A STUDY TO ASSESS THE EFFECTIVENESS OF SIMULATION BASED LEARNING ON MANAGEMENT OF PATIENTS WITH POST TRAUMATIC STRESS DISORDER (PTSD) IN TERMS OF COMPETENCY OF NURSING STUDENTS IN SELECTED NURSING COLLEGES OF HARYANA

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Abstract
Background: PTSD occurs as a reaction to extreme trauma, which cause distress in all individuals. There is rise in the cases of PTSD during the COVID-19 with emergency lockdown which needs to be diagnosed early. Simulation serves to be effective teaching method for improving competency among nursing students.
Aims: To assess and compare the effectiveness of Simulation Based Learning in terms of competency on management of patients with PTSD among Nursing students. **Methodology:** A Quasi-Experimental design was used in this study. Total 116 nursing students (58 in Experimental group and 58 in Comparison group) were selected by using Purposive sampling technique. Data was collected by using the selected variables, Structured knowledge questionnaire, OSCE and structured clinical decision making ability questionnaire. Simulation Based Learning was administered in Experimental group. The analysis was done by using descriptive and inferential statistics using SPSS version 20. **Results:** The mean post-test knowledge, skills and clinical decision making ability scores (16.7 ± 2.84), (25.8 ± 2.29) and (12.3 ± 2.76) of experimental group were higher than the mean post-test knowledge, skills and clinical decision making ability scores (11.9 ± 3.25), (17.4 ± 4.03) and (9.0 ± 2.09) of comparison group. The calculated "Z" and "t" value mean post-test knowledge, skills and clinical decision making ability scores were found to be statistically significant at 0.01 and 0.05 level of significance. There was statistically moderate positive correlation found between skills ability scores. **Conclusion:** Simulation based learning was effective in improving competency of nursing students on management of patients with PTSD.

Keywords: Simulation Based Learning, Competency, Post-traumatic stress disorder, Nursing Students.

INTRODUCTION

Post-traumatic stress disorder (PTSD) also called shell shock and battle fatigue syndrome which occurs as a reaction to extreme trauma, and likely to cause distress among all individuals. A traumatic event is a life-threatening event such as natural disasters, serious accidents, physical or sexual assault in adult or childhood. PTSD is a lasting consequence of traumatic events that cause intense fear, helplessness, or horror. Examples of PTSD include sexual or physical assault, the unexpected death of a loved one, an accident, war, or natural disaster. Families of victims can develop PTSD, as can emergency personnel and rescue workers. "Gender differences in PTSD" conducted in the year of 2017 shows that Women are more than twice as likely to develop post-traumatic stress disorder than men (10% for women and 4% for men). This may be due to the fact that women are more likely to be victims of domestic violence, abuse, and rape. Sexual assault is more likely to cause post-traumatic stress disorder than many other events.

According to the Oxford Dictionary, "the word stimulate is defined as the to reproduce the conditions of (a situation), as by means of a model, for study or testing or training". Simulation serves as an effective learning method for students when caring for the patients with post-traumatic stress disorder and it is the fact that simulation is becoming increasingly common as a clinical learning tool.

Simulation is used in nursing to improve the knowledge, clinical skills, clinical judgment, affective learning, communication skills, and confidence among the nursing students.

The National Council of State Boards of Nursing did a national survey on the use of simulation in nursing education in 2010. The results obtained showed that most respondents integrating simulation into five or more courses. The majority of students (81%) show their interest in learning through simulation. So, how simulation was effective in improving the knowledge, skills and clinical decision making ability among the nursing students?

A quantitative nonrandomized quasi- experimental study was conducted to investigate the effect of high-fidelity human patient simulators on nursing students' anxiety before 25 interacting with mentally ill patients. The undergraduate nursing students attended a 2- hour lecture on therapeutic communication, later simulation was provided through high- fidelity human- patient simulators. Data were collected over the course of two semester by using demographic characteristics, a pre- and post-simulation evaluation survey, Anxiety Visual Analog scale and pre and post state trait anxiety inventory. The results showed that there were significant differences between pre- and post-test on the visual analog scale (SD= 0.3) and the state- trait anxiety inventory (SD= 19.8). Thus, the study concluded that the high-fidelity simulation was effective in improving the student's anxiety before interacting with the mentally ill patients.

