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Assessment of effect of awareness program regarding biomedical waste management

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Abstract
Aim The aim of study was to assess the effect of awareness program on knowledge and practice regarding bio - medical waste management. **Methodology** Quantitative research approach with pre- experimental design was used to assess the knowledge and practice of 50 staff nurses at SKIMS Soura Srinagar Kashmir. Data was collected by using knowledge questionnaire and checklist. **Results** The study revealed that the mean pre interventional knowledge and practice score were 24.50 and 13.96 respectively and the mean post interventional knowledge and practice score were 44.04 and 15.80 respectively. The mean difference between pre and post interventional knowledge and practice score was 19.54 and 1.34 respectively with a p value of (<0.001). **Conclusion** The findings of the study revealed that awareness program was effective in improving the knowledge and practice scores of study subjects.

Key Words: Awareness Program; Knowledge; practice; Bio medical waste management.

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1. Introduction

The Bio-Medical Waste (BMW) is any waste generated during diagnosis, treatment or immunization, of human beings or animals or in research activity. As per the recent Bio medical waste Management and handling Rules, 2016 these rules apply to all persons who generate, collect, receive, store, transport, treat, dispose or handle bio medical waste in any form including hospitals, nursing homes, clinics, dispensaries, veterinary institutions, animal houses, pathological laboratories, blood banks, Ayush hospitals, clinical establishments, research or educational institutions, health camps, medical or surgical camps, vaccination camps, blood donation camps, first aid rooms of schools, forensic laboratories and research laboratories by whatever name they are called. [1].

The waste generated during entire course of healthcare activities is special in terms of its composition, quantity and their potential hazardous effect as compared to waste of other places, which require special attentiveness for its management [2]. Data from Government of India site indicates that total biomedical waste generated in India is 484 Tons Per Day (TPD) from 1,68,869 health care facilities [1].

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According to World health Organization, Of total amount waste generated in health care activities only 15% is hazardous while as 85% is considered as general non hazardous waste. It has been estimated that round about 16 billion injections are administered worldwide annually, but after wards all the needles and syringes are not properly disposed. Health-care waste contains potentially harmful microorganisms, which can infect hospital, patients, health workers and the general public. Health-care waste in some circumstances is incinerated, and dioxins, furans and other toxic air pollutants may be produced as emissions.. In 2010 unsafe injections were still responsible for as many as 33800 new HIV infections, 1.7million Hepatitis B infections and 318000 Hepatitis C infections. [4].The hepatitis outbreak in Modassa, Gujarat (India) 2009, pointed towards the core issue of poor biomedical waste management in the country [5].

Shashwati Nema and Ms. Akansha Singh-2015 conducted a study about health care waste management among hospital staff of a medical college hospital in Bhopal, central India It was found that 25(20 %) of study subjects have good knowledge 89(71.2) had average knowledge and 11(8.8%) had poor level of knowledge. The study concluded that there is a need of continuing education program about the proper management of Health care waste at all levels [6].

The need for study

Staff Nurses are one of the main occupational groups in

any health care agency. By virtue of their job responsibility they are frequently handling, dealing and exposed to biomedical waste. The awareness regarding bio medical waste is very important among health care personal particularly among staff nurses as they are at greater risk to get many fatal infections like Human immune deficiency virus, Hepatitis C virus, Hepatitis B virus and many other injuries by these infectious material.

Keeping in view the above points and from researchers own clinical experience the researcher realized that , Although the staff nurses have knowledge and practice regarding bio medical waste, but bio medical waste management and handling rules are amended from time to time as of latest amendment in 2016 . So the nurse researcher felt a strong need to update the knowledge of staff nurses with the latest and current amendments in bio medical waste management and handling rules. So this study was undertaken with this aim.

Problem Statement

A Study To Assess the Effect of Awareness Program On Knowledge And Practice Regarding Bio -medical Waste Management Among Staff Nurses At SKIMS Soura Srinagar Kashmir.

