

Effectiveness of Structured Teaching Programme on Knowledge Regarding Bio Medical Waste Management among Nursing Personnel

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How to cite this article:

Devi Buela Janet, Indrani Dasarathan, K Sesa Kumar/Effectiveness of Structured Teaching Programme on Knowledge regarding Bio Medical Waste Management among Nursing Personnel/Int J Practical Nurs. 2021;9(3):103-110.

Abstract

A study was conducted to find out the effectiveness of structured teaching programme by comparing the levels of knowledge regarding bio medical waste management among nursing personnel. Pre experimental one group pre test and post test research design was used. By using simple random sampling technique, 300 nursing personnel were selected. The outcome of the study revealed that before Structure Teaching Programme 130 (43.33 %) of nurses had moderately adequate knowledge, it is interesting to know that none of them had inadequate knowledge after STP. Paired 't' test findings revealed that nursing personnel had improved their knowledge after structured teaching programme. The association between socio-demographic variables and knowledge regarding biomedical waste management were significant at 0.05 level. The study findings concluded that majority of the nursing personnel improved their knowledge regarding bio-medical waste management after structure teachingprogramme.

Keywords: Medical Waste Management; Nursing Personnel; Random Sampling Technique.

Introduction

Bio Medical waste management include waste segregation, waste collection, waste transportation waste storage, waste disposal & waste minimization & reuses. In other words "Hospital Waste" includes both risk waste and non-risk waste.

The concern for bio-medical waste management has been felt globally with the rise in deadly infections such as AIDS, Hepatitis and improper disposal of Health care waste. The United National environmental programme (UNEP) through UN Basel

Convention (JAN, 2013) on the control of trans boundary movements of hazardous wastes and their disposal has classified health care waste as most hazardous waste, after radioactive waste.¹

Bio medical waste (Management and handling) Rules 1998 lay down clear methods for disposal of bio medical waste, defined as "any waste generated during the diagnosis, treatment or immunization of human beings or animals or in research activities used in the production or testing of biologicals." Pollution control boards of every state have been given the task

of authorizing and implementing the rules.²

According to WHO, every year an estimated 16 billion injections are administered worldwide, but not all of the needles and syringes are properly disposed of afterwards. In 2010, unsafe injections were still responsible for as many as 33 800 new HIV infections, 1.7 million hepatitis B infections and 315 000 hepatitis C infections. A person who experiences one needle stick injury from a needle used on an infected source patient has risks of 30%, 1.8%, and 0.3% respectively of becoming infected with HBV, HCV and HIV.¹

The Nurses spend maximum time with patients in the ward than any other member of the health team, it increases their exposure and risk to the hazards present in hospital environment, mainly from Bio-Medical Waste. They need to be well equipped with latest information, skills and practices in managing this waste besides reducing hospital-acquired infections to protect their own health. They are also responsible for preventing risk due to waste to the other members of health team and community at large.³

Need for the Study

Many types of waste is generated in the hospital e.g. general waste, human anatomical waste, animal waste, microbiology and biotechnology waste, waste sharps, discarded medicines, cytotoxic drugs, solid waste (tubing's, catheters, IV sets, items contaminated with the blood and body fluids; cotton, plaster casts, dressings etc.), liquid waste and chemical waste.⁴

The safe and sustainable management of biomedical waste (BMW) is social and legal responsibility of all people supporting and financing health-care activities. Effective BMW management (BMWM) is mandatory for healthy humans and cleaner environment. This article reviews the recent 2016 BMWM rules, practical problems for its effective implementation, the major drawback of conventional techniques, and the latest eco-friendly methods for BMW disposal. The new rules are meant to improve the segregation, transportation, and disposal methods, to decrease environmental pollution so as to change the dynamic of BMW disposal and treatment in India. For effective disposal of BMWM, there should be a collective teamwork with committed government support in terms of finance and infrastructure development, dedicated health care workers and health care facilities, continuous monitoring of BMW

practices, tough legislature, and strong regulatory bodies. The basic principle of BMWM is segregation at source and waste reduction. Besides, a lot of research and development need to be in the field of developing environmentally friendly medical devices and BMW disposal systems for a greener and cleaner environment.⁵

In a World Health Organization (WHO) meeting in Geneva, in June 2007, core principles for achieving safe and sustainable management of health care waste were developed. It was stressed that through right investment of resources and complete commitment, the harmful effects of health-care waste to the people and environment can be reduced. All stakeholders associated with financing and supporting health-care activities are morally and legally obliged to ensure the safety of others and therefore should share in the cost of proper management of BMW. WHO reinforced that government should designate a part of the budget for creation, support, and maintenance of efficient health care waste management system. Nongovernmental Organization should undertake program and activities that contribute in this incentive.⁶

