

Effectiveness of Video Assisted Teaching Program Regarding Knowledge on Biomedical Waste Management among Staff Nurses

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Abstract: Background: Biomedical waste has become serious health hazard in many countries, including India. Major issue related to current biomedical waste management in many hospitals is that some hospitals are disposing the waste in a haphazard, improper and indiscriminate manner. One of India's major achievements has been to change the attitudes of the operators and health care personnel and other health care members to incorporate good biomedical waste management practices in their daily operations and work. The main aim is to increase awareness and improve knowledge regarding BMW management among staff nurses. Objectives: To assess the knowledge of staff nurses regarding Biomedical waste management, To evaluate the effectiveness of video assisted teaching program regarding Biomedical waste management and to determine the association of knowledge among staff nurses with selected socio-demographic variables. Materials and Methods: One group pre test post test design and evaluative approach were selected for this study among 60 staff nurses working in Krishna Hospital and Medical Research Centre, Karad. Pre test was conducted before administration of video assisted teaching program and post test was conducted after 7 days. It was observed that after administering the video assisted teaching program the mean of total knowledge score was increased to 26.033 from 17.383 that of pre test knowledge mean score. The paired 't' value is 12.947 giving 'p' value <0.0001 which is considered to be extremely significant, indicates significant improvement in knowledge of staff nurses regarding BMW management. Conclusion: Based on the analysis of findings of the study there was evident increase in the knowledge scores among staff nurses in the study after administration of video assisted teaching program.

Keywords: Video assisted teaching program, knowledge, biomedical waste management, staff nurses

1. Introduction

The conflict between economic development and environmental quality has been well established in the environmental economics literature. Equally well established has been the trade-off between trade and environmental protection. That is, when an economy grows on the lines of an export-led growth strategy, then it uses more and more resources (renewable as well as non-renewable) to get into higher production levels thereby causing infliction or damage to the environment (in various forms of pollution).¹

Now it is well established fact that there are many adverse and harmful effects to the environment including human beings which are caused by the hospital waste generated during patient care. This issue makes biomedical waste management recently emerged as an issue of major concern not only to hospitals, nursing home authorities but to the environment. Hospital and other healthcare establishments have a 'duty of care' for the environment and for public health, and have particular responsibilities in relation to the waste they produce waste.²

2. Importance of this Study

Biomedical waste has become a serious health hazard in many countries, including India. Careless and indiscriminate disposal of this waste by health care establishments and research institutions can contribute to the spread of serious diseases such as hepatitis and AIDS(HIV) among those who

handle it and also among the general public. In other countries, they have separate law for collection and storage of solid hospital waste which was strictly followed whereas in India not much attention has paid to the management of biomedical waste.³

A major issue related to current biomedical waste management in many hospitals is that the implementation of biomedical waste is unsatisfactory as some hospitals are disposing the waste in a haphazard, improper and indiscriminate manner. Lack of segregation practices results in mixing of hospital wastes with general waste making the whole waste stream hazardous. In appropriate segregation ultimately results in an incorrect method of waste disposal.⁴

The awareness regarding biomedical waste management is very less among health personnel in India. Management of waste generated in any health care facility is a critical issue as it poses a direct threat to human health as well as to the environment. One of India's major achievements has been to change the attitudes of the operators and health care personnel including staff nurses and other health care members to incorporate good biomedical waste management practices in their daily operations and work (Berik Onursal, 2003). So awareness about various aspects of biomedical waste management is required and is needed to be assessed among the health personnel. Therefore, this video assisted teaching program will be helpful in maintaining proper management of biomedical waste and it will give awareness to the staff nurses who are working in the hospital.

2.1 Goal

The main goal is to increase awareness and improve knowledge regarding BMW management among staff nurses.

2.2 Conceptual Framework

Theoretical framework selected for this study was based on general systems theory as postulated by Von Bertalanffy. It is one type of exchange theory in which systems are composed of both structural and functional components that interact within the boundary that filters the type and rate of exchange with the environment. Here all the living systems are open systems because there is an ongoing exchange of matter, energy and information. The system is a unit that is greater than the sum of its parts and it has got various subsystems which has boundaries. Communication and feedback mechanism is essential for system to function in a system goal or end can be reached in various ways and any change in one part causes change in the whole system.

2.3 Input

It is a matter, energy and information received from the environment. In this study, input is considered as the assessment of knowledge of staff nurses and administration of video assisted teaching program. This will process the information about biomedical waste management.

2.4 Throughput

It is a matter, energy and information that is modified or transformed within the system. It is the process by which the system processes the input and releases an output. In this study throughput includes 2 stages, first is the cognitive responses by the respondents to the video assisted teaching program. And the second stage is the post-assessment or post-test to assess the level of changes in the knowledge.

