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### Assessment of the knowledge of staff nurses on health hazards related to bio medical waste disposal

Ashu Yadav

Tutor, Pushpanjali College of Nursing, Agra, Uttar Pradesh, India

#### Abstract

**Introduction:** Biomedical waste is any solid, fluid or liquid waste, including container and any intermediate products, generated during diagnosis and treatment in the hospitals. At the same time health services may generate large quantity of wastes and byproducts that need to be handled safely and disposed of properly.

**Materials and Method:** The descriptive study was conducted with convenience sample of 50 staff nurses working at hospital in Agra. The semi structured questionnaire was prepared for interviewing the participant. It contains about the demographic profile such as age in years, religion, family income per month, type of family, marital status, previous exposure to education regarding Bio Medical Waste Management and the source of information on Bio Medical Waste Management.

**Results:** Among 50 samples the majority 26 (52%) were under the qualification of B.SC (N). with regard to total years of experience the majority 35 (70%) were fall in 0-5 years of experience. With regard to source of information about bio medical waste management the majority 40 (80%) got information through nursing education. With regard to availability of needle burner the majority 34 (68%) were having needle burner. With regard to Ward the majority 12 (24%) were from A & B and C & D ward. The study findings revealed that among 50 nurses 35 (70%) had adequate knowledge, 15 (30%) had moderate adequate knowledge and none of them had inadequate knowledge.

**Conclusions:** the need of comprehensive training programs regarding handling, segregation, transportation & storage of waste in colour bins until final disposal and treatment for all hospital staff is highly recommended to deal with this burning issue of bio-medical waste management.

**Keywords:** Staff nurses, health hazards, biomedical waste, health services

#### Introduction

Biomedical waste is any solid, fluid or liquid waste, including container and any intermediate products, generated during diagnosis and treatment in the hospitals. Hospital waste is generated and discarded and is not intended for further use in a hospital. Biomedical waste (BMW) is now considered as a great concern due to increased awareness about HIV/AIDS, hepatitis B and hepatitis C and other potential infectious diseases. Healthcare activities like medical treatments, diagnostic tests, immunization, and laboratory examinations restore health and save lives. At the same time health services may generate large quantity of wastes and byproducts that need to be handled safely and disposed of properly<sup>[1]</sup>. As per the reports from developed countries approximately 1-5 kgs of waste is generated per bed per day, whereas 1-2 kgs / bed / day is the figure from developing countries<sup>[2]</sup>. In India it is estimated to be 2.0 kgs /bed/day<sup>[3]</sup>. Improper handling of solid waste in the hospital may increase the airborne pathogenic micro-organisms, which could adversely affect the hospital environment and the community as well. Construction of a Medical Waste Materials Recovery Facility (MED-MRF) will reduce the quantities of medical waste requiring landfill or incineration. Municipal Corporations, State Governments, and the Central Government need to plan and construct centralized facilities

to recycle, treat, and dispose of biomedical waste. The fundamental information for selecting and designing the most efficient treatment method of hospital waste is obtained by means of waste composition analysis. The final choice of treatment system should be made carefully, on the basis of various factors, many of which depend on local conditions including the amount and composition of waste generated, available space, regulatory approval, public acceptance, and cost<sup>[4]</sup>. Hospital waste is among the more dangerous types of garbage because of being contaminated with disease-carrying pathogens. Hospital wastes require a very safe disposal system, as it may lead to the spread of dangerous disease – viral hepatitis, TB, Bronchitis, Gastroenteritis and skin and eye related problems. According to a WHO Publication (1999) Health care waste includes all the waste generated by health-care establishments. Between 75% and 90% of the waste produced by health care providers is non-risk and the remaining 10-25% of health care waste is regarded as hazardous and may create a variety of health risks<sup>[5]</sup>.

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 [6]. Inappropriate segregation ultimately results in an incorrect method of waste disposal. Bio-Medical waste scattered in and around hospitals invites flies, insects, rodents, cats and dogs that are responsible for spread of communicable diseases like plague and rabies. Most importantly there is no mechanism to ensure that all waste collected and segregated, reaches its final destination without any pilferage. Additional hazard includes recycling of disposables without even being washed. Usage of same wheel barrow for transportation of all categories of waste is also a cause of infection spreading [7].

