A STUDY TO ASSESS KNOWLEDGE AND PRACTICES OF BIOMEDICAL WASTE MANAGEMENT AMONG HOUSEKEEPING STAFF AT A TERTIARY CARE TEACHING HOSPITAL

Medical Science

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ABSTRACT

Hospitals are health institutions providing patient care services. In the process of health care, waste is generated. Poor management of Biomedical Waste due to lack of knowledge and practices may put healthcare worker and community on risk. The housekeeping staff that cleans the hospital and collects waste may often be at greater risk than a professional medical staff that produces it. The present study was conducted in tertiary care teaching hospital using pre-validated modified questionnaire and observation checklist to assess the knowledge and practices of 128 housekeeping staff. Upon an assessment of knowledge and practices, most of the respondents had poor knowledge (59.38%) and poor compliance to desirable practices (59.38%) with respect to Biomedical Waste Management. Based on study results it can be concluded that, there is a need of multidisciplinary approach (Administrative supervision and continuous sensitization through training & education) to ensure adequate knowledge and compliance to desirable practices.

INTRODUCTION

Hospitals are health institutions of patient care services. In the process of health care, waste is generated. Poor management BMW due to lack of knowledge and practices may put healthcare worker and community on risk. This concern regarding the BMW is mainly due to the presence of pathogenic organisms and organic substances in hospital wastes in significantly higher concentrations.(1)

It is a known fact that improper management of Biomedical Waste may infect the healthcare workers with Hepatitis B & C, skin infections, respiratory infections and AIDS. Improper management of BMW impacts groups of workers in different manner. The housekeeping staff that cleans the hospital and collects waste may often be at greater risk than a professional medical staff that produces it.(2)(3)

A fact sheet by the World Health Organization mentioned that the healthcare waste includes 85% non-hazardous and 15% hazardous material that may be infectious, toxic or radioactive. The 15% hazardous material of healthcare waste contains harmful microorganisms and toxic chemicals which can harm healthcare workers and community.(4)

Under the Environment (Protection) Act, 1986, BMW Management Rules, 2016 came into force from 28th March 2016 in superseding of the earlier BMW Rules, 1998. An amendment to BMWM Rules 2016 was also notified via Gazette notification in 2018 and 2019. According to BMW Rules 2016, updating the knowledge and encouraging the safe practices regarding BMWM among healthcare workers is necessary and it is the responsibility of the healthcare facility in order to protect the environment and human beings.(5)

Keeping the above mentioned facts in mind, the current study was planned with an aim to assess the prevailing knowledge and practices among housekeeping staff regarding BMWM.

METHODS
Study setting

This cross sectional study was conducted in medical college & affiliated hospital and considered all available housekeeping staff involved in BMWM & who gave their consent to participate in the study. A total of 153 housekeepers were involved in BMWM, out of which 128 housekeepers were present throughout the study period (Jan 2019-May 2019) giving a response rate of 83.66%.

All housekeepers involved in BMWM (N=128) were divided in to three groups as per job assigned to them, "Housekeepers at generation point" (N=116), "Housekeepers for collection and transportation" (N=06) and "Housekeepers at common storage point" (N=06).

Study tools

The following study tools were developed using a pre-validated modified questionnaire and an observer based checklist in conjunction with WHO module, national guidelines/initiatives and published research on Biomedical Waste Management.

Questionnaire tool

The questionnaire was divided into two sections to assess the knowledge about Biomedical Waste Management in the study group.

Section 'A' had five (05) items related to selected demographic variables such as participant code, age, gender, education and job experience. Section 'B' had nineteen (19) items (questions) for assessing the knowledge regarding Biomedical Waste Management. The scoring of questionnaire was designed such that each question had four responses, in which one mark (1) was awarded to right answer and zero (0) mark was awarded for the wrong response thus to fill the maximum 19 marks and minimum 0 marks. To interpret the score obtained from questionnaire, the total score was classified as adequate knowledge ($\geq$ 75%), fair knowledge ($\leq$75% - >50%), poor knowledge ($\leq$50% - > 25%), very poor knowledge ($\leq$ 25%) in Biomedical Waste Management.

