

Assessment of the knowledge, attitude and Practices regarding Biomedical Waste Management amongst the Medical and Paramedical Staff in Tertiary Health Care Centre

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Abstract- Biomedical waste also known as infectious waste or medical waste. This study was therefore, conducted to understand the awareness amongst the employees as regards to biomedical waste management practices to study the knowledge, attitude and practice of the respondent. The hospital chosen for the study is a premier tertiary level institute in India. This cross sectional study was carried out in Department of Obstetrics and Gynaecology, CSM Medical University, (Erstwhile KGMU) Lucknow. The study was conducted in 120 hours. 10 doctors and 20 nurses were included in the study. Two groups were made: Group A- Nursing staff (20 nurses, all females) Group B- Doctors (10 Junior Doctors, 8 from Obstetrics and Gynaecology, 2 from Paediatrics). 30% of the doctors and 20% nursing staff have more than 70% knowledge about biomedical waste management. 100% doctors and 60% nurses have a positive attitude towards biomedical waste management.

Index Terms- Biomedical waste management, Attitude, Knowledge, Practice.

I. INTRODUCTION

Biomedical waste also known as infectious waste or medical waste, is defined as any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining there to or in the production or testing of biological and including categories mentioned in schedule I.

The large volumes of health care waste if not managed properly can lead to a global hazard. This could not only lead to the spread of highly contagious diseases but the hazardous chemical waste produced by the use of items can cause considerable damage to the ecosystem and the environment.

Thus health care waste, if not managed properly will be a cause in ushering of “disasters in making” by causing air, water, soil pollutions and helping in emergence of antibiotic resistant strains of microbial ingress of pollutants in the food chain and thus becoming a part of human consumption.

The scenario is no different in any metropolitan city of India. Therefore, the Department of Hospital Administration of a super-specialty tertiary hospital in Delhi designed a hospital

waste management manual to create awareness amongst the waste generators. To ensure implementation of the waste management system in accordance with the biomedical waste (Management and Handling) rules, 1998, the department of Hospital administration circulated manuals and memorandum amongst the concerned staff. However, the improper practice of segregation at the site of origin has been observed which causes mixing of infectious and non-infectious waste.

As such, there is an urgent need to demonstrate and promote best practices and techniques for health care waste management in countries that have not yet fully operationalized, and to facilitate operationalization by developing appropriate and affordable infectious waste treatment technologies that avoid formation and release of persistent organic pollutants (POPs) where none are yet available.

There is also growing concern about the spread of HIV, Hepatitis and other infectious disease that can be caused by needle-stick injuries and other forms of contagion that can result from the improper management of biomedical wastes by hospitals and other health care institutions.

As health systems are strengthened and health care coverage expanded in developing countries through efforts to meet the Millennium Development Goals, the releases of persistent organic pollutants (POPs) and other persistent toxic substances (PTS) to the environment can increase substantially. This is often an unintended consequence of choices in materials and processes that seek to improve health outcomes.

India already has biomedical waste management regulations including a ban on the incineration of biomedical waste with the exception of human and animal waste at the Union level, but their implementation and enforcement throughout the country has been inconsistent.

II. EFFECTS OF BIOMEDICAL WASTE ON HEALTH

Sharps: The reuse of syringes: Worldwide, an estimated 10 to 20 million infections of Hepatitis B and C and HIV occur annually from the reuse of discarded syringe needles without prior sterilization.

Accidental Contacts: This happens through contaminated air, water or food, by accidental contact with soiled dressings or by

injury from sharps. People are caught unawares because someone carelessly threw hazardous waste into the municipal bins and someone who had to treat the wastes and render them non-infectious and safe, did not do so.

Infections and diseases: Serious diseases may develop in health-care personnel, waste handlers, patients and the general public. In any healthcare establishment, nurses and house-keeping personnel are the main groups at risk of injuries, annual injury rates are 1020 per 1000 workers.

Highest rates of occupational injury among all workers who may be exposed to health-care waste are reported by cleaning personnel and waste handlers, the annual rate in USA is 180 per 1000.¹

There are reported cases of staphylococcal bacteraemia and endocarditis among housekeeping staff after a needle injury. Risk of infection of hepatitis B after needle stick injury-chances of susceptible health care workers (HCWs) is 6-30% after single needle stick exposure.

In USA, in June, 1994, 39 cases of HIV infection were recognized by the centers for disease control and prevention as occupational infections with the following pathways of transmission:

32 from hypodermic needle injuries.

- 1 from blade injury,
- 1 from glass injury (broken glass from a tube containing infected blood)
- 1 from contact with non-sharp infectious item,
- 4 from exposure of skin or mucous membranes to infected blood.

