Effect of Integrated High-Fidelity Simulation on Self-Efficacy and Satisfaction of Pediatric Nursing Students regarding Newborn Assessment

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Abstract

Background: Simulation education is a bridge between classroom learning and real-life clinical experience. It helps in nursing competency before engaging in real situation with the newborns to enhance safety. **Aim:** This study aimed to evaluate the effect of integrated high-fidelity simulation on self-efficacy and satisfaction of pediatric nursing students regarding newborn assessment. **Research design:** A quasi-experimental design was utilized in the current study. **Setting:** This study was conducted at Clinical Pediatric Laboratory Skills for third year students and teaching hall of Faculty of Nursing, Benha University. **Subjects:** A convenient sample of all pediatric nursing students who were studying the pediatric nursing course was enrolled in the study (254 students). **Tools of data collection:** Four tools were used: **Tool (1):** A structured interviewing questionnaire; Part (1): Personal characteristics of the studied students, Part (2): Pediatric nursing students' knowledge regarding newborn assessment. **Tool (2):** Observational checklist for newborn assessment. **Tool (3):** Self-efficacy regarding newborn assessment. **Tool (4):** Students' satisfaction. **Results:** Showed that most of the studied students had unsatisfactory level of knowledge and practice and had low self-efficacy at pre simulation intervention. Compared with, high self-efficacy at immediate post and after four weeks simulation intervention. **Conclusions:** High fidelity simulation intervention regarding newborn assessment had a significant positive effect in improving students' knowledge, practice, self-efficacy and satisfaction towards newborn assessment. **Recommendations:** Integration of high fidelity simulation in pediatric nursing program to enhance students' acquisition of knowledge and performance.

Keywords: Integrated high fidelity simulation, Newborn assessment, Pediatric nursing students, Self-efficacy, Satisfaction.

Introduction

Assessment of the newborn infant is challenging because of the infant's vulnerability during the transition from intrauterine to extrauterine life and during the neonatal period. Neonatal assessment and a systematic physical assessment by a skilled health care provider confirm normality and detect abnormalities, guiding the infant's subsequent care. Nurses require an understanding of neonatal anatomy and physiology as well as the skills to accomplish a comprehensive newborn assessment **(Gantan & Wiedrich, 2022).**

Early detection of newborn illness is an important step toward improving newborn survival. Poor knowledge of newborn danger signs delays care seeking. The nurse needs to be knowledgeable about a newborn's normal physiologic and behavioral adaptations and be able to recognize alterations from normal transition **(Buser, 2019).**

Innovative educational technologies, such as simulation provide unprecedented opportunities

for health and social care students, trainees and staff to acquire, develop and maintain the essential knowledge, skills, values and behaviors needed for safe and effective infant care **(Grimwood & Snell, 2020).**

Simulation-based training offers a safe risk-free environment for clinicians to develop and maintain competency. It is an integral part of many neonatal-perinatal medicine training programs, and is used as a basis for many standardized newborn training programs worldwide to teach neonatal procedures and resuscitation as noted in the 2021 European Resuscitation Council Guidelines **(Yousef et al., 2022).**

Several benefits are associated with the use of simulation in nursing training both for the students and the newborns. The specific skills developed during simulation training are knowledge of algorithms, learning clinical skills and handling emergency situations, developing ethical values and decision making, self-confidence and competence, communication with the child and the colleagues, teamwork and leadership, child safety and finally the satisfaction of being part of a multidisciplinary team **(Maria et al, 2023).**

Simulation in nursing education involves three levels of fidelity. Simulators are labelled as low, moderate and high fidelity reliant on how closely they resemble the real life. Low-fidelity simulators (LFS) are static non-computerized manikins or task-trainers. Moderate-fidelity simulators are simulators that utilize standardized patients or computer program that providing less realism **(Shaaban et al., 2021).**

High-fidelity simulation has been recognized as a computerized full-body mannequin that can be programmed to provide realistic physiological response to student

actions. High fidelity is the most realistic of simulation and they can provide real physical symptom **(Grimwood & Snell, 2020).**

Learners use simulation to develop their cognitive, affective, and psychomotor skills when working through different clinical scenarios in a protective and supportive setting. Students may apply their theoretical knowledge, learn from their errors without harmful action to the patients, learn from their peers, and bridge the gap between knowledge and clinical practise using simulation methods **(Osman & Mostafa, 2021).**

Significance of the study

Clinical simulation has been used as an effective and innovative teaching strategy. Through this methodology, nursing students and professionals have learning and training subsidies, having access to an extended relationship between theory and practice in a safe environment **(Linn et al, 2019).**

Moreover, physical examination component of the newborn assessment is the most important screen for major occult health problems and congenital anomalies. Whereas, there were 8.8% of newborns had an abnormality on the first detailed examination with an additional 4.4% having abnormalities only diagnosed at follow up examination. Moreover, survival rates of children from preterm births, congenital anomalies, chronic disease, or injury have increased because of advances in technology **(Coleman, 2017).**

The use of high fidelity simulation enhances learning and preparation, which will ultimately optimize newborn care and safety for hospitalized infants. So, this study was conducted to enhance increased knowledge, practice, self-efficacy and satisfaction of pediatric nursing students regarding newborn

assessment; through using high-fidelity simulation.

