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Pediatric Nursing Students' Perception of Simulation Based Education and its Relation to Their Learning Skills

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Abstract: Background: Simulation based education is an important teaching-learning strategy in the nursing curriculum for pediatric nursing students by providing a near-to-real practice environment for mastering dexterity in nursing care, learning skills and procedures. **Aim of the study:** This study aimed to explore pediatric nursing students' perception of simulation based education and it's relation to their learning skills. **Design:** A descriptive research design was used in this study. **Setting:** The study was conducted at Faculty of Nursing, Helwan University. **Subjects:** Convenient sample from all available pediatric nursing students at the third academic year at Faulty of Nursing, Helwan University (n=100) at the time of data collection from the beginning of October 2023 to the end of December 2023.**Tools:** It consisted of two tools: 1st tool Simulation Based Education Questionnaire and 2nd tool: Pediatric Nursing Observational Checklists. **Results:** The majority of pediatric nursing students had high perception level regarding simulation-based education and all of them had high practical level regarding gavage feeding, oral suction, intramuscular injection, oral temperature, **Conclusion:** there was no statistically significant differences between total pediatric nursing observational checklist procedures and total perception toward simulation based education. **Recommendations:** conduct longitudinal research to evaluate the long-term effects of simulation based education on the clinical performance and patient care outcomes of pediatric nursing students after graduation**.**

Keywords: *Pediatric Nursing, Simulation Based Education, Students' Learning Skills.*

Introduction

Nursing education today is influenced by rapid changes in health care technology, social, cultural, technological, economic forces and complexity in health care demands. These changes mandate the nursing educator to reshape their curriculum to make sure that the students gained the knowledge and the skills that allow them to deal with the unpredictable challenges of the twenty first century. Simulation experiences are an example of a valuable learning strategy that has the potential to prepare the students to deal with this unpredictable challenges and needs. [1]

Nursing is a profession in which nurses work in highly demanding environment and care for increasingly complex patients. Simulation training can help nurses to develop competency in technical skills, as well as to integrate cognitive and psychomotor pediatric skills into patient care and to enhance the communication skills with the pediatric patients. [2]

Simulation can become an inseparable part of nursing education and career to develop and enhance core nursing competencies and for learning the procedural and clinical skills, as well as for the application of such skills in the clinical setting. Providing quality of such training will become a

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coherent part of the individual and team performance to improve self-confidence, critical thinking and problem-solving capabilities. [3]

Pediatric nursing students are providing care for the pediatric patients within the context of their families. Safety is a priority when dealing with this vulnerable groups of population. For the majority of students, this is their first encounter with a pediatric patients so they had no or minimal experience in providing appropriate care for a pediatric patient. [4]

Providing a learning experience for the nursing students by rotation in the simulation laboratory can be incorporated as an effective strategy in providing specialty clinical practice and supplementing learning needs in acute nursing for children, by providing a near-to-real practice environment for mastering dexterity in nursing care and procedures. [5]

Simulation can take various forms, such as using standardized pediatric patients, role- playing and use of physical or virtual reality part-task trainers, computer patients (screen- based virtual world) or electronic patients. Fidelity refers to describe simulation products, and the precision of real life. Simulation attempts to achieve a level of fidelity that resembles situations encountered in real life. [6]

Simulation-based education provides an active learning environment where students can practice cognitive, psychomotor skills, and demonstrate critical thinking during patient care. Simulation based education gives nursing students the opportunity to prioritize assessment data and make critical decisions about patient care interventions. [7]

High-fidelity simulation, allows students to practice needed nursing care and clinical skills and by building self-confidence and positively impacting knowledge. Moreover, simulation has the advantage of reproducing the procedures repeatedly, without putting the patient at risk, which makes them safe during clinical practice. [8]

Significance of the Study

The recent increase in the number of nursing faculties and more demands for nurses around the globe, show the importance of studying the effectiveness of simulation. Simulation is an important factor in the nursing curriculum that teaches students necessary skills, knowledge and helps them acquire competencies. [9] The current study strives to provide information that can help in bridging the gap between education and practice. The gap between nursing education and actual nursing practice performance requirements has long been noted in nursing education. Graduates demonstrate the ability to think critically about pediatric patient situations and make clinical decisions. The National League for Nursing acknowledged nursing educators as vital to nursing education and to whom the responsibility of cultivating future quality and safe healthcare practitioners comes as a significant role expectation. [10] In addition, an objective in Egypt's developmental plan for the country's reform, Egypt's Vision 2030, aims to develop public services including health and education. In fact, one of the most important objectives of Egypt's Vision 2030 is to develop and expand nursing research that improves healthcare outcomes. So, from the researcher point of view, there is great importance to evaluate the effect of simulation based education on pediatric nursing students' learning skills as this will contribute to Egypt's Vision 2030 and enrich nursing practice. Also, the results of this study would also be a useful source for nursing policymakers working to integrate simulation into nursing curricula.

