

Perceived Barriers among Undergraduate Nursing Students toward Performing Physical Assessment of Critical Care Patients

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Abstract

Background: Physical evaluation is a crucial nursing instrument and fundamental to deliver good nursing care and is considered nursing practice's central component. **Aim:** We aimed to determine the perceived barriers among undergraduate nursing students toward performing physical assessment of critical care patients. **Design:** The descriptive design was utilized in this study. **Setting(s):** This study was performed at the Faculty of Nursing at Matrouh University, Egypt. **Participants:** A convenience sample of 179 undergraduate nursing students were included throughout the first semester. **Tool of data collection:** Three tools will be employed to obtain data for this study. **Tool one:** is critical nurse's student assessment; **tool two** is barriers to nurses' students using physical assessment scale; and **tool three** is assessing physical examination knowledge and practice. **Results:** Different factors influenced students' experiences, all of which combined to make it difficult for them to conduct well on physical assessments. The mean overall physical assessment barriers among the studied students were 115.23 ± 11.15 , with a percent score of 57.31 ± 7.9 . The mean of physical examination skills inventory (PESI) score was 68.97 ± 12.36 , with a percent score of 81.62 ± 20.60 and a mean score of 3.45 ± 0.62 . **Conclusions:** Being male, previous experience ICUs working and received previous physical assessment training, having a higher academic level, and a higher grades were all factors that were strongly linked with decrease perceived barriers among nurses' students' education and experience of physical assessment. Perceived barriers to physical assessment were positively correlated with age, academic level, grades level, and prior ICU work. Constructing competency-based education is considered a mean of overcoming physical assessment challenges. **Recommendations:** Training on performing physical assessment and educational support services and awareness are recommended.

Keywords: Nursing students; Skills; Health assessment; Barriers; Nursing competency

Introduction

Crucial care nurses must acquire advanced practical skills, competencies, and capacities to provide safe and high-quality care for their ICU patients (Liyew et al., 2021). Nursing professionalism is dependent on the preparation of nursing students who have recently graduated for a necessary work environment and care practices that take shape throughout nursing education (Egilsdottir et al., 2019). Healthcare nursing services are in high demand in healthcare societies. There is a continuous dynamic change in the work environment, such as the new technological health system or disease revolution. As a result, nursing students' skills must meet the requirement for constant improvement that future health professionals require (Alamri & Almazan, 2018). A daily physical assessment by a well-trained nurse is intended to observe a patient's health issue and assess the quality of nursing care for each patient (Liyew et al., 2021).

Throughout the twentieth century, physical assessment is an important part of the nursing profession. It includes the competency level at which nursing students transfer their knowledge and skills from the classroom to clinical conditions, which are important in providing

high-quality care to patients (Alamri & Almazan, 2018). It is an essential nursing instrument and fundamental to deliver good nursing care (Doğdu et al., 2021). Physical assessment is needed to enhance health care quality and establish patient care plans (Liyew et al., 2021).

Competence is a requirement for the learning journey to enable students to accomplish tasks and be ready for the real clinical situation after being evaluated in relevant situations for their knowledge, attitude, and skills (Albougami, 2020). Competence in physical assessment is essential for providing competent nursing care. Evaluating a student's physical assessment expertise provides important feedback for their achievement and allows them to take corrective action to improve. The instructors can take corrective action to identify obstacles and devise action plans to overcome them. Developing good practice environments, improvement of curriculum and non-technical skills, training and simulations, mentoring, and safety emphasis can help improve their educational experiences (Albougami, 2020; Doğdu et al., 2021).

Within the scope of nursing practice, health and physical assessments are core competencies (Egilsdottir et al., 2019). Physical examination skills were an essential component of nursing professionalization within

the last decade of the twentieth century. Physical assessment is an organized, systemic process. Nurses obtain subjective and objective data on patients' clinical health status and comprehensively investigate bodily systems using inspection, percussion, auscultation, and palpation skills (Doğdu et al., 2021; Liyew et al., 2021). Nurses must learn to practice safely. Physical assessment skills are critical for early detection of a massive issue, proper management, and mitigation of negative consequences (Albougami, 2020; Liyew et al., 2021). Patients also feel cared and valued during physical examinations because nurses pay for people needs and worries Korkmaz. Nursing students showed a moderate rate of moral sensitivity and ethical awareness (Alnajjar & Abou Hashish, 2021).

