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### RESEARCH ARTICLE

#### “A STUDY TO ASSESS THE EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE AND PRACTICE REGARDING BIOMEDICAL WASTE MANAGEMENT AMONG HOUSEKEEPING STAFF OF GOVERNMENT DOON MEDICAL COLLEGE HOSPITAL , DEHRADUN”

Aagya Singhal<sup>1</sup>, Nancy<sup>1</sup>, Pratibha Sharma<sup>1</sup>, Rashi Gurung<sup>1</sup>, Ritika Shah<sup>1</sup>, Shahil Srivastva<sup>1</sup>, Sweta Rawat<sup>1</sup>, Varsha Mudila<sup>1</sup> and Manish Jagariya<sup>2</sup>

1. Department of Nursing, State College of Nursing, Dehradun, Uttarakhand

2. Assistant Professor, Department of Community Health Nursing, State College of Nursing, Dehradun, Uttarakhand

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#### Abstract

Biomedical waste is defined as the waste segregated from the healthcare system that can be contagious, infective and hazardous. If this type of harmful waste is not managed properly it can lead to various health hazards. Thus, the housekeeping staff that are responsible for maintaining cleanliness in hospital and discarding waste should have been knowledge about Biomedical waste and its handling.

##### Objective–

1. To assess the pre-test knowledge and practice of housekeeping staff regarding biomedical waste management.
2. To assess the post-test knowledge and practice of housekeeping staff regarding biomedical waste management.
3. To assess the effectiveness of structured teaching programme on knowledge and practice regarding biomedical waste management among housekeeping staff.
4. To find out the correlation between knowledge and practice regarding biomedical waste management among housekeeping staff
5. To find out the association between the pre-test level of knowledge and practice score of housekeeping staff with their selected demographic variable.

**Methodology-** A quantitative research approach with pre-experimental research design was used to assess pre test and post test knowledge and practice of housekeeping staff regarding biomedical waste management. A total of 70 samples were taken by using convenience sampling technique. Self structured questionnaire and practice checklist was used to assess knowledge and practice of housekeeping staff.

**Results-** The findings of our study shows that the mean score and standard deviation of pre test knowledge is  $6.91 \pm 2.37$  and post test knowledge is  $13.87 \pm 1.96$  whereas of pre test practice is  $3.90 \pm 1.78$  and post test practice is  $8.46 \pm 1.00$ . The t value of knowledge was 21.87 and of practice was 19.37 which is more than tabulated t value 2.00.  $p < 0.05$  which shows that there is significant difference in knowledge and

practice after the structured teaching programme among the housekeeping staff regarding biomedical waste management.

**Conclusion**-The findings indicates significant improvement in level of knowledge and practice regarding biomedical waste management among housekeeping staff of Govt. Doon Medical College Hospital, Dehradun.

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## **Introduction:-**

Over the years, there have been massive advances in the healthcare system which is ironic that the healthcare setting which restores and maintains the health of the community also threatens the well being of the patient. The major threat that arises is from poor biomedical waste management practices, serves a huge risk to public health. Biomedical waste is one of the global issues of today's era.

Biomedical waste is the waste generated from the hospital, nursing home, dispensary, and from any other healthcare system during treatment, diagnosis or during any medical procedure.

Indian Medical Association Goes Eco-friendly (IMAGE) is the biomedical waste disposal and treatment project established by Indian Medical Association (IMA) Kerala state branch. The project is the largest common biomedical waste treatment in India. On an average, about 55.8 tonnes of biomedical waste reaches the IMAGE plant daily, 1674 tonnes monthly and 20,088 tonnes yearly.<sup>1</sup>

Medical Pollution Control Committee (MPCC) is the first established common medical waste treatment plant established in Uttar Pradesh with transportation system for safe transportation, treatment, and disposal of biomedical waste. It also providing biomedical waste management services in Uttarakhand.<sup>2</sup>

According to Union Ministry of Environment, Forest and Climate Change India generated 56,898 tones of biomedical waste during Covid-19 (June 2020- July 2021), and in Uttarakhand, 811 metric tonnes of biomedical waste was generated between March 2020 – February 2021.<sup>3</sup>

About 85% of the biomedical waste is non-hazardous, 10% is infectious and 3% is chemical and pharmaceutical waste, 1% is sharp waste and 1% is radioactive, cytotoxic and heavy metal waste.<sup>4</sup> However, if the infectious components get mixed with general waste the entire bulk of the hospital waste potential becomes infectious that can cause viral diseases like Human Immunodeficiency Virus (HIV), Hepatitis B, A and C, arboviruses, enteroviruses, dengue, Japanese encephalitis, tick-borne fever, and bacterial diseases like typhoid, cholera, tetanus, pseudomonas, septicemia, rheumatic fever and parasitic diseases such as malaria, leishmaniasis, kala-azar and lymphatic filariasis.<sup>5</sup> So, it's the duty of every hospital to ensure safe handling and management of biomedical waste.