Aim of the Study

This study was aimed to evaluate the effect of integrated high-fidelity simulation on self-efficacy and satisfaction of pediatric nursing students regarding newborn assessment.

Research hypothesis

Pediatric nursing students who will receive integrated high-fidelity simulation regarding newborn assessment will exhibit significant improved in knowledge, practice, self-efficacy, and satisfaction in post-tests compared with pediatric nursing students who will receive traditional methods of teaching regarding newborn assessment.

Subjects and methods

Research Design: A quasi-experimental research design was used to carry out the study.

Setting of the study

This study was conducted at pediatric nursing laboratory skills for third year students and teaching hall of Faculty of Nursing, Benha University. It is located in the fourth floor with a capacity of 15 students and contained simulation equipments and supplies such as Sim baby. The teaching hall located in the ground floor with a capacity of 250 students and contained computer and data show.

Subjects:

A convenient sample of all pediatric nursing students who were studying the pediatric nursing course in the second semester for the academic year 2020-2021 regardless their characteristics were enrolled in the study sample (254 students). The study sample was divided randomly into two identical groups [study group (n=127) & control group (n=127)].

- One group included 127 pediatric nursing students received traditional methods of teaching on newborn assessment content as a control group.
- Another group included 127 pediatric nursing students received traditional methods of teaching with integrated high- fidelity simulation through use of a high-fidelity semi-baby as a study group.

Tools of data collection:

Data were gathered by using the following tools:

Tool (I):- A structured interviewing questionnaire:

This tool was designed by the researcher in the light of reviewing relevant articles, previous studies and related literatures and under supervision of supervisors. It was written in an English language and composed of two parts as the following:

Part (1): Personal characteristics: It included 4 questions; age, gender, previous training with a high-fidelity simulation, and previous newborn assessment training with high fidelity simulation.

Part (2): Pediatric nursing students' knowledge (Pre\Immediate Post\After Four Weeks): This tool was designed by the researcher based on **(Kohler & Reinger, 2019)** and under supervision of supervisors. It was used to assess pediatric nursing students' knowledge regarding newborn assessment. It included (42 questions), multiple choice questions and open ended questions.

First section included pediatric nursing students' knowledge about general newborn assessment (12 questions).

Second section included pediatric nursing students' knowledge about nurses' responsibilities during newborn assessment (5 questions).

Third section included pediatric nursing students' knowledge regarding immediate newborn assessment (Apgar score), (5 questions).

Fourth section included pediatric nursing students' knowledge regarding anthropometrics measurements (4 questions).

Fifth section included pediatric nursing students' knowledge regarding skin characteristics (3 questions).

Sixth section included pediatric nursing students' knowledge regarding head characteristics (6 questions).

Seventh section included pediatric nursing students' knowledge regarding abdominal assessment (2 questions).

Eighth section included pediatric nursing students' knowledge regarding urogenital & neurological system (5 questions).

Scoring system of the pediatric nursing students' knowledge:

The studied students answers were compared with a model key answer, where score of one was given for the correct answer and zero for incorrect or unknown answer. Summed scores could range from 0 to 42. According to the students' responses, their total level of knowledge was categorized as following:

- Unsatisfactory (less than 80%)   (<34 points).
- Satisfactory (from 80% to 100%)   (34-42 points).

Tool (II):-: An observational checklist: This tool was adapted from **(Perez & Mendez, 2020)**. It was used to assess pediatric nursing students' practice regarding newborn assessment. It included (44 points) under grouped in to (10) sections.

First section included pediatric nursing students' practice regarding pre assessment preparation (7 items).

Second section included pediatric nursing students' practice regarding measurement of weight and tone assessment (3 items). **Third section** included pediatric nursing students'

practice regarding upper limb assessment (12 items).

Fourth section included pediatric nursing students' practice regarding chest and abdomen assessment (6 item).

Fifth section included pediatric nursing students' practice regarding lower limbs assessment (5 items).

