

## Original Research Article

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# Biomedical waste management awareness in public and private hospitals in a district of North India

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## ABSTRACT

**Background:** For proper disposal of bio-medical waste, introduction of laws only is not sufficient enough but the development of healthcare system that creates awareness and promote effective enforcement of existing BMW management guidelines among all healthcare personnel assumes primary importance. This study was planned to assess the biomedical waste management awareness among paramedical and auxiliary personnel in public and private hospitals in Meerut city.

**Methods:** A cross sectional observational study was carried out in 384 paramedical and sanitary staff of three government and three private hospitals of Meerut from November 2015 to October 2016. Information was collected on predesigned and pretested semi structured questionnaire. Scoring was done on the basis of response to each of the question awarding 1 mark to correct response and zero mark to wrong response. Score obtained between 0-5, 6-10 and 11-15 were labelled as poor, average and good knowledge respectively.

**Results:** In the present study 68.7% (264) of studied paramedical and auxiliary staff was untrained in both public and private hospitals. However, the higher percentage of untrained staff was observed in public hospitals as compared to private hospitals for any category of staff. In public hospitals 28.1% nurses, 25.0% technicians, 15.0% ward boys/aaya, 29.7% sweepers had gone through training for Bio medical waste disposal as compared to 37.5%, 41.7%, 30.0% and 39.1% respectively in private hospitals.

**Conclusions:** The overall awareness was found maximum among nurses as compared to technicians, ward boys/aaya and sweepers. On comparing the percentage of correct responses and scoring in public and private hospital workers, the paramedical and auxiliary staff of private hospitals had higher percentage of correct responses for most of questions. Intensive training programme at regular time interval should be done repeatedly to train and retrain all the staff, which may include question raising and problem solving approach.

**Keywords:** Biomedical waste management, Health care, Hospital

## INTRODUCTION

Overwhelming increase in patient number in both public and private hospitals has led to concomitant increase amount of generated waste, which during the entire course of healthcare activities needs special consideration for its composition, quantity and their potential hazardous effect as compared to waste of other places and thereby requires particular attention for its management.<sup>1</sup>

Moreover inadequate and inappropriate handling of healthcare waste not only has serious implications for the healthcare of those involved, but also carries a potentially significant risk to the environment as well.<sup>2</sup> Safe and reliable method for handling of biomedical waste which includes segregation at source into colour coded bags or containers and its collection and proper disposal should be ensured at every cost.<sup>3</sup> For proper management of biomedical waste the ministry of environment and forest

has promulgated the biomedical waste (management and handling) rules. This came into enforcement in July 28, 1998. These rules are meant to improve the overall waste management of health care facilities in India. And encompasses all who involve in any step of biomedical waste generation and handling.<sup>4</sup> These rules get amendments in 2000, 2003 and again in 2011 (notified) under the Environmental Protection Act 1986.

For proper disposal of bio-medical waste, introduction of laws only is not sufficient enough but the development of healthcare system that creates awareness and promote effective enforcement of existing BMW management guidelines among all healthcare personnel assumes primary importance.<sup>5</sup> This study was done to assess the biomedical waste management awareness among paramedical and auxiliary personnel in public and private hospitals in Meerut city.

## METHODS

A cross sectional observational study was carried out in 384 paramedical and sanitary staff of three government and three private hospitals of Meerut from November 2015 to October 2016. Out of 384, 192(50%) staff was covered randomly from public hospitals and 192 (50%) from private hospitals. Study participants included nurses, technicians, ward boys/aaya and sweepers. On the basis of number and availability of staff in government hospitals, (100%) technicians, (approximately 50%) auxiliary staff and (25%) nurses were taken. So out of 192 personnel, 64 nurses, 24 technicians, 40 ward boys/aaya and 64 Sweepers were included in the study

from public hospitals for comparison. An equal numbers of participants from each of strata were taken from private hospitals. Information was collected on predesigned and pretested semi structured questionnaire. Scoring was done on the basis of response to each of the question awarding 1 mark to correct response and zero mark to wrong response. Score obtained between 0-5, 6-10 and 11-15 were labelled as poor, average and good knowledge respectively.

Inclusion criteria comprised of those who were consenting for the study and were working in medical field/ hospital for more than 3 months.

Exclusion criteria consisted of participants who were working in the hospital for less than three months, Participants who were not willing to participate and those who were not available at the time of study.

All the data collected was entered in EPI INFO 7.

## RESULTS

In the present study 68.7% (264) of studied paramedical and auxiliary staff was untrained in both public and private hospitals. However, the higher percentage of untrained staff was observed in public hospitals as compared to private hospitals for any category of staff (Table 1). In public hospitals 28.1% nurses, 25.0% technicians, 15.0% ward boys/aaya, 29.7% sweepers had gone through training for bio medical waste disposal as compared to 37.5%, 41.7%, 30.0% and 39.1% respectively in private hospitals.

