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A STUDY TO ASSESS THE KNOWLEDGE REGARDING CURRENT BIO-MEDICAL WASTE MANAGEMENT AMONG B.SC (HONS) NURSING STUDENTS STUDYING IN GOVT COLLEGE, BHOPAL

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ABSTRACT

Background: Bio-medical waste management, or BMWM, is the process of minimizing the amount of waste produced by healthcare facilities and efficiently collecting, transporting, storing, and disposing of it so that it poses no longer any risks. Ignorance and insufficient understanding of BMWM might have detrimental effects. A study was conducted to evaluate the B.Sc. Nursing student's understanding of contemporary biomedical waste management. ***Methodology:*** A Non-experimental descriptive study was selected to assess the knowledge regarding biomedical wastemanagement. The convenient sampling technique used to select the sample. A structured knowledge questionnaire was used to collect the data. A total of 255 participants were recruited out of which 168 participated in the study and data were analyzedbyusing descriptiveandinferential statistics. ***Result:*** Most of the sample population (71.43%) has an average knowledge ofcurrent biomedical waste management. 15.48% have poorknowledge. Only 13.01% of the population has good knowledge regarding currentbiomedicalwaste management. There is a significant association between knowledge with age and year of study at 0.05 level of significance. ***Conclusion:*** The study concludes that most Nursing students had average knowledge regarding biomedical wastemanagement and there is a need for educational intervention to improve their knowledge.

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INTRODUCTION

The waste generated in the course of healthcare activities carries a higher potential for infection & injury than any other type of waste[1]. Apart from its being a legal mandatory requirement, strict adherence to the Bio-Medical Waste Management rules by the Government of India is aduty that should be carried out to protect the health &well-being, not only of the patients & staff of the hospital but also the public at large.[2] Bio-Medical Waste means any waste, that is generated during the diagnosis, treatment, or immunization of human beings or animals, or in research activities pertaining thereto or in theproduction or testing of biologicals[3]. Health care providers being the important professional who works collaborators with the health care team have lots of responsibility in knowing the categories of hospital waste, segregation management practices, etc. Correct disposal of hospital waste helps in the reduction of nosocomial infection.[4] One-fourth of biomedical waste is regarded as hazardous with the potential for significant health concerns for medical personnel & general community. So awareness about various parts is required[5].One of the most crucial tasks for a healthcare worker is to properly manage the biomedical waste produced in a facility because poor handling of this waste not only endangers human life and the environment but may also lead to legal action against hospital administration and healthcare personnel[6]. The hospital waste generated from large hospitals/nursing homes has deleterious effects due to its hazardous nature. BMW if not handled properly, is a potent source of diseases like AIDS, tuberculosis, hepatitis, and other bacterial diseases causing serious threats to human health. An ideal healthcare center is free from infection & acquired infection.Hospitals & health care teams need to give equal importance to treating the ill & at the same time not making the healthy fall ill[7].

MATERIALS & METHODS

A Non-experimental descriptive design was used to assess the knowledge regarding current bio-medical waste management. After

obtaining permission from the Principal, 255 Participants were recruited & finally 168 participated at the government nursing college in Bhopal. The data were collected from 01.06.2023 to 20.08.2023 through Google Forms. A convenient sampling technique (Non-Probability Sampling Technique) was used to select the sample. The Sample size was calculated using the formula. n= z 2 p*q/d 2 =195. A structured knowledge questionnaire was used to assess knowledge of current biomedical waste management. It consists of 25 multiple-choice questions, each correct answer was given a score of 'one', and the wrong answer was given a score of 'zero'. There were no negative markings. The total score given was 25. The assessment of knowledge was done by convertingthe score obtained into a percentage (%) score. i.e., 1-33% marks were considered as poor knowledge, 34-67 % as average knowledge, and 68-100% as good knowledge.