Sixth section included pediatric nursing students' practice regarding back and spine assessment (one item).

Seventh section included pediatric nursing students' practice regarding anus assessment (one item).

Eighth section included pediatric nursing students' practice regarding reflexes assessment (one item).

Ninth section included pediatric nursing students' practice regarding genitalia assessment (one item).

Tenth section included pediatric nursing students' practice regarding post assessment process (5 items).

Scoring system of the pediatric nursing students' practice:

The pediatric nursing students' practice were compared with the observational checklist sheet where 1 score were given for each step done correctly, 0 score for step done incorrectly and not done. Total pediatric nursing students' practice ranged from (0-44) points. According to the student's responses, their total level of practice was categorized as the following:

- Unsatisfactory (less than 60%) (26 points or less)
- Satisfactory   (more than 60%) (More than 26 points)

Tool (III):-: Self-efficacy assessment: This tool was adapted from **Michael (2005),** and modified by the researcher to suit the study subjects. It was used to assess students' self-

efficacy regarding newborn assessment. It consisted of 18 items, such as; (conduct a general overview about newborn, conduct assessment of gestational age, obtain newborn vital signs, inspection (skin; head, including hair; face, including mouth, eyes, and ears; neck; chest, abdomen, genitalia extremities and posture), palpation (fontanel; chest; pulses; abdomen; anal reflex; genitalia; hips for dislocation; newborn reflexes), auscultation (lung, heart and bowel sounds; apical pulse), assessment findings that may be a variation of normal, deal effectively with unexpected findings, understand significance of abnormal assessment data, remain calm when facing difficulties, solve the problem when having trouble, document appropriate findings of a complete newborn assessment, handle whatever happens when conducting newborn assessment, deal efficiently with unexpected events).

Scoring system is as the following:

This Likert type rating scale had three response options for respondents; from disagree to agree. The score of each item of the previous scale was ranged as the following: disagree (0), neutral (1), agree (2). This scale consisted of 18 questions, so summed scores could range from 0 to 36. The pediatric nursing students' total score was considered high self-efficacy if the percent score was 80% (29 points to 36) and moderate self-efficacy if scored from 60< 80 % (22 to less than 29 points) and low self-efficacy if scored less than 60% (<22 points).

Tool (IV): Student's satisfaction: This tool was adopted from **Anderson (2007)**. It assessed students' satisfaction regarding the educational content of newborn assessment. This tool included 9 items such as; (the length of time of education session, meeting learning objectives, learning a lot from education session, education session was better than

what I thought it would be, the environment for this education session was conducive to my learning , I believe the information learned in this education session will enhance my practice, the education session gave me an opportunity to demonstrate my critical thinking skills, I will be able to appropriately apply the information learned in this education session to my practice, I will adequately be able to make decisions about physical findings associated with newborn assessment).

Scoring system is as the following:

The Likert scale for this tool is a 5-point scale from strongly disagree to strongly agree. The score of each item of the previous scale was ranged as the following: strongly disagree (1), disagree (2), neutral (3), agree (4), strongly agree (5). This scale consisted of 9 items, so summed scores could range from 9 to 45. The pediatric nursing students were considered satisfied if the percent score was 80% (36 points) or more and unsatisfied if scored less than 80% (<36 points).

Tool Validity:

Tools of data collection were investigated for their content validity by panel of three experts in pediatric nursing / Faculty of Nursing/ Benha University, who are selected to test contents for clarity, relevance, comprehensiveness, understanding and applicability. The opinion was elicited regarding the format, layout, and relevancy of tools and all of their remarks were taken into considerations, and the tools were regarded as a valid from the experts' point of view.

Reliability:

Internal consistency reliability of all items of the tools was assessed using Cronbach's Alpha test. It was 0.89 for pediatric nursing students' knowledge regarding newborn assessment, 0.85 for an observational

checklist to assess pediatric nursing students' practice, 0.83 for pediatric nursing students' self-efficacy assessment regarding newborn assessment, 0.94 for students' satisfaction regarding the educational content of newborn assessment.

Ethical Considerations:

Approval from Ethical and Research committee was obtained. The researcher explained the aim of the study to pediatric nursing students and that the study does not carry any physical, psychological and social risks. The researcher secured that all the gathered data are confidential and are used for the research purpose only. The students were informed that they are optionally allowed either to participate or not in the study and they have the right to withdraw at any time. An oral consent was taken from the students.

Filed Work:

The actual field work was carried out during the second semester over a period of tenth weeks (from the beginning of March 2021 to the half of May 2021). The purpose of the study was explained by the researcher to all students included in the study. The researcher interviewed students in the academic year (2020–2021). The high fidelity simulation training program was implemented to achieve aim of the current study through these phases; assessment, planning, implementation and evaluation phase.

