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A Study of Knowledge Attitude and Practices of Biomedical Waste Management at a Tertiary care Hospital, Kolkata

Authors

**Dr.Reena Ray (Ghosh)¹, Dr.Tamal Kanti Ghosh², Dr.Narendra Nath Hait³
Dr. Rathindra Nath Ray⁴, Sujit Mishra⁵**

¹Assistant Professor, Department of Microbiology, R.G.Kar Medical College

²Principal, Midnapore Medical College

³Assistant Professor, Department of G&O, Midnapore Medical College

⁴RMO Cum Clinical Tutor, Department of G&O, Calcutta National Medical College

⁵MCA, Midnapore Medical College

Corresponding Author

Prof. (Dr.) Tamal Kanti Ghosh

Principal

Midnapore Medical College, 5. Vidya Sagar Road, Paschim Midnapore, WB, Pin 721101,

Email: ghoshtamal@hotmail.com

ABSTRACT

Despite the statutory provision of Biomedical Waste Management, practice in Indian Hospitals has not achieved the desired standard even after years of enforcement of the law. In view of this, the present study on Knowledge, Attitude and Practice (KAP) on the subject was carried out in a tertiary level teaching hospital, School of Tropical Medicine. The hospital under scrutiny for KAP is a 150 bedded super specialty teaching hospital and research centre with latest facilities. The Institute has a work force of 330 doctors, nurses and other support staff. The study is based on a questionnaire designed to understand the KAP of the staff involved in direct patient care facility regarding the Biomedical waste management practices. The KAP study enrolled 140 respondents, representing doctors and nurses from selected patient care areas; Here, a significant gap was observed in the knowledge, attitude and practice of the consultants, residents and scientists with regard to biomedical waste disposal, to their knowledge/understanding on the subject. The definite apathy of intellectuals towards the operational aspects of the BMW management system can be

attributed to the tubular vision of the professionals that is mainly focused on the curative aspects of the patient care services, with lack of understanding towards the role of support services in the overall context of comprehensive health care delivery. Nursing professionals on the other hand, had an edge over the clinicians as far as attitude and practice of BMW mgmt. is concerned although their knowledge on the subject was relatively low. This can be attributed to their accountability and commitment in ward management and the predominance of female workforce, which is by and large more disciplined. The para-medical staff including laboratory and housekeeping staff had least understanding on the subject, but had higher positive attitude with more practical habits, which may be attributed to strict instructions by authorities and fear for any punitive action.

INTRODUCTION

Hospital is one of the complex institutions which are frequented by people from every walk of life in the society without any distinction between age, sex, race and religion. This is over and above the normal inhabitants of hospital i.e. patients and staff. All of them produce waste which is increasing in its amount and type due to advances in scientific knowledge and is creating its impact. The hospital waste, in addition to the risk for patients and personnel who handle these wastes poses a threat to public health and environment. The air water and the land are today becoming disposable sinks for these waste(1)

The last decade witnessed a significant increase of public concern regarding Medical Waste disposal. This was fuelled by reports of “beach washing” of medical waste on the coasts of Florida and Gulf, and the “recycling” of disposable articles in developing countries (2). The reports and figures available from developed countries indicate that approximately 1-5 kg of waste is generated per bed per day, with substantial inter country and inter specialty differences (3). The data available

from developing countries also indicate that the(range is essentially similar but the figures are on a lower side with 1-2 kg per day per bed. In India, it is estimated to be 2.0 kg/ bed/ day (4) .The concern regarding the medical waste is mainly due to the presence of pathogenic organisms and organic substances in hospital solid wastes in significantly high concentrations. The substantial number of organisms of human origin in solid waste suggests the presence of virulent strains of viruses and pathogenic bacteria in undetected numbers (5). Therefore improper handling of solid waste in the hospital may increase the airborne pathogenic bacteria, which could adversely affect the hospital environment and community at large. (6) Improper Hospital Waste Management has serious impact on our environment (7). Apart from risk of water, air & soil pollution, it has considerable impact on human health due to aesthetic effects. It is the man behind machines / technology that matters. Therefore, a number of national and local seminars, workshops and symposia have been organized by number of

Institutions to develop methodology for BMW mgm and it's understanding (8). However, ground realities are far from ideal and need a lot of effort and commitment at the top level for effective implementation. The current scenario in the country reveals partial or no segregation at the time of generation, which at times is done by the contractors, or the rag pickers.

