Determinants of Nursing Students' Performance in Clinical Skills Laboratories

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Abstract

Background: Clinical skills laboratories play a crucial role in equipping nursing students with the practical competencies necessary for patient care. Objectives: This study aimed to investigate the level of first-year nursing students' clinical performance in clinical skills laboratories and explore the related factors. **Method:** A descriptive, cross-sectional design was employed in five skill labs at the Faculty of Nursing, Mansoura University. Convenience sampling composed of 250 students. Data were collected using the level of skills performance observational checklist and factors affecting Skill Lab Performance questionnaires during the second semester from February 2024 until May 2024. **Results**: The study revealed that most of the students were clinically competent, their scores above a satisfactory level (75%). The linear regression showed that high clinical performance of students was associated with student-related factors that included effective communication with teammates, eagerness to learn, and unauthorized absence from clinical. The assessment and clinical instructor-related factors, including encouraging students, spending enough time with students, skill lab is prepared, assessing methods that focus on the learning domain, introducing students to the assessment, and orienting students with assessment methods, with a significant P value at <0.005. **Conclusion**: In order to enhance the learning environment and optimize learn outcomes, the mentioned factors should be addressed by instructors.

Keywords: Clinical Performance, Influencing factors, Clinical Skill laboratories, Nursing students

Introduction

Clinical experiences are essential for nursing students to bridge the gap between theory and practice. The success of nursing education heavily relies on these practical experiences. The initial clinical encounter is particularly significant as it often solidifies a student's commitment to the nursing profession (**Yezengaw, T. et al., 2024**). However, this crucial first experience is frequently accompanied by high levels of stress and anxiety for students, which may be linked to a lack of interest or motivation in some cases (**Belay et al., 2024**). Nursing students often experience anxiety stemming from their perceived lack of competence and knowledge to provide quality patient care. This anxiety frequently leads to student dissatisfaction with their clinical education programs (**Seshabela & Shakwane, 2024**).

Nursing practice heavily relies on clinical laboratories that provide a safe and controlled environment for students before entering real-world clinical settings. These labs are equipped with simulation mannequins, equipment, and supplies to mimic real-life patient care scenarios. Clinical skills laboratories provide valuable space for nursing students to apply theoretical knowledge and develop their nursing skills (**Kurt & Eskimez, 2022; Nakayoshi, 2021**).

Effective clinical learning equips nursing students with clinical competency – the ability to successfully apply their professional knowledge, attitudes, and skills. This competency encompasses essential skills crucial for job performance (**Msosa et al., 2021**). Moreover, clinical learning experiences are integral to developing essential skills that empower nursing students to acquire clinical competency, develop independent learning abilities, make informed decisions, and demonstrate ethical commitment to patient care (**Fooladi et al., 2022**). Clinical competency involves the seamless integration of cognitive, emotional, and physical skills within the healthcare setting. It's a fundamental requirement for nurses to enhance the quality of healthcare services (**Daniels & Heradien, 2023**).

Several factors can affect the performance of nursing students. These factors include quality of instruction, availability of resources, clinical exposure, supportive learning environment, curriculum design, time and practice opportunities, individual motivation, and assessment methods. Other factors beyond the lab environment, such as clinical rotations, classroom learning, and personal factors, also influence the overall competency of nursing students (**Ahmedin et al., 2024; Munangatire et al., 2024**).

Understanding the factors that influence their performance can help educators and institutions enhance the learning environment and optimize student outcomes. Therefore, this study aimed to assess the level of nursing skills performance and its related factors among first-year nursing students in the clinical skills laboratories (**Sharda & Nowell, 2025**). Many studies on nursing performance training methods have focused on basic nursing education. The performance of nursing students in the lab is crucial for their future clinical practice (**Ayenew et al., 2024**).

Method

Aim of the Study

This study aims to assess the level of nursing skills performance and its related factors among first-year nursing students.

Research Questions

To address the objectives of this study, the following two research questions were developed:

Significance of the Study

This study holds significant implications for improving nursing education and patient care. By identifying the key factors that influence nursing students' performance in clinical skills laboratories, educators can implement targeted interventions to enhance student learning and competence (**Gürdil et al., 2022l; Gülnar et al., 2024**). These interventions could include optimizing laboratory resources, refining teaching methodologies, and addressing student support needs (**Stenberg et al., 2022**).