Therefore, the integration of simulation into nursing can be done by enhancing and strengthening the technical capabilities of all nurse educators and helping them implement these strategies safely.

OBJECTIVES

1.To assess and compare the effectiveness of Simulation based learning in terms of competency (knowledge, skills and clinical decision making ability) of nursing students on management of patients with Post-Traumatic Stress Disorder in experimental and comparison group.

2.To determine the relationship between knowledge, skills and clinical decision aking ability of nursing students on management of patients with Post-Traumatic Stress Disorder in experimental and comparison group.

METHODOLOGY

Research Design

A Quasi-Experimental Research design (Non-equivalent control group pre-test post-test design) was selected.

Population and Sample

In present study, target population is Nursing students studying in Nursing colleges of Haryana and accessible population is Nursing students studying in selected Nursing colleges of Ambala. The sample comprised of B.Sc. Nursing 3rd Year students of M.M. College of Nursing and M.M. Institute of Nursing Mullana, Ambala, Haryana. The students were selected by using the Purposive sampling technique and allocated in experimental and comparison group by using the computerized random allocation method. The nursing students who were willing to participate and available at the time of data collection were included and who are absent on the day of intervention and post test were excluded.

Sample size and d power

The power analysis was used to calculate the sample size by using the Cohen's d formula. The estimate effect size was 0.26 at the power of 0.80 and the recommended sample foe each group was between 59-64. Thus, a total eligible sample of 135 was selected for the study. (Figure1)

CONSORT DIAGRAM

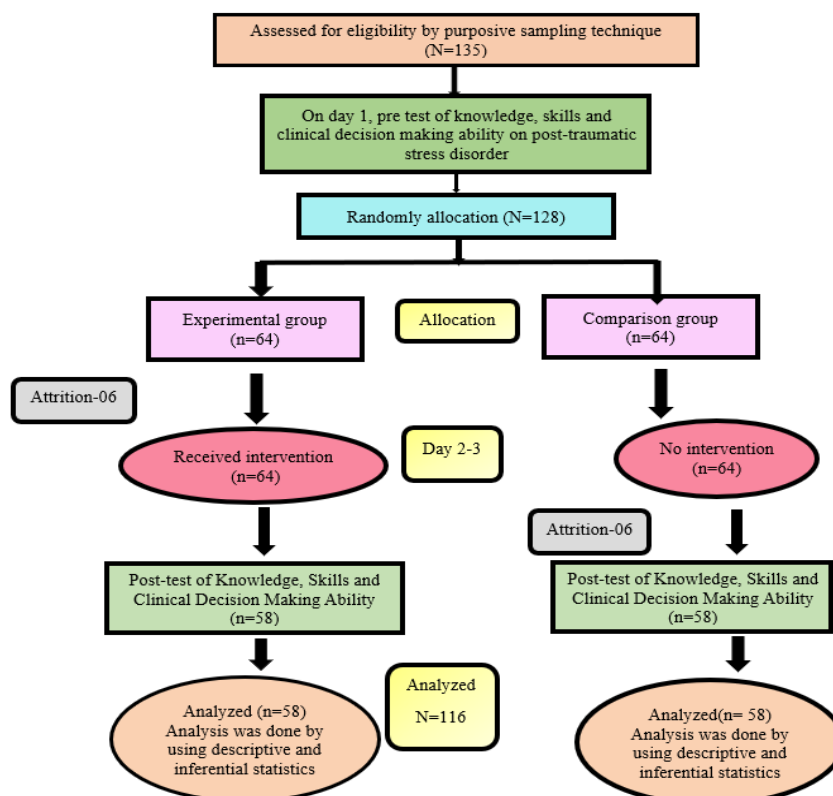The consort diagram for the sample selection is depicted in figure 1

Figure 1: Consort diagram for sample selection

SETTING OF STUDY
The present study was conducted in M.M. College of Nursing Mullana, Ambala and simulation Lab of M.M. Deemed to be University, Mullana, Ambala.