Ethical Consideration: Ethical Permission was obtained from, Departmental Research committee, Govt Nursing College Bhopal. Data was collected after getting formal permission from the concerned authorities. Data was collected after getting formal permission from the concerned authorities. The investigator explained the study objectives to the subjects and enrolled the subjects who were willing to participate on their own and signed the consent form. The confidentiality of data was maintained by assigning a unique number to the sample and not disclosing the subject identity.

Data Collection Measures: **A** convenient sampling technique (Non-Probability Sampling Technique) used to collect the sample. The tool was validated by experts and was found reliable. It is prepared in **Section A-** It consists of demographic data with 03 items (age, year of study, and source of information) **Section B -** structured knowledge questionnaire to assess knowledge among B. Sc(Hons) Nursing Students of selected govt college Bhopal on current biomedical waste management (i.e: 2016. 2018 & 2019 BMW Guidelines were prepared) . It contained 25 multiple-choice questions. Data was collected by administering a structured knowledge questionnaire to study subjects. Each correct answer wasgiven a score of 'one' and the wrong answer was given a score of 'zero'. There were no negative markings. The total score given was 25. The assessment of knowledge was done by convertingthe score obtained into a percentage (%) score. i.e., 1-33% marks were considered as poor knowledge, 34-67 % as average knowledge and 68-100% as good knowledge

Statistical Analysis: Descriptive and Inferential statistics were used for the analysis of data as per the objectives and hypothesis. In the descriptive analysis calculations were done by using frequency and percentage, mean and SD & inferential statistics like the chi-square test were used to find out the association between the level of knowledge regarding biomedical waste management among B.Sc(Hons) nursing students studying in selected govt college Bhopal with selected demographic variables.

RESULTS

Table 1 shows the frequency and percentage distribution of demographic variables like age, year of study, and source of information on current bio-medical waste management, most of the students who participated in the study come under the age group of 21-23 years (67.26%) of the total population. The rest of the population is included in the 18-20 and 24-25 age groups with 30.36% and 2.38% respectively. None of the students are included in the age group >25 years. The study was conducted among all the B.Sc (Hons) nursing students of Govt Nursing College Bhopal. Out of 255 students, 168 participated in the study. It includes 43 (25.51%) first-year students, 44 (26.19%) second-year students, 41 (24.4%) third-year students, and 40 (23.81%) fourth-year students. Maximum participation was from 2nd year students. The source of information used by 71.43% of the students is the nursing curriculum. 11.9% of students were using the internet as a source of information. 12.5% of the students have attendedworkshops on bio-medical waste management and 4.17% of the students are using other sourcesof information.

Table 1. Frequency & percentage distribution of demographic variables (N=168)

SL No.	Demographic variables	N = 168	
		Frequency	Percentage (%)
1	Age in years		
	18-20	51	30.36
	21-23	113	67.26
	24-25	4	2.38
	Above 25	0	0
2	Year of study		
	1st year	43	25.51
	2nd year	44	26.19
	3rd year	41	24.4
	4th year	40	23.81
3	Source of information		
	Nursing curriculum	120	71.43
	Internet	20	11.9
	Workshops on BMW	21	12.5
	Others	7	4.17

Table 2. The majority of the sample population (71.43%) has average knowledge of current biomedical waste management. 26 students out of 168 (15.48%) had poor knowledge. Only 13.01% of the population has good knowledge regarding current biomedical waste management.

Table 2. Showing the level of knowledge of the total sample population (N=168) asGood, Average & Poor using frequency and percentage distribution

Level of knowledge	Frequency(n=168)	Percentage (%)
Good	22	13.01
Average	120	71.43
Poor	26	15.48

Table 3 all the age groups have average knowledge of current bio-medical waste management. In the 18-20 year age group, 66.67% have average, 27.45% have poor & only 5.8% have good knowledge of current bio-medical waste management. Maximum students are included in the age group 21-23 years 73.4% of them have average knowledge & rest of them with 15.9% having good knowledge & 10.6% having poorknowledge. Only 4 students were included in the age group 24-25 years 75% of them have average knowledge & 25% have good knowledge. None of them have poor knowledge.