2.5 Output

It is an energy, matter and information that leave a system into the environment. In the present study it is the change in knowledge that is obtained by video assisted teaching program on biomedical waste management. This can be assessed by means of post-test knowledge scores which can be good, average and poor which proves the effectiveness level of video assisted teaching program

2.6 Methodology

One group pre test post test design was selected for the present study and an evaluative group pre test post test design was selected for the present study and an evaluative approach was found appropriate. The same group was used for conducting pre test and post test and study was conducted in Krishna Hospital and Medical Research Centre, Karad.

2.7.1 Sample Size Calculation

According to previous studies, enhancement in knowledge regarding BMW management mean

is 50% and standard deviation is 19.5%, thus sample size (n);

$$n = \frac{Z^2 SD^2}{(X \times E^2)} \\ = \frac{1.96^2 \times 19.5^2}{(50 \times 0.1)^2} \\ = 59$$

Therefore, minimum 59 subjects should be studied for assessment of educational intervention. Since the study was design to conduct before and after intervention, maximum number of subjects more than the minimum requirement had to be included as chance of unresponsiveness can occur from the subjects

2.7.2 Sample and Sampling Technique.

Staff nurses who are working in Krishna Hospital and Medical Research Centre, Karad and who are willing to participate in the study are included in the study. There 60 numbers of nurses who are willing and interested in the program. Written informed consents were obtained as well as clear explanations were given to the participants.

2.7.3 Variables

Dependent variables: Knowledge of the staff nurses.

Independent variables: Video assisted teaching program.

2.8 Data Collection

The present study aimed at assessing the effectiveness of planned teaching and Audio-visual CD ROM presentation on BMW management (according to biomedical waste Management & Handling Rules, 1998 under the Ministry of Environment & Forests) in terms of knowledge of the staff nurses. Pre test and post test were conducted before and after administration of video assisted teaching program.

2.9 Development of the Tool

A structured questionnaire was prepared for assessing the knowledge of the nurses. Video assisted teaching program consisting of planned teaching and CD ROM on BMW management (according to biomedical waste Management & Handling Rules, 1998 under the Ministry of Environment & Forests) was prepared for teaching program.

2.9.1 Tool and Technique Structured Questionnaire

SECTION A: It includes items related to demographic variables - age (in years), gender, educational qualification, working experience, history of any previous training regarding biomedical waste management.

SECTION B: It includes 34 knowledge questions of which 4 items each were related to biomedical waste management policy, handling and collection, storage and treatment of biomedical waste. And 8 questionnaires were related to segregation, 5 questionnaires on both transportation and disposal of biomedical waste. Each correct answer was given a score of one mark and wrong answer or unanswered was given a score of zero. The maximum score was 34. To interpret level of knowledge the scores were distributed as follows;

- Poor knowledge $\leq 50\%$
- Average knowledge 51 – 75 %

- Good knowledge > 75 %

2.9.2 Structured Planned Training

The structured planned teaching consists of the following topics

1. Introduction to Biomedical waste
2. Biomedical waste (management & Handling rules), 1998
3. Types of Biomedical waste
4. Schedule I: 10 categories of BMW
5. Schedule II: Segregation of BMW into 4 color coded containers
6. Schedule III: Symbols for BMW containers/ bags
7. Schedule IV: Non washable labels for BMW bags
8. Handling and collection of BMW
9. Storage of BMW
10. Transport of BMW within health care facility
11. Schedule V: Standard for treatment and disposal of BMW
12. Accident Reporting
13. Schedule V: Standard for treatment and disposal of BMW
14. Golden Rules of BMW management

According to the above topics video CD ROM was made as per biomedical waste Management & Handling Rules, 1998 under the Ministry of Environment & Forests and teaching was given to the audience during and after the video administration. Questions were raised by the audience and doubts had been cleared by the researcher.

Inclusion Criteria

- Staff nurses who are working in General wards, ICU, Maternity and Paediatric wards of Krishna Hospital and Medical Research Centre, Karad.
- Staff nurses who are available during data collection.

2.10 Ethical Clearance

The study was approved by the Institutional Ethical committee of the Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra before the commencement of the study. A written permission was obtained from the Medical Director and Director of Nursing Services of Krishna Hospital.

3. Results

There were 60 numbers of participants in the study in which 52 (87%) were females and 8 (13%) were males.

