Original Research Paper

Nursing

EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE AND PRACTICE REGARDING BIOMEDICAL WASTE MANAGEMENT AMONG STAFF NURSES

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ABSTRACT **Background:** Biomedical waste is the waste generated during the diagnosis and treatment of humans as well as animals from health care settings. Biomedical waste is hazardous and infectious. The proper handling and disposal of such waste are called biomedical waste management. Nurses play a crucial role in the process of handling hospital waste. This study aimed to assess knowledge and practices regarding biomedical waste management among staff nurses. A Quantitative research approach with a pre-experimental one-group pre-test post-test design was used. A consecutive sampling technique was used to select 60 staff nurses. Data were collected with a structured knowledge questionnaire and observation checklist. In the pre-test, the majority of the staff nurses i.e., 51.7% had poor knowledge, followed by 40% having average knowledge and only 8.3% had good knowledge about Biomedical waste management and 58.3% of staff nurses had poor practice skills, 41.7% had good practice skills in Biomedical waste management. After the implementation of the structured teaching program, in the post-test, none of the staff nurses had poor knowledge, 70 % had good knowledge, followed by 30% having average knowledge of biomedical waste management. 86.7% of the staff nurses had good practice scores and 13.3% had poor practice scores in biomedical waste management. It was concluded that the structured teaching program was effective in improving the knowledge and practice of staff nurses in biomedical waste management*

INTRODUCTION

Bio-medical waste (BMW) is defined as waste generated during diagnosis, treatment, or immunization of human beings or animals or in research activities pertaining thereto or in the production & testing of biological material.[1]

According to the WHO report (2018), Out of the total waste generated by healthcare activities, about 85% is general and non-hazardous waste, while the remaining 15% is considered hazardous. An average of up to 0.5kg of hazardous waste per hospital bed per day is generated by high-income countries; while low-income countries generate an average of 0.2 kg.[2]

Bio-medical Waste (Handling and Management) Rules were notified in July 1998. While in 2011, the 1998 rules were amended to include all persons who generate, collect, receive, store and transport bio-medical wastes. The 2011 rules have no provision for a monitoring authority, the 2016 rules state that the MOEF will review Health care facilities (HCF) once a year through state health secretaries, the SPCB, and the central pollution control board (CPCB). The State Pollution Control Board (SPCB), in its turn, will oversee implementation through district-level monitoring committees that will report to the State advisory committee or the SPCB. Moreover, according to the new rules, the advisory committee on Biomedical Waste management is mandated to meet every six months.[3]

According to the rules, 2016, waste should be segregated into 4 categories viz. yellow, red, white, and blue. Categories Yellow bin is being used to discard Human and animal anatomical waste. Categories red bin is being used to discard all recyclable waste. Categories white puncture-proof plastic container is for discarding sharps waste. A blue cardboard container is for glassware and metallic body implants.[4]

Bio-medical waste management started with the need to protect local communities from the spread of infections and later became an issue of global significance. Segregation of waste in a hospital affects infection control, patient safety, occupational health (in the hospital), and overall community health and the environment. It also helps cut down greenhouse gas emissions, persistent organic pollutants (POPs), mercury and other hazardous waste (HW). In the new environmental paradigm, Biomedical waste management affects many bigger environmental issues, including releasing POPs, which are released during medical waste incineration.[3]

The healthcare team includes doctors, Nurses & health workers who play a crucial role in the proper disposal of hospital waste. They come in a very early step in the chain of the hospital waste management process. But still, there are errors in handling Bio-medical waste, which could be due to a lack of knowledge and skills among the nurses.

A Descriptive survey approach was used to assess the level of knowledge regarding Biomedical waste management among 100 staff nurses in a selected hospital in Tamil Nadu. The sample was selected by non-probability convenience sampling technique. The data was collected with the help of a structured self-administered questionnaire. This study concluded that 75% of nurses have inadequate knowledge, 25% have moderate knowledge, and none have adequate knowledge of Bio-medical waste management. **K Dhasarathi (2018)** [5]

The above literature shows that there is a lack of knowledge and practice regarding bio-medical waste management among staff nurses. Nursing professionals form the backbone of any hospital. Nurses play a vital role in imparting health services at all levels viz, protection, prevention, promotion, and treatment. The nurses spend more time with patients in the ward than any other healthcare team member, increasing their exposure and risk to the hazards present in the hospital environment, mainly biomedical waste. So, they need to be well equipped with the latest information, skills, and practices in managing this waste besides reducing hospital-acquired infections to protect their health. They are also responsible for preventing risks related to waste exposure. So, this study was planned to assess the effectiveness of a structured teaching program on the knowledge and practice of staff nurses.