Aim of the study

The study aimed to assess pediatric nursing students' perception of simulation based education and its relation to their learning skills.

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Research questions:

1. What is the level of pediatric nursing students' perception of simulation based education?
2. What is the relation between pediatric nursing students' perception of simulation based education and their learning skills?

Subjects and Methods

Research design:

A descriptive research design was utilized in this study.

Research setting:

The study was conducted at Faculty of Nursing, Helwan University in pediatric simulation lab.

Subjects:

A convenient sample of all available pediatric nursing students at the third academic year at Faulty of Nursing, Helwan University (n=100) at the time of data collection from the beginning of October 2023 to the end of December 2023.

Tools of data collection:

Two tools were utilized in data collection as the following:

Tool (I): Simulation Based Education Questionnaire: It was designed by the researcher based on related literature and consisted of two parts:

Part I: This part included personal characteristics of the pediatric nursing students (age, gender, residence, housing of students and previous training on simulation).

Part II: This part was used to assess pediatric nursing students' perception toward simulation based education. It composed of 10 dimensions with 66 items as the following: Active learning (12 items), Development of Critical Thinking Skills (6 items), Satisfaction (5 items), Self-confidence with clinical simulation (8 items), Realism of Simulated Scenarios (7 items), Objectives and Information (5 items), Preferences for Simulation Types (8 items), Support and Collaboration (6 items), Problem-solving (5 items) and Feedback / Guided reflection (4 items).

Scoring system: pediatric nursing students' total perception was measured on three-point lickert scale as 3 for agree, 2 for neutral and 1 for disagree. The total perception scores were evaluated and classified as follows: (Low perception level) where pediatric nursing students' total perception toward simulation based education was <50% (<99 point). (Moderate perception level) where pediatric nursing students' total perception toward simulation based education was 50-<75% (99-<149 point). (High perception level) where pediatric nursing students' total perception toward simulation based education was ≥75% (≥149 point).

Tool (II): Pediatric Nursing Observational Checklists: This tool was adopted by the researcher to evaluate pediatric nursing students' learning skills about nursing procedures at premature area namely: neonatal resuscitation (16 items), gavage feeding (27 items), oral suction (19 items) and at medicine area namely: intramuscular injection (17 items), and measuring oral temperature (14 items).

Scoring system: Assessment of pediatric nursing students' practice regarding pediatric nursing procedures was accordingly classified either as: Done complete was scored (2), Incomplete done was scored (1) and Not done was scored (0). The total score of the students' practice was classified as

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follows: (Low practice level) where pediatric nursing students' score was <50%. (Moderate practice level) where pediatric nursing students' score ranged from 50- <75%. (High practice level) where pediatric nursing students' score was ≥75%.

Pilot Study:

A pilot study was conducted on 10% of the study subjects. A pilot study was carried out in order to test the feasibility of the tools used, clarity of questions and time needed to fill the study tools. Total time needed to complete both tools was about 50 minutes (15 minutes for the first tool, 35 minutes for the second one) for each pediatric nursing student. Based on the pilot study, no modifications were done.

The final version of the tools were prepared and used for each study subject. All pediatric nursing students were included in the study sample as no radical modification was required in the study tools.

Field Work:

The actual fieldwork started at the beginning of October 2023 to the end of December 2023. The researcher collected data by himself through meeting the pediatric nursing student and explaining the purpose of the study to them in the study settings. The purpose of the study explained simply to each study subject who agreed to participate in the study. The researcher was available all the time of the data collection in the previously mentioned study setting. Total time needed to complete the total tools were about 50 minutes (15 minutes for the first tool, 35 minutes for the second one) for each pediatric nursing student.