It reveals that, with regard to age about 52% (31) of staff nurses belong to age group 21 to 24 years of age, 30% (18) of participants belong to 34 years of age and above. And 13% (8) of the nurses belong to 25 to 29 years of age followed by 5% (3) of nurses belong to 30 to 34 years of age. With regards to educational qualification about 55% (33) were G.N.M, 22% (13) were Basic B.Sc(N) and 18% (11) were P.B Sc(N) followed by 5% (3) A.N.M respectively.

Table 1: Frequency & Percentage Distribution of Socio-demographic variables of staff nurses.

Variables	Category	Respondent	
		Frequency (F)	Percentage (%)
1. Age	A. 21 – 24 years	31	52%
	B. 25 – 29 years	8	13%
	C. 30 – 34 years	3	5%
	D. 34 years above	18	30%
2. Gender	A. Male	8	13%
	B. Female	52	87%
3. Education	A. ANM	3	5%
	B. GNM	33	55%
	C. PB. B. Sc (N)	11	18%
	D. B. B. Sc (N)	13	22%
4. Working Experience	A. 1 – 9 years	41	69%
	B. 10 – 19 years	5	8%
	C. 20 – 29 years	11	18%
	D. 30 years above	3	5%
5. Previous Training Regarding BMW	A. Yes	15	25%
	B. No	45	75%

In context with the working experience majority of staff nurses 69% (41) belongs to 1 to 9 years of experience. Further, 18% (11) of nurses belongs to 20 to 29 years of experience, followed by 8% (5) of the participants belongs to 10 to 19 years of experience and with 5% (3) of nurses which is the least in number belongs to 30 years above experience. The entire group of participants i.e. staff nurses in the study 75% (45) had not taken any training before regarding BMW and the remaining 25% (15) had had an educational exposure/ training regarding BMW.

Table 2: Frequency & Percentage distributions of total scores of staff nurses regarding BMW

Knowledge Score	PRE TEST		POST TEST	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Poor (0 – 16)	25	41%	0	0%
Average (17 – 25)	35	59%	20	33%
Good (26 – 34)	0	0%	40	67%

In pre test majority, 59% (35) of nurses were having average knowledge about BMW, and 41% (25) of nurses were having poor knowledge; and in post test there was an improvement in knowledge thus majority of the participants 67% (40) had good knowledge and the rest 33% (20) were having average knowledge regarding BMW. It was seen that none of the participants were having poor knowledge.

Table 3: Mean and Standard deviation of total knowledge scores of staff nurses regarding BMW

Area of analysis	Mean	Standard deviation	P	t
Pre test	17.383	3.836	<0.0001 Extremely significant	12.947
Post test	26.033	3.474		
Difference	8.65	-0.362		

Table no. 3 represents the pre test and post test mean, median, mode and standard deviation of total knowledge scores of staff nurses regarding BMW. The mean for pre test total knowledge score was 17.383 which was increased to 26.033 with pre test standard deviation of 3.836 followed by 3.474 of post test standard deviation.

Table 4: Paired 't' test to find the effectiveness of video assisted teaching program regarding knowledge in section wise of the nurses

Sl. No.	Area of Analysis	Mean	SD	Paired t test	
I	Knowledge regarding BMW management policies			P	t
	A. Pre test	2.950	0.8911	<0.0001	
	B. Post test	3.817	0.4315	Extremely significant	7.693
II	Knowledge regarding segregation of BMW	Mean	SD	P	t
	A. Pre test	4.1834	1.3720	<0.0001	
	B. Post test	5.8334	1.1520	Extremely significant	11.439
III	Knowledge regarding handling & collection of BMW	Mean	SD	P	t
	A. Pre test	2.0000	0.9742	<0.0001	
	B. Post test	2.9167	0.8693	Extremely significant	8.780
IV	Knowledge regarding storage of BMW	Mean	SD	P	t
	A. Pre test	2.400	1.0920	<0.0001	
	B. Post test	3.434	0.7673	Extremely significant	7.352
V	Knowledge regarding transport of BMW	Mean	SD	P	t
	A. Pre test	2.1334	1.0330	<0.0001	
	B. Post test	3.5167	0.9828	Extremely significant	10.437
VI	Knowledge regarding disposal of BMW	Mean	SD	P	t
	A. Pre test	2.450	1.171	<0.0001	
	B. Post test	3.734	1.133	Extremely significant	8.526
VII	Knowledge regarding treatment of BMW	Mean	SD	P	t
	A. Pre test	1.250	0.932	<0.0001	
	B. Post test	2.783	1.010	Extremely significant	10.539