The study was conducted through the following phases:

Assessment phase:

This phase involved interviews with students to collect baseline data. The researcher interviewed with the pediatric nursing students at faculty of nursing\ Benha University three days/ week; Saturdy, Monday and Wednesday according to their academic schedule from 9:00 AM and

extended to 3:00 PM (by rotation in groups). At beginning of interview; the researcher welcomed available students, explained the purpose, duration, activities of the study and took their oral approval to participate in the study prior to data collection.

The researcher gave pediatric nursing students (Tool I) for filling it to assess their knowledge toward newborn assessment and they finished answering within 15-20 minutes at the beginning of the day. After that, the researcher observed each pediatric nursing students, separately during their practices to apply systematic newborn assessment using observational checklists (Tool II) using high fidelity simulation at clinical pediatric nursing skill lab. The average time needed to observe each student was between 35-40 minutes. Finally, the researcher did of the explains (Tool III) to the pediatric nursing students to assess their self-efficacy toward newborn assessment and they finished answering within 10-15 minutes at the end of the day.

Planning phase:

Based on baseline data obtained from assessment phase and relevant review of literatures, the high fidelity simulation training program was designed by the researcher for pediatric nursing students according to the pediatric nursing students' needs newborn assessment and included two parts:

A. Scenario designing

Scenarios designing of newborn assessment in the Mannequin guideline book provided by Gaumard Scientific Company Inc, was adapted by the researcher to be applied to the study group. The modified scenario was revised by a panel of three experts in the pediatric nursing specialty and the needed modifications were carried out in developing the final scenario. The simulated scenario was on a newborn with a flexed arms

and legs, cyanosis, heart rate 120 b\m, temperature 37 °C, respiratory rate 40 c\m, grunting, murmer, normal features of newborn, various muscle activities (flexion and extension of arms and legs, flaccid limbs, twitching).

B.   Program construction:

A review of the past and current available literature was done using magazines, articles, periodicals, online access and books to get acquainted with various aspects of the research problem and develop the newborn assessment content. It was constructed, revised and modified from the related literatures to improve the students' knowledge and practice regarding newborn assessment. The contents were prepared in English language. Different methods of teaching were used as modified lectures; group discussion, demonstration, and re-demonstration, suitable teaching media were included, hand out to help proper understanding of the content. A training program booklet regarding newborn assessment content was designed by the researcher.

Implementation phase:

Motivation and encouragement during session were used to enhance motivation for the sharing in this study, each session started by a summary of the previous session and objective of the new one. The researcher was available at the previous mentioned settings three days per week Saturday, Monday and Wednesday according their academic schedule. The training started by teaching the theoretical part about newborn assessment for all pediatric nursing students. Theoretical part conducted in the 3rd year pediatric nursing students' teaching hall and took 6 hours but regarding implementation the practical part conducted in the affiliated pediatric nursing skill lab to this department and took 15 hours.

Evaluation phase:

After the implementation of the intervention contents, the immediate post-test was carried out to assess pediatric nursing students' knowledge, practice, self-efficacy and educational satisfaction by using high fidelity simulation using the same formats of pretest. This phase took one week second week of April 2021. Four weeks later after implementation of simulation intervention, another post-test was done using the same test format as immediate post-test. This phase took one week, second week of May 2021.

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using Statistical Package for Social Science (SPSS) version 20 for widows, running on IBM compatible computer. Data were presented using descriptive statistics in the form of numbers and percentages for qualitative variables, and mean and standard deviation for quantitative variables. Quantitative continuous data were compared using paired t test in case of comparison between two groups. Qualitative variables were compared using Chi-square test. Whenever the expected values in one or more of the cells were less than 5, Fisher exact test was used instead. Pearson correlation analysis were done for assessment inter relationship among quantitative variables. To test the independent predicator of students' score of competency and personal data, as independent factor, linear regression test and analysis of variance for the full regression were done. Statistical significance was considered at p- value<0.05 and   a highly statistical significance was considered at p- <0.001 and p- value >0.05 indicated non-significant.

Results:

Table (1): Shows that, more than half (52.0 % & 53.5%) of pediatric nursing students in

study and control group were in the age group 20 < 21 years, respectively, with a mean age 21.1 ±1.9 and 20.9 ±1.4 years old. Concerning gender, more than two thirds (65.4% & 67.7%) of studied students in study and control group , respectively, were females.

