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ORIGINAL ARTICLE

BIOMEDICAL WASTE MANAGEMENT: AWARENESS AND PRACTICES IN A DISTRICT OF MADHYA PRADESH

Manoj Bansal[1], Ashok Mishra[2], Praveen Gautam[3], Richa Changulani[3], Dhiraj Srivastava[4], Neeraj Singh Gour[5]

[1]Assistant Professor, Department of Community Medicine, Bundelkhand Medical College, Sagar (MP) [2]Professor [3]Assistant Professor, Department of Community Medicine, G.R Medical College, Gwalior (MP) [4]Lecturer, Department of Community Medicine, UP RIMS&R, Saifai, Etawah (UP) [5]Assistant Professor, College of Medicine, JNM Hospital, Kalyani, (AP)

Correspondence:
Dr. Manoj Bansal
Assistant Professor, Department of Community Medicine
Bundelkhand Medical College, Sagar (M.P.)
E-mail: drmanojpsm@gmail.com, Phone no. 09907542382

ABSTRACT

Background: A hospital is an establishment that provides medical care facilities. Since the majority of the persons receiving treatment in the hospital are suffering with infectious diseases therefore, the waste generated in hospital has potential to transmit infections and other hazards to hospital staff and nearby community, if not managed adequately. Adequate awareness in the hospital staff and practices regarding the biomedical waste management is crucial to prevent these hazards.
Objective: To assess the awareness and existing practices regarding biomedical waste and its management in a district of Madhya Pradesh.
Material And Methods: The present study was a cross sectional study carried out in both urban and rural health facilities of Gwalior district from Jan to Jun 2008. Only those hospitals having indoor care facility were included randomly. Medical, para-medical and non-medical personnel working at their current position for at least 6 months were included as study participants to assess awareness.
Statistical Analysis: Percentage and Proportion were applied to interpret the result.
Results: Awareness regarding biomedical waste management was highest among doctors followed by para-medical staff and least among non-medical staff. Practices of waste management in hospitals were grossly inadequate, particularly in rural area.
Conclusion: The present study concludes that regular orientation and re-orientation training programs should be organized for hospital staff and strict implementation of guidelines of biomedical waste management, to protect themselves and hospital visitors.

Key Words: Biomedical Waste, Hazards, Health care personnel

INTRODUCTION

A hospital is an establishment that provides medical care facilities to persons suffering or suspected to be suffering from any disease or injury. The medical facilities available in a hospital may be diagnostic, therapeutic or rehabilitative. Hospital wastes have always been considered as potentially hazardous. The major identified hazard is infection, because most of the persons receiving medical care in the hospital are suffering from communicable diseases.[1] Other hazards associated with poor waste management includes injuries from sharps, risks associated with hazardous chemicals or drugs and disposables being repacked and sold without being washed. Waste piles also attract variety of disease vectors, including mosquitoes and flies. [2] It is important to note that not all hospital waste has the potential to transmit infection. It is estimated that 80–85% is non-infectious general waste, 10%

is infectious and 5% is other hazardous waste. [3] However, if the infectious component gets mixed with the general non-infectious waste, the entire bulk of hospital waste potentially becomes infectious.[4]

The management of hospital waste requires its segregation and removal from the health- care establishments in such a way that it will not be a source of health hazards to those who are directly or indirectly related to hospital environment. The Ministry of Environment and Forest, Government of India promulgated "Bio-medical Waste (Management and Handling) Rules" in July 1998 and amended on 2nd June 2000 with the objective to promote scientific and systematic management of health care waste. These rules apply to all those who generate, collect, receive, store, transport, treat, dispose, or handle bio-medical waste in any form.[5,6]

Any carelessness in the management of wastes generated in a hospital tends to spread infections and contaminate the entire living environment prevailing in a hospital. Thus, improper waste management practices are a serious problem that involve not only to the hospital staff but society at large. In developing countries, however, medical waste materials have not received sufficient attention therefore the management of bio-medical waste is still a major challenge to the hospitals. [7]

Thus present study was conducted with the following objectives:

- To assess the awareness in hospital personnel regarding bio-medical waste and its management.
- To know the existing practices of bio-medical waste management in the health facilities of Gwalior district.