Govt of India, Ministry of Environment, Forest and Climate change in March 2016 have amended the BMWM rules. These new rules have increased the coverage, simplified the categorization and authorization while improving the segregation, transportation and disposal methods to decrease environmental pollution. It has four schedule, five forms and eighteen rules.⁷ A study conducted in the year 2020 regarding awareness of biomedical waste management among nursing personnel and auxiliary staff. The results showed that in pre-test out of 30 samples staff nurse (55.6%), auxiliary nurse midwife (54.3%) and ward boys (50.6%) of them had moderately adequate knowledge. In post test staff nurse (84.6%), auxiliary nurse midwife (83.7%) and ward boys (81.33%) of them had adequate knowledge after education. The study concluded that awareness created a base for the people who are directly concern with the waste management.⁸

Health care setting must realize that an effective programme of Bio Waste Management as an integral part of the infection control programme and therefore critically linked to the quality of patient care and work healthy and safely. In many instances waste handling is left to the poorly educated and lowest category of workers operating without any training, guidance and

supervision. The investigator personal experience in various field posting stimulated to conduct the study on Bio-Medical waste management which contribute to adequate knowledge to nursing professional, this will aid in appropriate management of waste in health care settings.

Objectives of the Study

- To assess the level of knowledge regarding bio medical waste management among nursing personnel before structured teaching programme.
- To assess the level of knowledge regarding bio medical waste management among nursing personnel after structured teaching programme.
- To find out the effectiveness of structured teaching programme by comparing the levels of knowledge regarding bio medical waste management among nursing personnel before and after structured teaching programme.
- To find out the association between knowledge of nursing personnel on bio medical waste management with their selected socio demographic variables.

Hypothesis

- H₁:** There will be significant difference in the levels of knowledge of nursing personnel before and after structured teaching programme.
- H₂:** There will be significant association between the knowledge of nursing personnel with their selected socio demographic variables.

Methodology

The research approach used in the study was quantitative approach, the pre experimental one group pre and post test design was selected to evaluate the effectiveness of structured teaching programme on knowledge regarding bio-medical waste management among nursing personnel. In Telangana districts Karimnagar District was chosen randomly, The sample size of the study was a total of 300 nursing personnel who are working in 60 selected primary health centers of Karimnagar district, in which multipurpose health assistance (F) (89), Health visitors (83), public health nurses (39), community health officer (5), staff nurses (84) were the samples.

The tool was constructed by structured questionnaire, consists of 2 parts, Part-1: The socio demo-

graphic variables like age, marital status, religion, professional qualification, present designation, monthly income, years of experience, participation in in-service education programme on Bio-Medical waste management, awareness about Bio Medical waste management through mass media, adoption of Bio-Medical Waste Management policy by PHC. Part 2: Consist of structured questionnaire on Bio Medical Waste Management in terms of type, hazards, segregation and treatment of Bio Medical Waste Management. The structured questionnaire consists of 40 multiple choice questions, the correct response was given the score of one, no mark (0) was awarded for the wrong response. The score was interpreted by following, inadequate knowledge = 50%, moderately adequate knowledge 51-75%, adequate knowledge > 75%. The content validity of the tools was established on the basis of opinion of medical experts and nursing experts and implemented their suggestions. Reliability of the tool was established by using test retest method. The instrument was found to be reliable as the reliability coefficient was $r = 0.84$. The pilot study was conducted 10% samples of the selected population. The result showed a positive correlation between knowledge regarding Bio medical waste management among nursing personnel. Hence the investigator proceeded with the main study.

A formal written permission was obtained from the District medical and health officer, Karimnagar and all MOs of concerned PHC's. All the selected nursing personnel were given the informed written consent form and adequate explanation was given and the purpose of the study was explained. Confidentiality of the information was assured along with the choice of dropping out of the study as and when they wished. The main study was conducted from Dec 2009 - Feb. 2010 at selected primary health centres which fall under district medical and health department of Karimnagar. Self-introduction was done by the investigator, Later the investigator explained the purpose of instruments to the nursing personnel. The data was collected by using structured knowledge questionnaire. Through Lecture cum demonstration method with the help of Liquid Crystal Display structured teaching programme was administered. At the end of the STP, doubts were clarified. After one week of STP, post test was conducted for the same sample. The data was analysed by using descriptive and inferential statistics.

