Effectiveness of Structure Teaching Programme on Biomedical Waste Management among Student Nurses

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ABSTRACT

Objective: To assess the level of knowledge and practice on disposal of Biomedical wastes and its related health hazards among student nurses. To find out the effectiveness of structured teaching programme on BMW management.

Method: Evaluative method was implemented and the study was based on the conceptual frame work of General System Model theory. A pre-experimental one group pre- test and post-test design was adopted. The samples of 84 GNM students were participated in study. Data were collected by convenient sampling method. Self structure tools were designed and validated for data collection.

Result: Among total sample maximum 57.15% (48) were 18 to 24 years of age. In case of both knowledge and clinical practice, the pretest highest scores was (47.62%) and it was the average score and posttest highest (71.43%) that was very good score. In pretest, knowledge score of GNM 1st year the maximum was 21 and mean 10.25, SD 2.12 and mean percentages 50%. GNM 2nd year the maximum score was 23 and mean 10.2, SD 0.71 and mean percentages 44.34%. GNM 3rd year the maximum score was 20 and mean 10.03, SD 1.41 and mean percentages 50.15%. In post test of GNM 1st yr mean was 14.68, SD 4.95 and mean percentages 69.90% and mean difference was 19.9%. In GNM 2nd year post test score mean was 17.52, SD 1.41 and mean percentages 76.17% and mean difference was 31.83%. In post test score mean was 17.41, SD 2.83 and mean percentages 87.05% and mean difference was 36.9%. Similarly in pretest, GNM 1st year the maximum score on clinical practice was 19 and mean 10.21, SD 2.07 and mean percentages 53.73%. GNM 2nd year the maximum was 21 and mean 10.16, SD 2.15 and mean percentages 48.38%. GNM 3rd year the maximum score was 18 and mean 10.12, SD 2.18 and mean percentages 56.23%. After educational intervention GNM 1st yr post test score mean was 15.47, SD 3.06 and mean percentages 81.42% and mean difference was 27.69%. GNM 2nd year mean was 15.26, SD 3.7 and mean percentages 72.66% and mean difference was 24.28%. GNM 3rd year post test score of mean was 15.44, SD 3.09 and mean percentages 85.77% and mean difference was 29.54%. In the Present study the calculated z-value was 21.11 which was greater than the tabulated z-value with the p value at less than 0.05 level of significance. So, the educational intervention on BMW management was effective to enhance the knowledge and clinical practice of the student nurses.

Conclusion: Biomedical waste (BMW) created in our country on an everyday premise is tremendous and contains irresistible and dangerous materials. Biomedical waste created in our country on an everyday premise is tremendous and contains irresistible and dangerous materials. It is the important for the student nurses and also all the employees of health care delivery system to identify the risks of the BMW in the workplace and its appropriate and successful management in a logical way. There is an essential need for better education to improve the practices of BMW management by well-designed seminars, programs and workshops for student nurses.

Key words: Biomedical waste management, structure teaching programme, knowledge and practice

INTRODUCTION

Biomedical waste (BMW) produced in our country on an everyday premise is tremendous and contains irresistible and dangerous materials. It is essential for health care providers to aware the health hazards of the biomedical waste in the workplace. [1] It is evaluated that 10-25% of the healthcare waste produced is dangerous and presents physical, chemical and/or microbiological hazard to everybody and health-care workers related with handling, segregation, treatment, and destruction of waste. [2] The BMW created in human services exercises can be a high hazard for contamination and injury in contrast with some other kind of waste thus, it is essential to have a safe and reliable strategy to deal with. It tends to create serious problem to general wellbeing and produces a huge effect on the earth if handle practice is to done in a wrong and deficient manner [3] It is predictable that yearly about 0.33 million tons of hospital waste is produced in India and, the waste production rate ranges from 0.5 to 2.0 kg per bed per day or is anticipated to grow at 8-10% yearly (Waste management, WHO,1999). Educational institutions with hospital play a crucial role for health care professionals to provide training on it. [1] Lack of awareness has prompted the hospitals turning into a center point of spreading illness instead of progressing in the direction of annihilating them. [4] To improve general information and practice identified with BMW the executives and its taking care of following advances can be taken like, exacting usage of bio clinical waste administration rules; it ought be made mandatory for hospitals and clinics to provide training to their personnel and prepared from qualified training centers and the centers should not turn out to be only an onetime action but regular and consistency required on training. Special focus should be on sanitary staffs and it should to be guaranteed that if some mishappen occurs to the health care personnel are accounted for to the individual responsible for bio medical waste management or the bio medical waste