The findings of this study can also inform the development of more effective curricula and assessment strategies in nursing programs. By understanding the challenges and facilitators of skill acquisition, educators can create a more supportive and conducive learning environment for nursing students, ultimately leading to the development of a more competent and confident nursing workforce (**Ti-enkawol et al., 2024**).

Q1: What is the level of nursing skills performance among first-year nursing students?

Q2: What are the factors affecting nursing skills performance among first-year nursing students?

Study design:

This research utilized a descriptive cross-sectional design. It is used to monitor, annotate, and

document the occurrence of behavior of aspects in a particular situation.

This research design is concerned with describing generalized relationships between distinct elements and conditions. It focuses on existing differences rather than change following an intervention, and the group is selected based on existing differences rather than random allocation (**Hunziker & Blankenagel, 2024**).

Setting:

This study was carried out at the Faculty of Nursing, Mansoura University. It has five skill labs equipped with almost all the needed supplies for clinical training. The capacity of students in each skill lab varies from 25 to 35 students.

Participants

This study involved a convenient sample of 250 students in the first-year Bachelor of Nursing (second semester), registered at the Fundamental of Nursing Practice course and health assessment course for the first time at the Faculty of Nursing, Mansoura University, Egypt, and willing to participate in the study. Those who withdrew or dropped out of the previously mentioned courses during the data collection period were excluded from the study.

Sample Size Calculation

The minimum sample size was calculated using the Steven K. Thompson equation to estimate the appropriate sample size for this study (**Thompson & John, 2012**). According to the total number of students at the first is 450. As the confidence level is 95%, the error proportion (0.05), and the probability (50%), then adding 20% for better data and follow-up drop, n= sample size required, N= Total society size, d = Percent of error size Z= This depends on the level of significance, for 0.95 this is 1.96. Therefore, our sample size is 250 participants based on the calculation.

Data Collections Tools

Two tools were used to gather data and developed based on the previous works of literature (**Yezengaw et al., 2024; Hailu et al., 2021; Tesfaye et al., 2020; Potter et al., 2021).**

Tool I: Skills Performance of Nursing Students observational checklist

This tool consists of two parts as follows:

Part (1): Nursing Students Demographic Data Sheet

This section was utilized to gather information about students' age, gender, and residence.

Part (2): Skills performance observational checklist

It included items such as students can perform nursing procedures independently, prepare the needed equipment, communicate effectively with patients, assess patients' needs accurately, apply aseptic technique, and collaborate effectively with colleagues (**Lynn, 2018; Arnold & Boggs, 2019; Jarvis, 2023; Sullivan, & Decker, 1998).**

Scoring system: Each item of checklist was scored on a Likert scale with (1) Poor performance, requiring substantial improvement, (2) Fair performance with significant areas needing development, (3) Satisfactory performance with some areas requiring improvement, (4) Generally good performance with minor areas for refinement, (5) Consistently excellent performance. The overall performance was scored as competent (total checklist score ≥ 75) or incompetent (total checklist score ≤ 75).

Tool II: Factors affecting Skill Lab Performance questionnaire

It includes 30 questions in four sub-scale, which are clinical instructor-related questions (10 items), assessment methods-related questions

(5items), skill lab environment-related questions (8 items), and students-related questions (7 items) (**Yezengaw et al., 2024; Getie et al., 2021; Hailu et al., 2021).**

Scoring system: Each item was scored on a Likert scale with (1) for disagree, (2) for neutral and (3) for agree, total score ranging from 30 to 90.

Validity& Reliability of the Tools

Content validity was assessed by a panel of five experts from the Critical Care and Emergency Nursing and Medical-Surgical Nursing Departments at the Faculty of Nursing, Mansoura University. The experts evaluated the instrument for content relevance, clarity of wording, length, format, and overall presentation. Necessary modifications were made based on their feedback Internal consistency reliability using Cronbach's Alpha was used with values of 0.885 for tool (1) and 0.787 for tool (2).