Results

Table 1: Frequency and Percentage distribution of Socio demographic Variables.

N=300		
Socio Demographic Data	Frequency (f)	Percentage (%)
Age in Years		
=20	24	8
21-30	60	20
31-40	102	34
41-50	62	20.67
> 50	52	17.33
Marital Status		
Married	196	65.33
Unmarried	19	6.33
Widow	62	20.67
Divorce	23	7.67
Religion		
Hindu	121	40.33
Christian	173	57.67
Muslim	6	2
Professional Qualification		
ANM	216	72
GNM	57	19
B.Sc(N)	23	7.67
PC B.SC (N)	4	1.33
Present Designation		
Multi-Purpose health Assistant (F)	89	29.67
Health visitor	83	27.67
Staff nurse	84	28
Public health nurse	39	13
Community health officer	5	1.66

Monthly Income in Rupees

Less than or equal to 10000	31	10.33
10001-20000	79	26.33
20001-30000	103	34.34
>30000	87	29

Years of Experience

1-5 years	41	13.67
6-10 years	77	25.67
11-15 years	36	12
>16 years	146	48.66

Participation in In-Service Education programme on Bio Medical Waste Management

Yes	28	9.33
No	272	90.67

Awareness about Bio Medical Waste Management through mass media.

Mass media	143	47.67
Peer group	117	39
Family members	40	13.33

Adoption of Bio Medical Waste Management policy in PHC

Yes	61	20.33
No	239	79.67

Table 2: Assessment of knowledge of nursing personnel regarding bio medical waste management before and after STP. (N=300)

Level of Knowledge	Before STP (Pre Test)		After STP (Post Test)	
	Frequency	Percentage	Frequency	Percentage
	(f)	(%)	(f)	(%)
Adequate	88	29.34	246	82
Moderately Adequate	130	43.33	54	18
Inadequate	82	27.33	0	0

Table 3: Mean Difference of structured teaching programme on level of knowledge regarding Bio medical waste management among nursing personnel. N=300

Category	Mean	Mean difference	Standard Deviation	"t"-value
General Information	Before	2.35	2.21	16.744**** df=299
	STP			
	After	1.11	p=< 0.00001	
	STP			
Hazards of BMW	Before	2.63	1.82	19.147**** df=299
	STP			
	After	1.43	p=< 0.00001	
	STP			
	Before	5.97	1.91	15.786**** df=299
	STP			

Table to be cont....

Waste Segregation	After		1.87		
	STP	7.84		0.85	p=< 0.00001
Treatment of BMW	Before	6.66		2.33	15.786**** df=299
	STP		1.52		
Overall Score	After	8.18		0.85	p=< 0.00001
	STP	23.57		7.35	18.391**** d,f=299
Overall Score	After	31.97	8.37	3.02	p=< 0.00001
	STP				

****Significant at 0.05 level and 0.001 level (2 tailed) at df=299, t=1.968 at 0.05 and t=3.323 at 0.001 level respectively.

Table 4: Association of level of knowledge of nursing personnel with their selected socio demographic variables after STP (N=300)

Socio Demographic Data	Level of Knowledge After STP (Post Test)				X ²	df & p
	50-75%		>75%			
	F	%	F	%		
Age in Years						
Less than or equal to 20	8	14.81	16	6.5		
21-30	1	1.85	59	23.98		Df=4
31-40	12	22.23	90	36.58	32.47*	p=0.0001
41-50	13	24.07	49	19.91		S
> 50	20	37.03	32	13		
Marital Status						
Married	19	35.18	177	71.95		Df=3
Unmarried	5	9.25	14	5.69	65.72*	p=0.0001
Widow	12	22.23	40	16.26		S
Divorce	18	33.34	5	2.03		
Religion						
Hindu	20	37.03	101	41.05		Df=2
Christian	30	55.56	143	58.13	9.85*	p=0.0072
Muslim	4	7.04	2	0.81		S
Professional Qualification						
ANM	28	51.85	188	76.42		Df=3
GNM	10	18.51	47	19.1	38.5*	p=0.0001
B. Sc (N)	15	27.78	8	3.25		S
PC B.SC (N)	1	1.85	3	1.21		
Present Designation						
Multi Purpose health worker	24	44.45	65	26.42		
Health visitor	6	11.12	77	31.3		Df=4

Table to be cont....