administration committee. [4] Many issues can be confined if the BMW administration is appropriately implemented. The exercises are generally proceeded as a major aspect of health care waste management include segregation, storage, collection, transportation and removal of biomedical waste. [5] Inappropriate removal techniques for these waste may create the spread of dangerous and harmful illnesses, for example, AIDS, hepatitis B and C, and tuberculosis (TB) among the hospital staff, waste handlers, patients and their relatives, and the community area where the waste is aimlessly deposited. [6] Awareness with respect to guidelines of removal of BMW should be instructed even among medical and paramedical faculty and staffs, including hospital administrators of private and governmental hospitals and medical colleges. [5] Nursing staff being at the focal point of giving all the treatment to the patient should have all the information in regards to the management and disposal of biomedical waste. However, generally this information is inadequate in most by far of nursing staff occupied with giving the important healthcare facilities to sick and ailing. Sufficient information in regards to handling of biomedical waste appropriate treatment methods of it and disposing the waste, and practicing safety measures can all go a long way in protecting the community from health hazards of biomedical waste. [5] Knowledge, attitude and practice (KAP) among HCWs are the three determinants used to evaluate the viable working of BMW the board framework in the Institution. Knowledge is characterized as the awareness with respect to biomedical waste administration. Attitude is characterized as their sentiments towards BMW management. Practice is characterized as the identification, segregation and packaging of biomedical wastes. [5] Adequate information about health hazards of BMW, right attitude towards handling of BMW and practice of safety measures can guarantee safe disposal of these wastes. In developing nations,

biomedical wastes have not received adequate attention, henceforth BMW management is still a challenge to the hospitals. [5] Diseases due to Hospital-acquired infection creates 10% of the all life-threatening conditions of in the Southeast Asia and it has been documented that its cause is due to poor administration of medical waste. [6] The above data and examination study it is clearly demonstrating that biomedical waste management is significant part of health care service. To avoid nosocomial contaminations, blood borne illnesses like HIV, Hepatitis B infection diseases and so forth all institution provides health care should implement strictly the BMW management guidelines. As nurses are the fundamental piece of the health care system, they ought to have legitimate information on it. During study period as they have clinical duty during their preparation period so they should need to know the management and treatment of BMW. Because of the above reason the researcher wants to conduct a study on it.

MATERIAL AND METHOD

The present study aimed to evaluate the effect of planned teaching programme on BMW among GNM students of selected school. The study was based on pre-experimental one group pre-test post-test research design. In the present study the basic measure will be the knowledge and practice score, treatment will be the planed teaching programme about BMW management. Independent variables were Teaching Programme on BMW management and dependent variables was knowledge and Practice on biomedical waste management. The target population was GNM students of 1st, 2nd and 3rd year and sample size were 84 students. Sampling technique was non-probability sampling technique through simple random sampling method.

The tool is divided in 3 parts, i.e. Section A-Proforma for collecting demographic data regarding age, gender, year of experience, any exposure to training programme regarding BMW management etc. Section B: Self Structured questionnaire to assess the knowledge on biomedical waste management Section C: Self Structured questionnaire to assess the practice on biomedical waste management. Section B and C had 25 nos. of questions each. The scoring system was ≤ 5 comes under "Poor", 6-10 "Average", 11-15 "Good", 16 – 20 "Very good" and 21- 25 comes under "Excellent" category. Tool was validated by verifying it with different expert from professionals of medical science, nursing science and statistician. The reliability of tool was tested by Cronbach's α test .which was 0.84 & it was reliable.