Ethical considerations:

The ethical research considerations in this study was included the following; prior study conduction, ethical approval obtained from the Scientific Research Ethical Committee of Faculty of Nursing, Helwan University. Moreover, the researcher clarified the aim of the study to each pediatric nursing student included in the study, confidentiality of the gathered data and results secured and students' oral and written informed consent was obtained and they were free to withdraw from the study at any time. Ethics, values, culture and beliefs respected.

Statistical Design:

The data obtained were synthesized, analyzed, and presented in the form of tables and figures using the Statistical Package for Social Sciences (SPSS) version 25. Qualitative variables were presented in the form of frequencies (n), and percentages (%); quantitative variables were presented in the form mean and standard deviation. The level of statistical significance (P–value) was established in 0.05. for comparison between means of two groups of parametric data of independent samples, (T- test) was used. Cronbach's alpha coefficient was used to determine the reliability of the tool. Test of significance was used to find out associations between study variables. Chi-square (x2) test of significance was used in order to compare proportions between two qualitative parameters. Correlation between variables was evaluated using Pearson correlation test (r).

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Results

Table (1): Number and percentage distribution of characteristics of the studied pediatric nursing students (n=100).

Characteristics	No.	%
Age (year)		
18 < 21 years	26	26.0
21 < 23 years	72	**72.0**
23- 25	2	2.0
Gender		
Female	63	**63.0**
Male	37	37.0
Residence		
Rural	48	48.0
Urban	52	**52.0**
Housing of students		
With family	75	**75.0**
University housing	17	17.0
Private housing	8	8.0
Previous training on simulation		
Yes	60	**60.0**
No	40	40.0

Table (1) shows that, less than three quarter (72.0%) of the studied subjects were aged from 21 < 23 years. As regards the gender, less than two third (63.0%) of the studied subjects were female, according to residence, more than half (52.0%) of the studied subjects were living in urban. In addition, more than two third (75.0%) of the studied subjects were housing with family. Also, less than two third (60.0%) of the studied subjects had previous training on simulation

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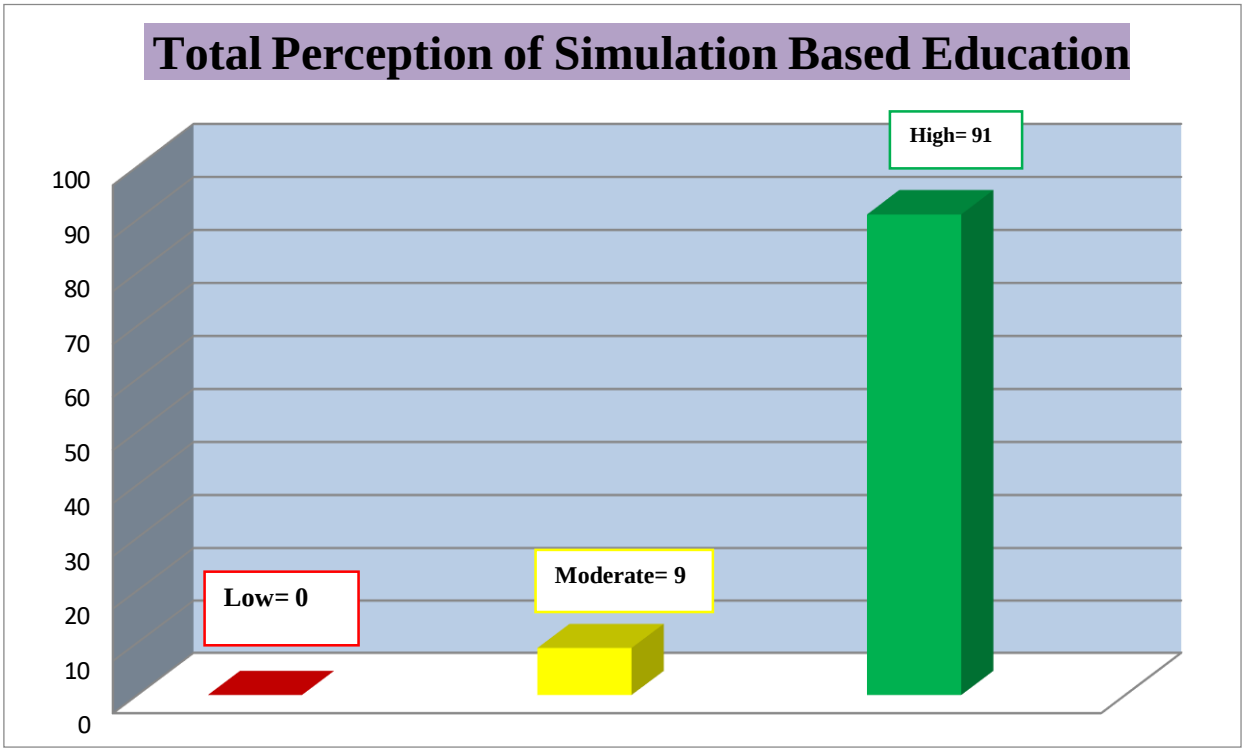