INSTRUMENTS
Content Validity and Reliability of instruments were established. The reliability of instruments structured knowledge questionnaire and clinical decision making ability questionnaire was checked by using Kuder Richardson-20 and it was found to be (0.77) and (0.66) and for the objective structured clinical examination reliability was checked by using Inter Rater reliability and found to be (0.75). Thus, all the tools were found to be valid and reliable.

TOOLS AND TECHNIQUES
The Tools used in the study were selected variables, structured knowledge questionnaire, objective structured clinical examination and structured clinical decision making ability questionnaire on management of patients with post- traumatic stress disorder.
SECTION I: Selected variables It comprised of three items i.e. Gender, Whether nursed a patient with PTSD, Have you ever experienced PTSD (self).
SECTION II: STRUCTURED KNOWLEDGE QUESTIONNAIRE It was used to assess the knowledge of nursing students on management of patients with post-traumatic stress disorder. It consists of 30 knowledge items and covers following content areas:- 1.Concept of PTSD 2. Causes and Symptoms of PTSD 3. Pathophysiology of PTSD 4. Risk factor and Diagnostic criteria of PTSD 5. Management of PTSD.
SECTION III- OBJECTIVE STRUCTURED CLINICAL EXAMINATION It was used to assess the skills of nursing students on management of patients with post-traumatic stress disorder. There was total 4 stations on management of patients with post-traumatic stress disorder. It comprises

of 40 items. Four observational checklist was prepared to assess the skills performed in each station. The time duration for each station was minutes. The stations included- initial assessment, diagnostic criteria, management by reassurance and management by prolonged exposure therapy.

SECTION IV: STRUCTURED CLINICAL DECISION MAKING ABILITY QUESTIONNAIRE it was used to assess the clinical decision making ability of nursing students on management of patients with post-traumatic stress disorder. It consists of five case scenarios. Each case scenario had 5 multiple choice questions. The scenarios was divided in to following areas: 1. Pharmacological management 2. Symptoms of patients with PTSD 3. Management of PTSD 4. Desensitization therapy 5. Intervention of PTSD among children's.

Technique of Data collection
The E-filling online technique was used to collect the data. Google form was used to collect the selected variables and learning management software was used for structured knowledge questionnaire and clinical decision making ability questionnaire. Observation technique was used for objective structured clinical examination.

INTERVENION
Conventional teaching
Before giving the intervention to the students, conventional teaching on PTSD was given to the participants by their subject teacher of B.Sc. Nursing 3rd year in M.M. College of Nursing and M.M. Institute of nursing.

Development of Simulation based video
A simulation video was prepared by researcher to orient the participants regarding simulation based learning in experimental group before giving the intervention.

Simulation based learning on PTSD
It was developed to improve the competency in terms of knowledge, skills and clinical decision making ability on management of patients with post-traumatic stress disorder among nursing students with the help of using two parallel case scenarios. Students were divided in to five groups, where four groups comprise of 12 students and one group comprise of 10 students. The total duration of each scenario was about 45 minutes.
Simulation based learning was conducted with the following objectives:
▪ Assessment of the patient with post-traumatic stress disorder.
▪ Conduct mental status examination on patient with post-traumatic stress disorder
 ▪ Management of patients with post-traumatic stress disorder.
The simulation based learning was conducted in a sequence of-
1. Planning of Simulation
2. Implementation
   • Briefing
   • Act
   • Debriefing

Planning of Simulation:
In planning of simulation, two case scenarios were prepared on post-traumatic stress disorder. Environmental set up for running the scenario was prepared, arranged the needed articles for the scenarios and roles were distributed to the participants.