A cross sectional study was conducted among 120 healthcare personnel of tertiary health care institute in Dakshina Kannada, Karnataka by using pre-test, semi-structured questionnaire. The study revealed that knowledge regarding color coding and risks of handling biomedical waste was poor across all the healthcare personnel especially among class IV waste handlers.<sup>6</sup>

The housekeeping staff are one of those health care workers who works in different wards of hospital and spend most of their time in contact with biomedical waste. So, it is necessary that they have an appropriate knowledge and practice regarding biomedical waste management to protect them as well as the society and public from harmful diseases.

## **Material and Methods:-**

### **Study design**

The study was conducted at Government Doon Medical College Hospital, Dehradun, Uttarakhand on housekeeping staff and pre-experimental : one group pre-test post-test research design was used.

Convenience sampling technique was used for collecting the sample. Sample size taken was 70 housekeeping staff of Government Doon Medical College Hospital, Dehradun.

**Inclusion criteria -**

1. The study includes the housekeeping staff of Doon Medical College Hospital, Dehradun.
2. The study includes the housekeeping staff who were present at the time of collection of data.
3. The study includes housekeeping staff who were willing to participate in the study.

**Exclusive Criteria –**

1. The study does not include housekeeping staff who were having complete knowledge about biomedical waste management.
2. The study does not include housekeeping staff who were not permanent.

**Instrument/tool**

It includes self structured questionnaire and practice checklist to evaluate the knowledge and practice of the housekeeping staff regarding biomedical waste management.

The tools were prepared in 3 sections

**SECTION A- Demographic data**

It include age of participant, gender, educational status, income, years of experience, source of knowledge.

**SECTION B- Self structured questionnaire**

It include 20 question which are distributed in 2 parts -

**Part 1** – Contain 10 questions related to introduction of biomedical waste management.

**Part 2** – Contain 10 questions related to knowledge regarding biomedical waste management.

**SECTION C- Practice checklist**

It include 10 questions.

**Scoring of Tool**

Each question was awarded 1 mark for correct answer and 0 mark if the answer is wrong .

Thus total marks for the questions related to knowledge

1. Inadequate- 0-6
2. Moderate – 7-13
3. Adequate – 14-20

Thus total marks for the questions related to practice

1. Poor – 0-3
2. Fair – 4-7
3. Good – 8-10

**Statistical analysis**

The analysis of data was done on the basis of objectives and hypothesis using descriptive and inferential statistics. Frequency and percentage distribution was used for analyzing demographic variables and compute pre test and post test level of knowledge and practice. Mean and standard deviation was used for comparing overall knowledge and practice score. Karl Pearson correlation coefficient was used to find out the correlation between knowledge and practice. Chi square was used to find the association between pre test level of knowledge and practice with the selected demographic variables.

**Result:-**

**Table 1:-** Frequency and percentage distribution of demographic variable.

n = 70

S.No	Demographic Variable	Frequency	Percentage (%)
1.	Age (in years)		
	21 – 30	24	34.3
	31 – 40	28	40

	41 – 50	14	20
	51 – 60	4	5.7
<b>2.</b>	<b>Gender</b>		
	Male	42	60
	Female	28	40
<b>3.</b>	<b>Educational Status</b>		
	Primary	5	7.1
	High School	12	17.1
	Intermediate	27	38.7
	Graduate	26	37.1
<b>4.</b>	<b>Income</b>		
	5,000 – 10,000	51	72.9
	10,000 – 15,000	14	20
	15,000 – 20,000	3	4.3
	20,000 – 25,000	2	2.8
<b>5.</b>	<b>Years of Experience</b>		
	1 – 5	43	61.4
	5 – 10	20	28.6
	10 – 15	5	7.1
	15 – 20	2	2.9
<b>6.</b>	<b>Previous Knowledge related to biomedical waste management</b>		
	Yes	70	100
	No	0	0
	<b>If yes, what is the source of knowledge</b>		
	Mass media	3	4.2
	Pamphlets	1	1.4
	Peer group	18	25.8
	Training officer	48	68.6

