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A Study to Assess the Effectiveness of Game Learning Method on Knowledge Regarding Biomedical Waste Management Among First Year Nursing Students of T John School and College of Nursing, Bangalore

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ABSTRACT

Waste management is important because it protects the environment from toxic effects. Proper segregation as well as disposal is necessary in hospitals. Furthermore, adequate knowledge on biomedical waste management is important. Game learning is incorporating an interactive experience. The following study was conducted in Bangalore to assess the effectiveness of gaming on knowledge regarding biomedical waste management among nursing students. A quasi-experimental design was adopted with a sample size of 60 first year B.Sc. and GNM students, and selected through simple random sampling. Data were collected using a self-structured knowledge questionnaire on biomedical waste management. The pre-test was followed by two predetermined gaming activities for the participants. A post-test was conducted one week later. Statistical analysis of data was done using frequency, percentage, t-test. The study shows that in the pre-test assessment out of total 60 samples, majority 39 (65%) had poor knowledge, whereas in the post-test assessment, all 60 (100%) samples had good knowledge about biomedical waste management. The difference between pre-test and post-test scores was calculated. The mean of the difference was 25 and the SD of the difference was 10.04. Student-t value shows that game learning is an effective tool {$t(20) = 4.742$ ($p<0.05$; $p = 1.725$)}. Gaming increases group participation among students and can be used in classroom settings to motivate and encourage students.

Keywords: Biomedical Waste Management, gaming, nursing students, segregation.

INTRODUCTION

Hospitals are centers of healing and also important centers for generating infectious waste. Effective management of biomedical waste (BMW) is not only a legal necessity, but also a social responsibility. All hospitals, nursing homes, clinics, primary health centers (PHCs), community health centers and laboratories must ensure the safe disposal and environmentally sound management of the waste they produce, as specified in the rules for proper disposal of BMW. The head of healthcare facilities must take responsibility for protecting healthcare professionals involved in the handling, transportation and disposal of BMWs, as well as ensuring the safety of the community and the environment. According to Biomedical Waste (management and handling) Rules, 1998, of India, "**Any waste which is generated during the**

diagnosis, treatment or immunization of human beings or animals or in research activities pertaining there to or in the production or testing of biological."

The WHO reports that 85% of hospital waste is non-hazardous, 10% is infectious and the remaining 5% is non-infectious but hazardous chemical, pharmaceutical or radioactive products. Waste is a potential source of transmission of infections, especially hepatitis B and C, HIV and tetanus; approximately 1.4 kg per bed per day of waste is generated in Indian hospitals and up to 4.5 kg per bed per day in developed countries like the United States and approximately 15% of the waste is hazardous and 85% of the waste is non-hazardous. Of the 15% of hazardous waste, 5% is non-infectious and 10% is infectious. About 15–35% of medical waste is regulated as infectious waste. This range depends on the total amount of waste generated.

Hospital waste is a potential health hazard for healthcare professionals and the public. Waste disposal problems in hospitals and other healthcare institutions have become increasingly worrying issues. The basic elements are to recognize the waste, identify where the waste was generated and determine the cause of generation, and plan the disposal of the waste in a scientific way, so as to make it environmentally non-hazardous and eliminate the source of infection.

Biomedical waste should be segregated into color-coded bags or containers at source, and its processing and proper disposal should be a major concern for both medical professionals and the general public. Proper segregation, as well as waste disposal in hospitals, are essential. It can also lead to health risks for patients and caregivers.

The study concluded that awareness campaigns and classes could be carried out to improve knowledge about the safe handling and disposal of BMWs for possible practical applications among medical students. There is a need to update your BMW management knowledge and practices. The researcher felt that raising awareness through a teaching program is an excellent way for nursing students to prepare themselves with the latest information on BMW management skills and techniques to help them function effectively in hospitals. Thus, assessing the knowledge of nursing students (as future professionals) through the expository method and the game method, it makes students aware of the importance of BMW management.

