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Simulation and Skill Learning in Nursing Education

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ABSTRACT

Simulation-based learning (SBL) currently in nursing professional education is largely used as an instructive method. This teaching mehodology provides a chance to exercise the decision making and clinical skills on simulated body. Simulation-based learning approach facilitate the nursing students to move in real life clinical care setting as professional. A quasi- experimental, before and after study design was used and, it was conducted among the nursing students in a private university, Lahore, Pakistan. A total of 133 nursing students participated in the study, the majority of the participants were female students 121(91%). In results the mean score before the educational intervention was 11.88 (Standard deviation 2.336) and after the educational intervention was 14.38 (Standard deviation 2.37). The difference between the two results was significant statistically, p was less than 0.05. The conclusion of the study is that, simulation is a valuable tool in order to gain knowledge, skills, and self-confidence, which are required to perform effective care in a clinical setting.

Keywords: Simulation, Skill learning, Nursing, Education

INTRODUCTION

Simulation based training for nursing professionals aims to help the trainee in addition the academic learning improve their critical thinking and skills. The fast changes at therapeutic level demands the nurse's instant skills with patient consideration to manage problem. (Shin *et al.,* 2015).

Simulated based clinical learning is helpful approach that gives chance to nursing student to rehearsal their decision making and clinical skills through diverse actual situational involvements, while not compromising the client's wellbeing (Podlinski, 2016). Results have depicted that nursing professional bring novelty to encourage the effective training in clinical care setting and classroom (Bennett & Rosner, 2018). It has been suggested that simulated body practice is a substitute to strengthen the real proficiencies with directed experiences (Jones *et al.,* 2015).

Simulation offers to the learner, multiple time practice to become the expert in managing different skills and task and on the other hand it provides an opportunity to apply knowledge for making decision without causing an upset to the patient. This prospect suggests to the learner to avail the opportunity to practice in lifelike situations and gain essential experience (Richardson *et al.,* 2014). According to the findings of the study of Thun (2015), nursing students facing simulation settings. Consequently, simulation offers in the proper practical and academic learning (Thun *et al.,* 2015).

In one research of Thun and coworkers (2015) simulated base experienced in learning is attractive beneficial, it was concluded by nursing students. Simulation in nursing education provide harmless and supportive setting which can never be managed with live clients. Simulation base nursing education offers to students with fast feedback regarding performance which could improvement in their confidence and permits them that they can make safe and sound mistakes and learn the implications of failure (Oh *et al.,* 2015).

Author's Contribution: **M. H.**, Conducted the study; **M.A.**, Helped in literature review and discussion; **S.S.**, Supervised the study; **A.G.**, Helped in methodology section

Moreover, simulation reassures clinical reasoning and critical reflection in students and lets one to appeal for a diversity in adult learning concepts (Botma, 2014). The purpose of simulation in profession of nursing education is to repeat the critical aspects for clinical situation. Therefore, students could attain practice in a non-threatening atmosphere. In nursing education the simulation training is connected to the clinical skill learning that happened in the hospitals, long-standing care services (Madhavanprabhakaran *et al.,* 2015).

Through simulated body exercises, learner could perform nursing psychomotor caring skills, critically think, and problem-solving approaches, by a real life-like circumstances at his personal pace. Nursing students have requirement to prepare for simulated base training only for sake of their hospital clinical nursing (Walshe *et al.,* 2014).

The utilization of simulation as an instructive instrument is currently progressively pervasive in nursing training. An assortment of test systems is utilized, for example, a basic model of the human body to achieve a straightforward practice, and a fake catheterization display or venous infusion model to create explicit nursing practices (Walshe *et al.,* 2014).

Recently, human patient test systems have been starting to prompt practices that are increasingly sensible, and have been utilized to offer understudies a prospect to evaluate, intercession, and survey patient (Wright *et al.,* 2018). Simulation based training has been validated to improve relational abilities, the capacity to cooperate with different individuals from a therapeutic group, and the ability to oversee complex situations (McGaghie *et al.,* 2014). Numerous investigations claim that simulation-based learning may improve hypothetical information acquisition (Alexander *et al.,* 2015; Aase *et al.,* 2014).