Objectives

1. To asses pre-interventional knowledge scores regarding Bio -medical waste management among Staff nurses. (pre-test).
2. To asses post- interventional knowledge scores regarding Bio -medical waste management among Staff nurses. (post- test)
3. To evaluate the impact of awareness program on knowledge regarding Bio -medical waste management among Staff Nurses by comparing pre and post interventional knowledge scores.
4. To asses pre-interventional practice score regarding Bio -medical waste management among Staff nurses. (pre- test)
5. To asses post- interventional practice score regarding Bio -medical waste management among Staff nurses. (post- test)
6. To evaluate the impact of awareness program on practice regarding bio medical waste management among staff nurses by comparing pre and post interventional practice score.
7. To determine association of pre interventional knowledge scores with demographic variables Gender, professional Qualification, Years of experience of Staff nurses.
8. To determine association of pre interventional practice scores with demographic variables Gender, Professional Qualification, Years of experience of Staff nurses.

Hypotheses

H1: There is a significant increase in mean post-interventional knowledge score as compared to mean pre interventional knowledge score regarding Bio -medical waste management among Staff nurses after administration of awareness program at 0.05 level of significance.

H2: There is a significant increase in mean post-interventional practice score as compared to mean pre interventional practice score regarding Bio -medical waste management among Staff nurses after administration of awareness program at 0.05 level of significance.

H3: There is a significant association of pre-interventional knowledge score of staff nurses with demographic variables (Gender , professional Qualification and Years of experience) at 0.05 level of significance.

H4: There is a significant association of pre-interventional practice score of staff nurses with demographic variables (Gender , professional Qualification and Years of experience) at 0.05 level of significance.

Conceptual framework

The Conceptual framework used is based on Stufflebean's evaluation model.

2. Materials and methods

Quantitative research approach with pre- experimental one group pre- test post– test design was used to assess the knowledge and practice of 50 staff nurses regarding Bio-medical waste management at SKIMS Soura Srinagar Kashmir. Purposive sampling technique was used to collect data from the study subjects and tool used for study was knowledge questionnaire and checklist.

The tool was divided into three sections:

Section 1: Demographic Data (Gender, qualification, years of experience). **Section 2:** Knowledge Questionnaire (consisting of 54 items) regarding Bio medical waste. **Section 3:** Checklist (consisting of 20 items) to assess practice on biomedical waste management.

The content validity of tool was ensured by submitting the tool to the experts in the field of medical surgical nursing , hospital infection control members ,community health nursing, child health nursing, A pilot study was conducted on 10% of total sample size. The test retest method was used to test the reliability of the tool. The scores of the tool administered at two different occasions were compared and calculated by using Karl Pearson's correlation coefficient formula.

The reliability coefficient of co-relation of knowledge questionnaire was (r= 0.94). Inter- rater reliability of the checklist was determined by administering it to 2 staff nurses. The computed inter rater reliability was found to be (r= 0.85). Thus, the tool was statistically significant and reliable.

3. Results

The data and the findings were entered in a master data sheet followed by the analysis and interpretation using descriptive statistics (i.e. frequency, percentage, mean, median and standard deviation) and inferential statistics (i.e. t-test and ANOVA) according to the objectives of the study. The results obtained were presented in the following headings:

Section I: Findings related to demographic variables

Variable		Frequency	%
Gender	Male	45	90
	Female	5	10
Professional qualification	G.N.M	15	30
	Post Basic Nursing	12	24
	BSC Nursing	23	46
Years of experience	<5 years.	20	40
	5-10 years.	18	36
	>10	12	24

Section2: Findings related to Knowledge regarding biomedical waste management before and after administration of awareness program.

Table 2 . Comparison of pre and post-interventional knowledge scores of study subjects regarding biomedical waste management

Knowledge Score	Mean	Median	S.D.	Range	Max.	Min.	Mean%
Pre interventional	24.50	25.5	8.428	27	41	14	45.37
Post interventional	44.04	46	6.141	21	53	32	81.56

To test the significance, following Null hypothesis was formulated.