Nurses need to integrate different knowledge from human bioscience to be able to interpret the collected data and to be prepared for a demanding work environment. Using high-fidelity mannequins and a simulation environment can reduce the student's stress in the real situation (Lewis et al., 2016; Egilsdottir et al., 2019). Nursing instructors are important gatekeepers for overcoming barriers to conduct a physical examination; furthermore, close collaboration between the university and clinical practice is required (Egilsdottir et al., 2019). Because of the crowded nursing curriculum, some clinical instructors instruct very few physical examination skills than others (Alamri & Almazan, 2018).

The novel nurses' students have no previous experience in how to assess critically ill patients who are attached to invasive devices and act unethically can jeopardize their education and training, exacerbating unprofessional behavior, poor nursing care quality, carelessness, untrustworthy patient associations, and putting patients at risk (Alnajjar & Abou Hashish, 2021). To be competent in physical assessment, it is necessary to overcome barriers that face nursing students in the clinical environment and practice. At the beginning of the curriculum development, nurses' educators need to pay attention to the noticed barriers to physical assessment skills. Several factors can affect the students' nurse's ability, such as individual motivational, professional, environmental, educational, cultural, communication factors, patients, and their cultures. Certainly, novel nurses themselves express their needs for improved physical assessment skills and be trained in these areas (Albougami, 2020).

Several studies Alamri and Almazan (2018), Albougami (2020), Egilsdottir et al. (2019) and Maniago et al. (2021) discuss perceived obstacles to the daily physical assessment of student nurses, such as concerns about the overall influence on the patient's results, a loss of self-confidence in conducting physical assessments, a sense of being inadequately trained to conduct physical assessments effectively, and a role models' absence within the nursing profession, which are just some of the issues that nurses face. Lowering physical assessment obstacles, constant physical

assessment training, and improving nursing students' planning quality could boost self-esteem and lead to more accurate patient health status assessments (Maniago et al., 2021). Understanding the obstacles to physical assessment among nursing students is necessary for developing quality patient care in nursing practice (Alamri & Almazan, 2018).

Nurses should learn advanced skills to diagnose and treat patients and detect deterioration in their conditions (Liyew et al., 2021). One step for preparing undergraduate students is performing a physical assessment, and a key learning results in programs of nurse education (Albougami, 2020). The integrated model would act as a link between theory and practice, enhancing student nurses' professional ability to accommodate as safe and effective future nurse practitioners (Jefferies et al., 2018). Therefore, the current study assesses barriers to implementing physical and respiratory assessments for critical care patients among undergraduate nursing students.

Significance of the study:

Critically nurses students need to be competency in physical assessment for their critically ill patients. Identifying needs for those students and perceived barrier toward performing physical assessment of critical care patients. Improve physical assessment skills and be trained in these areas has a significant effect on the nurses' academic achievement.

Method and materials

Research design: The descriptive design was utilized in this study.

Research aim: To determine the perceived barriers among undergraduate nursing students toward performing the physical assessment of critical care patients in the critical care setting.

Research questions:

What are perceived barriers among undergraduate nursing students toward performing physical assessment of critical care patients?

Settings: This study was performed at the Faculty of Nursing, Matrouh University, Egypt.

Subjects: A convenience sample of 179 undergraduate nursing students was included in the course of the academic year 2021-2022 throughout the first semester.

Tool: Three tools will be utilized to obtain data for this study.

Tool one: Critical nurses student assessment was developed by the researchers to assess undergraduate

students' sociodemographic characteristics (age, sex, (GPA), grade, working experience, training, and clinical units they could utilize their physical examination); working in a private hospital during university years, and years of experience in ICU.

Tool two: Barriers to nurses' students using the physical assessment scale (BNUPAS) was adopted by **Douglas et al. (2014), and Dođdu et al. (2021)** to determine the perceived barriers that hinder nurses' students from utilizing their physical assessment skills. Using Cronbach's alpha (α), this scale had a reliability of 0.80.20. It included 30 items categorized into six subscales: reliance on others and technology, time interruptions and constraints, ward culture, lack of confidence, influence on patient care, and specialty area. The responses are graded on a 5-point Likert scale, with 1 being strongly disagreed, 2 being disagreed, 3 being neither agree nor disagree, 4 agreeing, and 5 strongly agree. The overall score is the sum of the average BNUPAS subscale scores.

