

THE IMPACT OF A NEW PEDAGOGICAL INTERVENTION ON NURSING STUDENTS' KNOWLEDGE ACQUISITION ON SIMULATION-BASED LEARNING

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Abstract: This study aimed to assess the impact of a new pedagogical intervention on nursing student's knowledge acquisition in simulation-based learning. Quasi-experimental study. This study was conducted at the College of Nursing, Holy Family Hospital Rawalpindi. One hundred nursing students from 3rd year were selected for the study who volunteered for participation. Participants were divided into 2 equal groups, with 50 participants in each group through computer-generated randomization. In Group A, students were given the new pedagogical intervention of simulation-based learning, while Group B was the control group where the existing study program was continued. A pretest comprised of 15 questions was conducted before the study from the participants of both groups. These questions covered pathophysiology, symptoms, and nursing actions. The study's primary outcome was set as the differences in knowledge among nursing students of Group A and Group B assessed through post-test scores. All the participants were female nursing students with a Mean \pm SD of 20.1 \pm 0.83 years. Knowledge acquisition was significantly better in Group A compared to Group B (Post-test score: 9.86 \pm 1.63 vs.. 8.48 \pm 1.61 respectively, p-value=0.000). Students' perception score was also significantly higher in Group A than in Group B (8.34 \pm 0.87 vs.. 7.52 \pm 0.83, p-value=0.000). The Simulation-based learning intervention results in a significant improvement in the learning capability and knowledge of nursing students. Therefore, SB learning in the nursing curriculum is suggested to improve theoretical and practical knowledge acquisition.

Keywords: Nursing Students, Simulation, Theoretical Knowledge.

Introduction

As reported by the Pakistan Maternal Mortality Survey 2019, the estimated maternal mortality ratio in Pakistan is 186. This ratio is higher in rural and urban areas by 26% (203 vs..... 159 per 100,000 live births) (Wazir et al., 2021). Most of these deaths can be prevented if healthcare providers are well-trained and equipped. This situation suggests emphasizing learning not only theoretical knowledge but also actual practices for the healthcare givers. Learning for the first time in a real situation is stressful and raises the risk to the patients, while a difference is always observed between the theoretical knowledge and actual practices of the students named "GAP" (Cooper and Biro, 2014).

A study by P. Lavoie reinforced the need for the type of pedagogical intervention that can help improve nursing students' ability to understand signs and symptoms of deterioration of patient's conditions (Lavoie et al., 2015). Medical simulation-based (SB) learning has been suggested to greatly help in learning the actual practices in clinical-type settings. Therefore, SB learning is the pedagogical intervention believed to be effectively implemented to cover up this GAP (Smeby and Sutphen, 2014). This is also because a nurse's recognition of a patient's deteriorating situation and actions on management are said to be learned since the early years of education in nursing college. This learning aims to help the students learn the signs and symptoms they will observe in real clinical scenarios (Kelly et al., 2014). SB learning is more effective than classroom-

style teachings in developing the skills related to patients' deteriorating situation (Merriman et al., 2014).

Studies during the last decade shared the benefits of SB learning in better acquiring knowledge already learned in classroom settings. These had the primary objective of whether students could learn about symptoms and pathophysiology, thereby determining their best action in response using this intervention (Nehring and Lashley, 2009).

C. J. Connell, in a review related to empirical studies of learning interventions of deteriorating patient situations, expressed that very little data is available on a pure outcome basis, especially the ultimate goals of assessing theoretical knowledge, practical skills, and actual performance (Tun et al., 2015).

C. Foronda and co-workers reported that the simulation method was very successful in teaching the skills to the nurses and expressed the need for more evidence and data about contents to be included in these courses (Oh et al., 2015). A study done in 2015 shared that simulation creates a real picture for the students to apply their theoretical knowledge, and they learn the skills in a mirrored clinical situation. With this new pedagogical intervention, this is done without any risk to the actual patients, not otherwise possible (Connell et al., 2016; Foronda et al., 2013).

Studies were conducted to find students' feedback after participation in SB learning programs. The feedback shared reveals a high level of satisfaction with SB learning as an increased confidence level is expressed besides gaining

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academic knowledge (Foronda et al., 2013). Therefore, This study aimed to assess the impact of SB learning intervention on nursing students' knowledge acquisition. Therefore, the results will help formulate future learning programs for nursing students with a new pedagogical approach.

Methodology

This study was conducted at the College of Nursing Nishtar Medical University and Hospital Multan. For this quasi-experimental study design, 100 nursing students from 3rd year who volunteered to participate were selected for the study.

The nursing students who had attended the wards and were exposed to patients were excluded from the study.

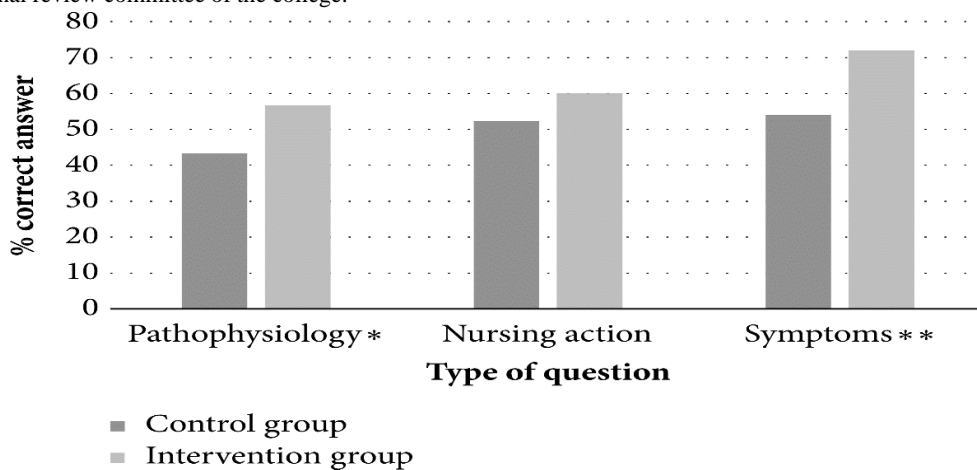
Through computer-generated randomization, participants were divided into 2 equal groups, with 50 participants in each. Group A was the intervention group where students were given the new pedagogical intervention of SB learning, while Group B was the control group where the existing study program was continued.