By June, 1996 the cumulative recognized cases of occupational HIV infection had risen to 51. All cases were nurses, medical doctors, or laboratory assistants. HCWs who are immunized are not at risk. Post exposure prophylaxis (PEP) with HB Ig and HB vaccine is 90% effective. However, Preexposure prophylaxis with HB vaccine is essential.¹ There are no vaccines against HIV. Post exposure prophylaxis with a two drug combination has to be administered within 6-12 hours for 80% effectiveness.

III. DOCUMENTED NEEDLE STICK INJURIES IN CMC VELLORE, INDIA

A total of 347 injuries occurred, mainly due to improper disposal of needles recapping and carelessness during use. The percentage of injuries attributed to improper disposal fell from 69.2% in 1995 to 38.5% in 1996 (after the education programme)².

A further decrease was noted after the additional introduction of small sharps containers. In 1995, 73% of injuries involved housekeeping staff, this fell to 12% in 1998.

It is recommended that all healthcare institutions should have a system of documenting needle-stick injuries and take measures to decrease their incidence (Richard et al, 2001).

According to WHO, HBV can survive in dry condition for a week or more. Worldwide more than 8 million Hepatitis B, more

than 2.3 million Hepatitis C and more than 8000 cases of HIV infections are estimated to occur yearly from the reuse of syringe and needles without sterilization.³ Thus there is need for proper health care waste management to ensure the safety of health care workers and the community at large.

This study was therefore, conducted to understand the awareness amongst the employees as regards to biomedical waste management practices to study the knowledge, attitude and practice of the respondent. The hospital chosen for the study is a premier tertiary level institute in India. Therefore, the current status of employee's awareness regarding biomedical waste management will help the authorities to develop the strategy for improving the situation in future. This study was designed to assess the knowledge, attitude and practices amongst the medical and paramedical staff of CSM Medical University, Lucknow. To improve the Biomedical Waste management training programme depending on the outcome. To recommend for improvisation of Biomedical waste management practices within the institution.

Methodology

- The study was conducted in the Department of Obstetrics and Gynaecology of CSM Medical University, Lucknow.
- This cross-sectional study was carried out in the month of March 2011.
- KAP (Knowledge, attitude and practices) study was conducted on the Medical and Paramedical staff of OTs and surgical wards. Knowledge and attitude of the medical and paramedical staff will be assessed towards the waste management practices.
- The study was conducted in 120 hours. 10 doctors and 20 nurses were included in the study. Two groups were made:
 - **Group A-** Nursing staff (20 nurses, all females)
 - **Group B-** Doctors (10 Junior Doctors, 8 from Obstetrics and Gynaecology, 2 from Paediatrics)
- The tool used for collection of data was a structured questionnaire which has a set of 3 questions concerning the knowledge, attitude and their practices on the subject.
- There were 11 such sets of questions.
- Information was gathered from the doctors and the nursing staff through this structured questionnaire.

Results:
Group A (Nurses, N=20) Data observed

S. No.	Code	Knowledge*				Attitude ⁺			Practices @		
		0	1	2	% ¹	0	1	% ²	0	1	% ³
1	1	0	4	7	64	1	10	91	3	8	73
2	2	1	3	7	64	1	10	91	3	8	73
3	3	1	4	6	55	0	11	100	4	7	64
4	4	2	1	8	73	3	8	73	3	8	73
5	5	1	3	7	64	1	10	91	2	9	82
6	6	1	2	8	73	1	10	91	2	9	82
7	7	2	2	7	64	3	8	73	2	9	82
8	8	1	3	7	64	0	11	100	3	8	73
9	9	1	5	5	45	0	11	100	4	7	64
10	10	0	5	6	55	0	11	100	3	8	73
11	11	2	3	6	55	1	10	91	4	7	64
12	12	0	3	8	73	0	11	100	3	8	73
13	13	2	3	6	55	1	10	91	5	6	55
14	14	0	5	6	55	0	11	100	3	8	73
15	15	1	3	7	64	6	5	45	4	7	64
16	16	1	2	28	73	5	6	55	3	8	73
17	17	1	3	7	64	7	4	36	2	9	82
18	18	1	3	7	64	4	7	64	3	8	73
19	19	3	2	6	55	6	5	45	4	7	64
20	20	1	3	7	64	7	4	36	4	7	64

*0- No Knowledge; 1-Inadequate knowledge, 2- Adequate knowledge
 + 0- Positive attitude absent, 1- Positive attitude present
 @0- don't follow the right practices, 1- follow the right practices
 %¹: Percentage of adequate knowledge
 %²: Percentage of positive attitude
 %³: Percentage of correct practices