Staff nurse	13	24.07	71	28.86	13.29*	p=0.0099
Public health nurse	10	18.51	29	11.78		S
Community health officer	1	1.85	4	1.62		
Monthly Income in Rupees						
Less than or equal to 10000	26	48.14	5	2.03		Df=3
10001-20000	14	25.92	65	26.42	10.57*	p=0.0001
20001-30000	7	12.96	96	39.02		S
>30000	7	12.96	80	32.52		
Years of Experience						
1-5 years	11	20.37	30	12.19		Df=3
6-10 years	17	31.48	60	24.39	6.65*	p=0.0840
11-15 years	8	14.81	28	11.38		NS
>15 years	18	33.34	128	52.03		
Participation in in-service education programme on biomedical waste management						
Yes	24	44.45	4	1.62	95.94*	p=0.0001
No	30	55.56	242	98.37		S
Awareness about biomedical waste management through mass media.						
Mass media	14	25.92	129	52.43		Df=2
Peer group	8	14.81	109	44.3	22.06*	p=0.0001
Family	32	59.25	8	3.25		S
Adoption of bio medical waste management policy by PHC						
Yes	12	22.23	49	19.91	0.14*	p=0.7033
No	42	77.78	197	80.08		NS

* Chi square is significant at the 0.05 level, S= Significant, NS= Nil Significant.

Discussion

The findings of the study based on objectives were:

First objective of the study was to assess the level of knowledge regarding bio medical waste management among nursing personnel before structured teaching programme.

Before Structured Teaching Programme 43.33% (130) of nurses were having moderately adequate knowledge, 29.34% (88) were having adequate knowledge and remaining 27.33% (82) of them were having inadequate knowledge.

Second objective of the study was to assess the level of knowledge regarding biomedical waste management among nursing personnel after structured teaching programme.

After STP 82% (246) of nursing personnel were having adequate level of knowledge, 18% (54) of nurses were having moderately adequate and none of them having inadequate knowledge. Similar findings were noted in a study conducted by Simple M (2005) on Bio medical waste management among staff nurses in a private hospital at Mangalore. The sample comprises of 30 staff nurses selected by using a multi stage random sampling technique. Structured knowledge questionnaire was used to collect the data. The findings of the study reveal that the mean percentage of knowl-

edge score of the nursing personnel was 50.29% in pre-test and it was 84.39% during the post test.

Third objective of the study was to find out the effectiveness of structured teaching programme by comparing the levels of knowledge regarding bio medical waste management among nursing personnel before and after structured teaching programme.

Paired 't' test was used to find out the effectiveness of structured teaching programme on knowledge. The mean difference of general information was statistically significant ($t_{299}=16.744$, $p<.00001$). The mean difference related to health hazards was statistically significant ($t_{229}=19.147$), $p<.00001$. The mean difference related to waste segregation was statistically significant $t_{229}=15.786$, $p<.00001$. The mean difference related to treatment of Bio-Medical waste management was statistically significant $t(229)=10.692$, $p<.00001$. Overall levels of knowledge, before STP the mean score was 23.57 with standard deviation of 7.35. After STP the mean score was 31.97 with standard deviation 3.02. The obtained 't' value 18.391 was highly significant affirming a substantial improvement in the aspect of overall knowledge among nursing personnel following STP. An average nurses improved their knowledge from 23.57 to 31.97 after STP. The difference between after and before STP knowledge scores is $t=18.391$, and it was significant overall improvement score of 8.37 is seen in knowledge.

Fourth objective of the study was to find out the association between knowledge, of nursing personnel on biomedical waste management with their selected demographic variables