In pursuing the goal of reducing health problems, eliminating potential risks and treating sick people, healthcare services inevitably create waste that can, in itself, be hazardous to health. Waste produced in the course of healthcare activities has a greater potential for infection and injury than any other type of waste. Inadequate and inadequate knowledge of healthcare waste handling can have serious health consequences and also a significant impact on the environment. It is estimated that around 0.33 million tonnes of medical waste is generated in India annually and the rate of waste generation varies from 0.5 to 2.0 kg per bed per day. Wherever it is generated, a safe and reliable method for handling biomedical waste is essential. Effective management of biomedical waste is not only a legal necessity, but also a social responsibility.

This study plays an important role in assessing students' knowledge about Biomedical Waste Management and aims to raise awareness among nursing students about Biomedical Waste Management.

OBJECTIVES

- To assess the level of knowledge on biomedical waste management among first year BSc and GNM nursing students
- To evaluate the effectiveness of game learning biomedical waste management among first year BSc

and GNM nursing students

- To find out the association between level of knowledge on biomedical waste management among first year nursing students with selected demographic variables

OPERATIONAL DEFINITIONS

- Evaluate – It is the statistical measurement of knowledge about learning games about biomedical waste management
- Effectiveness – It is the degree to which something can produce a desired result.
- Biomedical waste – Medical waste is any type of waste that contains infectious material (or potentially infectious material
- Game learning – organized play that provides fun and pleasure (Prensky,2001) Characteristics of the "set of activities involving one or more players": objective restrictions, rewards and consequences. Rule – guided and artificial in some respects

ASSUMPTIONS

1. The student will willingly participate in the study
2. The student will be able to understand the questionnaire
3. The student will participate in the games

HYPOTHESIS

H1: There will be significant effect in game learning method on increasing the level of knowledge on biomedical waste management.
H2: There will be difference between the level of knowledge with selected demographic variables

MATERIALS AND METHODS

Development of pre-determined game activities: Two pre-determined game activities were created at the suggestion of experts.

Game 1 - Provided an overview of the game. Divides nursing students into teams to promote collaboration and friendly competition. Scenarios related to biomedical waste management. Each team will be presented with a scenario and will need to make decisions about proper waste handling and disposal. To create interactive visuals are used to engage. After each team completes a scenario, a group debriefs to review their decision and discuss the logic behind it. Track each team's point throughout the game. You can award points based on the accuracy of your decision. At the end of the game, determine the winning team based on the score

Game 2 - Into the Trash, students can play as a biomedical waste management hero on a mission to dispose of waste correctly. Various pieces of different types of biomedical waste will be spread across the college. They will encounter various types of biomedical waste and will have to make decisions about how to dispose of it correctly. They earn points for correct choices. Finally, the team that scores the most points wins the game. This will help them understand the importance of proper biomedical waste management. A self-structured knowledge questionnaire was administered to the group that includes two sections, sociodemographic data and knowledge assessment before and after the intervention.

The following methods were used to analyse the data:

- Descriptive statistics such as frequencies and percentages were used to calculate demographic data in the pre-test and post-test.
- Mean and standard deviation were used to assess the level of knowledge on biomedical waste management among selected first year nursing students
- Mean and SD, and t-test to evaluate the effectiveness of learning the Game in biomedical waste management among selected first-year nursing students.
- Chi-square test is used to find the association between knowledge level with selected demographic variables of selected nursing students from T. John School and College of Nursing.

RESULTS

Organization and Presentation of data analysis:

Section 1: Description of demographic variables of 1st Year B. Sc. Nursing and GNM students respectively.

Section 2: Assessment of level of knowledge on biomedical waste management among the selected nursing students of T. John College of Nursing.

Section 3: Evaluation of the effectiveness of Game learning on biomedical waste management among the selected nursing students of T. John College of Nursing.

Section 4: Association between level of knowledge with the selected demographic variables of selected nursing students of T. John College of Nursing

Table 1.1: Demographic distribution of the selected nursing students.

