13(92.8%)	16(100%)
Waste management is team work/no single class of people is responsible for safe management	21(91.3%)	65(97.01%)	14(100%)	10(62.5%)
Safe management efforts by the hospital increase the financial burden on management.	23(100%)	64(95.5%)	10(71.42%)	16(100%)
Safe management of health care waste is an extra burden on work. Yes	6(26.08%)	26(38.8%)	13(92.8%)	13(81.25%)
Do you think that the hospital should organize workshop on BMW management to upgrade existing knowledge about biomedical waste management? Yes	21(91.3%)	65(97.01%)	14(100%)	6(37.5%)
Will you like to attend voluntarily Programme that enhance and upgrade your knowledge about waste management?	9(39.1%)	61(91.04%)	11(78.5%)	13(81.25%)
Do you think that infectious waste should be sterilized from infections by autoclaving before shredding and disposal?	20(86.9%)	49(73.1%)	3(21.4%)	2(12.5%)
Do you think that an effluent treatment plant for disinfection of infected water should be set up in Hospital?	23(100%)	67(100%)	14(100%)	15(93.7%)
Do you think it is important to report to the Pollution Control Board of India about a particular hospital if it is not complying with the guidelines for biomedical waste management?	22(95.6%)	48(71.64%)	9(64.2%)	5(31.25%)
Will you like to attend voluntarily Programme that enhance and upgrade your knowledge about waste management?	23(100%)	62(92.5%)	14(100%)	12(75%)

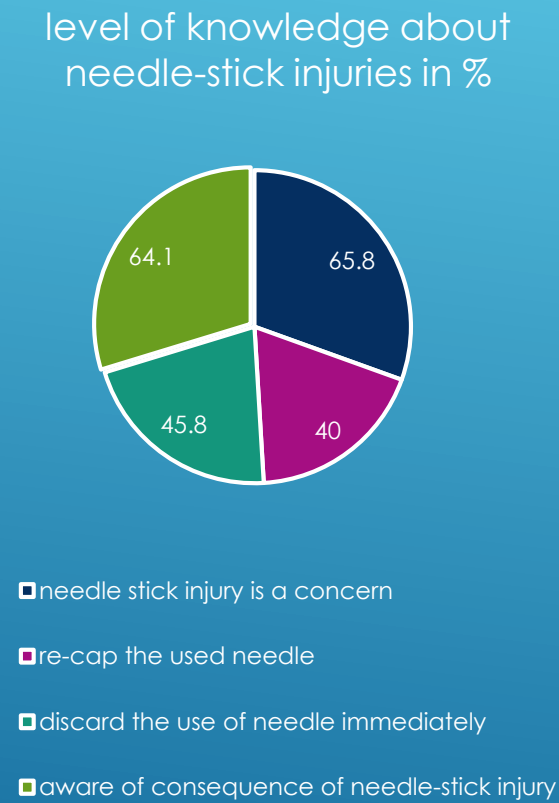
Majority of healthcare workers opined that Safe management of health care waste is not an issue at all 119(99.1%), Waste management is team work which is responsible for safe management 110(91.6%), 113(94.1%) think that Safe management efforts by the hospital increase the financial burden on management. 94(78.4%) like to attend voluntarily Programme that enhance and upgrade their knowledge about waste management.

84(70%) think it is important to report to the Pollution Control Board of India about a particular hospital if it is not complying with the guidelines for biomedical waste management in which Lab technicians are least interested 5(4.1%).

74(61.7%) think that infectious waste should be sterilized from infections by autoclaving before shredding and disposal but from table-3, Lab technicians and Group IV employees are not showing positive attitude towards this.