Tool three: Assessment of physical examination knowledge and practice. It consisted of two parts: Part one: physical assessment knowledge questionnaires were utilized to determine students' knowledge of physical assessment (MCQ). It comprised 30 questions covering all physical examination items (central nervous system, respiratory, cardiovascular, and gastrointestinal). Google form was employed to collect and send to the nurses' students throughout our Microsoft team. Part two was physical examination skills inventory (PESI) was adopted from (**Gharaibeh et al., 2019**). PESI was created using the physical examination content from the Faculty of nursing's "critical nursing I" courses. There are 32 items in the inventory covering general physical examination, cardiovascular, neurological, abdominal, and physical assessment skills. Every item is addressed. Alikert scale for four self reported item was used "I have never used it," "I know how to handle it but have never used it," "I have used it once or twice in my clinical practice," and "I use it 2-5 times a day." Total score was from 1 to 128. Five students participated in a pilot study to know the items' intelligibility and significance. The inventory was updated as a result of the findings.

Field Work:

After reviewing aliterature review and designed the tools the content validity was assessed from expertise. Apilot study was done on 18 undergraduate nursing students. The reliability of the tools was done and accepted. The actual field work started from the beginning of academic semester from September 2021 to the end of it January 2021.

Ethical considerations

- Approval from the Faculty of Nursing research committee and research ethics committee will be obtained.

- Written informed consent will be gathered from the dean of the Faculty of Nursing. It will include the aim of the study, potential benefits, risks, discomforts of participation, and the right to refuse to enroll in the study will be emphasized to subjects.

- Participants can drop out of the study at any time without affecting their ability to learn.

- Prior to filling out the questionnaire, the importance of the research will be described verbally to the participants and written informed consent will be acquired.

- The questionnaire did not include the participants' names to protect their privacy. The questionnaire was distributed at random among the participants, and the researchers will be on hand to answer any questions that may arise.

Results

Table 1 shows the frequency demographic distribution data of the studied students. About 68.7% of them were more than 21 years old, and 65.9 % were female. About 58.1 of them are in the third academic level. About 60.3% of them had no previous experience working in ICU, while 39.7% had previous ICU experience, and 88.7% had less than five years of experience. About 79.3% of them had previous experience learning.

Table 2 illustrates the perceived barriers of the studied students using nurses' utilization of physical assessment scale (BNUPAS) scores. The mean of overall physical assessment barriers among the studied students is 115.23 ± 11.15 , with a percent score of 57.31 ± 7.9 . The mean of subscale 1 (reliance on others and technology) is 25.61 ± 5.46 , with a percent score of 46.14 ± 15.18 ; subscale 2 mean (lack of time and interpretations) is 16.53 ± 3.28 , with a percent score of 57.65 ± 16.39 . Similarly, the mean of subscale 3 (the ward culture) is 16.05 ± 2.88 , with a percent score of 55.25 ± 14.38 . The mean of subscale 4 (lack of confidence) is 13.51 ± 2.20 , with a percent score of 59.43 ± 13.76 . The mean of subscale 5 (lack of nursing role models) was 14.68 ± 2.24 , with a percent score of 66.76 ± 13.98 . The mean of subscale 6 (lack of impact on patient care) is 15.88 ± 2.56 , with a percent score of 74.23 ± 16.01 , and the mean of subscale 7 (specialty area) is 12.98 ± 2.21 , with a percent score of 56.11 ± 13.83 .

Table 3 presents physical examination skills using physical assessment skills inventory (PESI) among the studied students. It was shown that the mean of physical examination skills inventory (PESI) score is 68.97 ± 12.36 , with a percent score of 81.62 ± 20.60 and a mean score of 3.45 ± 0.62 . Table 4 presents physical examination knowledge among the studied students. It was found that the mean of physical examination knowledge score is 39.39 ± 7.01 , with a percent score of