A pretest comprised of 15 questions was conducted before the study from the participants of both groups. These questions were aimed at finding the deterioration of the patient's condition. Questions related to 5 different scenarios covered pathophysiology, symptoms, and nursing actions.

As recommended in previous studies done for the same purpose, to assess the improvement in knowledge and skills, the same questionnaire was used while conducting post-test. The questionnaire was designed, and answers were checked by senior teaching staff of the college. All the students also filled out perception forms after study. These forms were based on student's perception of their confidence in gaining knowledge, skills, and communication abilities. (Calculated through a Likert scale of 1 to 10).

The study's primary outcome was set as the differences in knowledge between nursing students of Group A and Group B assessed through post-test scores.

Approval to conduct this study was obtained from the institutional review committee of the college.



Discussion

We included 100 decompensated cirrhotic patients with This study examined the role of the new pedagogical intervention in the acquisition of knowledge by students.

Data were analyzed using SPSS version 25. Quantitative variables were assessed and then compared by applying the Chi-square test. P < 0.05 was considered statistically significant.

Results

The age range in this study was from 18 to 21 years with an overall Mean ±SD of 20.1±0.83 years. There was no significant difference in Mea n±SD of age in groups A and B, as shown in Table I.

Table I: Mean ±SD of participants according to age in both groups.

Demographics	Group-A Mean±SD (n=50)	Group-B Mean±SD (n=50)	p-value
Age (years)	20±0.85	20.2±0.80	0.228

All the participants of the study were females. No participant had previous experience working in the wards. There was no statistically significant difference between the 2 groups in the pretest score; however, a significant difference appeared between the 2 groups after the SB learning intervention was conducted with the study group. Similarly, the perception of students also improved in the intervention group compared to the control group, as shown in Table II.

Table II: Pretest and Post-Test Knowledge Score and students perception

	Group-A n=50	Group-B n=50	p-value
Pretest Score	6.68±1.49	6.42±1.16	0.332
Posttest Score	9.86±1.63	8.48±1.61	0.000
Students Perception Score	8.34±0.87	7.52±0.83	0.000

This SB-based intervention improved post-test scores in the SB learning group than in the control group.

It was already suggested that the observation tools trigger the learning process of observers and guide them to recommended actions. C. L. Krogh in a study conducted in 2014 using simulated patient scenarios for engaging

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trainee nurses, C. L. Krogh reported that the students in the intervention group showed significantly higher overall performance scores. He also reported that the intervention group who viewed peer performance expressed more satisfaction than the other group (Krogh CL et al., 2018).

Shah N. conducted a study with 76 medical students of the Jinnah Sindh Medical University (JSMU), Karachi, Pakistan, published in 2017. As per the results, the group with simulation intervention performed significantly better in delivering skills with a mean score of 8.91 ± 3.20 vs. the control group with a mean score of 5.67 ± 1.84 ($p < 0.01$). They, therefore, concluded that simulation-based learning produces significantly better results (Shah N et al., 2017).

M. H. Reime and co-workers conducted a study in the nursing Department with 262 nursing and medical students in 2016. They shared their observations that simulation-based training was valuable and emphasized developing hands-on participation (learning by doing) for the students (Reime et al., 2017).

M. Wighus and I. T. Bjørk, in their study published in 2018, shared a positive experience with the intervention of teaching in the simulation centers. They also shared that teachers reported this experience as challenging yet useful.

Haukedal TA conducted a detailed study on the impact of SB Learning on nursing students' knowledge acquisition. The results proved that the group with SB learning had higher statistical significance scores than the control group. They concluded that theoretical knowledge may be enhanced by conducting the simulation workshops (Haukedal et al., 2018).

The results of our study are also in line with previous studies on the topic. The mean age in our study was 20.1 ± 0.83 years, while there was no significant difference in age between these 2 groups. All the students were female and had no experience attending the ward patients. Post-test results proved the impact of this pedagogical intervention of SB learning on nursing students' knowledge acquisition (Post-test score 9.86 ± 1.63 in the intervention group vs. 8.48 ± 1.61 in the control group, (p -value=0.000).

Students' perception was also assessed after the completion of the study using a Likert scale Score (1 as the least and 10 as the highest). Students in the intervention group gave 8.34 ± 0.87 marks, while students in the control group gave 7.52 ± 0.83 marks (p -value=0.000), showing the gain in knowledge, skills, and communication abilities expressed by the students undergoing SB learning intervention.

Our study gave an important update regarding new pedagogical interventions to help establish future learning programs. The limitations of this study include a small sample size. Moreover, this study duration is short, and long-term programs with more students will be helpful to explore more detailed options for future pedagogical interventions.

Conclusion

The SB learning intervention significantly improves nursing students' learning capability and knowledge. It has not yet been added to the nursing teaching courses. Therefore, it is suggested to add SB learning in nursing curriculum to improve their theoretical and practical knowledge.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

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Not applicable

Conflict of interest

The authors declared absence of conflict of interest.

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