The study shows majority 40% of samples were between age group 31-40 whereas minority 5.7% were between 51-60 years. 60% of samples were male and 40% were female. In terms of education majority 38.7% has completed intermediate education and only 7.1% had primary education. Almost 72.9% had income between 5,000 to 10,000 whereas only 2.8% were having income between 20,000 to 25,000. In terms of years of experience majority 61.4% had experience between 1 to 5 years and minority 2.9% had experience between 15 to 20 years. All 100% of samples had previous knowledge regarding biomedical waste management out of which 68.6% have gained knowledge from training officer, 25.8% from peer group, 1.4% from pamphlets and 4.2% from mass media.

**Table 2:-** Frequency and percentage distribution according to level of knowledge regarding biomedical waste management. n=70

Level of knowledge	Pre – test		Post – test	
	Frequency	%	Frequency	%
<b>Inadequate (0 - 6)</b>	31	44.28	0	0
<b>Moderate (7 - 13)</b>	36	51.42	29	41.42
<b>Adequate (14 - 20)</b>	3	4.28	41	58.58

In pre test majority of hosekeeping staff were having moderate knowledge and after structured teaching programme in post test majority had adequate knowledge.

**Table 3:-** Frequency and percentage distribution according to level of practice regarding biomedical waste management. n=70

Level of practice	Pre – test		Post – test	
	Frequency	%	Frequency	%
Poor (0-3)	38	54.28	0	0
Fair (4-7)	30	42.86	10	14.29
Good (8-10)	2	2.86	60	85.71

In pre test majority of housekeeping staff were having poor practice and after structured teaching programme in post test majority had good practice.

**Table 4:-** Comparison of overall knowledge score. n=70

Variable	Group	Mean±SD	Mean %	Mean difference	t value
Knowledge	Pre – test	6.91± 2.37	34.57%	6.96	21.87 df=69 p<0.05
	Post- test	13.87±1.96	69.36%		

Pre test mean±SD was 6.91±2.37 and post test mean±SD was 13.87±1.96 which shows significant difference between pre test and post test knowledge score. The calculated t-value was 21.87.

**Table 4:-** Comparison of overall practice score n=70

Variable	Group	Mean±SD	Mean %	Mean difference	t value
Practice	Pre – test	3.90 ±1.78	39%	4.56	19.37 df=69 p<0.05
	Post- test	8.46± 1.00	84.57%		

Pre test mean±SD was 3.90±1.78 and post test mean±SD was 8.46±1.00 which shows significant difference between pre test and post test practice score. The calculated t-value was 19.37.

**Table 5:-** Correlation between knowledge and practice regarding biomedical waste management. n=70

S.No	Category	Correlation co-efficient 'r' value
1.	Knowledge	0.404 df= 69 p<0.05
2.	Practice	

The calculated r value (0.404) > tabulated r value (0.232), p<0.05 which indicate significant correlation that is moderately positive correlation between knowledge and practice.

**Table 6:-** Association between pre-test level of knowledge of housekeeping staff with their selected demographic variables. n=70

Variable	Inadequate (0-6)	Moderate (7-13)	Adequate (14-20)	Df	Chi-square value	P-value	Inference
<b>Age of the participants</b>							
21-40 years	22	30	0	2	6.850*	0.032	S
41-60 years	9	7	2				
<b>Gender</b>							
Female	10	17	1	2	1.402	0.495	NS
Male	21	20	1				
<b>Educational status</b>							
Primary - High school	7	9	1	2	1.228	0.540	NS
Intermediate- Graduate	28	24	1				
<b>Income</b>							
5000-15000	30	33	2	2	1.621	0.444	NS
15000-25000	1	4	0				

<b>Years of experience</b>							
1-10 years	30	31	2	2	3.939	0.139	NS
10-20 years	1	6	0				
<b>Source of knowledge</b>							
Mass media – Pamphlet	2	1	1	2	7.934*	0.018	S
Peer group - Training officier	29	36	1				

The obtained p value for age of the participants and source of knowledge is  $p < 0.05$  which indicates there is significant association between knowledge of housekeeping staff regarding biomedical waste management. Hence, according to age of the participants and according to the source of knowledge the level of knowledge increases.