Table (2): Shows that all (100%) of the studied pediatric nursing students had unsatisfactory level of knowledge at pre-simulation intervention. While, (93.7%, 68.5% & 86.6%, 53.5%) of pediatric nursing students of study and control group had satisfactory level of knowledge at immediately post and after four weeks simulation intervention, respectively. Moreover, there was a highly statistical significant difference (p value <0.001) in favor of immediately post and after four weeks simulation intervention.

Figure (1): Shows that, most (96.9% & 93.7%) of pediatric nursing students of study and control group had unsatisfactory level of practice at pre-simulation intervention, respectively. While, (92.1%, 70.1% & 85.8%, 66.1%) of pediatric nursing students of study and control group had satisfactory level at immediately post and after four weeks simulation intervention, respectively. Moreover, there was a highly statistical significant difference (p value <0.001) in favor of immediately post and after four weeks simulation intervention.

Figure (2): Shows that, most (96.1%) of studied pediatric nursing students had low level of self-efficacy regarding newborn assessment at pre-simulation intervention. While, (95.3%, 61.4% & 88.2%, 41.7%) of pediatric nursing students of study and control group had high self-efficacy regarding newborn assessment, at immediately post and after four weeks simulation intervention, respectively. Moreover, there was a highly statistical significant difference (p <0.001) in

favor of immediate post and after four weeks simulation intervention of study and control group.

Table (3): Demonstrates that, there was a highly statistical significant difference (p value <0.001) in the studied students total educational satisfaction mean scores in favor of study group. It was observed that, students of study group had higher mean scores than student of control group at immediate post simulation intervention (41.2 ±2.6, 36.2 ±1.5), respectively. Moreover, there was a highly statistical significant difference (p <0.001).

Table (4): Demonstrates that, there was a statistically significant positive correlation between total scores of knowledge, practice, self-efficacy and educational satisfaction of pediatric nursing students of both study and control group at immediate post simulation intervention (P<0.001).

Table (1): Distribution of the studied pediatric nursing students regarding their characteristics (n = 254)

Characteristics	Study Group (n=127)		Control Group (n=127)		X^2	P
	No.	%	No.	%		
Age (Years)						
20 < 21	66	**52.0**	68	**53.5**		
21 <22	40	31.5	30	23.6	2.738	0.254
22 ≤ 23	21	16.5	29	22.8		
±SD$\overline{\text{X}}$	21.1 ±1.9		20.9 ±1.4			
Gender						
Male	44	34.6	41	32.3	0.159	0.689
Female	83	**65.4**	86	**67.7**		

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Table (2): Distribution of the studied pediatric nursing students according to total level of knowledge regarding newborn assessment through phases of simulation intervention (n= 254).

