Community Medicine

A Study on the Effectiveness of an Orientation Programme on Knowledge and Practice Regarding Management of Biomedical Waste among Student Nurses in a Tertiary Level Hospital of Eastern India

Dr. Sikata Nanda[1], Dr. Rabi Narayan Dhar[2*], Mrs. Sucharita Dash[3]
[1] Associate Professor, Dept of Community Medicine, SCB MCH, Cuttack, India
[2] Associate Professor Dept of Orthopaedics, VIMSAR, Burla, India
[3] Tutor, GNM School, SCBMCH, Cuttack, India

Original Research Article

Abstract: BMW (Biomedical waste means any waste generate during diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of the biologicals, including categories mentioned in schedule I of BMW management & handling Rules 1998. Health care wastes need to be properly segregated & treated and adequate knowledge, and practice amongst health care personnel is essential. As it is matter of concern that many diseases can occur due to improper management of BMW hence the current questionnaire based study was conducted as a pretesting procedure after which an orientation programmer was given then post test was conducted on 10th day. Information was collected on knowledge & practice & grey areas were identified amongst the student nurses in a tertiary level hospital in eastern India. The study results suggested that there was lack of adequate knowledge amongst the study participants on different aspects of BMW management.
Keywords: Biomedical Waste Management, Pretest, Posttest, Orientation Programme.

INTRODUCTION

Health care is "to do no harm" and for this it is essential to have our health care facilities clean and to ensure adherence to infection control practices [1]. Cleanliness and hygiene in hospitals are critical to preventing infections and also provide patient & visitors with a positive experience. Biomedical waste includes soiled cotton, syringes, bandages, hypodermic needles, tubing such as IV sets, urinary catheters. It is also known by other names like clinical waste, medical waste and health care waste in different parts of the world [2].

It comprises of 15-25% of total waste generated in the hospital [3]. Human immunodeficiency virus (HIV), Hepatitis C virus (HCV), Hepatitis B Virus (HBV) makes it have the propensity to cause transmission of disease hence it is essential that utmost care is to be exercised while handling & disposing it[3].

The hazardous impact of medical waste on the public & environment is increased to manifold times because besides affecting the health of patients it also affects health care workers (doctors, nurses, sanitary staffs etc) and general public. There is increased global awareness among health personnel about the hazards & appropriate management techniques .But the level of awareness in India is found to be unsatisfactory [4-6].

As the issue of hospital waste management has become an important worldwide need today & the long term effects of poor management in a humanitarian concern for public environment and health workers, so this study was undertaken to assess and evaluate the knowledge and practice of nurses in a tertiary care hospital at Cuttack, Odisha.

Objectives
- To assess the level of knowledge & practice of student nurses regarding Biomedical Waste Management.
- To evaluate the effectiveness of an Orientation programme on the level of knowledge & practice regarding Biomedical Waste management amongst students nurses.

- To find the relationship between knowledge and practices of nurses regarding BMW management.

MATERIALS & METHODS
Research Design
Evaluative Educational Interventional study.
Research Tool
Pretested predesigned questionnaire.

Place of Study
The study was conducted at SCB School of Nursing. In a tertiary level hospital at Odisha, India

Study Population
All willing cooperative students of GNM School Of nursing were included in the study. The 3 year GNM course comprised of a total of 300 students out of which a total of 294 students in the 3 year academic course were willing to cooperate and gave their consent to participate in this study.

Inclusive Criteria
- All male & female GNM students willing to participate in the study and who are present at the time of data collection.

Exclusion Criteria
- GNM students who will not willing to participate in the study.
- GNM students who were not present during data collection.

Prior permission was obtained from the concerned Principal of the SCB nursing school to conduct the study. Informed consent was taken from each participant who enrolled in the study.

Tools for the data collection
A structured questionnaire based on the knowledge and practice was prepared for assessment and an observation checklist was developed on the basis of the objective of the study.

Section A
Consisted of student knowledge questionnaire on BMW management on various aspects

Section B
Observation checklist containing the different dimension of BMW

Development of Orientation Module
Prepared by the investigators to enhance the level of knowledge and practice of GNM students regarding BMW management it covered the following aspects.
- Definition of Bio Medical Waste.
- Sources of Bio Medical Waste
- Health Hazards of Biomedical Waste
- Tx & disposal techniques for Bio Medical Waste.
- Biomedical waste management in India.
- Advantage and Disadvantage of tx and disposal of BMW.
- Instruction to waste handlers.
- Nurses role and responsibilities.

DATA COLLECTION
The subjects were assured for confidentiality and anonymity of the responses. Pre test was conducted on the day and the orientation programme was administered following pretest. Orientation programme was conducted on the same day and post test administered on the 10th day using the same questionnaire after the completion of the training programme.

DATA ANALYSIS
- The data was analysed and mean, SD and mean % was used to describe the area wise pre/post test knowledge scores.
- Paired t test was done to find out the effectiveness of orientation programme on comparison between pre & post test knowledge and practice scores.