The scenario is no different in a metropolitan city of India. The Dept. of Hospital administration of a supers pecialty 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 Bio-Medical waste (Management and Handling) rules, 1998, the dept. of hospital administration circulated manuals and memoranda 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. A study was therefore, conducted to understand the awareness amongst the employees as regards to BMW management practices to study the Knowledge, Attitude and Practice of the respondent. The School of Tropical Medicine& Carmichael Hospital for Tropical diseases Kolkata which is a premier tertiary level Institute in India was chosen for the study . Therefore, the current status of employee's awareness regarding BMW management will help the authorities to develop the strategy for improving the situation in future.

BIO-MEDICAL WASTE

Bio - Medical waste is "Any waste which, is generated during the diagnosis, treatment or immunisation of human beings or animals or in any research activities pertaining thereto or in the production or testing of biologicals". The basic elements is to recognize the waste, identify where waste is generated and determine the cause of generation, plan disposal of the waste in a scientific manner so as to render it environmentally non-hazardous and eliminate the source of infection (6).

Biomedical waste includes infectious and non-infectious waste. Infectious waste includes pathological waste, cotton, dressing, used needles, syringes, scalpels, blades, glass, etc. and non-infectious waste includes general waste from the kitchen / canteen, packaging material. When the concern is so much about the medical waste there is a need for such a ruling, the health care workers ought to understand what is actually biomedical waste and the waste connected with the hospital. Hospital waste refers to all waste, biological or non-biological that is discarded, and is not intended for further use in a hospital. According to a WHO report around 85% of the hospital wastes are actually nonhazardous, 10% are infective pharmaceutical and radioactive (9,10) (hence, hazardous), and the remaining 5% are non infectious but hazardous (chemical).

MATERIALS AND METHODS

Statement of Problem

Now a day's handling and disposal of biomedical waste has emerged as a major problem in India. The inadequate handling and disposal of healthcare waste may lead to transmission of infectious diseases. The groups most at risk are Doctors, nurses, paramedical staff, waste management operators, and scavengers. The management of hospital waste requires diligence and care from a chain of people, starting with the healthcare staff, continuing through collection workers, and finishing with disposal operators. If any of these lack knowledge or are careless in their work, or allow scavengers or children access to the waste, the chain would be broken and dangers of infection would follow. The present survey is conducted to study the awareness of Doctors, nurses, Medical Lab technologists and housekeeping staff, about biomedical waste management.

Survey

The awareness of Biomedical Waste (BMW) Management among Doctors, nurses, paramedical staff, General duty attendants (GDAs) and sweepers at the School of Tropical Medicine Kolkata, WB, were studied using an objective questionnaire to be completed by them and also by direct observation. The analysis of the questionnaire was based on the correct answers (positive response) given by them.

Specific Objectives-

- a) To understand the routine activities in hospital waste management.

- b) To assess the Knowledge on biomedical waste management among Doctor, Nurses, Medical Technologists, House Keeping staff i.e. attendants and sweeper at School of Tropical Medicine Kolkata.
- c) Training required (if any) to any particular group of paramedical staff of the hospital
- d) Recommendation

Research Instruments

The research instrument used for the study was a structured Interview Schedule. It consisted of 20 questions and all are objective type of question. This is so done as not to disturb them in their busy schedule. For each question there are four answers out which one of the most appropriate answers has to tick marked by the staff.