**Table 1: Distribution of study population according to training status.**

Training status	Nurse		Technician		Ward boys/aaya		Sweeper		Total
	Public	Private	Public	Private	Public	Private	Public	Private	
	No (%)	No (%)	No (%)	No (%)	No (%)				
Trained	18 (28.1)	24 (37.5)	6 (25.0)	10 (41.7)	6 (15.0)	12 (30.0)	19 (29.7)	25 (39.1)	120 (31.3)
Untrained	46 (71.9)	40 (62.5)	18 (75.0)	14 (58.3)	34 (85.0)	28 (70.0)	45 (70.3)	39 (60.9)	264 (68.7)
Total	64 (100.0)	64 (100.0)	24 (100.0)	24 (100.0)	40 (100.0)	40 (100.0)	64 (100.0)	64 (100.0)	384 (100.0)

**Table 2: Distribution of study population according to scoring pattern of BMW awareness.**

Paramedical staff	Poor		Average		Good		P value
	N	(%)	N	(%)	N	(%)	
<b>Nurse</b>							$\chi^2=10.8$
Public (64)	18 (28.1)		40 (62.5)		6 (9.4)		df=2
Private (64)	5 (7.8)		45 (70.3)		14 (21.9)		p=0.004
Total	23 (18.0)		85 (66.4)		20 (15.6)		128 (100.0)
<b>Technicians</b>							$^*\chi^2=0.87$
Public (24)	9 (37.5)		14 (58.3)		1 (4.2)		df=1
Private (24)	6 (25.0)		15 (62.5)		3 (12.5)		p=0.35
Total	15 (31.3)		29 (60.4)		4 (8.3)		48 (100.0)
<b>Ward boys/aaya</b>							$^*\chi^2=7.20$
Public (40)	26 (65.0)		14 (35.0)		0		df=1
Private (40)	14 (35.0)		26 (65.0)		0		p=0.007
Total	40 (50.0)		40 (50.0)		0		80 (100.0)

Continued.

Paramedical staff	Poor N (%)	Average N (%)	Good N (%)	P value N (%)
<b>Sweepers</b>				
Public (64)	37 (57.8)	27 (42.2)	0	$^* \chi^2 = 2.53$
Private (64)	28 (43.8)	36 (56.2)	0	df=1
Total	65 (50.8)	63 (49.2)	0	p=0.11
				128 (100.0)

\* $\chi^2$  is calculated after merging cell of good BMW awareness with average.

The comparison of scoring of BMW awareness of staff showed a better awareness in all categories of staff in private hospitals as compared to public hospitals. Table 2 shows that most of the nurses (82.0%) were having average (66.4%) to good (15.6%) awareness with a significant difference ( $p<0.001$ ) in private (92.2%) and public hospitals (71.9%). Similar trend but not statistically significant association was observed for the technicians. For ward boys/aaya the significant association ( $p<0.001$ ) of BMW awareness status can be seen in public and private type of hospitals as 65.0% of ward boys/aaya were having poor BMW awareness in public hospitals as compared to 35.0% in private hospitals. Similar trend but with no statistically significant association ( $p>0.11$ ) was seen in respect of sweepers also as 57.8% of sweepers from public hospitals were having poor awareness as compared to 43.8% in private hospitals.

## DISCUSSION

In the present study total paramedical and auxiliary staff trained was 31.3% which is comparable with Ananthachari et al who reported that 29.8% health care workers had received training for biomedical waste management in last 5 year period.<sup>6</sup> In the present study total nurses trained in BMW management were 32.8%, technicians trained were 33.3%, wardboys/aaya 22.5% and sweepers 34.3% whereas Kumar et al reported that majority of nurses (61.2%) had received training regarding BMW management while only 9.5% lab technicians had received this training and none of the sanitary staffs had reported about any training in relation to BMW.<sup>7</sup>

In the present study 66.4% nurses, 60.4% technicians, 50.0% ward boys/aaya were having average scoring whereas majority 50.8% sweepers were having poor scoring which is similar to the study done by Gupta et al who reported that knowledge score was 70% in nursing staff and 46.0% in lab technicians.<sup>8</sup> Among sanitary workers knowledge score was poor in more than 60.0% of participants. Bansal et al reported in Bhopal that overall knowledge among medical professionals was higher than paramedical workers while it was least among non-medical workers.<sup>9</sup> On the basis of scoring system among paramedical personnel just more than half categorized as having average knowledge and about one third showed good knowledge but majority of non-medical workers (70.73%) were poorly aware about the biomedical waste and its management. Majority (71.2%)

of the hospital staff was found to have average awareness about health care waste management. Nema et al on the basis of scoring system found that more than three-fourth of the nursing staff, technicians and class IV employees were having average level of awareness.<sup>10</sup> Poorest awareness was found among nursing staff (20.0%).

## CONCLUSION

The overall awareness was found maximum among nurses as compared to technicians, ward boys/aaya and sweepers. On comparing the percentage of correct responses and scoring in public and private hospital workers, the paramedical and auxiliary staff of private hospitals had higher percentage of correct responses for most of questions. To improve overall knowledge and practices related to BMW management and its handling strict implementation of Bio medical waste management rules should be enforced in each and every hospital with regular monitoring. It should be made compulsory for healthcare facilities to get their healthcare personnel trained from accredited training centers. These training sessions should be a continuous process depending upon the patient input in different health facilities and regular update should be added as and when new rules and recommendations are provided by the government. Thus, Intensive training programme at regular time interval should be done repeatedly to train and retrain all the staff, which may include question raising and problem solving approach. Prizes and consolations as positive reinforcement mechanisms can be strongly effective in motivating and educating the staff for proper BMW handling. The limitation of the study is that the study sample size is less and can be increased in future studies with involvement of multiple investigators in different institutions at different locations. Our study re-emphasises the importance of biomedical waste management practices in our hospitals and reinforce the need for training in BMW management for all cadres of health care workers in both continuous (for overall) and as per need manners(for individuals).

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