75.75 ± 13.48 and a mean score of 0.76 ± 0.13. Table 5 discusses the correlation between the perceived barrier related to their knowledge and practice. There is a significance statistically correlation between the overall physical assessment barriers and the studied student knowledge ($r = -0.214$, $p = 0.004$) and practice ($r = -0.214$, $p = 0.153$). Concerning the studied nurse's knowledge, there is a significance relation between the knowledge and subscale 2 (lack of interruptions and time), 4 (confidence lack), 6 (lack of influence on patient care) respectively ($r = -0.154$, $p = 0.040$, $r = -0.172$, $p = 0.021$, $r = -0.201$, $p = 0.007$). Regarding the studied nurses' practice, there is a significant relationship between the practice and subscales 1 (reliance on others and technology), and 3 (The ward culture), respectively ($r = -0.167$, $p = 0.025$, $r = -0.155$, $p = 0.038$). Table 6 illustrates the relationship between demographic characteristics and the studied student's physical assessment knowledge, practice, and perceived

barriers. There is a statistically significant difference between the studied students' perceived barriers of physical assessment and their age ($p = 0.013$), their academic level ($p = 0.004$), GPA grade ($p = 0.004$), and their working ICU experience ($p = 0.001$). Regarding their physical examination knowledge, there is a statistically significant variation between the studied students' perceived barriers of physical assessment and their age ($p = 0.011$), sex ($p = 0.023$), their academic level ($p < 0.001$), GPA grade ($p < 0.001$), their working ICU experience ($p < 0.001$), and their previous training ($p = 0.007$). Concerning their physical examination practice, there is a statistically significant difference between the studied students' perceived barriers of physical assessment and their age ($p = 0.021$), their academic level ($p = 0.025$), GPA grade ($p < 0.001$), and their working ICU experience ($p = 0.004$).

Table (1): Frequency distribution of the studied nurses' students in relation to their demographic data (n = 179):

Demographic data		No.	%
Age			
<21		56	31.3
≥21		123	68.7
Min. – Max.		19.0 – 24.0	
Mean ± SD.		21.13 ± 1.12	
Median		21.0	
Sex			
Male		61	34.1
Female		118	65.9
Academic level			
Second level		36	20.1
Third level		104	58.1
Fourth level		39	21.8
GBA			
A–		3	1.7
B+		31	17.3
B		57	31.8
B–		19	10.6
C+		43	24.0
C		21	11.7
C–		3	1.7
D+		2	1.1
Working experience at ICU			
Yes		71	39.7
No		108	60.3
Total Years of Experience			
<5		63	88.7
5–		8	11.3
Min. – Max.		0.25 – 9.0	
Mean ± SD.		1.93 ± 1.52	
Median		1.0	
Previous Training			
Yes		142	79.3
No		37	20.7

SD: Standard deviation

Table (2): Frequency distribution of perceived barriers using the physical assessment scale (BNUPAS) among the studied nurses' students:

Physical assessment barriers	Total Score	Mean Score	% Score
Subscale 1 reliance on others and technology	(9 – 45)		
Min. – Max.	13.0 – 45.0	1.44 – 5.0	11.11 – 100.0
Mean ± SD.	25.61 ± 5.46	2.85 ± 0.61	46.14 ± 15.18
Median	25.0	2.78	44.44
Subscale 2 lack of time and interruptions	(5 – 25)		
Min. – Max.	5.0 – 23.0	1.0 – 4.60	0.0 – 90.0
Mean ± SD.	16.53 ± 3.28	3.31 ± 0.66	57.65 ± 16.39
Median	17.0	3.40	60.0
Subscale 3 The ward culture	(5 – 25)		
Min. – Max.	9.0 – 22.0	1.80 – 4.40	20.0 – 85.0
Mean ± SD.	16.05 ± 2.88	3.21 ± 0.58	55.25 ± 14.38
Median	16.0	3.20	55.0
Subscale 4 lack of confidence	(4 – 20)		
Min. – Max.	8.0 – 18.0	2.0 – 4.50	25.0 – 87.50
Mean ± SD.	13.51 ± 2.20	3.38 ± 0.55	59.43 ± 13.76
Median	14.0	3.50	62.50
Subscale 5 lack of nursing role models	(4 – 20)		
Min. – Max.	8.0 – 20.0	2.0 – 5.0	25.0 – 100.0
Mean ± SD.	14.68 ± 2.24	3.67 ± 0.56	66.76 ± 13.98
Median	15.0	3.75	68.75
Subscale 6: lack of influence on patient care	(4 – 20)		
Min. – Max.	9.0 – 20.0	2.25 – 5.0	31.25 – 100.0
Mean ± SD.	15.88 ± 2.56	3.97 ± 0.64	74.23 ± 16.01
Median	16.0	4.0	75.0
Subscale 7 specialty area	(4 – 20)		
Min. – Max.	8.0 – 20.0	2.0 – 5.0	25.0 – 100.0
Mean ± SD.	12.98 ± 2.21	3.24 ± 0.55	56.11 ± 13.83
Median	12.0	3.0	50.0
Overall Physical assessment barriers	(35 – 175)		
Min. – Max.	80.0 – 143.0	2.29 – 4.09	32.14 – 77.14
Mean ± SD.	115.23 ± 11.15	3.29 ± 0.32	57.31 ± 7.97
Median	115.0	3.29	57.14