Universe of Study

The universe of study is Staff in School of Tropical Medicine Kolkata Doctors(100)(Director 01 Medical Supdt-cum Vice Principal 01(one),No of Medical Teacher 68, Residents 26, medical officers 04) ,Nurses 28 , Medical Lab Technologist 32, Gen. Duty Attendants 140 and Sweeper 30.

Sampling Method

Stratified Sampling- Stratified sampling method is used in this study. In this method, we first divide the population that is in to different sub populations. In this study the sample population is sub divided in to Doctors, Nurses ,Medical Technologists, Research Scholars attendants and sweepers

Sample Size

Out of total 330 staff members in the hospital 140 personnel involved in the study. As the research period was only three months, it was not practical to collect the responses from all the members in the hospital. Therefore, a sample size of 140 staff involved in handling of bio medical wastes on regular basis was selected for the study.

Collection of Data

Primary and Secondary data was used in this study.

Primary, Data -In this study the primary data used are observation, personal interviews, and interview schedules.

Secondary Data- The data is collected from books, journals, magazines, and also from internet.etc

Analysis

The Interview schedule has questions. All questions are objective type questions. Each question has option of answers out of which one of the most appropriate answers has to be ticked by the staff.

Tools for Data Analysis

- Percentage analysis

Study Period : 1st October 2011 till 31st December 2011

Limitations:

As the time period is very limited, the study cannot be a full-fledged one. Large number of subjects could not be assessed

- Accuracy of the findings depends on the accuracy of the information.

- The study is based on the information received from the interview schedule.

Analysis and Interpretation

Analysis and interpretations of the data collected, to assess the awareness of employees about biomedical waste management. Analysis and interpretations of the data were based on the objectives of the study.

RESULTS & OBSERVATIONS

Table- I shows knowledge of respondents regarding Bio-Medical Waste (BMW) Management.

Doctors:

The knowledge of Doctors about the existence of BMW management rules was 90.47%, the awareness about spread of diseases by improper BMW management was 100%, but the knowledge about the storage and disposal time of BMW was very poor i.e, 47.65%. Awareness regarding BMW segregation was 71.42% . .

The Doctor group was further sub categorized into Medical teachers(Sr. Faculty), Residents and Medical officers It was observed that among the Residents the awareness regarding BMW rules the categories of waste was 44.44%. The knowledge of BMW rules in Medical officers was 50%, however the knowledge of BMW categorization was observed to be 100%.The over all positive response regarding Attitude and Practice of BMW management amongst the Doctors was 73.12% and 77.81% respectively(Table –II).

The attitude to follow BMW rules amongst Resident was similar to their knowledge i.e,

44.44% where as the regarding segregation of waste it was poor 33.33%. Only 27.77% Residents has apposite attitude about methods of BMW disposal.

Nurses:

The overall knowledge among Nursing staff regarding the BMW management (Table-I) was

98.21%, that is better in comparison to all other categories staff. The least knowledge (85.71%) was regarding the BMW storage time. The positive response and observation regarding their Attitude and Practice of BMW management was high 98.21% and 97.32% respectively (Table-II).

Table-I

Knowledge,Attitude and Practice of BMW MGT			
Respondents	Knowledge	Attitude	Practice
Doctors(n=40)	83.12	73.12	77.8
Nurses(=28)	98.2	98.21	97.32
Medical technology(n=32)	56.25	53.9	52.73
GDA(n=30)	31.66	26.25	23.75
Sweeper(n=10)	36.25	37.5	37.5