Observation tool

The checklist was divided into two sections to assess the compliance to ongoing practices about Biomedical Waste Management in the study group.

Section 'A' had one (01) item related to participant code of housekeeping staff to confirm their presence throughout the study period. Section 'B' had twenty two (22) items related to BMWM. Out of twenty two (22) items, eight (08) items were applicable for housekeeping staff working at generation point, ten (10) items for housekeeping staff involved in collection and transportation of BMW and four (04) items for housekeeping staff involved at common storage point. The scoring of practices was designed such that each right practice (compliance) were given one mark (1) and zero (0) mark was awarded for the wrong practice (Non-compliance) thus to fill the maximum possible 08 marks, 10 marks and 04 marks for different group of housekeeping staff. To interpret the score obtained from observation checklist, the total score was further classified as adequate compliance ($\geq$ 75%), fair compliance ($\leq$75% - >50%), poor compliance ($\leq$50% - > 25%), very poor compliance ($\leq$ 25%) in Biomedical Waste Management practices.

Data analysis

After data were collected, further analysis was done using appropriate statistical software. Descriptive statistics was used to describe the demographic data of study population and discussing the Percentage and Mean of observations made on knowledge and practices related to BMWM.

Table 1: Demographic distribution of the study population

Demographic Distribution of the Study Population								
Demographic Variable	Categories	Generation Point (N=116)		Collection and Transportation (N=06)		Common Storage Point (N=06)		Overall (N=128)	
		N	%	N	%	N	%	N	%
Gender	Male	97	83.60	6	100	6	100	109	85.16
	Female	19	16.40	0	0.00	0	0.00	19	14.84
Age	< 30 Years	40	34.50	5	83.30	2	33.30	47	36.72
	30-45 Years	33	28.40	1	16.70	3	50.00	37	28.90
	> 45 Years	43	37.10	0	0.00	1	16.70	44	34.38
Educational Status	Illiterate	16	13.80	0	0.00	0	0.00	16	12.50
	1- 7th Standard	17	14.70	2	33.30	3	50.00	22	17.19
	8-10th Standard	43	37.10	4	66.70	3	50.00	50	39.06
	11th – Graduate	40	34.40	0	0.00	0	0.00	40	31.25
Job Experience	< 5 Years	34	29.30	5	83.30	4	66.60	43	33.60
	5-10 Years	20	17.30	1	16.70	1	16.70	22	17.20
	> 10 Years	62	53.40	0	0.00	1	16.70	63	49.20

Table 2: Mean score of prevailing knowledge in different groups of Housekeepers

Mean score of prevailing knowledge in different groups of Housekeepers				
Questionnaire section	Number of items (Total 19 items)	Mean score (Out of 19)		
		Generation point (N=116)	Collection & transportation (N=06)	Common storage point (N=06)
General knowledge about BMWM	09	8.54	6.00	6.50
Knowledge about segregation	07			
Knowledge about collection, transportation and storage of BMW	03			

Table 3: Knowledge score in different groups of Housekeepers

Prevailing knowledge score in different groups of Housekeepers						
Knowledge Score	Generation point (N=116)		Collection & transportation (N=06)		Common storage point (N=06)	
	N	Percentage (%)	N	Percentage (%)	N	Percentage (%)
≤ 25% (Very poor knowledge)	7	6.03	1	16.67	1	16.67
25.01 - 50.0% (Poor knowledge)	67	57.76	5	83.33	4	66.67
50.01 - 75.0% (Fair knowledge)	40	34.48	0	0.00	1	16.67
> 75.0% (Adequate knowledge)	2	1.72	0	0.00	0	0.00

RESULTS & DISCUSSION

Demographic characteristic of study population

Overall sample population and their distribution as per demographic variables shown in Table 1.

The study comprised of a total sample of 128 (N) Housekeepers. A majority of housekeepers (85.16%) were males. Most of the housekeepers (36.72%) involved in BMWM were younger in the age group < 30 years followed by 34.38% in the age group > 45 years. Most of the housekeepers in the study population had education between 8 - 10th standard across all three categories. Majority of housekeepers (49.20%) had a Job Experience of more than 10 years. A majority of housekeepers (85.18%) were male.