H01: There is no significant increase in mean post interventional knowledge score as compared to mean pre interventional knowledge score regarding bio medical waste management among staff nurses after administration of awareness program at 0.05 level of significance

Table no: 03

Pre & Post interventional Knowledge score	Mean ± SD	Mean- difference	t value	p value
Pre interventional score	24.50± 8.428	19.540	29.236	<0.001*
Post interventional score	44.04±6.141			

The data in table 3 reveals that the mean difference between pre interventional and post interventional knowledge scores was found to be (19.540) at with a p value of (<0.001), which is statistically significant at 0.05 level of significance . Hence the null hypothesis stating "There is no significant increase in mean post interventional knowledge scores as compared to mean pre interventional knowledge score regarding bio medical waste management among staff nurses after administration of awareness program at 0.05 level of significance" was rejected. This indicates that the awareness program was effective in improving the knowledge of the study subjects regarding biomedical waste management.

Section:-3 Practice of Study Subjects regarding bio medical waste management.
Table no: 04

Practice Score	Mean	Median	S.D.	Range	Max.	Min.	Mean %
Pre interventional Score	13.96	14	3.319	13	19	6	69.80
Post interventional score	15.80	16	1.979	8	19	11	79

Comparison of pre-interventional practice scores with post-interventional practice scores regarding biomedical waste management

To test the significance, following Null hypothesis was formulated.

$H0_3$: There is no significant increase in mean post interventional practice score as compared to mean pre interventional practice score regarding bio medical waste management among staff nurses after administration of awareness program at 0.05 level of significance.

Table no: 5

Pre & Post-interventional practice score	Mean ± SD	Mean-difference	t value	p value
Pre interventional score	13.96± 3.319	1.34	4.916	<0.001*
Post interventional score	15.80± 1.979			

It is evident from the data presented in, table 5 that (Mean ±SD) of post interventional practice score (15.80 ± 1.979) was higher than (Mean ±SD) of pre interventional practice score, (13.96 ± 3.319) with mean difference (1.34) with a p value of (< 0.001) which was found to be statically significant (p<0.001). The post-interventional practice score were significantly higher than their pre-interventional practice scores.

The mean difference was a true difference not a chance. This indicates that the awareness program was significantly (p<0.001) effective in improving the practice regarding biomedical waste management among study subjects. The above findings support the research hypothesis (H_2) which states that there is a significant increase in mean post interventional practice score as compared to pre interventional mean practice score regarding biomedical waste management among staff nurses after administration of awareness program at 0.05 level of significance. Hence null hypothesis (H_{02}) was rejected.

Table no: 06

Demographic Variables		Frequency				Association			
Variables		Poor	Average	Good	Chi test	Table Value	Df	P Value	Result
Gender	Female	18	22	5	1.867	5.991	2	0.393	NS
	Male	1	4	0					
Qualification	GNM	14	1	0	30.870	9.488	4	0.000	*
	Post basic BSc	4	7	1					
	BSc Nursing	1	18	4					
Years of Experience	>5 Years	4	13	3	7.494	9.488	4	0.112	NS
	5-10 Years	7	9	2					
	<10 Years	8	4	0					

*= Significant: NS = Not significant

The data presented in the table 6 indicates that there was statistically significant association of pre-interventional knowledge score with professional qualification as variable ($p<0.001$)

Thus the above findings support the research hypothesis (H_3) which states that there is a significant association of pre interventional knowledge score of staff nurses with the professional qualification and hence the null hypothesis H_{03} was rejected for this variable, which states that "there is no significant association of pre interventional knowledge score with demographic variable."

While as no association of pre interventional knowledge score was found between with other two variables (gender and years of experience) and hence null hypothesis H_{03} was accepted for these two variables which states that there is no significant association of pre interventional knowledge score with demographic variables.

Association of pre–interventional practice score of study Subjects regarding biomedical waste management with demographic variables (Gender, professional qualification, years of experience.)