Figure (1): Pediatric nursing students' perception regarding simulation-based education among study subjects (n=100)

Figure (1) displays the nursing students' perception regarding simulation-based education among study subjects, the majority (91.0%) of them had high perception level regarding simulation- based education.

Table (2): Pediatric nursing students' total learning skills of pediatric nursing observational checklists among study subjects (n=100).

Procedures	Total Practice Level		
	Low	Moderate	High
Neonatal Resuscitation	0	2	98
Gavage Feeding	0	0	100
Oral Suction	0	2	98
Intramuscular Injection	0	0	100
Oral Temperature	0	0	100
Total practice level of pediatric nursing procedures	0	0,8	**99.2**

Table (2) displays pediatric nursing students' total learning skills of pediatric nursing observational checklists among study subjects, the majority (99.2%) of them had high practical level regarding pediatric nursing observational checklists.

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Table (3): Relation between characteristics of pediatric nursing students and perception toward simulation based education among study subjects (n=100).

Characteristics	M±SD	t	p
Age (year)			
18 < 21 years	170.30±7.12	17.06	**.000****
21 < 23 years	167.16±8.16	36.30	**.000****
Gender			
Female	168.33±8.61	24.52	**.000****
Male	167.10±6.71	31.60	**.000****
Residence			
Rural	167.10±7.84	29.87	**.000****
Urban	168.59±8.06	27.01	**.000****
Housing of students			
With family	168.80±8.13	31.54	**.000****
University housing	163.88±2.68	32.99	**.000****
Private housing	167.75±11.44	15.62	**.000****

Table (3) states that, there was a highly statistically significant differences between characteristics of pediatric nursing students and perception toward simulation based education among study subjects with P value (0.000).

Table (4): Relation between characteristics of pediatric nursing students and total pediatric nursing observational Checklists among study subjects (n=100).

Characteristics	M±SD	t	p
Age (year)			
18 < 21 years	159.30±6.46	6.35	**.000****
21 < 23 years	162.45±4.17	20.77	**.000****
Gender			
Female	162.36±4.41	9.51	**.000****
Male	160.70±5.97	18.44	**.000****
Residence			
Rural	161.52±5.97	12.06	**.000****
Urban	161.96±4.13	16.37	**.000****
Housing of students			
With family	161.14±5.63	15.13	**.000****
University housing	164.05±1.85	13.15	**.000****
Private housing	162.50±1.92	10.73	**.000****

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Table (4) indicates that, there was a highly statistically significant differences between characteristics of pediatric nursing students and total pediatric nursing observational checklists among study subjects with P value (0.000).

Table (5): Persons correlation coefficient between total pediatric nursing observational checklist procedures and total perception toward simulation based education among study subjects (n=100).

Items		Total Neonatal Resuscitation	Total Gavage Feeding	Total Oral Suction	Total Intramuscular Injection	Total Oral Temperature
Total Neonatal Resuscitation	r	1	.284	.137	.121	.196
	p		.004**	.175	.231	.051
Total Gavage Feeding	r	.284	1	.364	.313	.008
	p	.004**		.000**	.002**	.939
Total Oral Suction	r	.137	.364	1	.494	.363
	p	.175	.000**		.000**	.000**
Total Intramuscular Injection	r	.121	.313	.494	1	.316
	p	.231	.002**	.000**		.001**
Total Oral Temperature	r	.196	.008	.363	.316	1
	p	.051	.939	.000**	.001**	
Total Perception	r	.157	.248*	.078	.105	-.150
	p	**.119**	**.013**	**.442**	**.299**	**.136**

Table (5) reveals that, there was no statistically significant differences between total pediatric nursing observational checklist procedures and total perception toward simulation based education among study subjects.

