**ORIGINAL RESEARCH PAPER** 

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## KNOWLEDGE, ATTITUDE AND PRACTICES RELATED TO BIOMEDICAL WASTE MANAGEMENT AMONG STAFF OF A TERTIARY CARE GOVERNMENT TEACHING HOSPITAL IN LUCKNOW

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## ABSTRACT

Health care workers have an important role in managing the bio medical waste and periodic studies should be carried out in order to identify the gaps with respect to knowledge and practices of healthcare workers. This cross-sectional study was undertaken in a government tertiary care teaching hospital in Lucknow between June 2019 and June 2020. Sample size was calculated to be 407 and population proportion sampling was used. Data collection was done using a pre-tested semi-structured questionnaire translated to Hindi which was administered by the researcher to assess knowledge and attitudes. An observational checklist was used to assess the practices of bio medical waste management. Majority (72%) of the study participants had received training in biomedical waste management. Mean score of knowledge about Biomedical waste management rule was highest for doctors, followed by staff nurses and housekeeping staffs. With respect to practice, highest mean score was observed for staff nurses followed by housekeeping staffs. Periodic trainings and appreciation will go a long way in reinforcing the good practices.

## **KEYWORDS**

Biomedical waste, tertiary care hospital, Lucknow

## INTRODUCTION

Bio-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 thereto or in the production or testing of biologicals.<sup>1</sup> Biomedical waste Management Rule was enacted by the Government of India in the year July 1998 and underwent various amendments, latest being in May 2019.<sup>2</sup>

Biomedical waste management is still at the infancy stage and recently got attention due to increased awareness about human immunodeficiency virus, hepatitis B virus, hepatitis C virus, and other potentially infectious diseases more prevalent among the healthcare workers.<sup>3</sup> Health care workers have an important role in managing the bio medical waste and periodic studies should be carried out in order to identify the gaps with respect to knowledge and practices of healthcare workers. Recommendations from these studies will help the administrators to identify the training needs. The present study was conducted to study knowledge, attitude and practices of bio medical waste management among staff of a government tertiary care teaching hospital in Lucknow.

## MATERIALS AND METHODS:

This cross-sectional study was undertaken in a government tertiary care teaching hospital in Lucknow between June 2019 and June 2020. The study included staff working in wards, intensive care units (ICUs), operation theatres, accident and emergency department, dressing rooms, injection rooms, laboratories and dental clinics who were involved in activities related to bio medical waste management such as segregation, collection, transport, treatment and proper disposal and gave consent to participate in the study.

Assuming the minimum knowledge of 50% among the staffs of the healthcare institute, with the formula 4pq/l<sup>2</sup>, taking precision to be 5% and level of confidence to be 95%, sample size was calculated to be 384. Accounting for the finite population of 3924 possible participants, population proportion sampling was used and final sample size of 407 was calculated.

Data collection was done using a pre-tested semi-structured questionnaire translated to Hindi which was administered by the researcher to assess knowledge and attitude. There were Seventeen multiple choice questions of knowledge domain and nine three-point Likert scale questions representing "Agree", "Neutral" and "Disagree" for assessing attitude. An observational checklist was used to assess the practices of bio medical waste management comprising of Ethical approval was obtained from the institutional ethics committee. Data analysis was done using SPSS version 23. Total individual and overall practice scores were calculated for the three domains. Descriptive statistical analysis was done.

#### **RESULTS:**

nine observation checkpoints.

The 407 participants included housekeeping staff (42%), staff nurses (30%), academic residents (22.4%) and paramedical staffs (5.6%). The mean age of the participants was  $32.2 \pm 7.7$  years and majority were females. Most of the participants (40.5%) had educational qualification of intermediate / post high school diploma and 82% of the study participants had a work experience of less than 10 years. Majority (72%) of the study participants had received training in biomedical waste management and 54.1% of the study participants had received the training within last one year (Table 1).

Table	1.	Demographic	Details	And	Biomedical	Waste
Manag	gem	ent Training Of T	he Study F	Partici	pants	

Variable		Job category /Cadre					
		Residents Nurses (n=92) (n=122)		Parame dical Staff (n=23)	Houseke eping Staff (n=170)	Total (N=407)	
Gender	Female	46 (50%)	101 (82.8%)	0	61 (35.8%)	208 (51.2%)	
	Male	46 (50%)	21 (17.2%)	23 (100%)	109 (64.2%)	199 (48.8%)	
Age of study	20-30 years	77 (84%)	76 (62.3%)	8 (34.8%)	66 (38.8%)	227 (55.7%)	
participa nts	31-40 years	15 (16%)	35 (28.7%)	9 (39.1%)	77 (45.3%)	136 (33.4%)	
	41-50 years	0	9 (7.4%)	3 (13.1%)	17 (10%)	29 (7.1%)	
	51-60 years	0	2 (1.6%)	3 (13.1%)	10 (5.9%)	15 (3.7%)	
Educatio nal	Illiterate	0	0	0	43 (25.3%)	43 (10.6%)	
qualifica tion	Primary	0	0	0	33 (19.4%)	33 (8.1%)	
	Middle school	0	0	0	3 (1.8%)	3 (0.7%)	