Most of the times there is no monitoring of trolley routes, resulting in trolley movement around patient care units posing a serious health hazard. There is no mechanism for ensuring waste treatment within prescribed time limits. Note that, Bio-Medical waste if not handled properly and within the stipulated time period could strike in the form of fatal infections. In some hospitals there is no proper training of the employees in hazardous materials management and waste minimization aspects. This indicates the lack of even basic awareness among hospital personnel regarding safe disposal of Bio-Medical waste [8]. The regular training programme about efficient management of bio medical waste is necessary to improve the present situation [9]. Hospital waste management has been brought into focus in India recently, particularly with the notification of the bio medical waste (management and handling) rules 1998. The rule makes it mandatory for the health care establishments to segregate, disinfect and dispose their waste in an eco-friendly manner [10]. There is a need for improved knowledge for nursing personnel regarding bio medical waste management in hospital in order to safeguard their own health as well as the protection of patients [11]. The government of India is also now planned to upscale the implementation of bio medical waste management in all tertiary care hospitals [12].

### Materials and Method

The descriptive study was conducted with convenience sample of 50 staff nurses working at hospital in Agra. Semi-Structure Interview: The semi-structured questionnaire was prepared for interviewing the participant. It contains about the demographic profile such as age in years, religion, family income per month, type of family, marital status, previous exposure to education regarding Bio Medical Waste Management and the source of information on Bio Medical Waste Management.

### Knowledge on bio-medical waste

A well-structured questionnaire with answer in multi choice format which consists of 30 questions regarding the

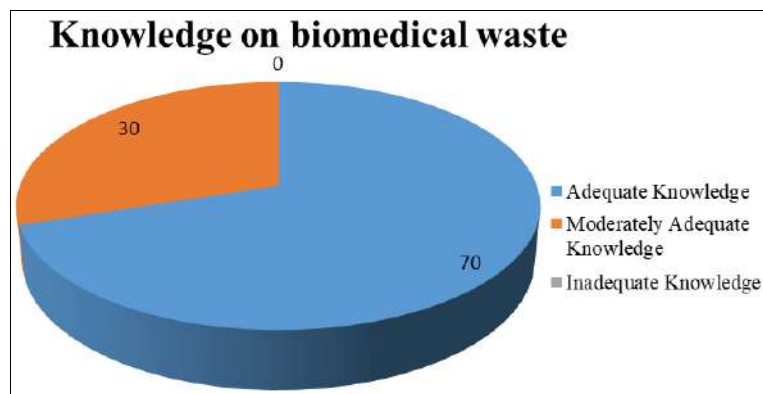
knowledge on Bio Medical Waste Management. The multiple choice questions has one right answer, which was allotted a score of "one" for every right answer and do not know answer was given the score of "zero". The total attainable score in the knowledge questionnaire was 30. The knowledge score was classified as follows; 0-50% - Inadequate knowledge, 51-75% - Moderate knowledge and 76-100% - Adequate knowledge. Procedure: The data analysis was done by using descriptive and inferential statistical methods.

### Results

Among 50 samples the majority 26 (52%) were under the qualification of B.SC (N). with regard to total years of experience the majority 35 (70%) were fall in 0-5 years of experience. With regard to source of information about bio medical waste management the majority 40 (80%) got information through nursing education. With regard to availability of needle burner the majority 34 (68%) were having needle burner. With regard to Ward the majority 12 (24%) were from A & B and C & D ward. The study findings revealed that among 50 nurses 35 (70%) had adequate knowledge, 15 (30%) had moderate adequate knowledge and none of them had inadequate knowledge.

