

Study of Knowledge Regarding Biomedical Waste Management among Healthcare Workers at Tertiary care Teaching Hospital SKIMS, Srinagar

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ABSTRACT

Introduction: Medical waste poses numerous potential health and safety hazards. Effective management of biomedical waste is not only a legal necessity but also a social responsibility.

Material and methods: It was a cross-sectional study in prospective design conducted in a tertiary care hospital SKIMS where 511 subjects were used for study which included faculty members (n=34), Resident doctors (n=123), Nursing Supervisors (n=11), Staff Nurses (n=102), Nursing Aids (n=55), Technicians (n=100), Lab attendants (n=19), Sanitary Supervisors (n=27) & Sanitary Attendants (n=40). A self-structured questionnaire was designed to cover various aspects of knowledge regarding biomedical waste management. Study areas included were selected randomly.

Results: Observations revealed that among the entire studied group faculty had the highest mean knowledge score of 17.6 ± 1.14 . Grading of knowledge score revealed that among faculty 100% (n=34) had excellent knowledge score followed by other staff.

Recommendations: The level of knowledge regarding biomedical waste management has to be assessed regularly and periodically among all the Health care workers. Any deficit in the knowledge about the handling of biomedical waste must be imparted as and when required.

Key words: BMW, HCW

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INTRODUCTION

Hospitals generate an enormous amount of waste. Each year in the USA alone, over 600000 tonnes of regulated medical waste are generated by hospitals and other health care institutions. In India, around 1.5 to 2 kg of waste is generated per bed per day in hospitals, and annually 0.33 million tons of BMW are generated. WHO states that 85 % of hospital wastes are non-hazardous, 10% are infectious and 5% are non-infectious but hazardous wastes. In the USA, 15% of hospital waste is infectious waste whereas in India it could range from 15% to 35% depending upon the total waste generated. (WHO, 253)¹

In the present scenario, the management of biomedical waste is becoming a major problem in most countries. Medical waste poses numerous potential health and safety hazards. In addition to their infectious and toxic characteristics, the highly variable and inconsistent nature

of medical waste streams has increased public concern about segregation, storage, treatment, transportation, and ultimate disposal. Inadequate management of biomedical waste can be associated with risks to health care workers, patients, communities, and their environment.²

Effective management of biomedical waste is not only a legal necessity but also a social responsibility. Hence, there is a need to develop awareness regarding Biomedical waste (BMW) among administrators, doctors, nurses, and paramedical staff. The purpose of effective management of biomedical waste is mainly to reduce waste generation, to ensure its efficient collection, handling, as well as safe

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disposal in such a way that it controls the infection and improves safety for employees working in the system. For this, a conscious, coordinated, and cooperative effort has to be made from physicians to ward boys.²

Health care workers (HCWs) have an important role in managing bio-medical waste through their knowledge, attitude, and practices (KAP).³

The present study was undertaken to assess the knowledge regarding BMW management amongst health care workers of an 800 bedded tertiary care hospital SKIMS, Soura, Srinagar of North India.

MATERIAL AND METHODS

Study Design: It was a cross-sectional study in prospective design conducted at Sher-I-Kashmir institute of medical sciences.

Study duration: The study was conducted for six months from 1st Jan 2016 to 30th June 2016.

Study Area: Study areas included were selected randomly and included general medicine & surgery wards, accident & emergency, surgical ICU, laboratory block & operation theatres (Main OT, Emergency OT & Minor OT).

Study population: All the staff members working in these areas were included in the study which included faculty, resident doctors, staff nurses, nursing attendants, technicians, lab attendants, sanitary workers, and sanitation supervisors.

Study Tool: A questionnaire was developed after scanning the literature and was validated by conducting a pilot study for 15 days to see its applicability in our scenario. It consisted of 21 questions regarding general awareness about biomedical waste, diseases spread by biomedical waste, biomedical waste management handling rules 1998, general management of biomedical waste, and biomedical waste management in SKIMS.

Each correct answer by the participant was given a unit score and an incorrect response a score of zero. A maximum of 21 scores was possible within the parameters of the research tool used.

Scoring:

Score	Grading
0---7	Poor
8---14	Average
15---21	Excellent

Statistical Analysis:

The data was plotted on excel 2013. The data was analyzed statistically with the help of Statistical software SPSS v19. The statistical significance was noted between the various parameters.