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	High	0	0	3	51	54
	rigii	0	0	$(12 \ 10/)$	(200/)	$(12 \ 20/)$
	Tutamaa	0	110	(15.170)	(3070)	(13.370)
	diata/	0	(07.50/)	15	(10.00/)	(103)
	diate/		(97.3%)	(03.2%)	(18.270)	(40.0%)
	post					
	school					
	dinloma					
	Graduat	0	2	5	0	17
	o and	0	(25%)	(21.70/)	9	$(A \ 10/_{-})$
	e allu		(2.370)	(21.770)	(3.370)	(4.170)
Mature	Democra	0	20	12	25	70
of work	rennane	0	(24.69/)	15	(20.69/)	(10, 40/)
OI WOIK	III	0	(24.070)	(30.370)	(20.070)	(19.470)
	Contract	0	92	10	135	(59.20/)
	uai		(75.4%)	(43.5%)	(79.4%)	(58.2%)
	Resident	92	0	0	0	92
		(100%)		-		(22.4%)
Working	Ward	35	70	5	91	201
area		(38%)	(57.4%)	(21.7%)	(53.5%)	(49.4%)
	OT	14	3	5	7	25
		(15%)	(2.5%)	(21.7%)	(4.2%)	(6.1%)
	Laborat	4	1	5	11	21
	ory	(4%)	(0.8%)	(21.7%)	(6.7%)	(5.2%)
	ICU	9	13	3	12	32
		(10%)	(10.7%)	(13%)	(7.1%)	(7.8%)
	Others	30	35	5	49	119
		(33%)	(28.7%)	(28.9%)	(28.8%)	(29.2%)
Work	0-10	92	111	18	113	334
experien	years	(100%)	(90.9%)	(78.3%)	(66.5%)	(82.1%)
ce	11-20	0	9	3	42	54
	years		(7.4%)	(13.1%)	(24.7%)	(13.3%)
	21-30	0	2	0	10	12
	years		(1.6%)		(5.9%)	(2.9%)
	31-40	0	0	2	5	7
	vears			(2.9%)	(2.9%)	(1.7%)
BMW	Yes	90	87	15	101	293
Manage		(98%)	(71.3%)	(65.2%)	(59.4%)	(71.9%)
ment		· /	. /	· /	(0)	· · · ·
training	No	2	35	8	69	114
done		(2%)	(28.7%)	(34.8%)	(40.6%)	(28.1%)
Years	No	2	35	8	69	114
since	training	(2.17%)	(28.6%)	(34.8%)	(40.5%)	(28%)
last	received	Ì Í	Ì	Ì	Ì Í	Ì Í
BMW	0-1	68	63	9	80	220
training	vears	(73.9%)	(51.6%)	(39.1%)	(47%)	(54.1%)
	1-5	22	21	6	19	66
	vears	(23.9%)	(17.2%)	(26.1%)	(11.2%)	(16.2%)
	5-10	0	3	0	2	5
	vears	Č.	(2.5%)	Ŭ	(1.2%)	(1.2%)
	10-15	0	0	0	0	0
	10-15	V I	0	l v	0	0
1 1	vears					
	years	0	0	0	1	1

The mean score of knowledge about biomedical waste management (out of 17) was highest for doctors (12.4), followed by staff nurses (11.96). Positive attitude was more among the paramedical staffs (9.2 out of 10) followed by doctors and housekeeping staffs. With respect to practice, out of 9, highest mean score was observed for staff nurses (4.52) followed by housekeeping staffs (4.32). Overall mean score for knowledge was 11.47 out of 17; attitude score was 9.1 out of 10; and overall practice mean score was 4.32 out of 9 (Table 2).