MATERIALS AND METHODS:

The present study was a cross-sectional study carried out in government and private hospitals of Gwalior district for a period of six months from Jan-Jun 2008.

The study was conducted in both urban and rural health facilities of Gwalior district. From urban area, two government and two private hospitals were selected randomly. Rural area was further divided into four blocks. From each block one government and one private health facility included in the study. Only those health facilities having indoor care were included in the study. Informed consent from the hospital authorities and health personnel of respective health facility was taken for the study and they were assured that confidentiality would be strictly maintained. Staff and students of Department of Community Medicine, G.R. Medical College, Gwalior, visited to selected hospital one by one.

In the first stage, investigators conducted interviews and in the second stage, existing practices of biomedical waste management were assessed. Observation of health facility was done to confirm the response of hospital authority about existing practices, using separate structured proforma. From each health facility, medical (doctors), para-medical (nurses and lab. technicians) and non-medical (waste handlers and sweepers) personnel, working at their current position for at least 6 months, were interviewed to find out the awareness about biomedical waste management by using purposive sampling method.

Pre-designed, pre-tested study tool consists of two sections. First section contains a total of ten questions, of these six were multiple choice questions with one correct option and four were answered as true or false. The second section contains questions regarding the existing practices of various steps involved in the biomedical waste management in respected health facility. Data collected was compiled and analyzed manually. Percentage and proportion were used for the interpretation of findings.

RESULTS:

A total of 12 hospitals were selected, of which four were from urban area and eight were from rural area of Gwalior district. Out of 246 health personnel interviewed, 116 (47.15%) were doctors, and para-medical and non-medical staff were 29.26% and 23.57% respectively. **(Table I)**

Table 1: Distribution of different health care personnel interviewed.

Type of Hospital	Medical (%)	Para-medical (%)	Non-medical (%)
Government	76 (47.50)	48 (30.00)	36 (22.50)
Private	40 (46.51)	34 (39.53)	22 (25.58)
Total	116 (47.15)	72 (29.26)	58 (23.57)

In this study, the overall awareness was found maximum among doctors followed by para-medical workers and least among non-medical workers. Majority of the medical workers were found aware about the biomedical waste management. Awareness regarding colour coding and segregation was little bid greater among para-medical workers than doctors. Regarding composition of hospital waste, only 32.75% medical, 25% para-medical and 3.44% non-medical workers gave correct answer. **(Table 2)**

Table 2: Showing awareness regarding biomedical waste and its management among health care personnel.

Question regarding	Correct Response		
	Medical (n=116) (%)	Paramedical (n=72) (%)	Nonmedico (n=58) (%)
Hazards associated with BMW† Management & Handling	116 (100)	69 (95.83)	25 (43.10)
Prevention of hazards associated with BMW† Management & Handling	116 (100)	67 (93.05)	22 (37.93)
Colour coding	64 (55.17)	44 (61.11)	06 (10.34)
Segregation of BMW†	52 (44.82)	37 (51.38)	04 (6.89)
Segregation of sharp waste such as contaminated needle	83 (71.55)	43 (59.72)	06 (10.34)
Transportation of BMW† for terminal disposal	112 (96.55)	54 (75.00)	27 (46.55)
Open unused sharps are not considered as BMW†.	78 (67.24)	30 (41.67)	05 (8.62)
Any item which has had contact with blood or any other fluid is considered as BMW†	115 (99.13)	63 (87.50)	30 (51.72)
Untreated BMW* can be stored maximum for 48 hrs.	70 (60.34)	31 (43.05)	07 (12.06)
About 10-25% of total waste generated in a hospital is hazardous	38 (32.75)	18 (25.00)	02 (3.44)

†Biomedical Waste

As far as practices of biomedical waste is concerned, in our study only one hospital of urban area adequately segregating the hospital waste while pre-treatment was done in only 33% hospitals under study. Transportation of biomedical waste out side the hospital was adequate in almost all the urban health facilities but none of the rural health facility shows adequate transportation. In urban area, all the hospitals were using Common Biomedical Waste Treatment Facility (CBWTF) for terminal disposal of waste. In rural area, the health facilities were using deep burial, burning and open dumping, either single method or in combination for terminal disposal. **(Table 3)**