Transference of learning is a significant objective of simulation in nursing. One of the consequences of simulation workout is a transfer of learning. Transfer of learning means that nursing students should use information they learned, either in a clinical situation or on satisfied exam testing (Van Merriënboer & Kirschner, 2017).The Nurse Executive Center (2010) found that 90% of nursing faculty thought that graduating nursing students are able to deliver safe and efficient nursing care when join the profession (Black, 2016).

MATERIALS AND METHODS

The study setting was a private nursing institute, Lahore, Pakistan. The quasi-experimental study design were used with pre and post educational intervention. Convenient sampling technique was used to collect data from 133 students. The inclusion criteria of participants was the students of Bachelor of Science in nursing enrolled in clinical subjects with different age brackets and clinical expertise. All these participant were at the same level of education and studying clinical subjects. However, those students who were not enrolled in clinical subjects or already enrolled in other simulated workshop with no clinical expertise were excluded. Data was collected through a questionnaire, after getting written permission from ethical review committee for conducting research, and consent was taken from participants. Simulated educational intervention was consisted on three session along with skill Lab. tutorials and clinical rotation. Skill Lab. tutorials aimed to provide psychomotor learning of different skills through simulated bodies. Moreover, the learned skills from skill lab were utilized in real clinical sittings. Data collection was done by the researcher and primary tutorial conducting teacher. Planned teaching program about knowledge and skill learning practice through simulation was delivered in four weeks duration and was evaluated by structured questionnaire. Descriptive statistics was used to analyze demographic characteristics of study participates and shown through frequency, percentage and standard deviation tables. Whereas, the pre and post data was analyzed through paired sample t-test in SPSS (Version 24).

RESULTS

Section 1:

This section represents the demographic characteristics of the participants whereas one hundred and thirty three students shared their information during this study.

The demographic data of the participants explored in the following table.

Table: I. Demographic characteristics of the participants.

#	Characteristics of Participants	Group	F	%
1	Participants Age	20 - 25 years	95	71
		26 - 30 years	33	24.8
		31 - 35 years	4	3
		36 - 40 years	1	0.8
2	Gender	Male	12	9
		Female	121	91
3	Marital status	Married	31	23.3
		Unmarried	102	76.7
4	Participant Status	student	118	88.7
5	Current Study Year	Year-I	48	36.1
		Year-II	55	41.4
		Year-III	20	15
		Year-IV	10	7.5
6	Qualification of instructor	Post-RN/BSN	45	33.8
		MSN	88	66.2
7	Experience - Professional	0- year	59	44.4
		1 - 5 years	64	48.1
		6 - 10 years	6	4.5
		Above 10 years	4	3
8	Repeated a course in this program?	Yes	30	22.6
		No	103	77.4
9	Your grade in last semester?	A	67	50.4
		B	61	45.9
		C	5	3.85
		D	0	0

Table I represent the demographic characteristics and their distributions of the participants.

Section 2:

Section 2 represents the frequency and percentage between pre and post comparison of educational interventions about simulation and skill learning in nursing education on the participants.