DEMOGRAPHIC VARIABLES			
S/N	**Demographic variable**	n = 60	%
1	**Age group**		
	18 – 20	52	87%
	21 – 23	8	13%
2	**Gender**		
	Male	12	20%
	Female	48	80%
3	**Family Health Professionals**		
	Yes	21	35%
	No	39	65%
4	**Income**		

	Less than Rs. 50,000	34	57%
	Rs. 50,001 - 1,00,000	18	30%
	Rs. 1,00,001 - 1,50,000	1	1.70%
	More than Rs. 1,50,000	7	11.60%
5	**Previous Knowledge regarding Biomedical Waste management**		
	Yes	33	55%
	No	27	45%
6	**Previous Knowledge regarding Game Learning**		
	Yes	14	23.30%
	No	46	76.70%

Section 2: Assessment of level of knowledge on biomedical waste management among the selected nursing students

PRE-TEST

Knowledge Level	**n**	**%**
Poor (1 - 7)	11	18.30%
Average (8 - 14)	39	65%
Good (15 - 21)	10	16.70%

Table – 2.1.1: Percentage and frequency distribution of nursing students according to level of knowledge in the pre-test.

DESCRIPTION

The above table shows that, in the pre-test assessment out of 60 samples in total, 11 (18.3%) samples had poor knowledge, 39 (65%) had average knowledge and 10 (16.7%) samples had good knowledge regarding biomedical waste management.

POST-TEST

Knowledge Level	**n**	**%**
Poor (1 - 7)	0	0%
Average (8 - 14)	0	0%

Good (15 - 21)	60	100%

Table – 2.1.2: Percentage and frequency distribution of nursing students according to level of knowledge in the post-test.

DESCRIPTION

The above table shows that, out of 60 samples in total, all the 60 (100%) samples had good knowledge regarding biomedical waste management in the post-test assessment.

MEAN, SD AND LEVEL OF KNOWLEDGE

Samples	**Max score**	**Pre-test**		**Post-test**	
		SD	**Mean**	**SD**	**Mean**
60	21	4.14	11	0	18

Table-2.2.2: Mean and SD values of the test scores of selected nursing students.

DESCRIPTION

The above table reveals the mean and the SD value of the pre-test and post-test scores of the selected nursing students. With regard to the test, the total score for the test was 21. In the pre-test, the mean scores of the selected nursing students was 11 and the standard deviation was 4.14. The mean score of the pre-test indicated that majority of the samples had average knowledge.

In the post-test, the mean scores of the nursing students was 18 and there was no deviation in the mean scores. The mean score of the post-test shows that majority of the samples had good knowledge. There was a significant increase in knowledge level after the intervention indicating the effectiveness of the tool.

Section 3: Evaluation of effectiveness of Game learning on biomedical waste management among selected nursing students.

Questions	**Samples**	**Mean of Difference**	**SD of Difference**	**Student 't' Test Value**	**Degree of Freedom**	***p* – Value (0.05%)**	**Inference**
21	60	25	10.04	4.742	20	1.725	**S***

**S: Significance; NS: Not Significant (at 0.05% significance*

Table – 3: Difference Mean and SD, and t test values of the pre-test and post-test scores.

DESCRIPTION:

The table – 3 shows the *student – t test* results to prove the effectiveness of intervention tool — Game learning for biomedical waste management. As mentioned in the above table, the questionnaire used for pre-test and post-test assessment consisted of 21 questions. The differences between the pre-test and the post-test scores were calculated. The mean of the score difference was 25 and the SD of the score difference was 10.04. The *student – t value* shows that Game learning is an effective tool *{t (20) = 4.742 (p<0.05; p = 1.725)}*.

Section 4: Association between level of knowledge with the selected demographic variables of selected nursing students of T. John College of Nursing.

PRE-TEST

Table – 4.1: Association between level of knowledge and selected demographic variables of age, gender, family health professionals, family income, previous knowledge regarding biomedical waste management and previous knowledge regarding game learning for general information.