Ethical Considerations

The researchers obtained approval from the Research Ethical Committee at the Faculty of Nursing Mansoura University, No.IRB0697. We obtained written informed consent from all respondents after explaining the study's goals. Respondents were informed of their right to withdraw from the study at any time. No incentives were offered for participation. We ensured participant anonymity and the confidentiality of their data

Procedure

Data was collected through three consecutive months during the second semester from the beginning of February 2024 until the end of May, 2024. Participants who agreed to participate in the study were interviewed individually for 10 minutes. At the outset of each interview, the study's purpose, nature, and tools were explained to each participant. Consequently, written consent was obtained from all participants who met the inclusion criteria and agreed to participate in the current.

The data were collected by two clinical instructors in critical care nursing department and supervised by researchers. Before collecting any data, clinical instructors received comprehensive training. This training covered the study's objectives, data collection methods, and the specific instruments used. This training ensured that the instructors were thoroughly familiar with each question, minimizing any potential bias during the data collection process. Researchers closely monitored the data collection process throughout. They regularly checked to ensure that all necessary information was collected for each participant.

Data analysis

The current study utilized Statistical Packet for the Social Sciences version 25 (SPSS-v25). Descriptive statistics such as frequency and percentage was utilized. and Logistic linear regression analysis was used to identify determinants affecting performance. Statistical significance was considered at a P-value of 0.05, and high statistical significance was considered at a P-value of 0.00.

Results

Figure (1) displays that (72% of participants were in the age group 18-≤20, 66.8% female and 71.6% live in rural areas. Table (1) shows that (66.4%, 51.6%, 52.4%, 51.6% and 73.6%) of participants were agree about skill lab is conducive, suitable for students, had sufficient ventilation and light, prepared with needed equipment and there were enough skills practicing programs respectively. While (67.6%, 49.6% and 48.8%) were neutral about skill lab meet the

objectives of clinical practice, has sufficient and effective learning methods and prepared with needed audiovisual material separately.

Table (2) represents that (73.2%, 61.2%,72.8%, 56.8% and 77.6%) of participants were agree about they were introduced to assessment techniques, method of assessment improves their clinical practice, continuous assessment is used, assessment focus on the learning domain and Checklists were used to evaluate student performance independently. Table (3) displays that (70.4%) were agree about Maintaining positive relationships with team members, (62.8%) were agree about they were punctual during my clinical practice, while (72.8%) were disagree about unauthorized absence from clinical practice, and (40%) were disagree about their parents' economic status affected clinical practice. Regarding effective communication practices with teammates, students were eager to learn and feeling secure throughout the demonstration process (52.4%, 59.6% and 51.2%) were neutral in that order.

Table (4) displays that (50%, 52.8, 46.4% and 71.2%) of participants were agree about clinical instructors orient them about purpose of clinical practice, have good clinical skills, allow students to perform tasks and encourage students during practicing procedure in that order. While (38%,49.2%, 61.2%, 51.6% and 50.4%) were neutral about providing a logbook, assessment methods orientation, spending enough time in the skill lab and providing constructive feedback by clinical instructors, also (63.2%) disagreed about clinical instructors using different learning methods. As regards level of performance figure (2) denotes that (73.2%) were competent and (26.8%) were incompetent.

Linear regression on factors affecting students' performance as presented in table (5) affirms that the following factors; skill lab is prepared with needed equipment, students are introduced to assessment techniques, assessment methods focus on the learning domain, effective communication with teammates, unauthorized absence from clinical practice, Orientation about assessment methods and clinical instructor encourage students were found to be associated with clinical practice performance with P value less than 0.05. Also, student was eager to learn and clinical instructor spent enough time with student were found to be associated with clinical practice performance with P value less than 0.001.

Table 1: Frequency and Percentage Distribution of skill lab related factors among study participants (n= 250).

No.	Items	Disagree		Neutral		Agree	
		No.	%	No.	%	No.	%
skill lab related factors							
	Conducive to clinical practice.	24	9.6	60	24	166	**66.4**
	Suitable for several students	11	4.4	110	43.8	129	**51.6**
	Sufficient artificial ventilation and light	11	4.4	108	43.2	131	**52.4**
	Meet the objectives of clinical practice	21	8.4	169	**67.6**	60	24
	Prepared with needed equipment and supplies	6	2.4	115	46	129	**51.6**
	Sufficient and effective learning methods	11	4.4	124	**49.6**	115	46
	Prepared with needed audiovisual material	15	6	122	**48.8**	113	45.2
	Enough skills practicing programs per semester	62	24.8	4	1.6	184	**73.6**

Table 2. Frequency and Percentage Distribution of assessment method related factors among study participants (n= 250).