Table: II. Pre and Post data of educational interventions

Item	Pre - Test Mean	Post - Test Mean	Mean Deference's
1. What is the preferred site for I / V cannula?	.82	.86	0.04
2. Apply a tourniquet---the venepuncture site	.88	.94	0.06
3. During I/V procedure a ---- can be felt when the needle enter the vein.	.37	.63	.26
4. For intramuscular injection at dorso - gluteal site divided the buttock in to.	.90	.85	-0.05
5. For intramuscular injection insert the needle.	.90	.82	-0.08
6. For intramuscular injection if the blood enter the syringe on aspiration	.77	.79	0.02
7. For female insert the urinary catheter approximately---------- once urine has started draining.	.41	.62	0.21
8. Slowly inflate the urinary catheter balloon with----- according to manufactures instruction	.74	.81	0.07
9. For male wrap sterile folded gauze around the penis and use to support the penis at a -----	.51	.73	0.22
10. A stoma is an opening on the front	.77	.80	0.03
11. Measure the stoma diameter and cut out hole	.49	.55	0.06
12. Lubricate first -----of nasogastric tube with water soluble lubrication?	.62	.80	0.18
13. Check the placement of N/G tube: aspirate gastric contents and check with chem-strip.	.34	.59	0.25
14. For enema Place patient----------	.73	.77	0.04
15. For enema instruct the patient to hold the solution about -------or longer as tolerate	.41	.61	0.2

16. For enema instruct the patients with cardiovascular disease------	.44	.65	0.21
17. For flatus tube leave the tube in place---	.41	.59	0.18
18. Rectal tube: size--------of adult	.26	.57	0.31
19. Whenever a stylet is used for ETT intubation	.50	.64	0.14
20. During ETT intubation clients head	.59	.77	0.18

Table II reveals the outcomes of various decision question of instruments, through pre and post information of students in regards simulation based expertise learning upgrade has been estimated with mediation. Learning in regards to favored site for I/V cannulation have been improved by mean distinction of 0.04 focuses. Apply a tourniquet to square venous circulatory system and raise the vein, related information upgraded by intercession 0.06 focuses. There is no improvement in learning of intramuscular infusion site and for intramuscular infusion, insertion the needle. Simulation based learning instructive session improved the knowledge by 0.21 focuses about insertion of the urinary catheter to female.

Section 3:

This section shows the normality of the data.

Table: III. Normality Test

Normality Tests	Kolmogorov Smirnov[a]			Shapiro Wilk		
Total	Statis-tic	df	Sig.	Statis-tic	Df	p-value
Pre	.135	133	.000	.973	133	0.011
Post	.104	133	.001	.978	133	.028

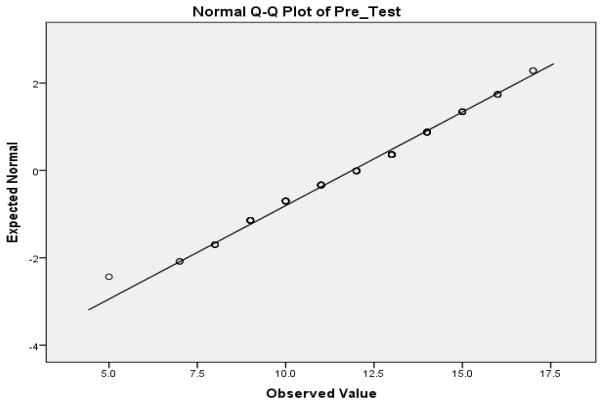

Fig: 1: shows the normality as Q-Q plot of pre test

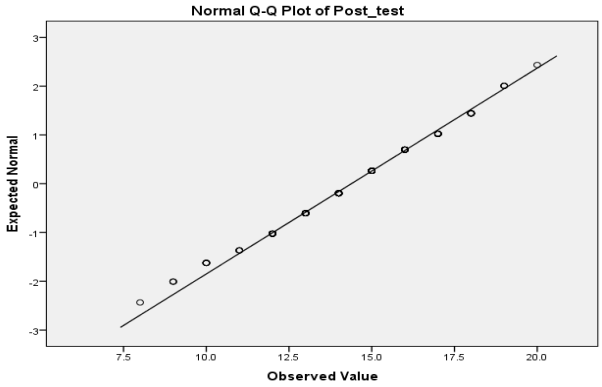

Fig. 2: Shows the normality as Q-Q plot of post test

Table III and figure 1 and II represent in order to determine normality statistically and graphically, through Q-Q Plot. The data points was closed to the diagonal line which represents that pre-test and post-test data was normally distributed.