Sl. No.	Demographic variable	n = 60	%	Knowledge level of Respondents (n = 60)				$\chi 2$
				Mean ≦ 11		Mean ≧ 12		
				No. of People	% of people	No. of People	% of people	
1	**Age group**							
	18 - 20	52	87%	30	57.70%	22	42.30%	0.8654 df = 1 (NS)
	21 - 23	8	13%	6	75.00%	2	25.00%	
2	**Gender**							
	Male	12	20%	11	91.70%	1	8.30%	**6.2671** df = 1 (S)
	Female	48	80%	25	52.00%	23	48.00%	
3	**Family Health Professionals**							
	Yes	21	35%	12	57.10%	9	42.90%	0.1099 df = 1 (NS)
	No	39	65%	24	61.60%	15	38.40%	
4	**Family Income**							
	Less than Rs. 50,000	34	57%	20	58.80%	14	41.20%	1.9098
	Rs. 50,001 - 1,00,000	18	30%	11	61%	7	39%	
	Rs. 1,00,001 - 1,50,000	1	1.70%	0	0.00%	1	100.00%	df = 3 (NS)
	More than Rs. 1,50,000	7	11.60%	5	71%	2	29%	
5	**Previous Knowledge regarding Biomedical Waste Management**							

	Yes	33	55%	17	52.00%	16	48.00%	2.1998 df = 1 (NS)
	No	27	45%	19	70.00%	8	30.00%	
6	**Previous Knowledge regarding Game Learning Method**							
	Yes	14	23.30%	10	71.00%	4	29.00%	0.9938 df = 1 (NS)
	No	46	76.70%	26	56.50%	20	43.50%	

NB: S: Significance at the level of 5% (p<0.05); NS: Not Significant at the level of 5% (p>0.05); df: degree of freedom

DESCRIPTION

The above table – 4.1 presents the results of Chi-square analysis of the pre-test scores and the demographic variables such as age group, gender, any health professionals in family, family income, previous knowledge regarding biomedical waste management and previous knowledge regarding game learning.

In the pre-test, the association between level of knowledge and demographic variable — gender ($\chi^2 = 6.2671$; $df = 1$; $p=3.841$) was significant. There was no significant association between knowledge level and other demographic variables like age group ($\chi^2 = 0.8654$; $df = 1$; $p=3.841$), family health professionals ($\chi^2 = 0.1099$; $df = 1$; $p=3.841$), family income ($\chi^2 = 1.1098$; $df = 3$; $p=7.815$), previous knowledge regarding biomedica l waste management ($\chi^2 = 2.1998$; $df = 1$; $p=3.841$) and previous knowledge regarding game learning ($\chi^2 = 0.9938$; $df = 1$; $p=3.841$).

POST-TEST

Table – 4.2: Association between level of knowledge and selected demographic variables of age, gender, family health professionals, family income, previous knowledge regarding biomedical waste management and previous knowledge regarding game learning for general information.

Sl. No.	Demographic variable	n = 60	%	Knowledge level of Respondents (n = 60)				χ2
				Mean ≦ 18		Mean ≧ 19		
				No. of Sample	% of Sample	No. of Sample	% of Sample	
1	**Age group**							
	18 - 20	57	95%	21	37%	36	63%	0.0153
	21 - 23	3	5%	1	33%	2	77%	df = 1 (NS)
2	**Gender**							
	Male	14	23%	6	43%	8	57%	1.1072