| Items	Study Group (n=127)												Control Group (n=127)												
	Pre-Simulation Intervention		Immediate Post-Simulation Intervention		X^2 FET	P	After Four Weeks Simulation Intervention		X^2 FET	P			Pre-Simulation Intervention		Immediate Post-Simulation Intervention		X^2 FET	P	After Simulation Intervention		X^2 FET	P			
	No.	%	No.	%			No.	%					No.	%	No.	%			No.	%					
Knowledge Score																									
Unsatisfactory	127	100.0	8	6.3	223.896	<0.00	17	13.4	194.028	<0.00			127	100.0	40	31.5	132.323	<0.00	59	46.5	92.860	<0.00			
Satisfactory	0	0.0	119	**93.7**			110	**86.6**					0	0.0	87	68.5			68	53.5					
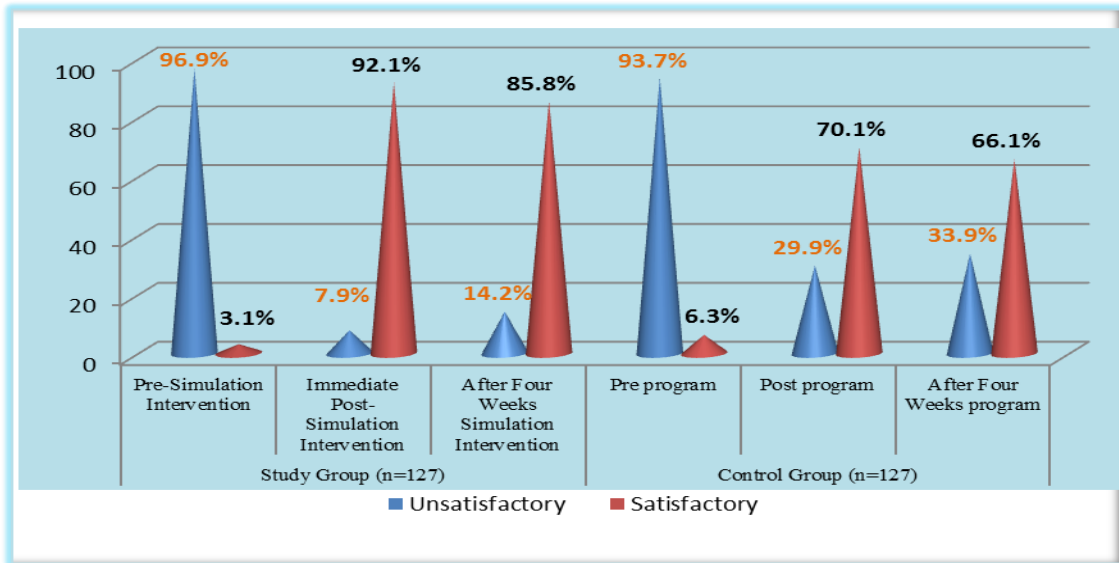
Figure (1): Distribution of the studied pediatric nursing students according to total level of practice regarding newborn assessment through phases of simulation intervention (n= 254).
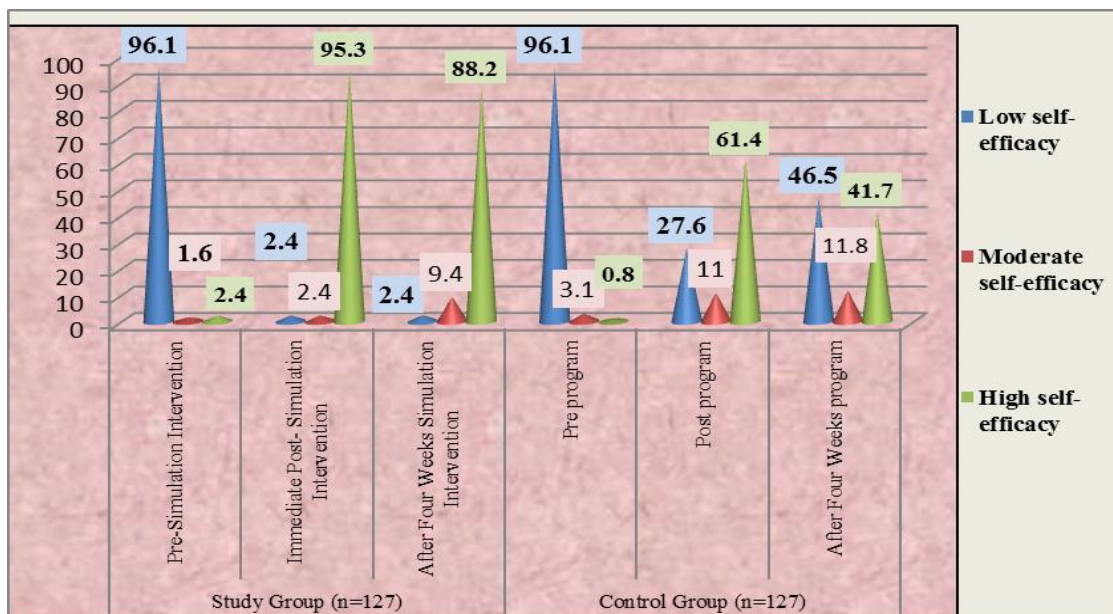

Figure (2): Distribution of the studied pediatric nursing students according to total level of self-efficacy regarding newborn assessment through phases of simulation intervention (n= 254).

Table (3): Distribution of the studied pediatric nursing students according to total level of educational satisfaction regarding newborn assessment immediate post simulation intervention (n= 254).

Total level	Study Group (n=127)		Control Group (n=127)		X^2	P
	No.	%	No.	%		
Unsatisfactory	8	6.3	23	18.1	8.267	0.004
Satisfactory	119	93.7	104	81.9		
Mean ±SD	41.2 ±2.6		36.2 ±1.5		18.772	<0.00

Table (4): Correlation between pediatric nursing students' knowledge score, practice score, self-efficacy score and educational satisfaction score immediate post simulation intervention (n= 254).