Section 4:

This portion explore the significant values achieved by the application of paired t-test that mentioned as under.

Table: IV. Paired Samples Statistics

Paired Samples Statistics				
	Mean	N	SD	Std. Error Mean
Pre Test	11.88	133	2.336	.203
Post Test	14.38	133	2.370	.206

Table: V. Show the paired differences of pre and post

Paired Differences					t	Sig.
Mean	S.D	Std. err mean	95% Confidence Interval of the Difference			
			Lower	Upper		
2.50	2.31	.000	-2.107	-2.900	-12.4	.00

Table: VI. Shows the paired sample correlation

	N	Correlation	Sig.
Pre-Test & Post-Test	133	.518	.000

Above mentioned table IV, V and VI presenting the values of paired sample t-test from the particular sample data summary. The related results are mentioned here for the paired t-test. From here its row identified the t statistic, t = -12.492, and the value of p = .000; i.e., a very limited possibility of this outcome happening by chance, underneath the null-hypothesis of no effects. The null hypothesis was rejected, because the p value (in fact the p = .000) is less than 0.05, ($p < 0.05$).

Conclusion of this paired sample t test result is that, here was solid evidence (t = 12.492, p = .000) that simulated educational interventional session improved the result marks. First of all significant value of our results was less than .05, so the null hypothesis was rejected and alternative hypothesis H_1 was accepted. It shows that, there is an effect of simulated skill learning education on knowledge of nursing students. When alternative hypothesis was accepted it means, simulated skill learning educational interventions regarding knowledge of students were effective. In this measurable informational index, it has improved the marks generally 2.5 focuses. Clearly, on the off chance that we were take another preliminary of points, we can acquire a mean matched contrast in marks which will be unique in relation to 2.5. That is the reason it is huge to look in 95% the Confidence Interval. (95% CI). P - Value 3, in the event that we do this examination multiple times, then ninety-five times than authentic incentive for distinction ought to be lie in 95% certainty interval. Along these lines confirms that difference in the marks was factually huge. Anyway, the truthful esteem was little yet this distinction in marks is reliable.

DISCUSSION

The results of this exploration propose that simulation-based nursing instructive projects have strong enlightening effect on the knowledge and psychomotor skills area. It is necessary to conduct different programs to fulfil the educational needs to improve the skills in hospital as the result similar to the study conducted (Wright *et al.,* 2018). The outcomes from this examination demonstrated that an introductive simulation-based situation meaningfully helps student to work with confidence in clinical practice and each of the main practice zones. Students who accomplished the simulation-based situation also showed increased clinical competence in hospital as compared to other students.

Literature explore that, increasingly clinical abilities focuses is readymade, many contend that test systems for skills preparing must to be set in a clinical domain to permit arranged learning (Lave, 1991). This would help in keeping up the skills of experts just as preparing student in clinical situations, other than learning abilities with the assistance of a test system, a clinical situation gives extra open doors in learning clinical capacities. For an increasingly experienced student this would be ideal, while for a beginner student with restricted capacity to focus on various improvements.

The present investigation proposed that nursing training is at an energizing time with fast changes and advances. Simulation make a genuine like condition as for learning proficient skills and change the conduct of the students about ability learning process when contrasted with findings (Ross, 2015). A progressively sensible learning condition can be made with the utilization of recreation in nursing training. Large amounts of information and abilities are normal in the nursing job. In this regard, the joining of an intuitive technique in a nursing program, for example, simulation, is critical as it results in the advancement of progressively qualified, talented individuals from the nursing profession. The knowledge and psychomotor skills can be improved by utilizing simulation innovation in nursing training, and simulation is putting forth a protected learning condition in nursing training.

The Satisfaction and self-confidence of

students in learning method demonstrate that most of members agreed that simulation as a training strategy was useful and compelling. This finding is reliable with (Egan *et al.,* 2007) which propose simulation is a successful way to deal with nursing training. Students' reactions additionally shown that understudies concurred that the usage of simulation as an encouraging technique was encouraging and helped with learning.