	Female	46	77%	16	35%	30	65%	df = 1 (NS)
3	**Family Health Professionals**							
	Yes	19	32%	8	42%	11	58%	0.4022
	No	41	68%	14	34%	27	66%	df = 1 (NS)
4	**Family Income**							
	Less than Rs. 50,000	27	45%	8	30%	19	70%	1.5127
	Rs. 50,001 - 1,00,000	21	35%	8	38%	13	62%	
	Rs. 1,00,001 - 1,50,000	12	20%	6	50%	6	50%	df = 3 (NS)
	More than Rs. 1,50,000	0	0%	0	0%	0	0%	
5	**Previous Knowledge regarding Biomedical Waste Management**							
	Yes	17	55%	9	53%	8	47%	2.7944
	No	43	45%	13	30%	30	70%	df = 1 (NS)
6	**Previous Knowledge regarding Game Learning Method**							
	Yes	12	23%	6	50%	6	50%	1.1482
	No	48	77%	16	33%	32	67%	df = 1 (NS)

NB: S: Significance at the level of 5% ($p<0.05$); NS: Not Significant at the level of 5% ($p>0.05$); df: degree of freedom

DESCRIPTION

The above table – 4.2 presents the results of Chi-square analysis of the pre-test scores and the demographic variables such as age group, gender, any health professionals in family, family income, previous knowledge regarding biomedical waste management and previous knowledge regarding game learning.

In the post-test, there was no significant association between knowledge level and demographic variables like age group ($\chi^2 = 0.0153$; $df = 1$; $p=3.841$), gender ($\chi^2 = 1.1072$; $df = 1$; $p=3.841$), family health professionals ($\chi^2 = 0.4022$; $df = 1$; $p=3.841$), family income ($\chi^2 = 1.5127$; $df = 3$; $p=7.815$), previous

knowledge regarding biomedical waste management ($\chi^2 = 2.7944; df = 1; p=3.841$) and previous knowledge regarding game learning ($\chi^2 = 1.1482; df = 1; p=3.841$).

Research Hypothesis – 1

H_1: There will be significant effect in game learning method on increasing the level of knowledge on biomedical waste management.

The *student – t test* results proved the effectiveness of intervention tool — Game learning for biomedical waste management. The questionnaire used for pre-test and post-test assessment consisted of 21 questions. The mean of the score difference was 25 and the SD of the difference was 10.04. The *student – t value* shows that Game learning is an effective tool $\{t (20) = 4.742 (p<0.05; p = 1.725)\}$.

Research Hypothesis – 2

H_2: There will be difference between the level of knowledge with selected demographic variables. In the pre-test, the association between knowledge level and demographic variable — gender ($\chi^2 = 6.2671; df = 1; p=3.841$) was significant.

In the post-test, there was no significant association between the level of knowledge and demographic variables among selected nursing students of a selected Nursing college.

DISCUSSION

This chapter addresses the discussion, summary, conclusion, nursing implications, limitations, and recommendations. The essence of any research project is based on the study results, limitations, interpretation of the research results, and recommendations that incorporate the implications of the study. It also gives meaning to the results obtained in the study. The discussion concerns whether the results of the research study support or differ from previous literature. The present study aimed to evaluate the effectiveness of learning games in relation to Biomedical Waste Management among first-year bachelor's and GNM nursing students. 60 samples were selected using the simple random sampling method. According to the plan, a game learning method with pre-determined playful activities was used to teach about Biomedical Waste Management. The aim was to improve the knowledge of undergraduate and GNM nursing students, so that they could develop a positive attitude and good practices in relation to it. The collection and analysis of variables was done based on the study objectives. The results of the study were discussed in terms of objectives and hypotheses that are formulated during the beginning of the study.

To assess the level of knowledge on biomedical waste management among first year BSc and GNM nursing students

From the study, it was revealed that in the pre-test assessment out of 60 samples in total, 11 (18.3%) samples had poor knowledge, 39 (65%) had average knowledge and 10 (16.7%) samples had good knowledge regarding biomedical waste management. Whereas in all the 60 (100%) samples had good knowledge regarding biomedical waste management in the post-test assessment.

The above study is supported by a study conducted by Nuno Tavares (2022) to assess the effectiveness of game learning method the study concluded that Game-based learning is an important alternative to traditional teaching methods.