No.	Items	Disagree		Neutral		Agree	
		No.	%	No.	%	No.	%
Assessment method related factors							
	Students are introduced to assessment techniques	-	-	66	26.4	184	73.6
	The method of assessment improves clinical practice.	6	2.4	91	36.4	153	61.2
	Continuous assessment techniques are used	-	-	68	27.2	182	72.8
	Methods of assessment focus on the learning domain.	8	3.2	100	40	142	56.8
	Checklists are used to evaluate student performance.	4	1.6	52	20.8	194	77.6

Table 3: Frequency and Percentage Distribution of Student related factors among study participants (n= 250).

No	Items	Disagree		Neutral		Agree	
		No.	%	No.	%	No.	%
Students related factors							
	Maintaining positive relationships with team members	11	4.4	63	25.2	176	**70.4**
	Having effective communication practices with teammates	50	20	131	**52.4**	69	27.6
	I was eager to learn and driven.	5	2	149	**59.6**	96	38.4
	I felt secure throughout the demonstration process.	26	10.4	128	**51.2**	96	38.4
	Unauthorized absence from clinical practice	182	**72.8**	5	2	63	25.2
	I was punctual during my clinical practice	9	3.6	84	33.6	157	**62.8**
	My parents' economic status affected my clinical practice	100	**40**	78	31.2	72	28.8

Table 4: Frequency and Percentage Distribution of Clinical Teaching Instructor related factor among study participants (n= 250).

No.	Items	Disagree		Neutral		Agree	
		No.	%	No.	%	No.	%
Clinical Instructors related factor							
	Provide students with a logbook	76	30.4	95	**38**	79	31.6
	Orient students about purpose of clinical practice.	29	11.6	96	38.4	125	**50**
	Orient students about assessment methods	10	4	123	**49.2**	117	46.8
	Spent enough time in the skill lab	34	13.6	153	**61.2**	63	25.2
	Use different learning methods	158	**63.2**	86	34.4	6	2.4
	Demonstrate good clinical skills	18	7.2	100	40	132	**52.8**
	Show good interpersonal skills	13	5.2	129	**51.6**	108	43.2
	Provides constructive feedback	44	17.6	126	**50.4**	80	32
	Allow students to perform tasks during clinical practice	20	8	114	45.6	116	**46.4**
1	Encourage students during practicing procedure	16	6.7	56	22.4	178	**71.2**

Table 5: Linear regression on factors affecting students' performance (n=250)

'Factors affecting students performance	Unstandardized Coefficients		Standardized Coefficients	t	.Sig
	B	Std. Error	Beta		
(Constant)	1.141	0.557		2.047	*0.042
Skill lab is prepared with needed equipment	0.199	0.078	0.224	2.551	*0.011
Students are introduced to assessment techniques	0.172	0.081	0.171	2.126	*0.035
assessment methods focus on the learning domain	0.192	0.091	0.215	s2.102	*0.037
Effective communication with teammates	0.125	0.059	0.193	2.121	*0.035
Student was eager to learn and driven	0.297	0.078	0.349	3.829	**0.001>
Unauthorized absence from clinical practice	0.123	0.039	241.	3.181	*0.002
Clinical instructor orient students about assessment methods	0.127	0.057	0.163	2.239	*0.026
Clinical instructor spent enough time with students	0.368	0.089	0.508	4.131	**0.001>
Clinical instructor encourages students	0.126	0.049	0.176	2.557	*0.011

Discussion

This study assessed level of skills performance among first year nursing students and associated factors/determinants, the results revealed there about three quarter of the participants were competent in their skills performance. This result was similar to the finding of a study done at Bahir Dar University College of medicine and health science students 65% (**Sharda & Nowell,**

2025). While it was higher than findings of studies done at Mettu University 24.5% (**Amsalu et al., 2020**) and Dire Dawa Health Sciences Colleges 19.2% (**Tesfaye et al., 2020**). This discrepancy might be due to the difference in study setting and characteristics of study participants.