The general result showed that the understudies experienced simulations a well appropriate learning approach in nursing preparing. As per past examinations (Jones et al., 2015). The students answered to be fulfilled, to have accomplished fearlessness, and the underscored highlights to have been available in the learning circumstance, all autonomous of the loyalty level in simulation and their instructive. The low-fidelity approaches appeared to be ideal, which could show that the requirement for cutting edge innovation. For the students, the low-fidelity simulation was an outstanding centered hypothetical learning circumstance, while their encounters in hospitalized setting, including subjective, psychomotor and full of affective challenges were constrained.

The students clarified the advantage of learning in a spectator job to give a low dimension of individual pressure and nervousness, while being the one to perform activity in the health problems circumstances was portrayed as being worried about staying away from disappointment and the opportunity to uncover one's insufficiency. In being the entertainer, they declared to figure out how to adapt to pressure, while in being the eyewitness to find out about the theme. These discoveries featured that the expression "dynamic student" incorporates both the physical and mental parts of recreation to expand action, (Hober & Bonnel, 2014). The participant who come across with simulation shown that simulation could be a proficient employment for common professional skill learning. Current simulated equipment have capacity to augment the student's skills, knowledge, and offer the chances to prepare for real practice. (Dodd, 2018)

CONCLUSION

Nursing professional skill practice on simulation is effective and inventive approach for enhancing the clinical skill learning outcome through nursing education. Satisfaction and efficacy of educational learning environments is highly interconnected with cognitive, affective, psychomotor and problem-solving capacities. The practice through simulation during nursing education can advance the quality of care in clinical setting, and this approach is helpful in supplementing the knowledge, attitude and performance of nurses for the application and translation into real clinical nursing practice. Simulation is helpful in BS Nursing programs with dedicated coaching in a very safe environment at the level of students self-directed, self-discovery and independent learning.

This study found that students perceive simulation as a valuable approach in order to gain knowledge, skills, and self-confidence required to perform effective care in a clinical setting.

Limitations of the study

The students of one program were participated in this study and sample size may not be satisfactory for generalizability of results. This study was conducted only in the one private university of Pakistan.

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REFERENCES

Aase, I., Hansen, B. S., & Aase, K. (2014). Norwegian nursing and medical students' perception of interprofessional teamwork: a qualitative study. *BMC Medical Education, 14*(1), 170.

Alexander, M., Durham, C. F., Hooper, J. I., Jeffries, P. R., Goldman, N., Kesten, K. S., . . . Tillman, C. (2015). NCSBN simulation

guidelines for prelicensure nursing programs. *Journal of Nursing Regulation, 6*(3), 39-42.

Black, B. (2016). *Professional nursing-E-book: Concepts & challenges*: Elsevier Health Sciences.

Botma, Y. (2014). Nursing student's perceptions on how immersive simulation promotes theory–practice integration. *International Journal of Africa Nursing Sciences, 1*, 1-5.

Bennett, C., & Rosner, D. K. (2018). *The Promise of Empathy: Design, Disability, and Knowing the Other.* Paper presented at the Proceedings of the 2018 CHI conference on human factors in computing systems

Brydges, R., Hatala, R., Zendejas, B., Erwin, P. J., & Cook, D. A. (2015). Linking simulation-based educational assessments and patient-related outcomes: a systematic review and meta-analysis. *Academic Medicine, 90*(2), 246-256.

Cant, R. P., & Cooper, S. J. (2014). Simulation in the Internet age: The place of Web-based simulation in nursing education. An integrative review. *Nurse education today, 34*(12), 1435-1442.

Davies, A. (2015). The hidden advantage in shoot/don't shoot simulation exercises for police recruit training. *Salus journal, 3*(1), 16.