Table-II

Attitude of the Respondents: Different categories of Doctors

Respondents (Doctors)	Aware of existence of BMW management rules 1998	Know categories of waste	Know color coding system	Can identify biohazard symbol	Aware of methods of segregation	Aware that waste should not be stored for >48hrs	Know methods of waste disposal	Know diseases spread by improper waste management
Medical Teachers (n=18)	17 (94.44%)	17 (94.44%)	17 (94.44%)	18 (100%)	17 (94.44%)	14 (77.77%)	16(88.88%)	18(100%)
Residents (n=18)	6(44.44%)	8(44.44%)	16(88.88%)	6(33.33%)	6(33.33%)	8(44.44%)	5(27.77%)	18(100%)
Medical Officer (n=4)	2(50%)	4(100%)	4(100%)	4(100%)	3(75%)	2(50%)	3(75%)	4(100%)

Table-III Practice of for BMW Mgt in Staff (Positive response to Questionnaire)

Respondents	Awareness of BMW Mgt rules	Know categories of waste	Know color coding	Identify biohazard symbol	Aware of segregation	Aware waste should not be stored >48hrs	Know Methods of waste disposal	Know disease spread by BMW
Doctors (n=40)	75%	80%	85%	95%	75%	62.5%	50%	100%
Nurses (n=28)	100%	100%	100%	100%	100%	78.57%	100%	100%
MT (n=32)	10.71%	12.85%	14.27%	14.27%	14.27%	7.14%	11.42%	11.42%
GDA (n=30)	33.33%	33.33%	20%	16.66%	16.66%	16.66%	16.66%	26.66%
Sweeper (n=10)	40%	50%	40%	50%	20%	50%	20%	30%

Medical Laboratory Technologists (MT):

The overall positive response regarding knowledge of BMW Management among the M.Ts was 56.26% (Table). The awareness about the BMW rules was only in 62.5%, and that of BMW storage period was 37.57%. The positive response of questionnaire and direct observation regarding Attitude and Practice of BMW management was 53.90% and 53.73% respectively.

GDA (General Duty Attendant):

The overall knowledge about BMW management in this group was only 31.66%. Their knowledge about the categories of BMW, colour coding, segregation of biomedical waste was 33.33%. The attitude and practice of BMW management amongst the GDAs was 26.25% and 23.75% respectively.

Sweepers:

Amongst the sweeper categories the overall knowledge about BMW management was 36.25%. The awareness in context categories of

waste, color coding and storage of BMW was 50%. The knowledge regarding the Biohazard symbol was only in 20%. On questionnaire and observation, the attitude and practice of Biomedical waste management was found to be 37.50% respectively.