DISCUSSION:

The present study was conducted in government and private hospitals of both urban and rural area to find out the awareness and existing practices regarding biomedical waste management in the district. Awareness among health care workers is essential for the adequate management of biomedical waste. The overall awareness about biomedical waste management was found highest among medical professionals. Almost all the doctors and majority of the para-medical workers were quite aware about hazards and method of prevention of hazards of biomedical waste management and handling while it was least among non-medical workers. Similar observations were noted by Deo et al [8] and Pandit NB et al [9]

The knowledge regarding segregation is important to prevent the mixing of hazardous and non-hazardous or domestic waste which has to be disposed off with municipal waste. In this study, knowledge about colour coding and segregation was more among para-medical than medical staff. These findings were supported by studies done by various researchers. [8, 10]

Our study reveals that knowledge about transportation of waste for terminal disposal was highest among doctors than para-medical staff and least among non-medical staff. In our study, only 32.75% doctors, 25% para-medical and 3.44% non-medical staff were agree with the fact that about 10-25% of total waste generated in a hospital is hazardous. This may be because

of there low level of education. Saini et al found that person with higher education level were more aware regarding the issue.[11]

Segregation is the most important step in the entire process of biomedical waste management. Segregation not only reduces the risks associated with the biomedical waste but also the cost of handling, treatment and disposal. As per the findings of this study, majority of the hospitals using two or three colour coded bags to segregate the waste and the practices of waste segregating were not adequate and mixing of waste was found. Pandit NA et al in his study in Srinagar and Gupta et al in Lucknow also reported that there was no mechanism for waste segregation of infectious and non-infectious waste.[12,13]

Storage and transportation of waste were found adequate in hospitals of urban area, while not in rural health facilities. This may occur because in urban area, all the hospitals under study have a contract with Common Biomedical Waste Treatment Facility for transportation and terminal disposal. Persons working with CBWTF collect waste from these hospitals daily by separate vehicle used only for transportation of biomedical waste.

The health facilities of rural area were using deep burial, burning and open dumping near to hospital premises for terminal disposal. Pandit NB et al in his study carried out in a district of Gujarat and Rijal et al in Kathmandu valley also noted that there were no effective waste segregation, collection, and transportation and disposal system in most of the health care institutions. [9, 14]

Table 3: Showing existing practices of biomedical waste management in urban and rural hospitals.

Step of BMW† Management	Urban Hospitals (n=04) (%)	Rural Hospitals (n=08) (%)	Total (n=12) (%)
Segregation			
Adequate	01 (25)	00 (00)	01 (8.33)
Notadequate	03 (75)	08 (100)	11 (91.67)
Pre-treatment			
Yes	02 (50)	02 (25)	04 (33.33)
No	02 (50)	06 (75)	08 (66.67)
Storage at site of production			
<=1day	04 (100)	03 (37.50)	07 (58.33)
>1day	00 (00)	05 (62.50)	05 (41.67)
Frequency of removal			
<=1day	04 (100)	03 (37.50)	07 (58.33)
>1day	00 (00)	05 (62.50)	05 (41.67)
Transportation			
Adequate	04 (100)	00 (00)	04 (33.33)
Notadequate	00 (00)	08 (100)	08 (66.67)
Method used for terminal disposal			
CBWTF#	04 (100)	00 (00)	04 (33.33)
Others	00 (00)	08 (100)	08 (66.67)

Common Biomedical Waste Treatment Facility

CONCLUSION:

The present study concluded that the awareness regarding biomedical waste management was satisfactory in medical personnel while poor in para and non-medical workers. As these workers are regularly engaged in the process of biomedical waste management and handling, therefore there is an urgent need for orientation training regarding the issue, to entire health care personnel especially para and non-medical workers to protect themselves and people visiting to hospital and nearby community. Also, there is a need of strict implementation of guidelines of biomedical waste management and regular supervision and monitoring by a separate committee, exclusively formed for the implementation of rules related to the safe management and handling of hospital waste in entire district.

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