Egan, M., Raats, M., Grubb, S., Eves, A., Lumbers, M., Dean, M., & Adams, M. (2007). A review of food safety and food hygiene training studies in the commercial sector. *Food control, 18*(10), 1180-1190.

Eppich, W., & Cheng, A. (2015). Promoting Excellence and Reflective Learning in Simulation (PEARLS): development and rationale for a blended approach to health care simulation debriefing. *Simulation in Healthcare, 10*(2), 106-115.

Hober, C., & Bonnel, W. (2014). Student perceptions of the observer role in high-fidelity simulation. *Clinical Simulation in Nursing, 10*(10), 507-514.

Jones, F., Passos-Neto, C. E., & Braghiroli, O. F. M. (2015). Simulation in Medical Education: Brief history and methodology. *Principles and Practice of Clinical Research*(2).

Kidd, L. I., Tusaie, K. R., Morgan, K. I., Preebe, L., & Garrett, M. (2015). Mindful teaching practice: Lessons learned through a hearing voices simulation. *Issues in mental health nursing, 36*(2), 112-117.

Liaw, S. Y., Koh, Y., Dawood, R., Kowitlawakul, Y., Zhou, W., & Lau, S. T. (2014). Easing student transition to graduate nurse: a simulated professional learning environment (SIMPLE) for final year student nurses. *Nurse education today, 34*(3), 349-355.

Madhavanprabhakaran, G., Al-Khasawneh, E., & Wittmann, L. (2015). Perceived benefits of pre-clinical simulation-based training on clinical learning outcomes among Omani undergraduate nursing students. *Sultan Qaboos University Medical Journal, 15*(1), e105.

McGaghie, W. C., Issenberg, S. B., Barsuk, J. H., & Wayne, D. B. (2014). A critical review of simulation-based mastery learning with translational outcomes. *Medical Education, 48*(4), 375-385.

Mitchell, E. L., Arora, S., Moneta, G. L., Kret, M. R., Dargon, P. T., Landry, G. J., . . . Sevdalis, N. (2014). A systematic review of assessment of skill acquisition and operative competency in vascular surgical training. *Journal of Vascular Surgery, 59*(5), 1440-1455.

Oh, P.-J., Jeon, K. D., & Koh, M. S. (2015). The effects of simulation-based learning using standardized patients in nursing students: A meta-analysis. *Nurse education today, 35*(5), e6-e15.

Podlinski, L. A. (2016). The Effect of Simulation Training on Nursing Students' Content Exam Scores.

Richardson, H., Goldsamt, L. A., Simmons, J., Gilmartin, M., & Jeffries, P. R. (2014). Increasing faculty capacity: Findings from an evaluation of simulation clinical teaching. *Nursing education perspectives, 35*(5), 308-314.

Ross, J. G. (2015). The effect of simulation training on baccalaureate nursing students' competency in performing intramuscular

injection. *Nursing education perspectives, 36*(1), 48-49.

Shin, S., Park, J.-H., & Kim, J.-H. (2015). Effectiveness of patient simulation in nursing education: meta-analysis. *Nurse education today, 35*(1), 176-182.

Thun, E., Bjorvatn, B., Flo, E., Harris, A., & Pallesen, S. (2015). Sleep, circadian rhythms, and athletic performance. *Sleep medicine reviews, 23*, 1-9.

Van Merriënboer, J. J., & Kirschner, P. A. (2017). *Ten steps to complex learning: A systematic approach to four-component instructional design*: Routledge.

Walshe, N., O'Brien, S., Hartigan, I., Murphy, S., & Graham, R. (2014). Simulation performance evaluation: Inter-rater reliability of the DARE2-Patient safety rubric. *Clinical Simulation in Nursing, 10*(9), 446-454.

Wright, A., Moss, P., Dennis, D. M., Harrold, M., Levy, S., Furness, A. L., & Reubenson, A. (2018). The influence of a full-time, immersive simulation-based clinical placement on physiotherapy student confidence during the transition to clinical practice. *Advances in Simulation, 3*(1), 3.