Implementation of Simulation:
1. Briefing
 Introduction of self and topic was given to the participants. Explained about the simulation based learning and gain Confidentiality of the participants. Orientation to the environmental setup of the case scenario was given to the participants. - The case scenarios were explained in detailed. Roles of each participant was divided by their own willing and discussed their roles separately to maintain confidentiality. The duration of briefing was about 15 minutes.
2. Act
Allow the participants to act as a real case and believable for themselves and others as possible. Instructed to be open, respectful and avoid harm to other participants. Observers observe the events during the scenario. The duration of act was about 10 minutes.

3. Debriefing
It was done to assess the errors and areas of improvement during the scenario. All the points which were noted by the observer throughout the scenario was collected from the observer prior to debriefing session. Allow all the participants to share their experienced or reaction after the screenplay with their role. Analysed the parts which was left to reflect in the simulated scenarios and make them understand which was to be happen in a structured manner. Summarized the case scenario with all the points which were noted by the observer were covered in debriefing. Debriefing would end with take home message. The duration of debriefing was about 30 minutes.

DATA ANALYSIS
The final data collection was done from 21st February to 9th March, 2022. After obtaining the consent, study participants were assured about confidentiality of the responses. Data analysis was done by using the SPSS 20.00 version. Normality of data was checked by using Kolmogorov-Smirnov test. In the present study, analysis was done by using descriptive and inferential statistics i.e frequency, mean, median, standard deviation, chi-square, Mann Whitney U test, Wilcoxon Signed rank test, Independent t test, Paired t test and Pearson coefficient correlation was used for data analysis. The hypothesis of knowledge was tested at 0.01 level of significance and skills and clinical decision making ability was tested at 0.05 level of significance.

Result
Description of selected variables
The selected variables of the nursing students are described in terms of gender, nursed a patient with PTSD, experience of PTSD (self). The result shows that majority of the nursing students (70.6%) in experimental group and (79.5%) in comparison group were females. Majority of the nursing students (90%) in experimental group and (93%) in comparison group were never nursed a patient with PTSD. Maximum number of nursing students (90%) in experimental group and (86%) in comparison group were never experience any symptoms of PTSD. Chi-square values shows that the all the variables are homogeneous and comparable.

HYPOTHESES TESTING
Effectiveness of simulation based learning on competency in terms of knowledge score
H_{1a}: There will be significant difference in mean post-test knowledge score of nursing students on management of patients with post-traumatic stress disorder between experimental and comparison group.
H_{2a}: There will be significant difference in mean pre and post-test knowledge score of nursing students on management of patients with post-traumatic stress disorder with in experimental and comparison group.

The results of Mann Whitney U test showed that the non-statistically significant difference (Z= -.142, p= 0.88) in pre-test and statistically significant difference (Z= -5.63, P= 0.00) in post test at 0.01 level of significance in experimental and comparison groups in terms of mean knowledge score. Hence research hypotheses H_{1a} was accepted. Thus, it further interfered that simulation based learning was effective in improving knowledge of nursing students on management of patients with PTSD. The Wilcoxon Signed Rank test showed that statistically significant difference (Z= -6.80, P= 0.00) and non-statistically significant difference (Z= -1.46, p= 0.14) in mean knowledge score in experimental and comparison group. Hence, research hypotheses H_{2a} was accepted.

Table 1 Mann Whitney U test and Wilcoxon Signed Rank test shows difference in pre-test and post-test Knowledge score of Nursing Students on Management of Patients with Post-Traumatic Stress Disorder in Experimental and Comparison Group
N=116

Group	Experimental (n=58)	Comparison (n=58)	Z value	P Value
Pre-test	58.0	58.9	-.142	0.88[NS]
Post-test	76.0	40.9	-5.63	0.00*
Z value	-6.80	-1.46		
P value	0.00*	0.14[NS]		

*Significant (p≤0.01)　　　　[NS] **Not significant(p>0.01)**　　　　**Z= -2.57 to 2.57**