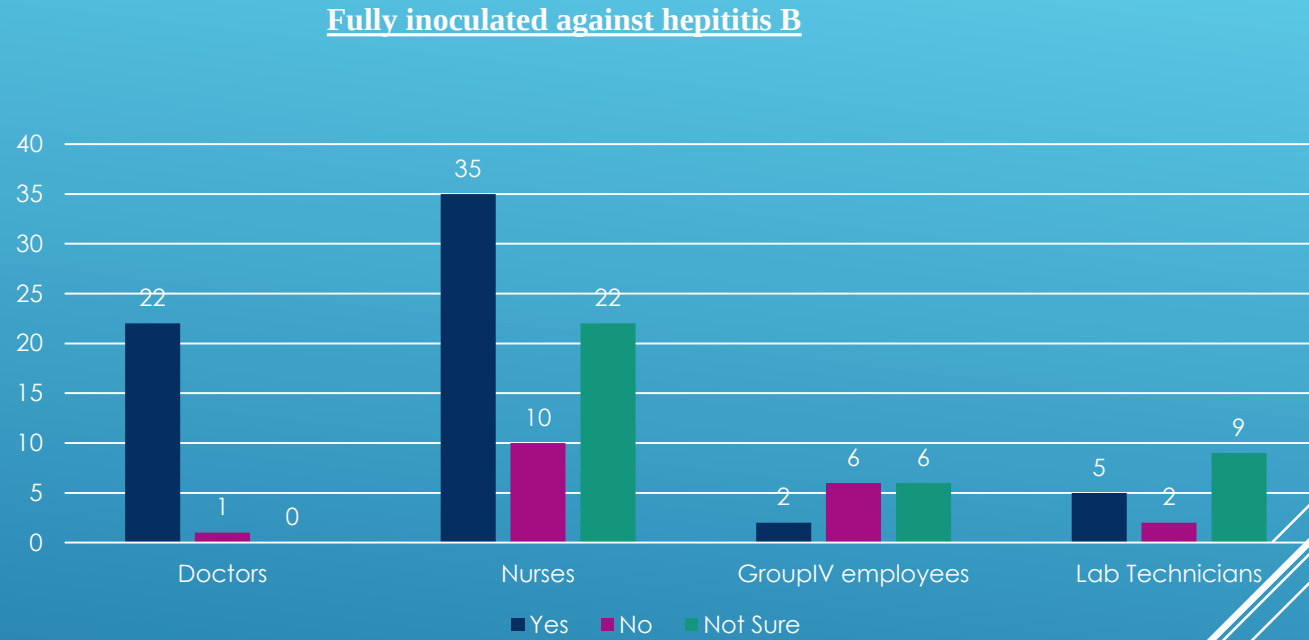
106(88.4%) think that the hospital should organize workshop on BMW management to upgrade existing knowledge about biomedical waste management.

Figure-2: Level of knowledge in healthcare workers on needle-stick injuries



- 65.8% Healthcare think that needle stick injury is a concern.
- 40% healthcare workers including doctors nursing staff, lab technicians and Group IV employee are re-capping used needles and 45.8% discard the used needle immediately.
- 64.1% healthcare workers are aware of consequence of needle stick injury.

Figure-3 fully inoculated against hepatitis B



Fully immunised 35 were nursing staff, (5) laboratory technicians, (2) Class IV employees and (22) doctors, respectively. From the above graph, majority Group IV employees, Lab Technicians and nursing staff is not immunized against hepatitis B or they didn't recognise when they get vaccination against Hepatitis B.

CONCLUSION

1. Knowledge regarding the BMW generation, hazardous, rules, and disposal of biomedical waste management is more among nursing staff and Doctors compared to other health care workers.
2. By observation, housekeeping staff is not doing practice according to BMW guidelines.
3. The attitude towards BMW management of housekeeping staff was low. Higher practice found in the house keeping staff and nursing staff in the present study may be due to higher responsibilities assigned to them in handling of BMW. The practice of recapping the needles was very low across cadres.
4. By observation, the BMW waste are stored in hospital more than 48hours because of lack of transport.

RECOMMENDATION

1. Regular training programme should be organised for the housekeeping staff and Lab technicians as well as for other healthcare staff to enhance the knowledge about the BMW.
2. Housekeeping staff should wear protective devices such as gloves, face masks, gown, while handling the waste. Biomedical waste label should be put on waste carry bags and waste carry trolley and also poster has put on the wall adjacent to the bins (waste) giving details about the type of waste that has to dispose in the baggage as per biomedical waste management rule. Carry bags also have the biohazard symbol on them.
3. Strong leadership Skills are essential for implementation of BMW rules and also need to increase its competence so that monitoring is regular.
4. Alternatives transport must be used to collect the waste in case the driver is not present or bad condition of vehicles.

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Thank You

A close-up photograph of a computer keyboard. The central focus is a bright blue rectangular key with rounded corners, featuring the words "Thank You" in a bold, white, sans-serif font. The key is slightly raised and has a subtle shadow beneath it. Surrounding this key are several standard white keys. To the left, a key with a double quote symbol (") is visible. Above the blue key, a key with a closing square bracket (]) and a curly brace (}) is partially seen. To the right, a key with a forward slash and underscore (/) is visible. The lighting is soft, creating gentle highlights and shadows on the keys' surfaces.