SD: Standard deviation

Table (3): Frequency distribution of the studied nurses' practice using physical examination skills inventory (PESI) scores:

	Total Score	Mean Score	% Score
Physical Examination Skills Inventory (PESI)	(20 – 80)		
Min. – Max.	35.0 – 80.0	1.75 – 4.0	25.0 – 100.0
Mean ± SD.	48.97 ± 12.36	3.45 ± 0.62	61.62 ± 20.60
Median	64.0	2.70	70.0

SD: Standard deviation

Table (4): Frequency distribution of the physical assessment knowledge among the studied nurses' students:

	Total Score	Mean Score	% Score
Assessment knowledge	(0 – 52)		
Min. – Max.	6.0 – 50.0	0.12 – 0.96	11.54 – 96.15
Mean ± SD.	39.39 ± 7.01	0.76 ± 0.13	75.75 ± 13.48
Median	41.0	0.79	78.85

SD: Standard deviation

Table (5): Relation between perceived assessment barriers in relation to the studied nurses' practice and knowledge (n = 179):

Perceived barriers	Knowledge		Practice	
	r	p	r	p
Subscale 1 reliance on others and technology	-0.069	0.361	-0.167*	0.025*
Subscale 2 lack of time and interruptions	-0.154*	0.040*	-0.115	0.126
Subscale 3 The ward culture	-0.121	0.108	-0.155*	0.038*
Subscale 4 lack of confidence	-0.172*	0.021*	-0.050	0.506
Subscale 5 lack of nursing role models	-0.108	0.150	0.015	0.844
Subscale 6: lack of influence on patient care	-0.201*	0.007*	0.112	0.137
Subscale 7 specialty area	-0.013	0.868	-0.080	0.288
Overall Physical assessment barriers	-0.214*	0.004*	-0.153*	0.041*

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

Table (6): Relationship between the studied students' demographic data and their physical assessment knowledge, practice, and perceived barriers