Group B (Doctors): Data Observed

S. No.	Code	Knowledge*				Attitude ⁺			Practices @		
		0	1	2	% ¹	0	1	% ²	0	1	% ³
1	21	0	2	9	82	0	11	100	0	11	100
2	22	0	2	9	82	1	10	91	0	11	100
3	23	2	2	7	64	0	11	100	2	9	82
4	24	3	3	5	45	1	10	91	4	7	64
5	25	0	6	5	45	0	11	100	1	10	91
6	26	3	3	5	45	0	11	100	4	7	64
7	27	3	2	6	45	1	10	91	3	8	73
8	28	3	2	6	55	0	11	100	4	7	64
9	29	1	2	8	73	0	11	100	1	10	91
10	30	4	2	5	45	0	11	100	2	9	82

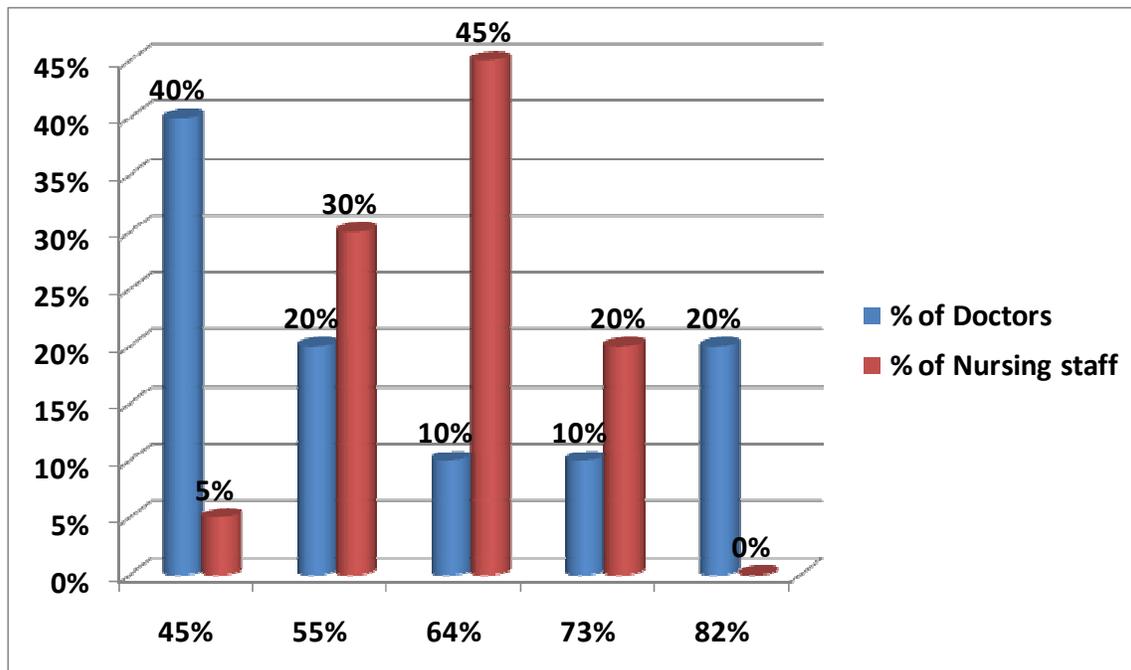
*0- No Knowledge; 1-Inadequate knowledge, 2- Adequate knowledge
 + 0- Positive attitude absent, 1- Positive attitude present
 @0- don't follow the right practices, 1- follow the right practices
 %¹: Percentage of adequate knowledge
 %²: Percentage of positive attitude
 %³: Percentage of correct practices

Analysis

Knowledge of the respondents:

The level of knowledge amongst Doctors and the Nursing staff.

Sl. No.	% of Adequate knowledge	% of Doctors	% of Nursing staff
1	45%	40%	5%
2	55%	20%	30%
3	64%	10%	45%
4	73%	10%	20%
5	82%	20%	0%



Percentage of adequate knowledge
 X Axis- Percentage of adequate knowledge.
 Y Axis- Percentage of respondents.