RESULTS

Table-1: Pre & Post Test Score on Knowledge in Different Aspects of Biomedical Waste Management in the study subjects

SN	Study Domain	Pre Test		Mean Score	Post Test		Mean Score	Result
		Mean %	SD		Mean %	SD		
1	Definition of Biomedical waste	54.88	20.46	1.28	89.01	16.51	2.01	P<0.01
2	Source of Biomedical waste generation in hospital	66.65	13.59	2.16	84.69	15.31	2.46	P<0.05
3.	Waste Management handling rules	56.12	16.41	1.61	66.41	18.91	1.77	P<0.01
4	Categories of Waste	23.15	15.41	1.33	83.51	9.16	2.3	P<0.01
5	Health hazards of BMW	22.14	9.8	1.48	83.99	7.86	1.98	P<0.01
6	Collections of BMW in hospital	43.19	8.45	2.61	69.47	8.91	2.16	P<0.05
7	Segregation of wastes as per colour code at source	32.61	8.13	1.92	76.42	11.12	2.57	P<0.01
8	Storage of BMW	46.17	17.11	2.54	79.18	12.49	2.16	P<0.01
9	Transportation of BMW	36.66	7.46	2.61	92.71	13.89	2.1	P<0.01
10	Disposal / Tx of BMW	40.17	11.69	1.66	86.46	21.73	4.1	P<0.01
11	Instruction given to waste handler	28.17	13.17	3.21	66.17	13.1	1.21	P<0.01
12	Occupational exposure and needle stick injuries	21.52	7.17	0.99	82.61	14.12	1.2	P<0.01
13	Nurses roles and responsibilities	33.16	8.61	1.38	69.17	16.17	2.6	P<0.01

Table-2: A comparative analysis between Pre and Post Test scores on Practices that was followed in different aspects of Bio Medical Waste Management in the participants

Sl. No	Different areas of knowledge that was practiced	Pre Test		Post Test		Result
		Mean %	SD	Mean %	SD	
1	Disposal in specified color code container	22.42	22.16	48.90	17.12	P<0.01
2.	Use of personal protective measure.	33.14	14.17	72.91	13.11	P<0.01
3.	Disposal of sharp in puncture proof container (hub cutter or NST)	41.79	16.16	76.46	10.98	P<0.01
4.	Adoption of proper universal precaution	12.46	17.71	66.16	14.12	P<0.01
5.	Reporting of needle stick syringe or any occupational exposure	23.49	23.12	42.18	12.19	P<0.01
6	Reporting of Exposure to other hazards like chemical / genotoxic / pharmaceutical waste	23.16	14.12	83.12	12.41	P<0.01
7	Record maintenance in wards whether done properly.	16.12	11.12	72.76	9.41	P<0.01

DISCUSSION

The domain wise pre and post test scores on knowledge & practices are shown in table 1 & 2, As per the pre test result more than half of respondents i.e. 54.88% were aware of the definition of Bio medical waste. The knowledge about health hazards of Bio medical waste was found in 22.14% of study subjects. Knowledge regarding segregation of waste as per color code was found in 32.61% of students. About 56% were aware about the waste management handling rules.

There was poor knowledge amongst the students in regard to nurse's roles and responsibilities i.e. about 33.16% had adequate knowledge. As revealed from pre test, knowledge on instruction given to waste handlers was found in 28.17%, So as per the pre test results there was inadequate knowledge in must know or core areas of BMW like health hazards and disease transmission due to BMW, different categories of disinfection, collection, segregation, transportation and treatment of Bio Medial Waste in a health care facility.

However, after the orientation programme, as per the post test, there was improvement or gain in the level of knowledge amongst the students which was statistically significant.

Table 2 depicts the different practices that were adopted by the nursing trainee students during their ward duty. An assessment was done as pretest prior to orientation programme and post test was conducted 10 days after the programme.

The different practices that were adopted like color code bins were correctly identified and utilized by only 22.42% of individuals as revealed from pre test but 48.90% could properly identify the containers as per the post test.

Similarly only 41.79 % were actually destroying needles by hub cutter or NST. But post testing revealed that 76.46% adopted good practice of destroying needles appropriately.

Personal protective measures like gloves were used by only 33.14% of student nurses but after the orientation course about 72% practiced safety measure in the wards.

The practice of reporting injuries resulting from improperly disposed Bio medical waste was low amongst the student nurses. Stein et al in their study reported that among nurses only 37% reported that they ever suffered from needles stick injury [7]. Low reporting of needle stick injuries may be attributed to their lack of awareness about the establishment of a injury reporting system within a health care facility. In a study conducted by Bathma et al in Bhopal, it was observed that the knowledge about BMW management and handling rule was (54.5%) in nurses [8]. In same study the knowledge on color container used in hazardous waste was 72.7% in nurses.

Initially in the present study, knowledge about BMW rules was low but in a study conducted by Mathur *et al*. in Hyderbad the level of knowledge was high amongst health care personnel [9].

However, after the orientation programme the achievement was considerably increased both in the gain of knowledge and practice.

CONCLUSION
- It may be concluded that, nursing education, nursing administration needs to be strengthened.
- The findings definitely show improvement in the level of knowledge, Hence the topic has to be included in the curriculum as it is an important public health problem.

- Nursing teachers can use the orientation module to teach children about BMW, so that they can improve their level of knowledge and practice. .
- The gaps found in the pre and post test can be achieved 100% if the tutor in the school as well as other nursing staffs of the institution working in different wards should be sensitised from point of generation to the point of treatment.
- It should be made mandatory for all student nurses to undergo CME orientation programme / workshop for updating their knowledge on BMW management.
- Periodical trainings can be can be organised for these student nurses.
- Different evaluation methods like MCQ's, short answer types / long answer types .in the form of written examination as well as maintainence of log books in wards under BMW category may improve their level of knowledge and practice.
- Strict implementation of BMW rule in the need of the hour.The training / teaching / learning sessions should not only be at the entry level of the students rather it should be an ongoing continuous programme. Effective management of BMW is not only a legal necessity but also a social responsibility.

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