The results also clarified that the majority of participants fall within the 18-20 age group, female and reside in rural areas. These findings are consistent with (**Nakayoshi et al., 2021**). This study identified several factors influencing student performance in clinical practice as follow: skill lab is prepared with needed equipment and students are introduced to assessment techniques. These finding agrees with (**Nakayoshi et al., 2021; Msosa et al., 2021).**

Assessment methods focus on the learning domain was one of the affecting factors of clinical performance. This finding is supported by a study conducted in public universities and colleges (**Ridwan et al., 2019**). Student clinical performance may be significantly enhanced when teaching and learning styles are aligned with individual preferences. This personalized approach fosters the development of crucial skills like critical thinking, problem-solving, and the ability to apply knowledge in real-world scenarios

Clinical instructor-related factors including encourage students, spend enough time with students and orient students about assessment methods were significantly associated with the students' clinical performance. In this regard, students in clinical settings benefit significantly from encouragement provided by their instructors. Study participants highlighted the crucial role instructors play in facilitating communication between students, staff and various departments. This finding aligns with the research of (**Getie et al., 2021**).

Students who received sufficient guidance from their instructors during clinical rotations demonstrated improved clinical skills laboratories proficiency. This finding aligns with the research of (**Tsige et al., 2019**) which emphasized the importance of regular instructor interaction for effective skill development. Additionally, the study found that providing students with clear orientation about assessment methods positively impacted their performance. This finding is consistent with the research of (**Tesfaye et al., 2020**). It is possible that this positive impact stems from the presence of orientation can lead the students to focus on their clinical performance.

Students-related factors including effective communication with teammates, eager to learn and unauthorized absence from clinical practice were significantly associated with the students' clinical performance. This finding is highly similar to that of a prior study conducted by (**Relloso et al., 2021; Hailu et al., 2021**). This may be due to the reason that, the presence of effective communication among students and their eager and commitment helps the students to observe, assist and conduct different tasks, which helps them to improve their performance. In this study, comparison and discussion were difficult due to the shortage of similar studies carried out in Egypt.

Limitations

Although this study provides valuable insights into nursing students' performance and the factors affecting it, its findings should be interpreted in light of a number of limitations. These limitations include the cross-sectional study design; this research cannot definitively establish cause-and-effect relationships between variables. Furthermore, the use of convenience sampling, a non-probability method,

limits the generalization of the findings to other student populations

Implications for Nursing Education

This study suggests several key improvements for nursing education. Firstly, well-equipped labs with sufficient resources are crucial for effective learning. Secondly, effective teaching methods, including hands-on training and simulations, are vital. Thirdly, a supportive learning environment with clear expectations and constructive feedback is essential. Finally, addressing individual student needs through personalized instruction can significantly enhance student performance. By implementing these strategies, nursing education can better prepare students for their future careers.

Conclusion and Recommendations

The results revealed there about three quarter of the participants were competent in their skills performance, their score above 75%. The factors that significantly affect students' performance were skill lab is prepared with needed equipment, students are introduced to assessment techniques, assessment methods focus on the learning domain, effective communication with teammates, unauthorized absence from clinical practice, orientation about assessment methods, clinical instructor encourage students, student was eager to learn and clinical instructor spent enough time with student. In order to enhance learning environment and optimize learn outcome, mentioned factors should be addressed by instructors. Researcher recommend that future researchers consider employing qualitative research methodologies to gain a deeper and more comprehensive analysis.

Declarations

Ethics approval and consent to participate

The researchers obtained approval from the Research Ethical Committee at the Faculty of Nursing, x University, No. IRB0697. The names of participants were hidden to ensure anonymity and confidentiality. Before conducting the study, informed consent was obtained from each patient after explaining the study's goals, and they were informed that the research was voluntary, confidential, and purely for academic purposes. Our study rigorously adheres to the ethical principles established by the Declaration of Helsinki, ensuring compliance with its standards throughout the research process.

Author Contributions

All authors contributed substantially to all stages of this research, from conceptualization and design to data collection, analysis, and manuscript preparation. They have all reviewed and approved the final manuscript and are accountable for all aspects of the work.

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