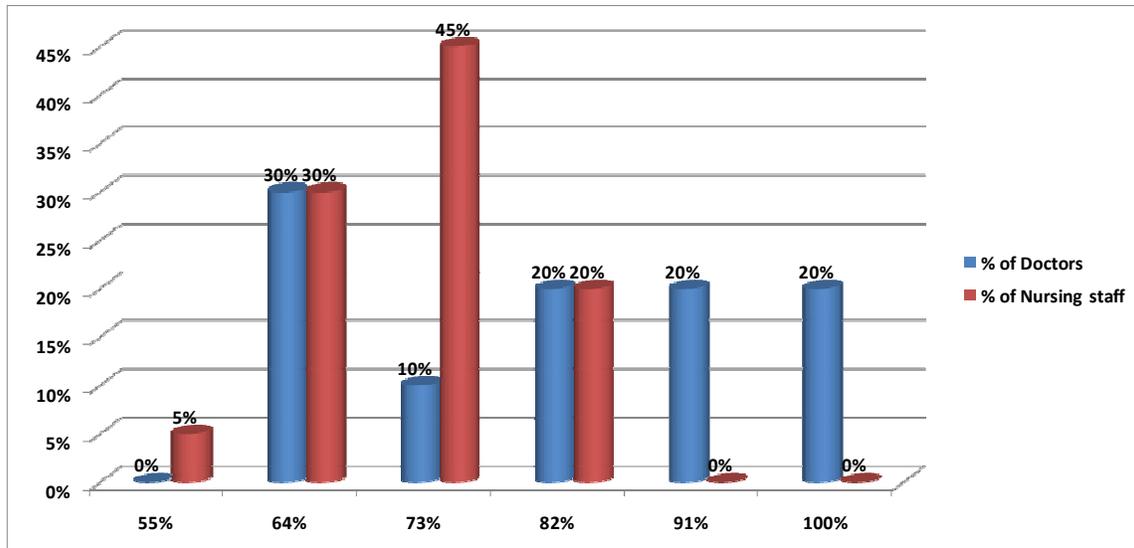
Attitude of the Respondents:

- 100% doctors have positive attitude towards waste management.
- 60% nurses have positive attitude towards waste management.

Practices

The degree of correct practices being followed by Doctors and the Nursing staff.

Sl. No.	% of Correct Practices	% of Doctors	% of Nursing staff
1	55%	0%	5%
2	64%	30%	30%
3	73%	10%	45%
4	82%	20%	20%
5	91%	20%	0%
6	100%	20%	0%



X-Axis – Percentage of correct practices.
Y- Axis- Percentage of respondents.

IV. DISCUSSION

The participants involved in this study were assessed for knowledge, attitude and practice of BMW management. Interestingly, this study revealed that the awareness and proper practice of biomedical waste management was not satisfactory. Our study showed that for:

Knowledge

- The majority of staff (Doctors and Nurses) were conscious of the measures for safe collection and final disposal of BMW, but only:
 - 30% of the doctors and
 - 20% nursing staff have more than 70% knowledge about biomedical waste management.
 - This shows that the people with higher education have more awareness about the environmental issues, national and International activities on biomedical waste management and the rules prescribed there in.
 - These findings are in similar to the study conducted by S. Saini et al.⁴

Attitude

Almost whole of the staff (Doctors and Nurses) showed a positive attitude towards the need for measures for safe collection and final disposal of BMW and supported the ongoing efforts.

- 100% doctors and
- 60% nurses have a positive attitude towards Biomedical waste management.

These findings are in contrast to the study conducted by S. Saini et al.⁴

Practices:

70% of the doctors and 65% of the nurses were practicing more than 70% of the correct practices as per the norms of the university.

These findings are in support to the Pandit et al.⁵ This study reported that proper hospital waste management was not being practiced.

The comparison of Knowledge, with Attitude and practice of groups shows that the people with high education, as doctors have better knowledge, attitude and practices of BMW management. This can be attributed to their accountability and commitment in patient and ward management.

Although nursing staff have relatively less knowledge about the BMW management rules, but a good percentage of this category has a positive attitude and follow the correct practicing habits.

Findings similar to that in our study were observed by Rao et al.⁶ In this study the need to periodically acquaint the participants with the updated BMW management and handling rules was felt.

V. CONCLUSION (RECOMMENDATIONS)

Based upon the observations of our study we recommend that:

All the employees of various designations are required to be aware of proper collection, segregation, and transport to the final disposal point.

A single training session is not sufficient for effective and complete practice of biomedical waste management.

There is a need for intensive training programs at regular time interval to repeatedly train and re-train all the staff with special importance to the new comers and to periodically acquaint them with updated BMW management.

There is also a need for orientation programs for newcomers to understand the hospital function and the proper collection and transport of hospital waste.

We recommend that strict supervision and surveillance should be followed in day-to-day hospital waste management activities.

The entire waste management practices should be a part of total hygiene practice of the society rather than confining to hospital and health facility.

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