RESULT
Finding related to sociodemographic variable of total sample under study (Table No.1)

In the present study age of the sample revels that maximum 57.15% (48) were 18 to 24 years of age and minimum 16.66% (14) are between the age of more than 23 years. Total 7.14% samples were male and 92.86 % of total samples were female. From total sample 22.62% were in GNM 1st year, 36.9 % were GNM 2nd year and 40.48% were in GNM 3rd year. From total sample 79.76% were 10+2 pass, 20.24 % were graduate and none of sample were post graduate. Among them 59.52% had experience more than 6 months to 1yr and, 40.48% had more than 1yr and no one having less than 6 month of clinical practice experience.

Comparison of pretest and posttest Knowledge Scores and clinical practice score Before and After Educational Intervention (Table no-02)

In present study, the pretest of knowledge on BWM the highest score was 47.62% which was the average score and lowest score was 5.95% the poor knowledge score and 46.43% was in the range of good score. After the intervention, post-test score on knowledge regarding BWM was highest

of 71.43% that was very good score and lowest was 17.86% under good score range. In case of clinical practice, in pre test 65.48% students were in average score and 34.52% student had good clinical practice skill. After the teaching session, in post test result 48.81% students were in good category, 44.05% were in very good category, 4.76% were in excellent category and 2.38% were in average caterory.

Table no.-01: Analysis of socio-demographic variables. N=84

Demographic variables		Frequency (f)	Percentage (%)
Age (in completed years)	18 -20 yrs	48	57.15
	21-23yrs	22	26.19
	More than23yrs	14	16.66
Gender	Male	6	7.14
	Female	78	92.86
Year of placement	GNM Ist yr	19	22.62
	GNM IInd yr	31	36.9
	GNM IIIrd yr	34	40.48
Highest degree of educational qualification	10+2 pass	67	79.76
	Graduation	17	20.24
	Post-graduation	0	0
Period of exposure to clinical practice	Less than 6months	0	0
	6months to 1yr	50	59.52
	More than 1yr	34	40.48

Table no.-02: Comparison of pretest and posttest Knowledge and Clinical Practice Scores Before and after Educational Intervention N=84

	Knowledge Scores				Clinical Practice Score			
	Pretest score		Post test score		Pretest score		Post test score	
	(f)	(%)	(f)	(%)	(f)	(%)	(f)	(%)
Poor(<5)	5	5.95	0	0	0	0	0	0
Average(6-10)	40	47.62	0	0	55	65.48	2	2.38
Good(11-15)	39	46.43	15	17.86	29	34.52	41	48.81
Very Good(16-20)	0	0	60	71.43	0	0	37	44.05
Excellent(21-25)	0	0	9	10.71	0	0	4	4.76

Table no.-03: Distribution of Subjects According Year Wise Comparison of Mean, SD of Knowledge Score and clinical practice score N=84

Knowledge score	Year of placement	Pre-test			Post-test			Difference in mean %
		Mean	SD	Mean %	Mean	SD	Mean %	
	GNM 1st yr	10.25	2.12	50.00	14.68	4.95	69.90	19.9
	GNM 2nd yr	10.2	0.71	44.34	17.52	1.41	76.17	31.83
	GNM 3rd yr	10.03	1.41	50.15	17.41	2.83	87.05	36.9
Clinical practice score	GNM 1st yr	10.21	2.07	53.73	15.47	3.06	81.42	27.69
	GNM 2nd yr	10.16	2.15	48.38	15.26	3.7	72.66	24.28
	GNM 3rd yr	10.12	2.18	56.23	15.44	3.09	85.77	29.54

Table no. -04: Calculation of the difference between the pre-test and post-test knowledge scores and clinical practice by using paired 'z' test. N=84

Intervention on	pre test mean	post test mean	mean diff.	SD	Z-Value	P-Value	Inference
Knowledge area	10.35	17.48	7.13	3.09	21.11	0.0001	extremely statistically significant
Clinical Practice	10.15	15.67	5.51	3.06	16.4	0.0001	extremely statistically significant

According Year Wise Comparisons of Mean, SD and mean percentages of Knowledge Score and clinical practice score on Biomedical Waste Management (Table-03)