H_{04}: There is no significant association of pre-interventional practice scores of staff nurses regarding biomedical waste management with demographic variables (Gender, professional qualification, years of experience) at 0.05 level of significance

Table no: 07

Demographic Variables		Frequency			Association				
Variables	Opts	Poor	Average	Good	Chi test	Table Value	Df	P Value	Result
Gender	Female	4	20	21	1.362	5.991	2	0.506	NS
	Male	1	1	3					
Qualification	GNM	1	9	5	8.122	9.488	4	0.087	NS
	Post Basic Bsc nursing	3	5	4					
	Bsc Nursing	1	7	15					
Years of Experience	>5 Years	0	8	12	5.952	9.488	4	0.203	NS
	5-10 Years	2	8	8					
	<10 Years	3	5	4					

NS = Not significant

The above findings support the hypothesis (H_{04}) stating that "There is no significant association of pre-interventional practice score of staff nurses regarding biomedical waste management with demographic variables (Gender, professional qualification, years of experience). Hence null hypothesis H_{04} was accepted.

4. Discussion

In pre interventional assessment among the total study subjects (N=50) majority 26 (52 %) had average level of knowledge, 19(38%) had poor level of knowledge and only 5 (10%) had good level of knowledge regarding bio medical waste management. The findings of study were consistent with the findings of the study conducted by Nagaraju B, Padmavati GV, Purnik DS, Shantharaj M Sampulatha SP- 2013 among the health care providers (n=120) working in Primary health centers of Bagepalli Taluk karnatka India with the view to prepare informational booklet. It was found that 24%were having good level of knowledge, 65%having adequate knowledge and 10% were having poor level of knowledge [7]. Therefore, the present study findings revealed that in pre interventional assessment of knowledge majority of staff nurses has average level of knowledge which emphasis that there was a need to improve their knowledge regarding bio medical waste management.

In post interventional assessment among the total study subjects (N=50) none of study subjects 0 (0%) had poor level of knowledge 7 (14 %) had average level of knowledge and majority of study subjects 43 (86 %) had good level of knowledge regarding biomedical waste management. The findings of study were similar with the findings of study conducted by Ahmad Mohmad Elnour, Mayada Mohmad Reda, Mohmad Darwish El

Borgy, Nureldin Elthahir Fadlella, Aleya Hanefy Mohmaud-2015, impact of health education with regard to health care waste management at White Nile State Sudan (n=200). The result (pos test**)** revealed that majority of study subjects (56%) had good level of knowledge 34 % had fair level of knowledge and only 10 % had poor level of knowledge [8]

In this study, the comparison of pre and post interventional knowledge score of study subjects regarding biomedical waste management was done, The mean post interventional knowledge score (44.04 ± 6.141) of staff nurses regarding Biomedical waste management was significantly higher than that of the mean pre-test knowledge scores (24.50 ± 8.428), With a mean difference of (19.540) and with a p value of (<0.001) This indicated that awareness program was effective in enhancing the knowledge of staff nurses regarding bio medical waste management. The findings of study were consistent with the study conducted by Joyti shrivastav-2015 on knowledge regarding bio medical waste management among staff nurses at Sir Sundar Lal Hospital Bnaras Hindu university Varanasi .The pretest knowledge score was (17.0 ± 2.25) and post test knowledge was (21.94 ±1.20) with a mean difference of (4.94). The result revealed that there was significant increase in post test knowledge as compared to pretest knowledge and was statistically significant (P<0.001). Hence it was observed that planned teaching program was effective in improving the knowledge of staff nurses [9].

The findings of present study were also consistent with findings of study conducted by Akthar Chesfeeda-2015 on effectiveness of planned teaching program on knowledge regarding safe disposal methods of bio medical waste among staff nurses at SKIMS Medical College Bemina Srinagar Kashmir .it was found that mean post test knowledge scores (25.7± 2.4) of the staff nurses regarding safe disposal methods of Biomedical waste was significantly higher than that of the mean pre-test knowledge scores (15.9± 2.8) p<0.05. This indicated that planned teaching programme was effective in enhancing the knowledge regarding safe disposal methods of biomedical waste [10]. The findings of present study were also consistent with the findings of study conducted by Kadar -2007 regarding biomedical waste management among 120 fourth year B.Sc. nursing students of three nursing colleges in Bangalore. The pre-test mean score was only 49.5% where as the post-test mean score was 86.6% and was highly significant (t= 22.56, p<0.001). The study concluded that PTP was effective in improving the knowledge of the nursing students. [11]

The findings of study were also consistent with another study conducted by Vishal Barthma, Sanjay Agarwal, Umesh Sinha, Girgesh Gupta, Neeraj Khare-2015 among post Graduate students regarding biomedical waste management at tertiary care hospital Bhopal .The result revealed that there was significant increase in post test knowledge as compared to pretest knowledge and was statically significant (P<0.001). The pretest mean score was (3.93 ±1.388) and post test mean score was (7.27±1.311) with a mean difference of (3.34). Hence concluded that educational intervention was effective in improving knowledge of post graduate students [12].