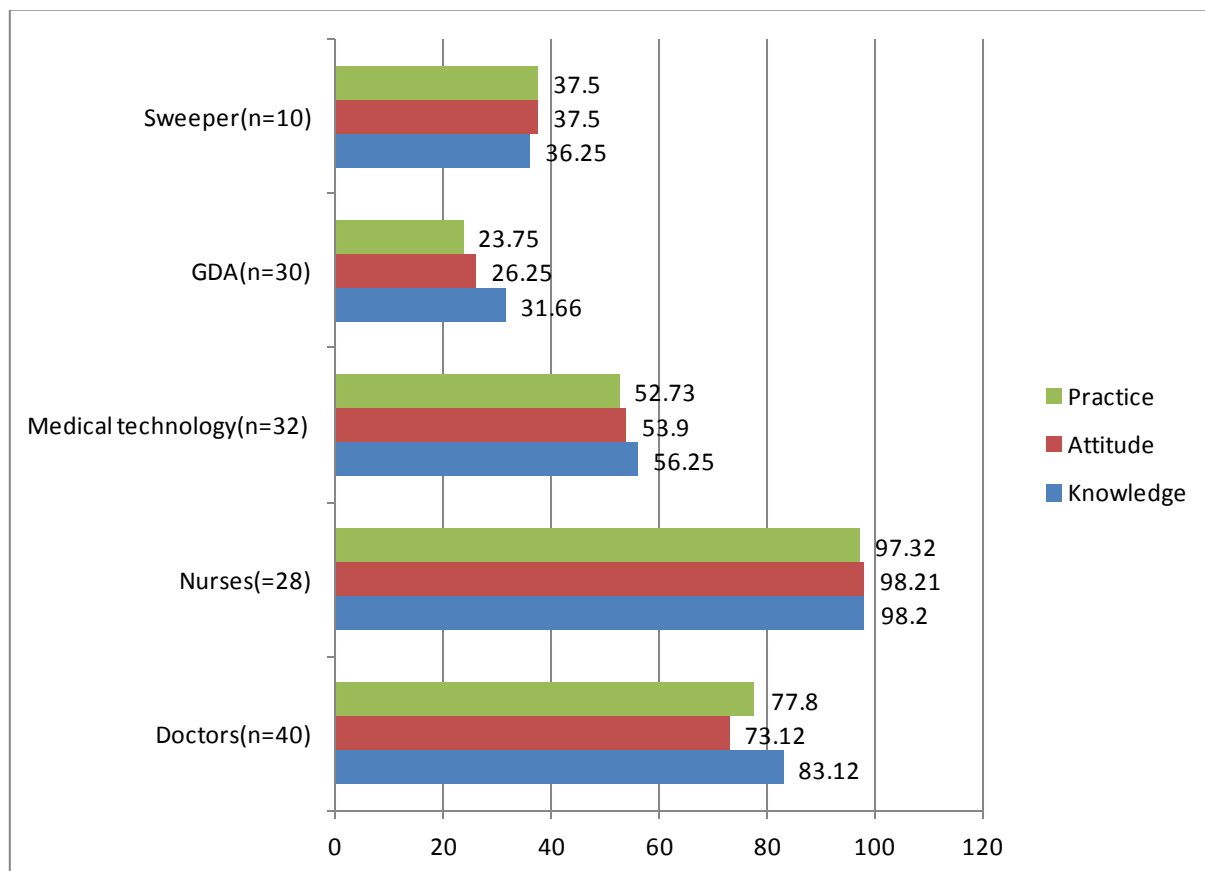
Interpretation**Findings**

- Housekeeping regularly wear protective devices such as gloves, face masks, gown.etc, while handling the waste.
- There is biomedical waste label 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 be disposed in the baggage as per biomedical waste management rule. Carry bags also have the biohazard symbol on them.
- Closed trolley is being used for carrying wastes

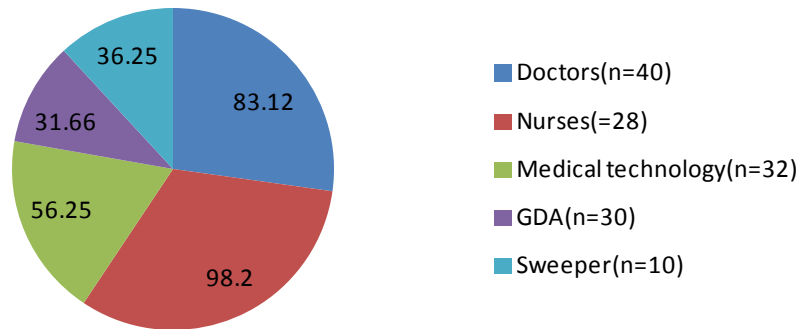
- Hospital does not have its own incinerator and the treatment of Biomedical Waste is outsourced to M/S Sembramky Pvt Ltd
- The nursing staffs have excellent knowledge about the different categories of hospital wastes.
- All the nursing and housekeeping staff have excellent knowledge about colour coding of waste carry bags.
- The nursing staff has excellent knowledge about contents of waste carry bags.
- The knowledge about routes of disease transmission is poor amongst the GDAs & Sweepers.
- About 98% of the nursing staff has knowledge about the different aspects of BMW management.

- About 56.25% of MT has knowledge about BMW management
- The knowledge amongst GDAs and Sweepers is poor that is 31.66% & 36.25.