Discussion

In relation to the characteristics of the studied students it was observed from table (1) that, less than three quarter of the studied group were aged from 21 < 23 years. This finding is consistent with the results of a study conducted by **Keshk et al.** [11] in Egypt, entitled (Preparation of Nursing Students for Clinical Clinical Practice: The Case of Nursing Education), which reported that the majority of nursing students were within the age range of 20 to 22 years, reflecting the typical age for students in the final years of their nursing education. However, this result contrasts with a study by **Malone et al.** [12] in the United States, entitled (Non-traditional Students in Nursing Programs: Age and Gender Differences in Career Pathways), which found that a significant proportion of nursing students were aged 24 to 26 years, a difference attributed to the prevalence of second-degree and non-traditional students in U.S. nursing programs.

From the researcher's point of view these variations underscore the influence of different educational systems and pathways on the demographic characteristics of nursing students.

As regards the gender distribution of the nursing students, it was observed that less than two-thirds of the studied group were female. This finding is consistent with the findings of **Ibrahim et al.** [13] in their study (Gender Distribution in Nursing Programs in Egypt: A Study on the Changing Demographics), reported that the majority of nursing students were female, reflecting the traditionally

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female-dominated nature of the nursing profession. However, the higher proportion of males in the control group contrasts with trends observed in many other regions.

For instance, **Rajacich et al.** [14] in their study (If they do call you a nurse, it is always a 'male nurse': experiences of men in the nursing profession), found that nursing programs in Canada are increasingly attracting male students, with males comprising around 40% of nursing cohorts, marking a significant shift from previous years. Similarly, **Al-Motairy et al.** [15] in their study (The changing face of nursing in Saudi Arabia: gender diversity in the profession), noted a growing male presence in nursing programs, suggesting that efforts to diversify the nursing workforce are beginning to show results. These findings indicate a global trend towards greater gender diversity in nursing, although cultural and societal norms continue to influence gender distribution differently in various regions.

According to the residence of the nursing students, it was observed that more than half of the studied group were living in urban areas. This finding is consistent with the results of **El-Sayed et al.** [16] who in their study (The Influence of Urbanization on Nursing Students' Educational Experiences in Egypt), reported that a significant portion of nursing students reside in urban areas, likely due to the concentration of educational institutions and healthcare facilities in cities. The study highlighted that urban students often have better access to resources and clinical training opportunities, which could explain their higher representation.

However, this finding contrasts with a study conducted by **Smith et al.** [17] in the United States, entitled (Rural vs. Urban: Disparities in Nursing Education and Workforce Distribution), which found that nursing students from rural areas made up a more substantial proportion of the student body. This difference may be attributed to targeted recruitment efforts in rural communities to address healthcare shortages.

Regarding the living arrangements of the nursing students, it was observed that more than two-thirds of the studied group were housing with their families. This finding is consistent with the results of a study by **Hassan et al.** [18] entitled (Living Arrangements and Academic Performance of Nursing Students in Egypt), which reported that a significant majority of nursing students preferred to live with their families during their studies. The study highlighted that living with family provides emotional and financial support, which can positively impact students' academic performance and overall well-being.

This finding also aligns with the results of a study conducted by **Kim et al.** [19] in South Korea, entitled (Impact of Family Support on Nursing Students' Academic Success and Stress Levels), which found that students who lived with their families experienced lower stress levels and higher academic achievement compared to those living alone or in dormitories.

Regarding training on simulation, it was observed that less than two-thirds of the studied subjects had received training on simulation. This finding is consistent with the study by **Lewis et al.** [20] entitled (The Impact of Simulation-Based Training on Nursing Students' Clinical Skills Development), which reported that approximately 60% of nursing students across various programs had access to simulation training. The study highlighted that while simulation is increasingly recognized as a vital component of nursing education, access to this training can still be limited by resources.

On the other hand, a study by **Zhang et al.** [21] in China, entitled (Evaluating the effectiveness of simulation-based education in nursing), indicated that a higher percentage (around 75%) of students had received simulation training, reflecting differences in educational approaches and the prioritization of simulation in different regions.

From the researcher’s point of view, this finding may be due to the increasing recognition of the importance of simulation- based training in nursing education.