RESULTS

The study population included faculty members (n=34), resident doctors (n=123), nursing supervisors (n=11), staff nurses (n=102), nursing aids (n=55), technicians (n= 100), lab attendants (n=19), sanitary supervisors (n=27) & sanitary attendants (n=40).

Mean Knowledge Score:

Observations revealed (Table 1) that among the entire studied group faculty had the highest mean knowledge score of 17.6 ± 1.14 , followed by residents who had a mean knowledge score of 16.2 ± 1.36 . Nursing supervisors had a mean knowledge score of 15 ± 1.09 . While nursing aids had a mean knowledge score of 11.5 ± 2.25 . The lowest mean knowledge score was found in sanitary attendants ($7.1 \pm .96$) and lab assistants/attendants (7.58 ± 1.42).

Table 1 - Mean Knowledge score in relation to the designation of Health care workers

Designation	Mean Knowledge Score	Frequency(n)
Faculty	17.6 ± 1.14	34
Resident doctors	16.2 ± 1.36	123
Nursing Supervisors	15.0 ± 1.09	11
Staff Nurses	14.9 ± 1.95	102
Nursing Aids	11.5 ± 2.25	55
Technicians	12.77 ± 2.16	100
Lab Assistants/Lab Attendants	7.58 ± 1.42	19
Sanitary Supervisors	11.7 ± 3.04	27
Sanitary Attendants	$7.1 \pm .96$	40

Grading of Knowledge Score

Grading of knowledge score (Table 2) revealed that among faculty 100% (n=34) had excellent knowledge score, followed by resident staff where 87% were graded as excellent. 42% of staff nurses were graded as having average knowledge score. Among sanitary attendants, 72 % (n=29) were graded as having poor knowledge scores.

Table 2- Levels of mean knowledge score in relation to the designation of Health Care Workers'

Designation	Excellent	Average	Poor	Frequency(n)
Faculty	34 (100%)	0 (0%)	0 (0%)	34
Resident doctors	108 (87.8%)	15(12.2%)	0 (0%)	123
Nursing Supervisors	7 (63.6%)	4(36.4%)	0 (0%)	11
Staff Nurses	60 (58.8%)	42(41.2%)	0 (0%)	102
Nursing Aids	6 (11%)	49(89%)	0 (0%)	55
Technicians	23(23.0%)	77(77%)	0 (0%)	100
Lab Assistants/Lab Attendants	0 (0%)	9(47.4%)	10(52.6%)	19
Sanitary Supervisors	8 (29.6%)	19(70.4%)	0 (0%)	27
Sanitary Attendants	0 (0%)	11(27.5%)	29(72.5%)	40

Table 3: Mean knowledge score among different groups of staff

Designation	Mean Knowledge Score	Frequency(n)	P-value
Doctors	16.6 ±1.14	157	0.0001
Nursing staff	15.2 ±1.36	168	
Other paramedical	15.5 ±1.09	119	
Sanitation Staff	8.9 ±1.05	67	

Mean knowledge score in relation to the experience of Health care workers

Studying the mean knowledge score viz a viz the *work experience* of selected cadres of HCWs (Table 4), revealed that no statistically significant differences existed.

Table 4- Mean knowledge score in relation to the experience of Health care workers

Designation	Experience in years	Mean knowledge Score	n	P-value
Doctors	0-10 years	16.2 ±1.36	126	0.765
	10 -20 years	18.1± .73	10	
	20 years and above	17.6 ±1.20	21	
Nursing Staff	0-10 years	14.0± 2.69	78	.722
	10 -20 years	13.6± 2.69	36	
	20 years and above	13.7 ±2.51	54	
Technicians	0-10 years	11.4± 3.39	32	0.999
	10 -20 years	10.8± 3.17	20	
	20 years and above	12.5± 2.21	67	
Sanitation Staff	0-10 years	9.00± 3.07	1	.922
	10 -20 years	8.9± 3.07	65	
	20 years and above	9.1± 3.07	1	

Mean knowledge score in relation to the area of work of Health care workers

Observations for the mean knowledge score of Health care Worker's in relation to the *area of work* (Table 5) revealed that among the staff there was no significant variation in mean knowledge score viz a viz various areas of work.