Total scores	Pearson correlation coefficient			
	Study group (n=127)		Control group (n=127)	
	Immediate Post Simulation Intervention		Immediate Post Simulation Intervention	
	r	P-value	r	P-value
Knowledge – practice	0.526	0.00	0.701	0.00
Knowledge - Self-efficacy score	0.251	0.007	0.470	0.00
Knowledge- Educational session satisfaction score	0.282	0.002	0.470	0.00
Practice -Self-efficacy score	0.346	0.00	0.613	0.00
Practice - Educational session satisfaction score	0.448	0.00	0.425	0.00
Self-efficacy score- Educational session satisfaction score	0.199	0.033	0.207	0.027

Discussion

Regarding characteristics of studied pediatric nursing students, the present study showed that, more than half of the studied students aged between 20<21 years. This result agreed with the findings of the study done by **Gamal El-deen et al., (2020),** entitled "Impact of using simulation based learning on nursing students' performance, self-efficacy, satisfaction and confidence during pediatric injection administration", who reported that, the age of the studied students ranged from 20-21 years.

As regards gender of the studied students, nearly two thirds of studied students were females. This finding was in an agreement with the findings of the study done by **Ramdan et al., (2022),** entitled "Effect of low fidelity simulation training program on knowledge and practices of pediatric nursing students regarding intravenous cannulation", they found that, bout more than two third of nursing students were females compared to about one third of nursing students was males.

Regarding pediatric nursing students' total score knowledge regarding newborn assessment, the present study revealed that, all studied students had unsatisfactory knowledge regarding newborn assessment during pre-simulation intervention, which improved to the majority of students of study group had satisfactory knowledge at post and after four weeks-simulation intervention. Moreover students of control group had also satisfactory knowledge at post- simulation intervention but not the same improvement of study group. Moreover, there was a highly statistically significant difference.

These results were corresponding with the results of study done by **Jyoti et al., (2021),** entitled "simulation versus traditional method of teaching on the retention of birthing care", they revealed that, knowledge score for simulation group was higher than traditional teaching group after simulation training. Also, these results coincided with those of **Dincer & Ataman, (2020),** in their study about "The effect of high reality simulation on nursing students' knowledge, satisfaction, and self-confidence levels in learning", they determined that, the scores of knowledge in the post-test and first month test after simulation intervention of the students in the experimental group were found to be statistically significantly higher than the control group. From the researcher point of view, this may be due to simulation helps students to understand contents better than traditional lecture, and easier to apply learned skills for clinical nursing practices, which helps remembering and retrieval of knowledge. Also, simulation classes leading to enhancing and restoring the pediatric nursing students knowledge and given them opportunity for feedback about the acquired knowledge and availability of lecture and power point and hard copy.

Regarding pediatric nursing students' total score practice regarding newborn assessment, the present study revealed that, most of the studied students had unsatisfactory practice regarding newborn assessment during pre-simulation intervention. Which improved to majority of students of study group had satisfactory practice at immediate post and after four weeks simulation intervention. Moreover students of control group had also satisfactory practice at immediate post and after four weeks simulation intervention but not the same improvement of study group.

These findings were coherent with those of **El-Meanawi et al., (2019),** who conducted a study entitled "Simulation education: Its effect on nursing student's knowledge, performance, and satisfaction", in which the results showed highly statistically significant difference in students' practice level between the three different phases (pre-program, post program and follow up of simulated education program) at P value of (0.000). From the researcher point of view, this may be due to using simulation as a teaching method provides students with a chance for demonstration, re-demonstration and correction of their mistakes, which can lead to gaining student confidence and improving practical skills.

According to pediatric nursing students' total score self-efficacy regarding newborn assessment, the current study reported that most of students of study group had high self-efficacy. While, less students of control group had high self-efficacy in immediate post and after four weeks simulation intervention. Moreover there was a highly statistically significant difference.

These findings were coherent with findings of the study of **Al Kalaldeh, (2020),** entitled "Enhancing nurses self-efficacy by

high-fidelity resuscitation simulation training: a pre-post study", who indicate that, students' self-efficacy has significantly improved after the simulation training considering all self-efficacy dimensions; recognition, debriefing and recording, responding and rescuing, and reporting (P<0.05). From the researcher point of view, this may be as a result of simulation environment that simulates visual, auditory and tangible learning methods and elicits different and more engaged responses.

In relation to pediatric nursing students' total score of educational satisfaction regarding newborn assessment, the current study determined that students of study group were more satisfied than students of control group with total mean scores (41.2 ±2.6, 36.2 ±1.5), respectively. Moreover there was a highly statistically significant difference (p<0.001).

These findings were in conformity with the findings of the study done by **Blanie et al., (2020),** entitled "Comparative value of a simulation by gaming and a traditional teaching method to improve clinical reasoning skills necessary to detect patient deterioration", they reported that, satisfaction and motivation were improved for both study and control group, post simulation training, although satisfaction was significantly greater in the study group (p < 0.05). From the researcher point of view, this can be traced back to that teaching methods and strategies used in the high fidelity simulation were effective and that simbaby facilitates leaning process by providing a real and tangible situation.