Knowledge domain

Assessment of knowledge was undertaken for housekeepers in all groups namely "Housekeepers at generation point", "Housekeepers for collection and transportation" and "Housekeepers at common storage point". The Questionnaire was distributed to all housekeeping staff involved in BMWM and Mean value calculated based on correct responses provided. The calculated Mean value of each group shown in Table 2. The result of our study reveals that, the observed mean score was highest among housekeeping staff working at generation point (8.54) followed by common storage point (6.50) and collection & transportation (6.00).

Further knowledge score were calculated for each group and it was found that most of the study participants (>50%) had poor knowledge regarding BMWM. However, a few housekeepers 40 (34.48) at generation point had fair knowledge also. Out of 128 housekeeping staffs only two (02) had adequate knowledge about BMWM (Table 3 & Figure 1).Since the success of any organization to a large extent depends on the human resources development. Keeping this in mind, S. Vishal Batma et al (2015) conducted the study for healthcare workers and found that there was low Mean score (3.93) for knowledge about BMWM.(6)

The findings of present study were similar to a study conducted by Puneet A et al (2016) revealed that, knowledge regarding BMWM in class IV employees (Sanitary staff) were found to be very low. Further author added that, the low level of sanitary staff may be due to the lack of any formal training to them.(7)

Another similar study conducted by Dhasarathi k et al (2019) also revealed that 75% of healthcare workers had inadequate knowledge, 25% had moderate knowledge and none of them had 0% adequate knowledge. Further, the author concluded that inadequate knowledge lead to inappropriate management of waste which ultimately harms the healthcare workers and the community.(8)

The finding related to knowledge domain in present study are important, since the generation point is an important place to segregate the biomedical waste. Various studies conducted in the field of waste management revealed how the adequate knowledge of healthcare worker about BMWM affects the financial burden and helps in preventing the harmful effects of biomedical waste on human being as well as in protecting the environment.(9)

Practice domain

To assess the compliance to practices, non-participatory single point observations were made on each item provided in observation checklist. Researcher personally observed the entire event of compliance to right practice on identified study participant. The result of our study reveals that, the observed Mean score was 4.20 among housekeeping staff working at generation point, 4.50 for those in collection & transportation and 1.67 for those working at common storage point (Table 4).

Further, the compliance score were calculated for each group and it was found that most of study participants (>50%) were in Poor Compliance category. However, a few housekeepers 43 (37.07%) at generation point showed Fair Compliance. Out of 128 housekeeping staff none were in Adequate Compliance category (Table 5 & Figure 2).

The findings of the present study were similar to the study conducted by Ramesh k et al (2015). The study result revealed low Mean scores regarding compliance to practices among sanitary workers as compare to professional medical staff. This poor compliance could be due to inadequate supply of requisite items for BMWM (personal protective equipment, colour coded waste bins), lack of supervision & accountability and lack of continuous sensitization through educational program.(10)(11)
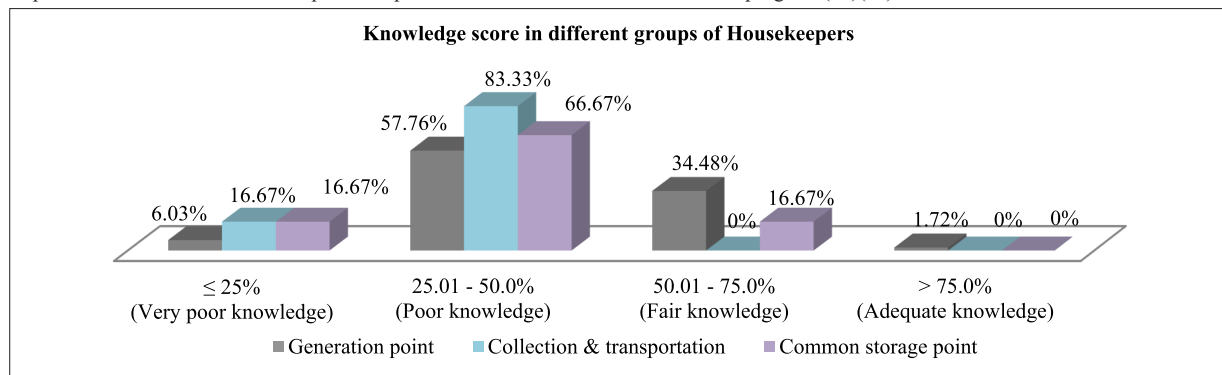