	Perceived barriers Mean \pm SD.	Practice Mean \pm SD.	Knowledge Mean \pm SD.
Age			
<21	3.38 \pm 0.27	3.21 \pm 0.75	0.73 \pm 0.13
\geq 21	3.25 \pm 0.33	3.56 \pm 0.52	0.77 \pm 0.13
Test of Sig. (p)	t=2.506* (0.013*)	U=2639.50* (0.011*)	U=2703.50* (0.021*)
Sex			
Male	3.28 \pm 0.31	3.60 \pm 0.54	0.75 \pm 0.12
Female	3.30 \pm 0.32	3.37 \pm 0.64	0.76 \pm 0.14
Test of Sig. (p)	t=0.419 (0.676)	U=2861.0* (0.023*)	U=3217.50 (0.244)
Academic level			
Second level	3.33 \pm 0.27	2.94 \pm 0.74	0.71 \pm 0.18
Third level	3.23 \pm 0.30	3.60 \pm 0.48	0.76 \pm 0.12
Fourth level	3.42 \pm 0.36	3.53 \pm 0.58	0.80 \pm 0.10
Test of Sig. (p)	F=5.801* (0.004*)	H=24.257* (<0.001*)	H=7.341* (0.025*)
GBA			
A-	3.20 \pm 0.23	3.67 \pm 0.58	0.95 \pm 0.01
B+	3.23 \pm 0.24	3.82 \pm 0.27	0.82 \pm 0.07
B	3.17 \pm 0.32	3.51 \pm 0.55	0.78 \pm 0.09
B-	3.36 \pm 0.33	3.26 \pm 0.67	0.75 \pm 0.14
C+	3.39 \pm 0.34	3.38 \pm 0.66	0.71 \pm 0.14
C	3.44 \pm 0.29	3.12 \pm 0.63	0.72 \pm 0.17
C-	3.45 \pm 0.27	3.83 \pm 0.15	0.74 \pm 0.11
D+	3.46 \pm 0.0	1.75 \pm 0.0	0.38 \pm 0.36
Test of Sig. (p)	F=3.164* (0.004*)	H=32.763* (<0.001*)	H=30.085* (<0.001*)
Working experience at ICU			
Yes	3.19 \pm 0.31	3.77 \pm 0.30	0.80 \pm 0.08
No	3.36 \pm 0.31	3.24 \pm 0.68	0.73 \pm 0.15
Test of Sig. (p)	t=3.431* (0.001*)	U=1967.0* (<0.001*)	U=2873.0* (0.004*)
Total Years of Experience			
<5	3.22 \pm 0.30	3.74 \pm 0.31	0.80 \pm 0.08
5-	3.03 \pm 0.38	3.95 \pm 0.07	0.82 \pm 0.07
Test of Sig. (p)	t=1.365 (0.209)	U=178.0 (0.161)	U=219.0 (0.547)
Previous Training			
Yes	3.29 \pm 0.30	3.52 \pm 0.55	0.77 \pm 0.11
No	3.30 \pm 0.39	3.16 \pm 0.78	0.71 \pm 0.19
Test of Sig. (p)	t=0.061 (0.951)	U= 1877.50* (0.007*)	U= 2179.0 (0.110)

SD: Standard deviation

t: Student t-test

F: F for One way ANOVA test

U: Mann Whitney test

H: H for Kruskal Wallis test

*: Statistically significant at $p \leq 0.05$

Discussion

This study aimed to look into nursing students' physical assessment skills and their challenges (Liyew et al., 2020). Most nurses agreed that a complete physical examination of severely ill patients is necessary. The undergraduate nursing curriculum covers physical health

assessments that are most meaningful to everyday nursing practice, emphasizing interpreting physical health assessment findings and establishing clinical judgment (Kutah, 2021). Nursing graduates must be capable of caring for individual patients with different diagnoses. Programs are required to offer all necessary abilities for a nurse to practice after graduation (Morrell et al., 2019).

Physical examination qualities should be emphasized in nursing courses, and institutions should offer students with opportunities to practice those skills in clinical settings. The studied students had a high BNUPAS "lack of influence on patient care" subscale score. They stated that they could not use the assessment data to establish a nursing care plan and use assessment skills to enhance the quality of nursing care. They also had high BNUPAS "lack of nursing role models" subscale scores, showing that they cannot improve their assessment skills in real situations with experienced ICU nurses who seldom use this skill in their practice. They also reported a moderate BNUPAS score in the subscale lack of confidence, ward culture, and lack of time and interruptions. This may be interpreted due to lack of self-confidence to make the decision to use physical assessment skills and worry about performing it correctly; unable to put their physical examination abilities into practice due to the predominant culture in clinical settings; and impotent to apply physical examination abilities due to a lack of time and distractions.

Nursing students did not utilize physical examination skills due to a lack of time or cultural factors discouraging them (Douglas et al., 2015). Alamri and Almazan (2018) discovered that the Subscales "reliance on others and technology," "ward culture," and "lack of influence on patient care" have substantial differences in perceived barriers in physical assessment between the classroom and clinical settings. Maniago et al. (2021) noticed that according to the students, four of the seven subscales (dependence on others, ward culture, lack of time and interruption, reliance on technology, and lack of influence on patient care) were identified as barriers to performing physical exams in the clinical context. Douglas et al. (2015) showed that students gave the greatest weight to the impact of specialization and a lack of confidence. On the other hand, reliance on others and technology, as well as a sense of lack of control over patient care, got the lowest marks. The current finding corroborates findings from prior international studies conducted among final-year nursing students (Douglas et al., 2015; Kohtz et al., 2017).

