Effect Of Simulation Based Learning On Competency Of Nursing Students Regarding Emergency Management Of MI

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Abstract

Objectives: The study aims to assess the effectiveness of simulation based learning regarding emergency management of myocardial infarction in terms of competency of nursing students.

Methodology: Quasi-experimental study was used to assess the competency of 111 nursing students regarding emergency management of myocardial infarction in M.M. College of Nursing, and M.M. Institute of Nursing, Mullana, Ambala, Haryana. Samples were randomly allotted in experimental and comparison group by using purposive sampling technique. Data was collected by using selected variables, structured knowledge questionnaire, Objective Structured Clinical Examination (OSCE) checklist and structured clinical decision making ability questionnaire. The analysis of the study was done by using SPSS version 20.

Results: The study findings showed that **t**he mean post-test knowledge (16.6±3.5), skills (21.87± 3.5) and clinical decision making ability (8.1±1.78) scores of nursing students in experimental group was higher than the mean post -test knowledge (15.1± 4.1), skills (14.69± 3.7), and clinical decision making ability (7.9±1.74) scores in comparison group. The calculated't' and Z value of post-test knowledge, skills and clinical decision making ability scores was found to be statistically significant at 0.05 and 0.01 level of significance.

Conclusion: Simulation based learning was effective in enhancing the competency of nursing students regarding emergency management of myocardial infarction.

Keywords: Competency, emergency management of myocardial infarction, simulation based learning, nursing students.

Introduction

Myocardial Infarction is the most prevalent cardiovascular disease characterized by decline or cut off in blood supply to the heart due to arterial sclerosis or fatty deposition leading to narrowing of the coronary arteries.

Annually 805,000 people are affected with Myocardial Infarction leading to death in the US. As per the report of American Heart Association in 2020, with ageing of the population, incidence of MI continues to rise gradually. Mortality rate is found to be higher among the females i.e. 7.4% and 4.8% than the males 4.6% and 3.9% with ST segment and non ST elevation MI. In the year 2019, an estimated number of 17.9 million people died from CVDs, representing 32% of all global deaths in which 85% were due to heart attack. More than three quarters of deaths take place in low and middle-income countries due to cardiovascular diseases. As per the report of 'India: Health of the Nation's States, the India state level disease burden initiative, Disability Affected Life Years (DALYs) in India for the heart attacks was 3,062 per 100,000 people which resulted the highest rate in Punjab (5,759) followed by Tamil Nadu (4,788) and Haryana (4,244), Andhra Pradesh (4,023), Maharashtra (3,658), Karnataka (3,892) and Gujarat (3,736).

Among the patients suffering from acute MI, 70% of fatal events are due to occlusion from atherosclerotic plaques. There are two main types of MI, non ST-segment elevation MI which is same as the unstable angina and ST-segment elevation MI. The immediate management for a patient with considering myocardial infarction should handle it promptly by effective administration of emergency drug therapy and oxygen therapy (if necessary) followed by quick transfer to an

area with a high level of supervision and resuscitation facilities. Simulation based learning which is one of the effective educational or training method which help the learner to acquire knowledge by expanding or replacing the real situation with guided situations.Various research studies have evaluated the effectiveness of simulation-based educational interventions in nursing. It provides the opportunity to acquire and practice clinical skills in a safe, controlled and reproducible environment without the risk of harming patients. A study was carried out to evaluate the effectiveness of simulation practices in improving the emergency case management skills of 42 nursing students regarding management of myocardial Infarction. The study results revealed that levels of knowledge (mean score of pre-test: 2.83; post-test: 5.95) were statistically significant ($p<0.05$). It concluded that simulation practices were effective in the improvement of students' self- confidence and knowledge in emergency case management. As per the findings of multiple studies concluded that nursing students were not competent enough regarding myocardial infarction. Accordingly, simulation based learning can provide an opportunity to develop their competency level of nursing students regarding emergency management of myocardial Infarction.

Materials and Methods

Nursing students studying in B.Sc. Nursing 2nd Year in M.M. College of Nursing, Mullana, Ambala, (Haryana) and, M.M. Institute of Nursing, Mullana, Ambala, (Haryana) were allotted for the study.

Study design

A Quasi- experimental Non- equivalent control group pretest posttest design was favorable for the study.

Sample and Sampling techniques

In the present study, sample size was calculated by using Cohen's d formula at power of 80% and non- probability purposive sampling technique was used to select the sample.

Inclusion criteria

The study included the nursing students

- who were- willing to participate and
- available at the time of data collection

Exclusion criteria

Nursing students who were absent on the day of intervention (Simulation Based Learning) and on the day of posttest.

Data Collection tools and techniques

Data was collected by using selected variables (such as gender, attainment of clinical evaluation marks in emergency department, ICU, CCU, and medicine ward, previous sessional marks in medical surgical nursing, and have you ever nursed a patient with myocardial infarction.).