To evaluate the effectiveness of game learning biomedical waste management among first year BSc and GNM nursing students

Student – t test results prove the effectiveness of intervention tool — Game learning for biomedical waste management. the questionnaire used for pre-test and post-test assessment consisted of 21 questions. The

differences between the pre-test and the post-test scores were calculated. The mean of the difference was 25 and the SD of the difference was
10.04. The *student – t value* shows that Game learning is an effective tool *{t (20) = 4.742 (p<0.05; p = 1.725)}*.
The above study relies on a study carried out by Khanam et al (2017) a quasi-experimental study to assess the knowledge regarding Bio medical waste and effect of gaming, a sample size of 60 BSc nursing students was selected, through simple random sampling. The result shows, the mean percentage of pre-test was 36% with mean 8.97 and the total mean percentage of post-test was 66.8%, with mean 16.62. The study concludes that gaming increases the group participation of students and can be used in the classroom setup to motivate students.

To find out the association between level of knowledge on biomedical waste management among first year nursing students with selected demographic variables

The following socio- demographic variable were tested statistically for checking significant association with the level of knowledge: age group, gender, any health professionals in family, family income, previous knowledge regarding biomedical waste management and previous knowledge regarding game learning.
In the pre-test, the association between level of knowledge and demographic variable — gender ($\chi^2 = 6.2671; df = 1; p=3.841$) was significant. There was no significant association between knowledge level and other demographic variables like age group ($\chi^2 = 0.8654; df = 1; p=3.841$), family health professionals ($\chi^2 = 0.1099; df = 1; p=3.841$), family income ($\chi^2 = 1.1098; df = 3; p=7.815$), previous knowledge regarding biomedical waste management ($\chi^2 = 2.1998; df = 1; p=3.841$) and previous knowledge regarding game learning ($\chi^2 = 0.9938; df = 1; p=3.841$).
In post- test also there was no significant association between knowledge level and demographic variables like age group ($\chi^2 = 0.0153; df = 1; p=3.841$), gender ($\chi^2 = 1.1072; df = 1; p=3.841$), family health professionals ($\chi^2 = 0.4022; df = 1; p=3.841$), family income ($\chi^2 = 1.5127; df = 3; p=7.815$), previous knowledge regarding biomedical waste management ($\chi^2 = 2.7944; df = 1; p=3.841$) and previous knowledge regarding game learning ($\chi^2 = 1.1482; df = 1; p=3.841$).
Evidence-based practice in nursing is a process by which scientific evidence is identified, evaluated and applied in nursing care interventions. This will help specialist nurses to rely more on research and confirmation rather than experience.
The main objective of the study was to evaluate the level of knowledge about biomedical waste management among first-year bachelor's and GNM nursing students. The study was carried out at T John School and College of Nursing, Bangalore.
The objectives of the study were to evaluate the level of knowledge on biomedical waste management among first-year bachelor's and GNM nursing students, to evaluate the effectiveness of learning games on biomedical waste management among first-year bachelor's and GNM nursing students, and to find out the association between the level of knowledge on biomedical waste management among first-year nursing students with selected demographic variables.
The study aimed to examine the following hypothesis: There will be a significant association between the level of knowledge on biomedical waste management between the first year of bachelor's degree and GNM with pre- and post-test and there will be a difference between the level of knowledge with selected demographic variables An extensive review of related literature for this study was done by the investigator, including a Medline search for published and unpublished research, a hand search of recent literature, and

a review of citations. The information provided by the literature allowed the researcher to study the extent of the selected problem, previously addressed on the topic, to develop a conceptual framework, perform data analysis, as well as interpret data that helped develop the conceptual framework and tool selection. Literature reviews also helped in assessing the level of knowledge A quantitative study approach with a quasi-experimental design was selected, that is, a pre-test – post-test group design and a schematic representation of the study design were selected. The study was conducted among first year nursing students of B.Sc and GNM T. John School and College of Nursing, Bangalore. The simple random technique was used to select 60 samples. A self-structured questionnaire was used to assess knowledge about biomedical waste management among first-year bachelor's and GNM nursing students. A closed questionnaire and predetermined game activities were used in this study.