**Table 1:** Demographic profile of 50 staff nurse

Demographical Variables	Frequency	Percentage
<b>Qualification</b>		
a). A.N.M	8	16
b). G.N.M	18	36
c). B.Sc. (N)	20	40
d). M.Sc. (N)	4	8
<b>Total years of experience</b>		
a). 0-5 years	35	70
b). 6-10 years	9	18
c). ≥10 years	6	12
<b>Source of information about bio-medical waste management</b>		
a). Education in nursing	40	80
b). Attended workshop/conference	2	4
c). Teaching by senior staff/colleagues	7	14
d). Mass media	1	2
<b>Availability of needle burner</b>		
a). Yes	34	68
b). No	16	32
<b>Ward</b>		
a). AB ward	12	24
b). ICCU	6	12
c). Causality	4	8
d). NICU & Paediatric	9	18
e). Post-Operative ward	6	12
f). C & D Ward	11	22
g). Geriatric	1	2
i). General	1	2



**Fig 1:** Data on distribution of knowledge level regarding biomedical waste management among nurses.

**Table 2:** Association between the levels of knowledge on biomedical waste management with selected demographic variables

Status	Adequate Knowledge	Moderately Knowledge	Total
<b>Qualification</b>			
a). A.N.M	3	5	8
b). G.N.M	8	10	18
c). B.Sc. (N)	15	5	20
d). M.Sc. (N)	4	0	4
<b>Total years of experience</b>			
a). 0-5 years	8	27	35
b). 6-10 years	6	0	9
c). ≥10 years	2	4	6
<b>Source of information about bio-medical waste management</b>			
a). Education in nursing	10	30	40
b). Attended workshop/conference	0	2	2
c). Teaching by senior staff/colleagues	2	5	7
d). Mass media	0	1	1
<b>Availability of needle burner</b>			
a). Yes	10	24	34
b). No	4	12	16
<b>Ward</b>			
a). AB ward	2	10	12
b). ICCU	5	1	6
c). Causality	2	2	4
d). NICU & Paediatric	6	3	9
e). Post-Operative ward	2	4	6
f). C & D Ward	3	8	11
g). Geriatric	0	1	1
i). General	1	0	1

## Discussions

Since nurses, handle healthcare wastes at a major level, and this study mainly focussed to assess the knowledge and to recommend necessary implication programme needed on biomedical waste management in hospital. The Biomedical waste management rules, 1998 formulated by the Indian Government has given regulations about the handling, storage, transportation and final disposal of the healthcare wastes [13]. Study done has established a baseline of information and statistics on perception of HWs on MWM from generation to final disposal. The perceptions of HWs on MWM have been properly analysed and recorded to give information that can form the basis for realistic planning, designing, budgeting and implementation of MWM, which is economical, effective and efficient. The data developed shows the magnitude of the problem and extent of the gap between HWs, based on which awareness and proper resource allocation can be improved.

This study found that 70% nurses had adequate knowledge

on biomedical waste management. Similar a study conducted by Gupta et.al found that the knowledge of nursing staff was appreciable (70%) [14]. Also nurses from rural area of Haryana staff had 73% knowledge and awareness on biomedical waste management (Verma *et al.*, 2014) [15]. Most of the nurses 40 (80%) got information about biomedical waste management from their nursing education, and 7(14%) of nurses got information through their senior staff and colleagues. Mohapatra *et al* (2012) done a study about waste management among doctors showed the necessity of having a balance between effective practical training and theoretical aptitude building among the medical group [16]. Periodical education and training must need to get updated knowledge on biomedical waste management not only to the nurses, need to all the health care workers.

The findings of the study would help the nurse practitioner to develop a new vision in control of infection through proper segregation of hospital waste and control of

infections and injuries related to that. The findings of the study recommended the educationalists at various institutions to emphasize the importance of proper segregation of biomedical waste in hospitals to control infections. The nursing students can be provided with opportunities to implement during their clinical exposure. The nurse as an administrator can organize and conduct various training programs on Bio medical waste management to nurses and fourth class workers, which will enhance their knowledge and keep them aware of proper segregation of waste in the respective areas. This finding indicated that the practices of health care providers were dependent on years of experience they had, as experience increased the safer were the practices.

### Conclusions

The awareness and practices of the BMW management varied among different categories of HCW and were not found to be satisfactory. For effective implementation of biomedical waste management practices in the hospitals periodical sensitization and continuous training program is mandatory to improve the biomedical waste knowledge and practices among health care workers especially focusing at the nursing staffs. Hence, the need of comprehensive training programs regarding handling, segregation, transportation & storage of waste in colour bins until final disposal and treatment for all hospital staff is highly recommended to deal with this burning issue of bio-medical waste management.

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