Table 3. Showing level of knowledge according to age group as Good ,Average &Poor using frequency and percentage distribution table (N=168)

Level of Knowledge	18-20		21-23		24-25	
	F	%	F	%	F	%
Good	3	5.8	18	15.9	1	25
Average	34	66.67	83	73.4	3	75
Poor	14	27.45	12	10.6	0	0

Table 4. The knowledge level of third-year students is higher than the other batches, as 80.48 % of them have average knowledge of current bio-medical waste management. Among 1st years, 58.13% & 41.86% have average and poorknowledge respectively. No student from the first year had good knowledge of current biomedical waste management. In 2nd year, 72.12% having average, 20.45% having good & 6.82% having poor knowledge. In 3rd year, an equal number of students have good & poorknowledge, i.e., 9.76% each. 75% of 4th-year students have average knowledge, 22.5% have good & 2.5% have poor knowledge among 4th years. Table 5 Most of the students are using the nursing curriculum as a source of information.74.17% of students using the nursing curriculum have average knowledge 14.17% have good & 11.66% have poorknowledge 65% of students using the internet have average knowledge, 30% having poor & 5% having good knowledge. Among students who have attended workshops on BMW management 71.42% have average knowledge, 14.28% each for good & poor knowledge.

Table 4. Showing level of knowledge according to year of study as Good, Average& Poor using frequency and percentage distribution table. (N=168)

	1ST Year		2ND Year		3RD Year		4TH Year	
	F	%	F	%	F	%	F	%
Good	0	0	9	20.45	4	9.76	9	22.5
Average	25	58.13	32	72.72	33	80.48	30	75
Poor	18	41.86	3	6.82	4	9.76	1	2.5

Table 5. Showing level of knowledge according to source of information as Good,Average & Poor using frequency and percentage distribution table. (N=168)

Level	Nursing curriculum		Internet		Workshops onbmw Management		Others	
	F	%	F	%	F	%	F	%
Good	17	14.17	1	5	3	14.28	1	14.28
Average	89	74.17	13	65	15	71.42	3	42.85
Poor	14	11.66	6	30	3	14.28	3	42.85

Table 6. Findings regarding the relationship between knowledge regarding current biomedical waste management with selected demographic variables. (N=168)

Sl.No	Demographic Variables	Level of knowledge			Deg ree of freedom	Chi square		Significance
		Good	Average	Poor		Calculated Value	Tabulated value	
1	Age in years							
	18-20	3(5.8%)	34(66.67%)	14(27.45%)	4	10.4	42.61	S
	21-23	18(15.9%)	83(73.4%)	12(10.6%)		5		
	24-25	1(25%)	3(75%)	0				
2	Year of study							
	First year	0	25(58.13%)	18(41.86%)	6	38.8	12.59	S
	Second year	9(20.45%)	32(72.72%)	3(6.82%)				
	Third year	4(9.76%)	33(80.48%)	4(9.76%)				
	Fourth year	9(22.5%)	30(75%)	1(2.5%)				
3	Source of Informa Tion							
	Nursing	17(14.17%)	89(74.17%)	14(11.66%)	6	9.44	12.59	NS
	curriculum							
	Internet	1(5%)	13(65%)	6(30%)				
	Workshops	3(14.28%)	15(71.42%)	3(14.28%)				
	on BMW							
	Others	1(14.28%)	3(42.85%)	3(42.85%)				

S: Significant
NS: Non-Significant

Students using other sources of information, 42.85% each for average & poor knowledge, and 14.28% for good knowledge. Table-6 The data shows that there is a significant relationship between knowledge & age and knowledge & year of study at 0.05 level of significance with selected demographic variables. hence the research hypothesis is accepted. There is no relationship between knowledge and the source of information used by students was found non-significant whereas the null hypothesis is accepted with the source of information.