According to correlation between studied variables, the present study reported that there was a statistically significant positive correlation between total scores of knowledge, practice, self-efficacy and

educational satisfaction of students of both study and control group immediate post and after four weeks simulation intervention.

These results were consistent with the results of **El-Meanawi et al., (2019)** who and found that there was statistically significant positive correlation between knowledge, practice and self-efficacy after simulation intervention. From the reasecher point of view this could be due to students practices directly influenced by their knowledge besides knowledge is the baseline for the practices and essential to achieve best practices and improved practice leading to high self-efficacy and satisfaction.

Conclusion

Most of the studied pediatric nursing students had satisfactory level of knowledge and practice regarding newborn assessment at immediately post and after four weeks of simulation implementation as compared to pre simulation intervention. Meanwhile, the majority of studied pediatric nursing students had high level of self-efficacy and satisfaction toward newborn assessment immediately post and after four weeks of implementation of high fidelity simulation as compared to pre simulation intervention. Meanwhile, there was a statistically significant positive correlation between knowledge, practice, self-efficacy and satisfaction of studied students immediate post and after four weeks simulation intervention

Recommendations

- Integration of high fidelity simulation in pediatric nursing program to enhance students' acquisition of knowledge and performance.
- Providing a continuous training program for faulty staff members about using high fidelity simulation in the training of nursing students.

- Further studies repeating of the study on large sample to generalize the results.

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تأثير المحاكاة عالية الدقة على الفعالية الذاتية ورضا طلاب تمريض الأطفال تجاه تقييم الأطفال حديثي الولادة

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المحاكاة عالية الدقة هي تقنية لتعليم المهارات التمريضية باستخدام نماذج متطورة من الأجهزة التي تشبه في عملها الوظائف الحيوية في الإنسان، عند مقارنتها بأنواع أخرى من طرق التدريس في تعليم التمريض، حيث أنها تؤدي إلى نتائج تعليمية إيجابية. تم استخدام تصميم بحث شبه تجريبي لتحقيق هدف هذه الدراسة. أجريت هذه الدراسة في معمل مهارات تمريض الأطفال الإكلينيكي لطلاب الفرقة الثالثة وقاعة التدريس بكلية التمريض جامعة بنها. شملت هذه الدراسة عينة ملائمة من جميع طلاب تمريض الأطفال الذين كانوا يدرسون مقرر تمريض الأطفال في الفصل الدراسي الثاني للعام الدراسي 2020-2021 بغض النظر عن خصائصهم في عينة الدراسة (254 طالبًا). واظهرت النتائج ان جميع الطلاب كانت معلوماتهم غير مرضية قبل التدخل باستخدام جهاز المحاكاة عالي الدقة. في حين أن (93,7٪ و 86,6٪) من طلاب مجموعة الدراسة كان مستوى معلوماتهم مرض بعد تنفيذ التدخل باستخدام جهاز المحاكاة عالي الدقة. فيما يتعلق بمستوى ممارسات طلاب تمريض الأطفال تجاه تقييم حديثي الولادة ، أوضحت الدراسة الحالية أن (96,9٪ و 93,7٪) من مجموعة الدراسة والمجموعة الضابطة كانت ممارساتهم غير مرضية قبل التدخل باستخدام جهاز المحاكاة عالي الدقة. في حين أن (92,1٪ و 70,1٪) من طلاب مجموعة الدراسة والمجموعة الضابطة كان مستوى ممارساتهم مرض بعد تنفيذ التدخل باستخدام جهاز المحاكاة عالي الدقة. كما أوضحت الدراسة الحالية أن الغالبية العظمى (96,1٪) من طلاب المجموعة الدارسة لديهم مستوى منخفض من الفعالية الذاتية قبل استخدام المحاكاة. مقارنة بنسبة (95,3٪ و 61,4٪) من مجموعة الدراسة و المجموعة الضابطة كان لديهم فعالية ذاتية عالية، بعد استخدام المحاكاة عالية الدقة. فيما يتعلق بمستوى الرضا التعليمي. وقد لخصت الدراسة الحالية بوجود علاقة طردية ذات دلالة إحصائية بين معلومات و الممارسات والفعالية الذاتية والرضا لطلاب كل من مجموعة الدراسة والمجموعة الضابطة مباشرة بعد و بعد أربعة أسابيع من استخدام جهاز المحاكاة عالي الدقة. و قد أوصت الدراسة بدمج المحاكاة عالية الدقة في البرامج التعليمية لتمريض الأطفال لتعزيز اكتساب الطلاب للمعرفة والأداء.