There was a significant association was found between post knowledge scores with following socio demographic variable like age, marital status, religion, professional qualification, present designation, monthly income, year of experience, participated in in-service education on biomedical waste management, awareness about bio medical waste management at 0.05 level. Hence the formulated Hypothesis. The study was supported by following studies, RashmiKundapur, et. al. (2014) conducted a study regarding awareness of nursing staff about the biomedical waste segregation in a tertiary care centre. The total of 96.66% of nurses knew the segregation of biomedical waste was the need of the hour. 90% of them felt they have adequate knowledge about segregation. 96% knew the colour coding of sharps and human anatomical waste. But 99% knew the colour coding of blood, blood products and microbiological waste. 67% knew the colour coding of pharmacological waste and double glove disposal. Only 89.3% were confident that they followed the correct methods of segregation.9Jyoti Srivastava (2016) conducted a study to assess the knowledge of staff nurses regarding biomedical waste management. The study results showed that the staff nurses had average knowledge regarding biomedical waste management. The planned teaching programme was found effective because post test knowledge was better than the pre test knowledge score among staff nurses.10A D Pattan (2015) was conducted a study among 60 B.Sc. 3rd year nursing students to assess the knowledge regarding biomedical waste management. Knowledge regarding biomedical waste management average knowledge found to be a satisfactory. The mean knowledge score was 25.32 with standard deviation 1.43 gain the knowledge.11Das SK, et.al., (2016) conducted a study to assess the knowledge and practice regarding hospital waste management among healthcare providers of a tertiary care hospital. The study was conducted in the Departments of General Medicine, Surgery, Gynaecology and Obstetrics, and Radiotherapy among 198 different hospital staff within 3 months with the help of a predesigned and pretested interview schedule to elicit the knowledge of BMW management. The above study revealed certain paucity of knowledge among the healthcare providers in the field of BMW management which adversely affected their practice. There should be regular comprehensive training programs regarding BMW management for all level of workers and strict implementation of them.¹²Merandi R, et.al, (2017) conducted a quantitative evaluative approach with

pre experimental one group pre test post test design was used to regarding knowledge and practices after training programme among health care staffs. The study results showed that the mean post test knowledge score regarding biomedical waste management was significantly higher than that of mean pre test score.¹³

Conclusion

The present study concluded that structured teaching programme was an effective mode to create awareness among nursing personnel and helps to improve the knowledge of nursing personnel on bio medical waste management. Statistically there was a significant association between the knowledge of nursing personnel with their selected socio demographic variables. Hence it indicates that the health care institutes should organize in-service education and orientation programme regarding Bio medical waste management.

Recommendations

- A study can be on conducted on larger samples.
- A follow up study can be conducted among all categories of health personnel (medical and Para medical) in different settings.
- A similar study could be conducted in public sector and private sector setting.
- A comparative study can be conducted with different groups of personnel.

References

1. <http://www.ignou.ac.in/ignou/aboutignou/school/sohs/programmes/detail/230/2>
2. Park. (2015). Textbook of preventive and social medicine. 23rd Edition. Jabalpur; M/S. Bansarridas Bhanot publishers. P. No: 789
3. AFACFO, (2002) Manual Bio Medical Waste Management of hospital infection control for armed forces. Second edition. P. No. 21.
4. Jacob Annamma. R Rekha. Jadhav Sonali Trach and. (2015). Policies for segregation and disposal of bio medical waste. Clinical Nursing procedures: The art of Nursing practice. 3rd Edition. New Delhi; JAYPEE the health sciences publishers. P. No: 147.
5. PriyaDatta, Gursimaran Kaur Mohi and Jagdish Chander. Biomedical waste management in India: Critical appraisal. Journal of Laboratory Physicians. 2018; 10(1): 6-14.
6. WHO. Review of Health Impacts from Microbiological Hazards in Health Care Wastes. Geneva: World Health Organization; 2004.
7. Bio-Medical Waste Management Rules. 2016 Published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-Section (i), Government of India

- Ministry of Environment, Forest and Climate Change. Notification; New Delhi, the 28th March, 2016.
8. Dr.Mamatha I. V, Dr. N. Konda Reddy. Awareness of Biomedical Waste Management Among Nursing Personnel and Auxiliary Staff. *Journal of Critical Reviews*.2020; 7(4): 337-340.
 9. RashmiKundapur, et.al. The Awareness in Biomedical Waste Management of Nursing Staff at A Tertiary Care Hospital of Mangalore, South India *Nitte University Journal of Health Science*. 2014; 4(4): 73-75.
 10. Jyoti Srivastava. Knowledge Regarding Biomedical Waste Management among the Staff Nurses. *International Journal of Science and Research*. 2016; 5(7): 1714-1716.
 11. A.D. Pattan. A Study to Evaluate the Effectiveness of Planned Teaching Programme on Knowledge Regarding Biomedical Waste Management Among B.Sc. 3rd year Nursing students of K.L.E. University Institute of Nursing Science, Belgaum, Karnataka. *International Journal of Nursing Critical Care*.2015; 1(2): 10-13.
 12. Das SK, Biswas R. Awareness and practice of biomedical waste management among healthcare providers in a Tertiary Care Hospital of West Bengal, India. *International Journal of Medicine and Public Health*. 2016; 6:19-25.
 13. Merandi R, Williams A. Effectiveness of 'training programme' on knowledge and practices of biomedical waste management among health care workers. *Galore International Journal of Health Sciences & Research*. 2017; 2(4): 45-52.