MATERIALS AND METHODS

A Quantitative research approach with a Pre experimental one-group pre-test-post-test design was used to accomplish

the objectives of the study. The study was conducted on 60 staff nurses of a civil hospital and S.P.N (Ch.) hospital in Mukerian, district Hoshiarpur Punjab, India. A consecutive sampling technique was used to select the sample using sampling criteria. A structured knowledge questionnaire and observational checklist were prepared on basis of the review of the literature on bio-medical waste management. In the knowledge questionnaire, 30 questions regarding the purposes of bio-medical waste management, its survey, segregation, collection, storage, transportation, treatment, and nursing responsibilities during bio-medical waste management were added. In the Observational checklist, 10 points of bio-medical waste management were enlisted to check the practice of staff nurses. Then Tools was distributed to nine experts including two doctors and seven experts of the department of Medical-Surgical Nursing. Changes were done according to their valuable opinions. Data collection was done in the month of February 2020. Samples were taken from various wards, i.e., the medical ward, surgical ward and Emergency ward of Civil Hospital, Mukerian, and S.P.N. (Ch.) Hospital, Mukerian. A pre-test of subjects was taken and a structured teaching program on bio-medical waste management was given to staff nurses. After seven days, a post-test was conducted by using the same structured knowledge questionnaire and observational checklist to assess the effectiveness of the structured teaching program.

RESULTS
Section - I
Table 1: Frequency and Percentage Distribution of Sample Characteristics   N=60

Sample characteristics	Frequency (n)	Percentage (%)
Age (in years)		
21-25	18	30
26-30	21	35
31-35	18	30
≥ 36	3	5
Level of professional education		
GNM	28	46.7
B.Sc. Nursing	22	36.6
P.B. B.Sc. (N)	10	16.7
M.Sc. Nursing	-	-
Years of experience		
≤ 5	21	35
6-10	19	31.7
11-15	15	25
≥ 16	5	8.3
Area of work		
Medical ward	30	50
Surgical ward	20	33.3
Emergency ward	10	16.7
In-service education		
Yes	22	36.7
No	38	63.3

Table 1 depicts that 35% of the staff nurses were in the age group 26-30 years followed by 30% in the age group 21-25 years,30% in the age group 31-35 and 5%≤36. According to the level of professional education, 46.7% of the nurses were GNM Diploma holders,16.7% were P.B.B.sc (N) and 36.6% of staff nurses were graduates.

Regarding years of experience, 35% of the staff nurses were having ≤ 5 years of experience,31.7% were having 6 - 10 years of experience, 25% were having 11-15 years of experience and only a few i.e., 8.3% of nurses were having ≥ 16 years of experience. According to the area of work, 50% of nurses were in the medical ward, 33.4% were in the surgical ward and 10% were in the emergency ward and only 36.7% of staff nurses had attended in-service education programmes regarding bio-medical waste management.

Table 2: Pre-test and post-test knowledge score on biomedical waste management among staff nurses.   N=60

Level of Knowledge	Score	Pre-test		Post-test	
		(n)	(%)	(n)	(%)
Good	≥ 23	5	8.3%	42	70%
Average	16-22	24	40%	18	30%
Poor	≤ 15	31	51.7%	0	0%

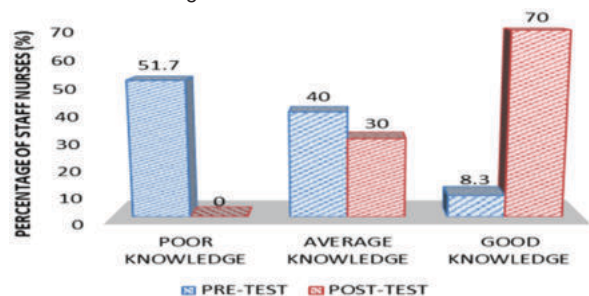*Maximum knowledge score=30*
Minimum knowledge score=0

Figure 1: Pre-test and post-test knowledge score on biomedical waste management among staff nurses.