Structured knowledge questionnaire that comprised of 30 items (Multiple Choice Question), Objective Structured Clinical Examination (OSCE) checklist comprised of 34 items. Four observational checklist was prepared to assess the skills performed in each stations and structured clinical decision making ability questionnaire comprised of 4 case scenarios regarding the emergency management of myocardial infarction and each case scenario has 4 multiple choice question total 16 items through E-filling system (Google form and LMS).

Intervention

After conventional teaching was given, Simulation Based learning (SBL) video on emergency management of MI as a part of interventional tools was shown to the experimental group of nursing students before the intervention. Total 12 SBL sessions were conducted using two parallel case scenarios on emergency management of MI for 63 students of intervention group which was divided into 6 groups where each session comprise of 10 students and one last group comprise of 13 students. SBL was conducted with the following objectives:

- Assessment of the patient with (MI)
- Emergency Management of the patient with MI.

Results

Description of selected variables of nursing students comparing the experimental and comparison group

Maximum of the nursing students were female (78.19%) in experimental and (76.78%) in comparison group respectively. In terms of previous sessional marks, less than half (47.28%) of nursing students in experimental group and (44.64%) in comparison group scored within the range of 0-18. Majority (72.73%) of the nursing students in experimental group and (75%) in comparison group haven't nurse a patient with myocardial infarction. The computed χ^2 value of the selected variables were found to be non-significant at 0.05 level of significance (Table 1).

Table –1 Chi- Square showing Comparison of Frequency, Percentage Distribution in terms of Selected Variables of Nursing Students regarding Emergency Management of Myocardial Infarction in Experimental and Comparison Group

N= 111

Selected variables	Experimental Group (n= 55) f (%)	Comparison Group (n=56) f (%)	χ^2	df	'p' value
1. Gender					
1.1 Male	12(21.81%)	13(23.22%)	0.03	1	0.86^{NS}
1.2 Female	43(78.19%)	43(76.78%)			
2.Attainment of clinical evaluation marks Medicine ward.					
2.1 2.1 50-65	3 (5.45%)	5 (8.92%)	0.50	1	0.47 ^{NS}
2.2 66-80	52 (94.55%)	51 (91.08%)			
Cardiac care unit					
2.3 50-70	31 (56.36%)	26 (46.42%)	1.09	1	0.29.1 ^{NS}
2.4 71-90	24 (43.64%)	30 (53.58%)			
3. Previous sessional marks in Medical surgical Nursing					
3.1 0-18	26(47.28%)	25 (44.64%)	0.11	2	0.94 ^{NS}
3.2 19-37	19 (34.54%)	21 (37.5%)			
3.3 38-56	10 (18.18%)	10 (17.86%)			
4. Have you ever nursed a patient with myocardial infarction?					
4.1 Yes	15(27.27%)	14(25%)			
4.2 No	40(72.73%)	42(75%)	0.07	1	0.78^{NS}

^{NS} Not Significant (p>0.05) **χ^2 at (1) = 3.84,**

***Significant (p<0.05)** **χ^2 at (2) = 5.99**

Effectiveness of simulation based learning on competency in terms of knowledge score of nursing students

The mean post-test knowledge score of nursing students in experimental group (16.6±3.5) was higher than the comparison group (15.1± 4.1). In experimental group, the calculated't' value 5.91 (p=0.00*) of pre-test post –test knowledge scores was found to be statistically significant at 0.05 level of significance. In comparison group, the calculated't' value 3.04 (p=0.00*) of pre-test post –test knowledge scores was found to be statistically significant at 0.05 level of significance (Table 2).

Table 2 Mean, Standard Deviation, Mean Difference, and Standard Error of Mean Difference and "t" value of Pre-test and Post-test Knowledge Scores of Nursing Students regarding Emergency Management of Myocardial Infarction in Experimental and Comparison Group

N= 111

Group	Knowledge	Mean± SD	M_D	SE_{MD}	t value	df	p value
Experimental (n=55)	Pre test	12.49± 3.9	4.12	0.69	5.91	54	0.00*
	Post test	16.61±3.5					
Comparison (n=56)	Pre-test	13.33± 4.0	1.83	0.59	3.04	55	0.00*
	Post-test	15.16± 4.1					

*** Significant (p<0.05)** **t at (54), (55) = 1.67,**

^{NS} Not significant (p>0.05) **| -t |=t**

Effectiveness of simulation based learning on competency in terms of skills score of nursing students

The mean post-test skills score of nursing students in experimental group (21.87± 3.5) was higher than the comparison group (14.69± 3.7). In experimental group, the calculated't' value 13.84 (p=0.00*) of pre-test post –test skills score was found to be statistically significant at 0.05 level of significance. In comparison group, the calculated't' value 2.65 (p=0.01*) of pre-test post –test skills score was found to be statistically significant at 0.05 level of significance (Table 3).