Figure 1: Knowledge score in different groups of Housekeepers

Table 4: Mean score of compliance to practices in different groups of Housekeepers

Mean score of compliance to practices in different groups of Housekeepers			
Study group observed	Number of activity observed	Maximum score	Mean observed score
Generation point Housekeepers	08	08	4.20
Collection & transportation Housekeepers	10	10	4.50
Common storage point Housekeepers	04	04	1.67

Table 5: Compliance score to practices in different groups of Housekeepers

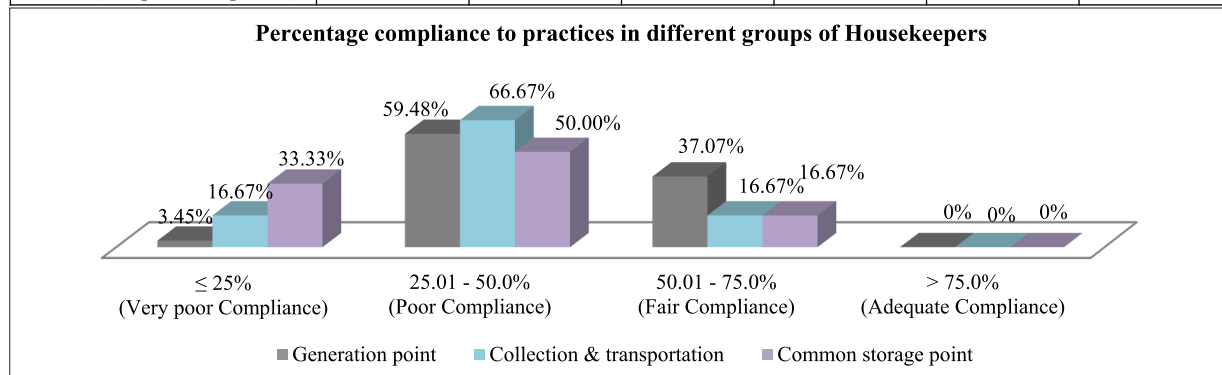| Compliance score to practices in different groups of Housekeepers					
Compliance Score	Generation point (N=116)		Collection & transportation (N=06)		Common storage point(N=06)	
	N	Percentage (%)	N	Percentage (%)	N	Percentage (%)
≤ 25% (Very poor compliance)	4	3.45	1	16.67	2	33.33
25.01 - 50.0%(Poor compliance)	69	59.48	4	66.67	3	50.00
50.01 - 75.0%(Fair compliance)	43	37.07	1	16.67	1	16.67
> 75.0%(Adequate compliance)	0	0.00	0	0.00	0	0.00

Figure 2: Percentage Compliance to practices in different groups of Housekeepers

A cross sectional study conducted by Vanesh M et al (2011) among healthcare worker revealed that the sanitary staff were most ignorant about rational practices related to BMWM and the results of that study were similar to the present study. (12)

Similarly a study by Chawla S et al (2016) titled "Practices regarding Biomedical Waste Management among Health Functionaries" involving healthcare workers revealed that appropriate biomedical waste management and safe handling practices were lacking among health functionaries.(13)

CONCLUSION
Knowledge about color coding, waste segregation, transportation and storage in a safe manner is the crucial for BMWM. In present study, low level of knowledge and compliance to desirable practices could be attributed to lack of training and also to relatively low educational level of the sanitary staff. Hence, there should be ongoing educational program involving multidisciplinary approach (administrative supervision and continuous sensitization through training & education) to ensure adequate knowledge and compliance to desirable practices among housekeeping staff.

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