DISCUSSION

The total score obtained by each student was converted to a percentage (%) score. Students who had a % score in the range of 1-33%, 34-67%, and 68-100% were considered to be having poor average and good knowledge respectively. In the present study majority of students (71.43%) had average knowledge 13.01% had good knowledge, and 15.48% had a poor level of knowledge on current bio-medical waste management. The mean score obtained by 1st year students is 9.60 (38.42%), 2nd-year students is 13.90 (56.45%), 3rd year students is 12.63 (50.54%), and 4th year students is 14.15 (50.37%) That means most of the 1st year students are having poor knowledge and other 3 batches having average knowledge on current bio-medical waste management. The mean score of the total population is 12.54(50.37%) indicates that the population has average knowledge. Thus it was evident that the majority of the students had an average level of knowledge regarding current bio-medical waste management.

Knowledge regarding BMWM While assessing the knowledge of 168 students in the present study maximum (71.43%) had average knowledge 13.01% had good knowledge, and 15.48% had a poor level of knowledge on current bio-medical waste management.

Similar findings were reported by Haider S et al about 70.83% average level of knowledge regarding BMWM. In Karnataka also similar finding was reported by Therese K and Rao JN that the majority had a moderate level of knowledge, 85% and 80% respectively[44]. Chaudhary and Mahajan reported that the total mean score for knowledge was 10.76 ± 2.67 similar to the present study where the total mean score was 12.54. [45] Rosuzeita et al in Malaysia found mean score 6.75. Pratap S et al in Odisa, also found that the majority of students 53.33% had moderate knowledge on managing the BMW.[46] Contradictory findings reported by Ajmera V et al in Rajasthan were 61.67% high level of knowledge, 33.33% moderate level of knowledge, and 5% low level of knowledge regarding BMW management.[47] This implies that the level of knowledge regarding BMWM among nursing students of Bhopal was comparatively better as compared to Odisa, Malaysia, and lower to Karnataka and Rajasthan.

Association between the level of knowledge regarding BMWM with selected demographic variables: The Chi-square test results showed that the calculated value is greater than the tabulated value for demographic variables like age in years and year of study and that significant association between age (in a year) and year of study, age and year of study of the students have a significant impact on the level of knowledge at 0.05 level of significance. There is no association between the source of information & knowledge on current bio-medical waste management. A similar study conducted by Jolly GV revealed that there is a significant relationship between knowledge & demographic variables like age sex marital status occupation.[42] A similar result by Chaudhary and Mahajan In was found that the fourth-year students had better knowledge scores than the other-year students. [45] Vasamreddy et al and Kumar & Padmaja also found that

IV-year students had significantly more knowledge than I-year students (P = 0.000, $\chi 2 = 67.60$**).[48] Therese K found that Significant association between knowledge with age in year. For the supporting of no association between source of information & knowledge on BWM[44] Pratap S et al in Odisa reported similar results. [46] But another study by Tiwari KS et al and Ajmera V et al reported there is no association between age and years of study with knowledge regarding BMWM. [49,48] Thus, It was discovered that 4th years had more knowledge and were responsible for the possibility of health concerns, whereas 1st years did not. The study sample was drawn by using a convenience sampling technique and the selection bias may have influence. The sample was collected only at the Government nursing college in Bhopal. Incorporating hands-on learning experiences where students actively engage in sorting, handling, and disposing of biomedical waste under the supervision of a senior nursing officer, and conducting regular workshops and seminars focused on biomedical waste management is recommended to improve the knowledge.

CONCLUSION

This study conducted among nursing students revealed that their average understanding of current biomedical waste management is linked significantly to their age and the year of their study. Thus, there is a pressing necessity to enhance students' knowledge through hands-on educational approaches and increased exposure to clinical settings for practicing biomedical waste management procedures.

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