The above table no.4 depicts the mean and standard of pre test and post test score of different aspects of knowledge regarding BMW management. The first knowledge aspect is regarding BMW management policies with pre test mean 2.950, standard deviation 0.8911 and post test mean increased to 3.817, standard deviation 0.4325 ($P<0.0001$) which is considered extremely significant. For knowledge score regarding segregation of BMW management, the pre test mean 4.1834, standard deviation 1.3720 and post test mean increased to 5.8334, standard deviation 1.1520 ($P<0.0001$) which is considered extremely significant. The next knowledge aspect is regarding handling and collection of BMW with pre test mean 2.0000, standard deviation 0.9742 and post test mean increased to 2.9167, standard deviation 0.8693 ($P<0.0001$) which is considered extremely significant. For knowledge regarding storage of BMW, the pre test mean 2.400, standard deviation 1.0920 and post test mean increased to 3.434, standard deviation 0.7673 ($P<0.0001$) which is considered extremely significant. The fifth knowledge aspect is regarding transport of BMW, the pre test mean 2.1334, standard deviation 1.0330 and post test mean increased to 3.5167, standard deviation 0.9828 ($P<0.0001$) which is considered extremely significant. The sixth knowledge aspect is regarding disposal of BMW with pre test mean 2.450, standard deviation 1.171 and post test mean increased to 3.734, standard deviation 1.133 ($P<0.0001$) which is considered extremely significant. The last knowledge aspect is regarding treatment of BMW, the pre test mean 1.250, standard deviation 0.932 and post test mean increased to 2.783, standard deviation 1.010 ($P<0.0001$) which is considered extremely significant.

Table 5: Paired 't' test to find the effectiveness of video assisted teaching program regarding total knowledge scores of the nurses

Area of analysis	Mean	SD	P Value	Paired 't' test
A. Pre test	17.383	3.80	<0.0001	12.497
B. Post test	26.033	3.44		

Table no.5 depicts that the mean knowledge score after administering the video assisted teaching program had increased than before. The paired 't' value is 12.947 giving 'p' value <0.0001 which is considered extremely significant, indicates significant improvement in knowledge regarding BMW.

4. Discussion

The study revealed that before administering the video assisted teaching program, 35(59%) participants were having average knowledge regarding BMW and the rest 25(41%) participants were having poor knowledge and none of the participants i.e. 0(0%) were having good knowledge. But, after administering the teaching program, majority of the staff nurses, 40(67%) were having good knowledge regarding BMW and the rest, 20(33%) were having average knowledge and none of them 0(0%) are having poor knowledge regarding BMW. The results showed that there is lack of appropriate information regarding BMW management among the staff nurses.

Study was supported by similar study to assess the knowledge of hospital staff regarding BMW management in tertiary hospital in Uttar Pradesh. Training was given to the nursing staff in which majority i.e. 159 (78.4%) nurses were having average knowledge and 23 (11.3%) nurses were having good knowledge whereas 2 (1.03%) were having poor knowledge, after the training it is evidenced that 108 (52.8%) were having good knowledge and the rest 95(47.2%) were having average knowledge.⁵

One way ANOVA is used for determining the association between pre test knowledge and selected socio-demographic variables like age, education and years of experience. Unpaired 't' test is used for finding the association between pre test knowledge and previous training experience.

- 1) There is significant association between age of the staff nurses and pre test knowledge regarding BMW management policies ($P=0.0202$, $F=3.533$), segregation ($P<0.0001$, $F=8.862$) and storage ($P=0.0015$, $F=5.862$) of BMW.
- 2) There is a significant association between education of the staff and pre test knowledge regarding segregations of BMW ($P=0.0023$, $F=5.452$), handling and collection of BMW ($P=0.0263$, $F=3.316$).
- 3) There is a significant association between years of experience of the staff and pre test knowledge regarding segregations of BMW ($P<0.0001$, $F=13.391$).
- 4) There is a significant association between previous training experience of the staff and pre test knowledge regarding treatment of BMW ($P=0.0190$, $t=2.412$).

The study also depicts that the mean knowledge score after administering the video assisted teaching program had increased than before i.e. pre test knowledge mean was 17.383 and post test mean was 26.033 with 't' value 12.497 giving 'p' value <0.0001 which is considered extremely significant, indicates significant improvement in knowledge regarding BMW. Therefore, the VAT program was found to be effective.

Similar study was conducted in selected PHCs in Bangalore on knowledge aspect of BMW management in which video assisted teaching was also administered. The pre test mean was 36.70 which was increased to post test mean 86.70 with 't' value 14.04 giving 'p' value <0.0001 at a significant 5% level, which was considered as extremely significant. Thus this indicate that video assisted teaching was effective.⁶

5. Conclusion

Based on the analysis of findings of the study the following inference was drawn. There was evident increased in the knowledge scores among staff nurses in the study after administration of video assisted teaching program.

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