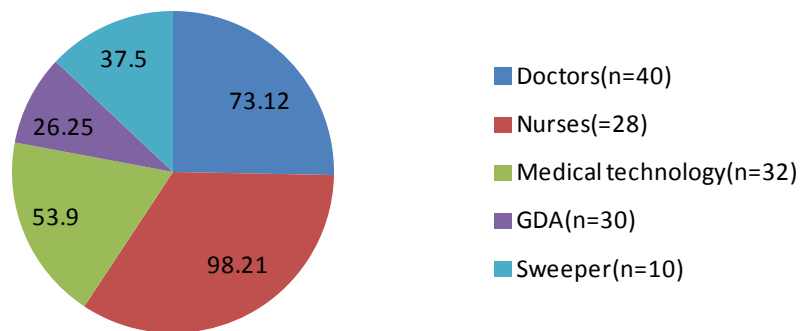
Medical wastes pose significant impact on health and the environment. Especially in a developing country like India, may be because of its huge population and pollution level when taken into account as such. However, from this study it can be said that though the management of waste is done in very appreciable level still there is an urgent need for raising awareness and education on medical waste issue for the staff. Proper waste management strategy is needed to ensure health and environmental safety.



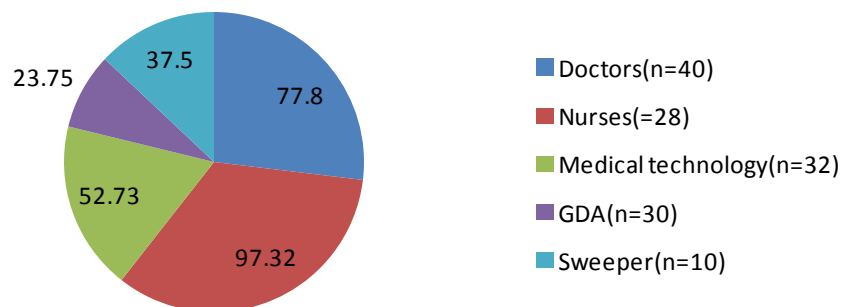
Knowledge of BMW MGT (Positive response %)



Attitude of BMW MGT (Positive response %)



Practice of BMW MGT (Positive response %)



DISCUSSION

In the present study certain deficiencies in the knowledge of BMW management amongst of Categories of staff was identified. It was observed that the Doctors have good the oretical knowledge of BMW management however their attitude and practice towards different aspects of BMW was not satisfactory. Our observation is similar to that of Mathew, Benjamin and Sengupta (11).

The overall knowledge of Nursing Staff was highly satisfactory, their attitude and practical application of knowledge in the different aspects of Biomedical waste management was the best amongst all the categories of staff. The nurses were very meticulous and careful in in carrying out the BMW management procedures. These observations are in agreement with the study done by Saini, Nagarajan and Sarma (12).

In spite of the statutory guidelines of BMW management thesis a definite lack of positive attitude and practical application of knowledge. There is apathy towards operational aspect of BMW management system amongst the Doctors more so in the Residents.

The knowledge, attitude and practice of BMW procedures is not satisfactory amongst the Medical Technologists .So far as the GDAs and sweepers are concerned their awareness is poor but have better attitude and practice of the knowledge which they have.

Periodic CMEs for the Doctors, workshops for the Residents and training programmes for the other categories of staff should be undertaken at regular

intervals to update the knowledge. Motivation of the different categories of staff must be done. Strict supervision and surveillance system should be followed in day to day BMW management activities. Nursing personnel who are correctly practicing the Biomedical Waste Management(BMW) should be involved as role models. Smooth and uninterrupted supply of logistics for BMW should ensured.

CONCLUSION

Medical wastes pose significant impact on health and the environment. Especially in a developing country like India, may be because of its huge population and pollution level when taken into account as such. However, from this study it can be said that though the management of waste is done in very appreciable level still there is an urgent need for raising awareness and education on medical waste issue for the staff. Proper waste management strategy is needed to ensure health and environmental safety.

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