Table 5- Mean knowledge score in relation to the area of work of Health care workers

Designation	Experience in years	Mean knowledge Score	n	P-value
Doctors	Ward	16.2 ± 1.26	46	0.745
	OT	16.1 ± .703	15	
	Lab	16.6 ± 1.10	56	
	Other	16.5 ± 1.90	40	
Nursing Staff	Ward	14.0 ± 2.99	44	0.502
	OT	13.2 ± 2.00	38	
	Lab	13.5 ± 2.11	5	
	Other	12.9 ± 2.15	81	
Technicians	Ward	11.4 ± 3.39	2	0.909
	OT	10.6 ± 3.17	20	
	Lab	12.5 ± 1.21	67	
	Other	11.5 ± 2.21	30	
Sanitation Staff	Ward	9.01 ± 3.06	44	0.122
	OT	8.8 ± 0.07	10	
	Lab	9.8 ± 3.52	10	
	Other	9.2 ± 3.52	3	

DISCUSSION

The Evolving health care system of India, in its goal of solving health issues and minimizing possible health risks, has unavoidably created waste which itself may be harmful to health. Surprisingly, the waste generated at any stage of health care activity has a higher likelihood of injury and infection than any other type of waste. Biomedical wastes as they are rightly called are waste generated during diagnosis, treatment, immunization, or research activities.

The study found that among the entire staff studied, faculty had the highest mean knowledge score of 17.6 ± 1.14 , followed by residents who had a mean knowledge score of 16.2 ± 1.36 . Nursing Supervisors had a mean knowledge score of 15 ± 1.09 , while nursing aids had a mean knowledge score of 11.5 ± 2.25 . The lowest mean knowledge score was found in sanitary attendants $7.1 \pm .96$ and lab assistants/attendants 7.58 ± 1.42 . Mathew S et al (4) et al in a study conducted at Ludhiana, Punjab revealed that knowledge of the existence of the BMW Management Rules 1998 was better in doctors than in the nurses or the paramedical staff. Gupta Gupta V et al⁵ in 2015 conducted a study at PGIMS, Rohtak which revealed that knowledge score was highest among doctors (86%), followed by

nursing staff (70%) and lab technicians (46%). Similarly study by Ranu R et al⁶ et al in June 2016 revealed that doctors were the majority of those with good knowledge and attitude, nurses had the same in practice while cleaning staff had the majority of those with poor knowledge score as compared to all other categories. However, the Soyam GC et al³ study revealed that nursing staff had higher knowledge as compared to other staff including doctors.

In a study from Andhra Pradesh⁹ conducted among dental surgeons/doctors, 43.4% had excellent knowledge, 33.8% good, 19.4% moderate knowledge regarding the BMW management which is quite different compared to our doctors and on the lower side. Kumar R et al⁷ reported that doctors and nurses had better knowledge, positive attitude, and good practices compared to paramedics and sanitary staff regarding infectious waste management and were found similar to our results.

Our study found no significant association between the area of work or duration of experience and the knowledge score. Findings of a study by Hakim S.A et al⁸ regarding KAP of health-care personnel towards waste disposal management at Ai Shams University Hospitals, Cairo, revealed that variables like duration of work experience and have ever

received training on waste management were not significantly related to satisfactory scores in any of the studied domains among physicians and housekeepers, and training was not related to KAP scores of nurses ($P>0.05$). The only significant variable was lifetime work experience among nurses; more of those who had worked > 2 years had satisfactory knowledge scores (68.7%) than those who had worked < 2 years (47.3%) ($P<0.05$).

Knowledge about biomedical waste management rules among the technically qualified personnel like the doctors, nurses, and laboratory staff in our study was high but was low among the sanitary staff; this was similar to the findings from other studies.^{10,11} Chudasama RK et al¹² reported much lower knowledge scores as compared to our study.

CONCLUSION AND RECOMMENDATIONS

The study observed that knowledge regarding various aspects of biomedical waste was adequate among all cadres of Healthcare workers except sanitation staff. Higher qualification and work experience was associated with higher knowledge score among doctors and nurses.

The level of knowledge regarding BMW management has to be assessed regularly and periodically among all the HCWS. Any deficit in the knowledge about the handling of BMW must be addressed as and when required. Hence there is a need to introduce comprehensive training programs by Hospital management on BMW management among all Hospital staff so that not only their knowledge but actual practices of BMW management will also improve.

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