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Regarding the total perception of nursing students towards simulation-based education, it was observed that the majority of the students in the study group achieving a high perception level regarding simulation- based education. This dramatic shift aligns with findings from a study by **Cant and Cooper,** [22] which found that students' perceptions of simulation improve markedly after structured and repeated exposure to simulation exercises, coupled with effective debriefing and reflection.

As regarding pediatric nursing students' total practice level of pediatric nursing observational checklist among study subjects, the majority of them had high practical level regarding pediatric nursing procedures as, neonatal resuscitation, gavage feeding, oral suction, intramuscular injection, and oral temperature. These results suggest that the simulation based education provided to the study subjects significantly enhanced their practice level of pediatric nursing procedures skills, as supported by research from **Anderson et al.** [23] in their study (The impact of simulation-based education on neonatal resuscitation skills in nursing students). The study found that students who received targeted simulation training were more likely to perform critical tasks accurately during neonatal resuscitation.

Additionally, a study by **Robinson et al.** [24] entitled (Enhancing practical skills in nursing students through targeted training programs), found that students who received specialized training in intramuscular injection techniques showed marked improvements in both accuracy and confidence compared to those who only received traditional classroom instruction.

Furthermore, a study by **Thompson et al.** [25] entitled (Routine clinical skills in nursing education: the impact of repeated practice), reported similar findings, where nursing students demonstrated consistent competence in performing routine procedures like oral temperature measurement across different educational settings. The study highlighted that such skills are often solidified early in the nursing program through repeated practice and are less likely to show significant differences between students who receive additional training and those who do not.

The current study results revealed that there were highly statistically significant differences between the characteristics of pediatric nursing students and their perception toward simulation-based education among the study subjects. From the researcher's point of view this finding suggests that various personal factors, such as age, gender, previous experience, and educational background, may influence how nursing students perceive and respond to simulation-based education.

This result is consistent with the study by **Al-Ghareeb and Cooper** [26] entitled (The influence of personal characteristics on nursing students' perceptions of simulation- based learning), which found that factors such as previous clinical experience and familiarity with simulation technology significantly impacted students' initial perceptions of SBE. Students with more experience or prior exposure to simulation tended to have more positive perceptions.

Furthermore, the significant differences indicate that the educational effectively addressed some of the initial disparities in perception, potentially by levelling the playing field for students with varying backgrounds. This aligns with findings from a study by **Liaw et al.** [27] entitled (Addressing variability in nursing students' perceptions of simulation-based education through tailored interventions), which reported that personalized simulation based education and targeted support can significantly improve perceptions of SBE, particularly among students who may initially struggle due to lack of experience or confidence.

The highly statistically significant differences suggest that simulation based education tailored to individual characteristics could be crucial in enhancing the overall effectiveness of simulation-based education. As highlighted by **Roh et al.** [28] in their study (Personal characteristics and their impact on nursing students' engagement in simulation-based learning) understanding and addressing the diverse

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needs of students can lead to more equitable and effective educational outcomes in simulation-based learning environments.

The study also revealed that there were highly statistically significant differences between the personal characteristics of pediatric nursing students and their performance on the total pediatric nursing observational checklist with (P = 0.000). From the researcher's point of view this finding suggests that various personal factors, such as age, gender, prior clinical experience, and educational background, may significantly influence how effectively nursing students perform essential pediatric nursing tasks.

The highly statistically significant differences observed in this study underscore the importance of considering personal characteristics when designing and implementing simulation based education. As noted by **Park et al.** [29] in their study (Personal characteristics as predictors of clinical competence in nursing education) understanding the diverse backgrounds and experiences of nursing students is essential for optimizing their clinical performance and ensuring equitable educational outcomes.

Conclusion

The majority of pediatric nursing students had high perception level regarding simulation-based education and all of them had high practical level regarding gavage feeding, oral suction, intramuscular injection, oral temperature, Furthermore, there was no statistically significant differences between total pediatric nursing observational checklist procedures and total perception toward simulation based education.

Recommendations

In the light of the study findings, the following recommendations are suggested: Encourage pediatric nursing students to actively engage in simulation based education sessions to enhance their practical skills and confidence in performing pediatric nursing procedures. Implement regular training sessions for faculty members on the latest simulation based education techniques and technologies. Conduct longitudinal research to evaluate the long-term effects of simulation based education on the clinical performance and patient care outcomes of pediatric nursing students after graduation.

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