# Table 2: Mean Score In Knowledge, Attitude And Practice Regarding Biomedical Waste Management

	Job category /Cadre wise Mean score							
	Residents	Nurse	Paramedi Housekee Total					
			cal staff	ping staff				
BMW Knowledge (out of 17)	12.4	11.96	10.39	10.77	11.47			
BMW Attitude (out of 10)	9.15	8.97	9.2	9.15	9.1			

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BMW	3.75	4.52	3.6	4.32	4.23
Practice (out					
of 9)					

Although 93% knew that hospital waste should not be mixed with general waste, only 71% were observed to practice it (figure 1). Staff nurses (96.7%) had a higher knowledge followed by residents (85.9%) and then by the housekeeping staff (80.6%) regarding the disposal of soiled and anatomical waste in yellow bin. The awareness regarding the disposal of sharp needle waste in blue bin was present in 83.5% of study participants and regarding the disposal of expired and discarded medicine in yellow bin in only 29.5%. Regarding the disposal of contaminated linen in yellow bin, 64.2% of total study participants answered correctly and residents had a higher knowledge followed by staff nurses and then by housekeeping staffs. It was low in paramedical staff.



Figure1: Knowledge, attitude and practice about mixing infectious wastes with general wastes

Around 93.8% of the total study participants agreed to the need of colour coding for segregation and waste disposal and 10.5% were not of the positive attitude about the requirement of further training for BMW. For the question if the study participant was comfortable if other staff members corrected them for wrong segregation practice, 89.6% of them had a positive attitude. The residents were most reluctant for correction followed by staff nurses. Residents were most reluctant to inform the concerned authority i.e., the University Environment Department for picking up the BMW if the bin was filled more than  $3/4^{\text{m}}$ , followed by the staff nurses and paramedical staffs.

The correct practice of segregating tissue waste or other wastes in yellow bin was found to be 71.4% of study participants. Of these, the best practice was found in staff nurses followed by housekeeping staff and then by residents. Segregation of infected plastic waste in red bin was found correct in 70.5% and segregation of sharp waste (metal) in puncture proof and closed containers in 74.6% of participants. Syringe and sharp waste were found mixed in blue bin in some clinical areas. Glass waste was disposed in blue bin by 81.6% of the study participants. It was practiced by residents the most, followed by housekeeping staffs and by staff nurses.

Around 86.8% of the study participants segregated biomedical waste at the source of generation. It was seen that 92.1% of the house keeping staffs did good practice of segregation of biomedical waste at the source of generation followed by the staff nurses and then by residents. Around 98.5% of the study participants did not segregate the liquid waste. Waste water contaminated with body fluids were flushed into the sewage drainage directly. Regarding the pre-treatment of the laboratory waste/microbiological waste/blood samples and suction apparatus, it was practised by only 4% of study participants. Separate segregation of blood bag in order to be sent for autoclaving prior to incineration was found in some of the departments like Radiotherapy department and blood bank.

## DISCUSSION:

The present study was conducted to study knowledge, attitude and practice of bio medical waste management among staff of a government tertiary care teaching hospital in Lucknow.

It was seen that 72% of the study participants had received training in BMW management. This is lower than studies by Kumar et al in Gujrat and Sehgal R K et al in Delhi.<sup>45</sup> But this proportion is higher than other studies like Munda N.K et aland Karmakar N et al.<sup>67</sup>

Around 93.8% of the participants in our study agreed to the need of colour coding for segregation. Findings varied from 45.6% in the study

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by Deress.T et al and 96.8% in the study by Karmakar N et al.<sup>8,7</sup> Even though 86.8% of the study participants segregated biomedical waste at the source of generation, we have seen that disposal of expired and discarded medicines, contaminated / discarded linen and liquid waste need more focus.

In the study by Puneet. A et al all the doctors and laboratory technicians and 75% of class IV employees wanted to upgrade their knowledge on BMW management.<sup>9</sup> As per the study by Kumar D et al in Gujarat on staff nurses, 97.7% of the study participants felt the need for such training to be held annually and 96.3% were willing to attend such training if conducted in near future.<sup>4</sup> Majority (89.5%) of our study participants were also willing for further training. Induction training programme of all categories of health care workers, periodic CME sessions, annual trainings in the hospital would help reinforce and update knowledge of BMW management and motivate staff to comply with the rules and guidelines. Strengthening the supportive supervision of work done by the supervisors of the respective cadres, provision of certificates of appreciation or "Employee of the month" awards will encourage good practices. Performance feedback and positive reinforcement may also be useful. On the Spot memo, administrative and work practice controls and provision of proper infrastructure as well as materials will improve the practice of biomedical waste management.

#### CONCLUSION

The knowledge aspect of biomedical waste management was good for resident doctors followed by staff nurses, paramedical staffs and housekeeping staffs. But when it comes to the attitude and practice aspect it was found that in majority of the areas the housekeeping staffs and nurses were performing better than the resident doctors. Periodic trainings and appreciation will go a long way in reinforcing the good practices.

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