**Table 4.7:-** Association between pre-test level of practice of housekeeping staff with their selected demographic variables n=70

Variable	Poor (0-3)	Fair (4-7)	Good (8-10)	Df	Chi-square value	P-value	Inference
<b>Age of the participants</b>							
21-40 years	29	22	1	2	1.120	0.571	NS
41-60 years	8	9	1				
<b>Gender</b>							
Female	18	10	0	2	2.840	0.241	NS
Male	19	22	1				
<b>Educational status</b>							
Primary - High school	3	13	1	2	11.237*	0.003	S
Intermediate- Graduate	34	18	1				
<b>Income</b>							
5000-15000	34	30	1	2	0.167	0.919	NS
15000-25000	3	2	0				
<b>Years of experience</b>							
1-10 years	33	28	2	2	0.489	0.782	NS
10-20 years	4	3	0				
<b>Source of knowledge</b>							
Mass media – Pamphlet	1	2	1	2	7.934*	0.018	S
Peer group - Training officier	36	29	1				

The obtained p value for educational status and source of knowledge is  $p < 0.05$  which indicates there is significant association between practice of housekeeping staff regarding biomedical waste management. Hence, according to level of educational status and according to the source of knowledge the level of practice increases

### Discussion:-

This chapter discusses the major findings of the study and reviews that in relation to findings from the result of previous study.

The present study was conducted to assess the effectiveness of structured teaching programme on knowledge and practice regarding Biomedical waste management in Government Doon Medical College, Dehradun, Uttarakhand. In order to achieve the objective of the study pre-experimental (one group pre-test post-test) research design was adopted. There was total 70 samples that fulfilled the inclusion and exclusion criteria using convenience sampling technique. The Data was evaluated using Self Structured Questionnaires and Practice Checklist.

**The Discussion Is Done Under The Following Categories:**

Discussion related to biomedical waste management and its effectiveness of structured teaching programme of knowledge and practice among housekeeping staff.

The result shows the enhancement in knowledge (13.87) and practice (8.46) after application of structured teaching programme, which is more than the previous knowledge (6.91) and practice (3.90) regarding biomedical waste.

Finding of the study revealed that in pre-test knowledge (44.28%) samples had inadequate knowledge, (51.42%) had moderate knowledge, (4.28%) had adequate knowledge. In pre test practice (58.28%) had poor practice, (42.86%) had fair practice and (2.86%) had good practice, whereas in post-test knowledge (0%) had inadequate knowledge (41.42%) had moderate knowledge and (58.58%) had adequate knowledge and in post-test practice (0%) had poor practice (14.29%) had fair practice and (85.7%) had good practice.

**Discussion related to correlation between knowledge and practice regarding biomedical waste management among housekeeping staff.**

The calculated r value (0.404) > tabulated r value (0.232), thus  $p < 0.05$  which implies moderately positive correlation between knowledge and practice regarding biomedical waste management.

**Discussion related to association between selected demographic variable and pre test level of knowledge and practice regarding biomedical waste management among housekeeping staffs.**

Chi square value for age of participants for knowledge ( $\chi^2 = 6.850$ ) and practice ( $\chi^2 = 1.120$ ), gender ( $\chi^2 = 1.402$ ) ( $\chi^2 = 2.840$ ), educational status ( $\chi^2 = 1.228$ ) ( $\chi^2 = 11.237$ ), income ( $\chi^2 = 1.621$ ) ( $\chi^2 = 0.167$ ), years of experience ( $\chi^2 = 3.939$ ) ( $\chi^2 = 0.489$ ), source of knowledge ( $\chi^2 = 7.934$ ) ( $\chi^2 = 7.934$ ). The obtained p value for age of participants and source of knowledge  $p < 0.05$  indicates there is significant relation between knowledge of biomedical waste management hence level of knowledge increases according to age and source of knowledge and p value for educational status and source of knowledge is  $p < 0.05$  which indicates there is significant relation between practice of biomedical waste management and hence level of practice increases according to educational status and source of knowledge.

**Conclusion:-**

Based on the findings, it is statistically evidence proved that the knowledge and practice of the participants regarding biomedical waste management have been significantly increased after structured teaching programme has been implemented.

**Source Of Support**

Nil.

**Conflict of Interest**

None.

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