Regarding practice 24 (48 %) of study subjects had good level of practice, 21 (42 %) had average level of practice and only 5 (10 %) of study subjects had poor level of practice in pre i interventional assessment The findings of study were similar with the findings study conducted by Ahmad Mohmad Elnour,Mayada Mohmad Reda, Mohmad Darwish El Borgy, Nureldin Elthahir Fadlella, Aleya Hanefy Mohmaud-2015 regarding health care waste management at White Nile State Sudan (n=200). The result (pre test) showed that 42% of study subjects had good level of practice before the educational intervention program and 55% and 3% had fair and average level of practice respectively [8]**.**

Regarding post test practice of biomedical waste management none 0 (0%) of study subjects had poor level of practice,13 (26%) had average level of practice and majority of study subjects 37 (24%) had good level of practice .The findings of study were similar with the study conducted by Ahmad Mohmad Elnour ,Mayada Mohmad Reda , Mohmad Darwish El Borgy , Nureldin Elthahir Fadlella A leya Hanefy Mohmaud-2015 ,impact of health education regarding health care waste management at White Nile State Sudan(n=200) . The result (pos test) revealed that majority of study subjects 55 % had good level of practice , 42 % had fair level of practice and only 3 % had poor level of practice .The mean post test practice score (15.80 ± 1.979) of staff nurses regarding Biomedical waste management was significantly higher than that of mean pretest practice scores (13.96 ± 3.319) with a mean difference of (1.34). The result also revealed that there was a significant relation between pretest and post test practice score in interventional group (Z=2.652) and p value (0.008) which was statically significant (p<0.05) indicating that health education was effective in improving practice of staff nurses regarding health care waste management [8].

The present study results revealed that there was a significant association of pretest knowledge score with professional qualification (p=0.000) as a variable while as no association of pre-test knowledge score was found with other demographic variable gender and years of experience (p=0.393) and (p=0.112) respectively ,The findings of study were similar to the study conducted by Manish Patidar, Pavan Kumar Jain, Ravindra H.N-2014 who conducted a study to assess the effectiveness of structured teaching program on bio medical waste

management among staff nurses at two hospitals of Vadodra. The study revealed that there was no significant association of knowledge with gender and years of experience as variable (p=0.600) and (p=0.265) respectively, but there was significant association of knowledge with educational qualification as variable (p = 7.846) [13].

The present study results also revealed that there was no association of pre test practice scores with any of demographic variable (gender, professional qualification and years of experience) of staff nurses (p=0.506), (p=0.087), (p=0.203) respectively The findings of study were consistent with the study conducted by Nagaraju B, Padmavati GV, Purnik DS, Shantharaj M Sampulatha SP-2013 on bio-medical waste management among the health care providers (n=120) working in Primary health centers of Bagepalli Taluk karnatka India with the view to prepare informational booklet. It was found that there was no association between practices with demographic variables except for years of experience [7]

Recommendation

Keeping in view the findings of present study, the following recommendations were put forward for further research

- A similar study can be replicated on larger sample in a different setting to validate the findings and for generalization.
- A similar study can be conducted on other staff of hospitals like doctors and paramedical staff.
- A similar study can be conducted using true experimental design.
- A similar study can be under taken by using other teaching strategies like self-instructional module practical demonstrations, skill development program, etc.
- Other exploratory or comparative studies on the same topic can also be conducted.
- A self instructional module can be developed based on the learning needs of the nursing student.

Conclusion

The study concluded that awareness program was effective in increasing the knowledge and practice of staff nurses regarding bio medical waste management

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