Effectiveness of simulation based learning on competency in terms of skills score
H_{1b}: There will be significant difference in mean post-test skills score of nursing students on management of patients with post-traumatic stress disorder between experimental and comparison group.
H_{2b}: There will be significant difference in mean pre and post-test skills score of nursing students on management of patients with post-traumatic stress disorder with in experimental and comparison group.
The independent t test showed that the non-statistically significant difference (t= 0.12, p= 0.89) in pre-test and statistically significant difference (t= 5.28, p= 0.00) in post test at 0.05 level of significance in experimental and comparison groups in terms of mean skills score. Hence research hypotheses H_{1b} was accepted. Thus, it further interfered that simulation based learning was effective in improving skills of nursing students on management of patients with PTSD. The result of paired t test showed that statistically significant difference (t= 10.0, P= 0.00) in experimental group and (t=10.0,p= 0.00) in comparison group. Hence, research hypotheses H_{2b} was accepted.

Table 2 t test shows difference in pre-test and post-test skills score of Nursing Students on Management of Patients with Post-Traumatic Stress Disorder in Experimental and Comparison Group
N=116

Group	Experimental (n=58)	Comparison (n=58)	t value	P Value
Pre-test	17.4 ± 4.03	17.5 ± 4.63	0.12	0.89[NS]
Post-test	25.8 ± 2.29	23.4 ± 2.54	5.28	0.00*
t value	10.0	10.0		
P value	0.00*	0.00*		

*Significant (p≤0.05)   t at 57, 114= 2.00, 1.65
[NS] **Not significant(p>0.05)**

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

H_{1c}: There will be significant difference in mean post-test clinical decision making ability score of nursing students on management of patients with post-traumatic stress disorder between experimental and comparison group.

H_{2c}: There will be significant difference in mean pre and post-test clinical decision making ability score of nursing students on management of patients with post-traumatic stress disorder with in experimental and comparison group.

The independent t test showed that the non-statistically significant difference (t= 0.94, p= 0.34) in pre-test and statistically significant difference (t= 7.26, p= 0.00) in post test at 0.05 level of significance in experimental and comparison groups in terms of mean clinical decision making ability score. Hence research hypotheses H_{1c} was accepted. The result of paired t test showed that statistically significant difference (t= 6.84, P= 0.00) in experimental group and (t=6.6,p= 0.00) in comparison group. Hence, research hypotheses H_{2c} was accepted. Thus, it further interfered that simulation based learning was effective in improving clinical decision making ability of nursing students on management of patients with PTSD.

Table 3 t test shows difference in pre-test and post-test clinical decision making ability score of Nursing Students on Management of Patients with Post-Traumatic Stress Disorder in Experimental and Comparison Group

N=116

Group	Experimental (n=58)	Comparison (n=58)	t value	P Value
Pre-test	8.55 ± 2.93	9.0 ± 2.09	0.94	0.34^{NS}
Post-test	12.3 ± 2.76	9.0 ± 2.09	7.26	0.00*
t value	6.84	6.6		
P value	0.00*	0.00*		

*Significant (p≤0.05)   t at 57, 114= 2.00, 1.65
^{NS} Not significant(p>0.05)

Correlation between the knowledge, skills and clinical decision making ability scores of nursing students

H_3: There will be significant relationship between knowledge, skills, clinical decision making ability score of nursing students on management of patients with post-traumatic stress disorder in experimental and comparison group

Pearson's correlation shows that in experimental group there was statistically non-significant correlation (r=0.12, p=0.36) between pre-test knowledge and skills score and (r=0.12,p=0.92) between post-test knowledge and skills score. Simultaneously there was statistically non-significant correlation (r=0.07, p=0.60) between pre-test knowledge and clinical decision making ability score and (r=0.18,p=0.17) between post-test knowledge and clinical decision making ability score.

In comparison group there was statistically non-significant correlation (r=0.32, p=0.10) between pre-test knowledge and skills score and (r=0.05,p=0.68) between post-test knowledge and skills score. Simultaneously there was statistically non-significant correlation (r=0.96, p=0.47) between pre-test knowledge and clinical decision making ability score and (r=0.40,p=0.75) between post-test knowledge and clinical decision making ability score. Therefore, the research hypotheses H_3 was rejected.