Table 2 and Figure 1 illustrate that in the pre-test, 51.7% of staff nurses had a knowledge score of ≤ 15, 40% had a knowledge score of 16-22, and 8.3% of them had a knowledge score of ≥ 23 on Biomedical waste management. In the post-test, 70% had a knowledge score of ≥ 23 on biomedical waste management.

Hence it can be concluded that in the pre-test, only 8.3% of the staff nurses had a good level of knowledge and 51.7% of the staff nurses had a poor level of knowledge and in the post-test, 30% of staff nurses had an average level of knowledge on Biomedical waste management

Table 3: Pre-test and post-test practice scores on biomedical waste management among staff nurses.   N=60

Level of practice	Score	Pre-test		Post-test	
		(n)	(%)	(n)	(%)
Good	> 5	25	41.7%	52	86.7%
Poor	≤ 5	35	58.3%	08	13.3%

Maximum knowledge score=10
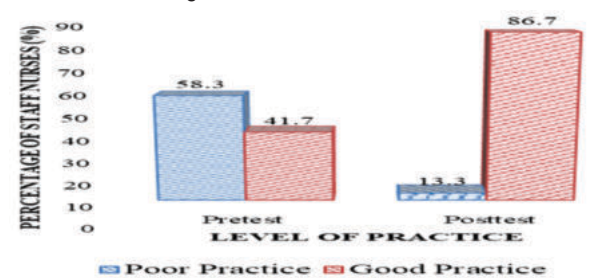*Minimum knowledge score=0*

Figure 2: Pre-test and post-test practice scores on biomedical waste management among staff nurses.

Table 3 and Figure 2 depict that in the pre-test, 58.3% of staff nurses had practice scores of ≤ 5, 4and 1.7% had practice scores of >5 on biomedical waste management. Hence it is concluded that in the pre-test, 58.3% of staff nurses had poor practice skills in biomedical waste management, and in the post-test, 86.7% of staff nurses had good practice skills in biomedical waste management

Table 4: Comparison of mean pre-test and post-test knowledge scores regarding Biomedical waste management among staff nurses

Level of knowledge	Mean	SD	Mean D	t value	df	P value
Pre-test	11.9	4.272	9.65	16.84	59	.001*
Post-test	21.63	2.617				

Table 4 represents that the pre-test and post-test mean knowledge scores of staff nurses' biomedical waste management were 11.98 and 21.63 respectively. The difference between the mean pre-test and post-test knowledge scores (9.65) was statistically significant at the $p < 0.05$ level. Findings reveal that a structured teaching program effectively improved staff nurses' knowledge regarding bio-medical waste management.

Hence, the research hypothesis (H1) was accepted as the difference between post-test means knowledge score was statically significant. ($p < 0.05$)

Table 5: Comparison of mean pre-test and post-test practice scores regarding Biomedical waste management among staff nurses   N=60

Level of practice	Mean	SD	Mean D	t value	df	P value
Pre-test	5.87	1.652	1.26	4.353	59	.001*
Post-test	7.13	1.535				

Table 5 depicts the effectiveness of structured teaching program on practice regarding bio-medical waste management among staff nurses showed that the mean pre-test practice score was 5.87 ± 1.652 and the mean post-test practice score was 7.13 ± 1.535 with a mean difference of 1.26 with a calculated value (t=4.353, df=59, p=0.05) indicates highly significant. Findings reveal that a structured teaching program effectively improved staff nurses' practice regarding bio-medical waste management.

Hence, the research hypothesis (H2) was accepted as the difference between post-test means practice scores was statistically significant. ($p < 0.05$)

CONCLUSION

Based on the findings of the present study, the investigator found that the knowledge score and practice score of staff nurses was improved after a structured teaching programme. Thus, a structured teaching programme effectively improved the knowledge and practice of staff nurses regarding bio-medical waste management.

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