After analysis it reveals that in pre test GNM 1st year the knowledge score of mean 10.25, SD 2.12 and mean percentages 50% before educational intervention. In post test score mean was 14.68, SD 4.95 and mean percentages 69.90% and mean difference was 19.9%. In GNM 2nd year the mean 10.2, SD 0.71 and mean percentages 44.34% before educational intervention. In post test score mean was 17.52, SD 1.41 and mean percentages 76.17% and mean difference was 31.83%. GNM 3rd year the mean was 10.03, SD 1.41 and mean percentages 50.15% before educational intervention. In post test score mean was 17.41, SD 2.83 and mean percentages 87.05% and mean difference was 36.9%. so

there was increase score of student in knowledge area. In case of clinical practice, students of GNM 1st year had mean 10.21, SD 2.07 and mean percentages 53.73% before educational intervention. In post test score mean was 15.47, SD 3.06 and mean percentages 81.42% and mean difference was 27.69%. In GNM 2nd year the mean 10.16, SD 2.15 and mean percentages 48.38% before educational intervention. After intervention score of mean was 15.26, SD 3.7 and mean percentages 72.66% and mean difference was 24.28%. In GNM 2nd year the mean was 10.12, SD 2.18 and mean percentages 56.23% before educational intervention. In post test score of mean was 15.44, SD 3.09 and mean percentages 85.77% and mean difference was 29.54%.

Calculation of the difference between the pre-test and post-test knowledge scores and clinical practice score by using paired 'z' test. (Table no.-04)

In the Present study to find out the effectiveness of teaching program "z" was adopted. The calculated z-value was 21.11 which was greater than the tabulated z-value at $p<0.05$ level of significance. The mean pretest score was 10.35 and post test score was 17.48 with mean difference of 7.13 and SD of 3.09. So the z-value 21.11 was found extremely statistically significant at the two-tailed P value is less than 0.0001. so there was increase of knowledge after educational intervention on biomedical waste management. Again on clinical practice area it reveals that mean pretest score was 10.15 and post test score was 15.67 with mean difference of 5.51 and SD of 3.06. So the z-value 16.4 was found extremely statistically significant at the two-tailed P value is less than 0.0001. So there was showing that the clinical practice skill was improved after educational intervention on BMW management.

DISCUSSION

Appropriate administration of biomedical squanders includes dynamic association and synchronization among legislative and nongovernmental bodies, the clinical organizations, and the medicinal services personnel. As students nurses are future front line members of the health care delivery system, assessing their knowledge and awareness and clinical practice skill regarding BMW helps us to identify where the essential changes can be done for the proper implementation of the policies regarding BMW management. Many studies are conducted on biomedical waste management in India and other developing countries like Srilanka, Bangladesh, Nepal etc. But due to lack of awareness, resourses and inappropriate working environment of hospitals and clinics, strong rules and regulation for the segregation and appropriate management of BMW may be lacking. A similar study was conducted by Monika Sekar et. al. in Puduchery, India on 150 health care workers(post graduate students, interns, sanitary staffs, nurses and technicians) of a tertiary care hospitals. She concludes that sanitary workers are highly ignorant regarding biomedical waste management than other professional workers of health care system. So regular training session are required to develop knowledge existing staffs and newly appointed persons. [6] Another study conducted by Dr. Romy Biswass et. al. regarding awareness and practice on biomedical waste management among health care practitioners in a tertiary care hospital, West Bengal, India. According to their result radiology dept. had no colour code bins for use, in emergency medicine ward no use of blue and black bin. So he concludes that there should be regular training regarding BMW management for staff to create awareness among them. [7] Sugandhi Sharma and Trideep Jyoti Deori (2020), conducted a study to assess the knowledge, attitude and practice regarding BMW management among post graduate residents in a tertiary care hospital, Lucknow. The study revealed that majority of residents had an average knowledge regarding BMW management due to lacunae in the knowledge, and practices among them. [2]

CONCLUSION

The study indicated that in general the student nurses have gain general information and knowledge of practice about BMW, despite the fact that the mentality of students with respect to BMW was acceptable. The investigation uncovered that the significance of preparing with respect to bio clinical waste management can't be overemphasized, without genuine and complete information about its practices of suitable waste removal. There is a need of regular training of BMW by the faculties. The student nurses should get vaccinated against Hepatitis B virus, so it ought to be made compulsory before their clinical posting.

Ethical statement: The institutional ethical committee has approved to conduct the study.
Conflict of interest: No conflict declared.

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