DISCUSSION

The purpose of this study was to assess the effectiveness of simulation based learning on the knowledge, skill and clinical decision making ability regarding management of patient with PTSD among nursing students. In the present study, maximum of nursing students (70.6%) in experimental group and (79.3%) in comparison group were females. These findings were consistent with the study conducted by Silvia García-Mayor, Casta Quemada-González L et.al (2021) which showed that majority of nursing students were females in (80.43%) in the study.

Findings related to effectiveness of simulation based learning for nursing students in terms of knowledge and skill

In the present study the mean knowledge score of nursing students in the experimental group was higher than the (Z value=-6.80; p=0.00*) than the comparison group and the mean skill score of nursing students in the experimental group was higher than (t=10.0;p=0.00*) than the comparison group. These findings were consistent with the findings of (**Nicholas J. Formosa, Ben W. Morrison, Geoffrey Hill&Daniel Stone, et.al 2020)** where it was found that the post test knowledge score in simulation based learning was higher than the other group.

In the present study the mean skills score of nursing students in the experimental group was higher than the (t=5.28, p=0.00) than the comparison group. These findings were consistent with the study **MaalyIbrahem El malky, Sabah Hassan El-Amrosy L et.al 2016** which showed that simulation was effective in improving the skills of nursing students (t=5.41,p= 0.003).

Findings related to effectiveness of simulation based learning for nursing students in terms of clinical decision making ability

In the present study the mean clinical decision making ability score of nursing students in the Experimental group were significant higher (t=7.26;p=0.00*) than the comparison group in post test regarding management of patients with post-traumatic stress disorder. The results of the study were not consistent with the study **GulSahin, Tulay Basak L et.al…2021**) which showed that that mean clinical decision making ability score was not higher than that of pre test.

CONCLUSION

The following conclusions were drawn from the present study:

- Simulation based learning was effective in enhancing the knowledge on management of patients with post-traumatic stress disorder.
- Simulation based learning was effective in enhancing the skills on management of patients with post-traumatic stress disorder.
- Simulation based learning was effective in enhancing the clinical decision-making ability on management of patients with post-traumatic stress disorder.

RECOMMENDATIONS

- A study can be conducted to assess the perceptions of nursing students regarding the simulation based learning.
- A comparative study can be conducted to find out the effectiveness of simulation based learning with other teaching strategies in terms of competency regarding management of patients with post-traumatic stress disorder.
- A mixed method study may be conducted to identify barriers to the development of clinical simulation or difficulties that may be encountered.

IMPLICATIONS

The major implications of the study are as follows:

Nursing education

Simulation-based clinical education method should be used in nursing with the help of realistic clinical scenarios, simulation-based educational interventions nurses are able to develop effective non-technical skills, practice rare emergency situations, and practice a variety of authentic life-threatening situations.

Nursing practice

Simulation based learning (SBL) help the nurses for further improving their knowledge and strengthen their (technical and non-technical) skills. It will also help the nurses to develop the competency and manage the condition of the patient.

Nursing administrator

Different educational programs on simulation based learning should be planned for the nurses to better develop their critical thinking and clinical decision-making skills. The nursing administrators should facilitate the establishment of simulation lab in health care settings and conduct induction programme and continuing nursing education programme among nursing personnel.

Nursing research

In the present study simulation based learning was effective for nursing students. Based on the findings, the professionals and nursing students can conduct further studies on other aspects of management of post-traumatic stress disorder and importance of team work and its impacts on health outcomes, in order to assess the competency of staff nurses.

DECLARATION OF CONFLICTING INTERESTS

The author declared that there is no conflict of interest in respect to the research, authorship and publication of article.

Ethical approval

The ethical approval for conducting the study was obtained from the institutional ethical committee of Maharishi Markandeshwar (Deemed to be University), Mullana, Ambala, Haryana and the ethical number was (Project number: 2135).

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