Another challenge to nursing students utilizing physical assessment skills was ward culture. The ward culture is a critical determinant in the prevalent implementation of interventions, and nursing interventions are influenced by ward culture. Nursing students need the correct role models to establish and utilize physical examination skills in clinical settings. As a result, hospitals should have the correct ward culture and role models to assist nursing students in honing their physical assessment abilities throughout clinical practice (Flott & Linden, 2016; Alamri & Almazan, 2018). Jamshidi et al. (2016) discovered that when faced with new experiences in the clinical learning environment, the studied students became overwhelmed and distressed, which is in line with the current finding. Supplying care to patients is stressful from the standpoint of these students. Shadadi et al. (2018) reported that establishing

plans should be used to increase the students' motivation and hold effective communication workshops.

The present paper found that students less than 21 years old, their academic level, GPA grade, their working ICU experience, and their perceived physical assessment barriers had significant differences among the studied students. There was no significant difference between sex and the perceived barriers to physical assessment in the current study. Alamri and Almazan (2018) noted that female nursing students reported more barriers in physical assessment than male nursing students on the subscale "reliance on others and technology." The male nursing students identified "interruptions and lack of time," "ward culture," "lack of confidence," "lack of nursing role models," and "lack of influence on patient care" as greater obstacles in physical assessment than the female nursing students. To improve the physical assessment skills, instructional videos improved students' physical assessment grade performance, and simulation training devices improved students' physical assessment competence (Albougami, 2020). Nursing students valued physical assessments, but they were uncertain how to use them efficaciously in their care (Weiting, 2019). Kutah (2021), reported that female studied nurses performed more physical assessment techniques than male studied nurses.

Several authors Birks et al. (2014) and Douglas et al. (2015) realized that failing to provide opportunities for students to practice and master skills, while in undergraduate courses may result in a lack of application of the skill as a registered nurse, and this skillful notice gives nursing practice clarity and legitimacy Kohtz et al. (2017) noted that advanced abilities needed in certain areas should be administrated and learned in the nurse's specialized area of work where the skill will be used.

The present study displayed that the perceived barriers had increased in relation to students under 21 years old, with a novel academic level, lower GPA levels, and no previous ICU work. Regarding physical assessment, knowledge, and practice, the current study showed that students more than 21 years old, with higher academic levels and GPA, and who had previous working experiences had more physical assessment knowledge. Moreover, the students more than 21 years, male sex, higher academic level, GPA, previous working experience, and training had more significant differences in their practice. This can be interpreted that increasing their level of knowledge and practice improves their confidence level, becomes familiar with the ICUs environment, and decreases obstacles to conducting the physical assessment for severely ill patients. The current finding agrees with Liyew et al. (2020). They discovered that prior training, age, overall year of experience, and year of experience in ICU were all variables that were positively related to nurses' total knowledge score on physical assessment. Jamshidi et al. (2016) noted that numerous students did not have enough knowledge to matter at the bedside when

negotiating with clinical learning environments, and supplying care to individuals was difficult.

E-learning is often considered a supplement to traditional didactic teaching or as part of a blended learning program (Li et al., 2021).

Conclusion and Recommendation

According to the findings of this study, undergraduate nurses working in ICUs had better knowledge and practices regarding physical assessment skills in crucially ill patients. In terms of associated factors, being male, having worked in ICUs, receiving training, having a higher academic level, and having a higher GPA are factors that positively correlated with nursing students' knowledge and practice of physical assessment. While age, academic level, GPA level, and prior ICU work were factors that were strongly linked with perceived barriers to physical assessment. As a result, training in physical assessment for critically ill patients and educational support services and awareness are recommended to improve undergraduate students' knowledge and experience and decrease disease-perceived physical assessment obstacles.

To accurately assess the patient's health status and remove barriers to conducting the physical examination, self-confidence must be increased. More constructive and competency-based teaching methods should be implemented in academic and clinical settings, allowing students to express their issues/doubts freely, while also taking the steps required to improve their competency in conducting physical assessments. Through simulation, nursing knowledge, critical thinking, communication skills, clinical practice, self-confidence and satisfaction, and clinical decision-making are improved (Omer, 2016). Using the simulated environment, physical assessment video, and scenario-based learning may help decrease perceived barriers among undergraduate students. Orientation and setting goals and outcomes of physical assessment before each clinical round may be helpful.

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