Table 3 Mean, Standard Deviation, Mean Difference, and Standard Error of Mean Difference and "t" value of Pre-test and Post-test Skills Score of Nursing Students regarding Emergency Management of Myocardial Infarction in Experimental and Comparison Group

N= 111

Group	Skills	Mean± SD	M_D	SE_{MD}	t value	df	p value
Experimental (n=55)	Pre test	13.49± 2.8	8.38	0.60	13.84	54	0.00*
	Post test	21.87± 3.5					
Comparison (n=56)	Pre-test	13.05± 2.12	1.64	0.61	2.65	55	0.01*
	Post-test	14.69± 3.7					

*** Significant (p<0.05)** **t at (54), (55) = 1.67,**

^{NS} Not significant (p>0.05) **|-t |=t**

Effectiveness of simulation based learning on competency in terms of clinical decision making ability score of nursing students

The mean post-test clinical decision making ability score of nursing students in comparison group (8.1±1.78) was higher than the experimental group (7.9±1.74). In experimental group, the calculated Z value -5.59 (p=0.00*) of pre-test post –test clinical decision making ability scores was found to be statistically significant at 0.01 level of significance. In comparison group, the calculated Z value -5.68 (p=0.00*) of pre-test post –test clinical decision making ability scores was found to be statistically significant at 0.01 level of significance (Table 4).

Table 4 Wilcoxon Signed Rank Test showing Mean, Standard Deviation, Mean Rank and Z value of Pre-test and Post-test Clinical Decision Making Ability Score of Nursing Students regarding Emergency Management of Myocardial Infarction in Experimental and Comparison Group

N= 111

Variable	Group		Mean±SD	Z value	p value
Clinical Decision Making Ability	Experimental (n=55)	Pre-test	5.50±1.6	-5.59	0.00*
		Post-test	7.94± 1.7		
	Comparison (n= 56)	Pre-test	5.64± 1.8	-5.68	0.00*
		Post-test	8.19± 1.7		

^{NS} Not Significant (p>0.01) Z= -2.58 to 2.58

*** Significant (p≤0.01)**

Discussion

In present study**,** the mean post-test knowledge score (16.6±3.5), t= 5.91; p= 0.00 of nursing students was higher than the mean pre-test knowledge score (12.49± 3.9) regarding emergency management of myocardial infarction in experimental group. These findings were consistent with the study conducted by D'Souza Melba Sheila, Venkatesaperumal Ramesh et.al (2017) to evaluate the effectiveness of simulation in critical care nursing among students where it was found that the mean post-test knowledge score (15.9±1.7) was higher than the mean pre-test knowledge score (7.4±2.2) regarding myocardial infarction and cardiac arrest.

The mean post-test skills score (21.87± 3.5), t= 13.84; p= 0.00 of nursing students was higher than the mean pre-test skills score (13.49±2.8) regarding emergency management of myocardial infarction in experimental group. These findings were consistent with the study conducted by Fayza Ahmed Abdou, Safaa Hassan Zaki Abass (2021) where it revealed that moreover all the students (100%) had performed their skills at good level after the application of simulation based learning about acute coronary syndrome. The findings of the study showed enhancement of skills of nursing students in both experimental and comparison group which signified that simulation based learning regarding emergency management of myocardial infarction was effective in experimental group. Considering that ongoing clinical posting can be an aid in enhancement of skills in comparison group.

The mean post-test clinical decision making ability score (7.94± 1.7), Z= -5.59; p= 0.00 of nursing students was higher than the mean pre-test clinical decision making ability score (5.50±1.6) regarding emergency management of myocardial infarction in experimental group. Similarly the mean post-test clinical decision making ability score (8.19± 1.7), Z= -5.68; p= 0.00 of nursing students was higher than the mean pre-test clinical decision making ability score (5.64±1.8) regarding emergency management of myocardial infarction in comparison group. A study conducted by Valerie Michele Howard (2007), the mean score of case study decreased from pretest to posttest (668.25), while the mean score for the simulation group was increased to 737.56 which showed significant difference, with p value of 0.051 indicating use of human patient simulator as an educational intervention among nursing students was effective in enhancement of critical thinking abilities.

In post-test there was no significant differences between experimental and comparison group in terms of clinical decision making ability. However, the findings revealed that simulation based learning was effective in enhancing the competency of nursing students regarding emergency management of myocardial infarction in experimental group. On the other hand, the ongoing clinical duty provides an opportunity to learn and enhance clinical decision making ability of nursing students regarding emergency management of myocardial infarction in comparison group.

Conclusion

Simulation based learning (SBL) was effective in enhancing the competency of nursing Students in terms of knowledge, skills and clinical decision making ability regarding emergency management of myocardial infarction. Although, conventional teaching on myocardial infarction as well as the clinical posting showed efficient improvement of competency of nursing students regarding emergency management of myocardial infarction in comparison group. However, the study findings showed that the mean post test scores of nursing students were higher in experimental group than the comparison group.

Recommendations

- A comparative study can be conducted to find out the effectiveness of simulation based learning with other teaching strategies in terms of competency regarding emergency management of myocardial infarction.

- A similar study can be conducted using high-fidelity manikins to find out the effectiveness of simulation based learning on communication and team building skills of nursing students regarding emergency management of myocardial infarction.

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