The self – structured questionnaire consists of two sections:

Section A: Socio demographic data of nursing students

Age, gender, income, family health professionals, previous knowledge regarding biomedical waste management and game learning.

Section B: Structured questionnaire was prepared after going through an intensive review of literature including research articles and personal discussions with experts. Structured questionnaire had 21 questions on knowledge regarding biomedical waste management.

Each question has four options out of which one was correct answer was gives score of '1' and wrong answer was given a score of '0'. The total attainable score for the knowledge item would be 21. The maximum score was 21. The score was converted into percentage and the resulting regard as below:

- 75-100% - Good knowledge
- 50- 75% - Average knowledge
- Below 50% - Poor knowledge

Two pre-determined gaming activities were prepared, game one was by providing an overview of the game and divided the nursing students into team to promote collaboration and friendly competition. Scenarios related to Biomedical waste management. Each team will be presented with a scenario and will need to make decisions on proper waste handling and disposal. To make interactive visuals are used for engaging.

After each team completes a scenario, a group discuss to review their decision and discuss the rationale behind them. Keep track of each team's point throughout the game. Points were awarded based on the accuracy of their decision. At the end of the game, winners were determined based on the scores achieved. And the second game was making students understand the importance of proper biomedical waste management for that we have used another game called trash treck in which the students can play as a biomedical waste management hero on mission to dispose the waste correctly. Various chits of different type of biomedical waste will be scattered around the college. They will encounter various type of biomedical waste and they have to make decision on how to dispose them correctly. They earn points for correct choices. Finally, the team who's score maximum points win the game.

The major findings of the study showed that pre-test assessment out of 60 samples in total, majority had poor knowledge, 39 (65%) whereas in post-test assessment, all the 60 (100%) samples had good knowledge regarding biomedical waste management. Thereby Game learning was proved to be an effective tool as the findings showed $\{t\ (20) = 4.742\ (p<0.05;\ p = 1.725)\}$ through this study. And there was no significant association between knowledge level and other demographic variables.

NURSING IMPLICATIONS

The findings of the study have various implications in different areas of nursing that is in nursing education, nursing practice, nursing administration and nursing research.

Nursing practice

- Nurses can provide a better framework for learning process, valuable sources for supporting students and the upcoming generation.
- Keeping this as the background, nurses can conduct health promotion programs in the clinical and community settings.
- This research can be administered to promote health awareness

- **Nursing education**
  - The student nurse should be motivated to take up the innovative approaches to provide health education to the people in different settings
  - This study can be used to teach the students in the classrooms and in the clinical settings for teaching adolescents and patients.
  - In service education to be provided to the nursing personnel at various levels to improve their knowledge regarding Biomedical Waste Management and can be kept in the college for future references.
- **Nursing administration**
  - Nurse administrator can organize in-service education program to educate students regarding Biomedical Waste Management.
  - The nurse leader must manage and co-ordinate teaching programs in promoting the health of common people and communicate them for positive attitude regarding Biomedical Waste Management.
  - Nurse administrators have to take initiatives in implementing Game learning and to establish health training programs for nurses and faculty to enhance their knowledge to the future nursing.
- **Nursing research**
  - The findings of the present study can inspire the nurse researchers to conduct further research related to effectiveness of game learning regarding Biomedical Waste Management.
  - This study can be reference to the scholars especially the beginners. • Disseminate the findings of research through seminars, workshops and publishing in nursing journals.

LIMITATIONS

- Study is limited in only Bangalore
- The sample size was small and hence the generalization of the study should be done with caution.
- Because of the time constraints, follow up of longer duration could not be made.

RECOMMENDATIONS

- Keeping in view of the findings of the present study, the following recommendations have been made:
- A similar study can be replicated on a large sample in another setting in-order to get generalized variables with different selected baseline variables.
- A comparative study can be done.

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