

Investigating the factors influencing nursing students' competency in patient safety

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Abstract

Patient safety competencies among nursing students remain challenging and are influenced by various factors, including student characteristics. This study aimed to assess the correlation between the cumulative Grade Point Average (GPA), interest, learning motivation, learning style, critical thinking ability, level of patient safety knowledge, and patient safety competencies. A cross-sectional study was conducted involving 232 professional

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nursing students from a private university in Semarang City, Central Java, Indonesia. Participants were selected using a purposive sampling technique. Data on patient safety competencies were collected through observational sheets, while independent variables were assessed using structured questionnaires. Data were analyzed using chi-squared tests for bivariate analysis and logistic regression for multivariate analysis. Bivariate analysis indicated significant correlations between patient safety competencies and cumulative GPA, interest, learning motivation, critical thinking ability, and the level of patient safety knowledge. Multivariate logistic regression identified interest (OR=2.927) as the strongest influencing factor, followed by GPA (OR=2.424), learning style (OR=1.915), knowledge level (OR=1.904), learning motivation (OR=0.490), and critical thinking ability (OR=0.309). These findings highlighted important implications for nursing education and clinical practice, emphasizing the critical need for integrating patient safety into nursing curricula. Educational strategies should prioritize fostering student interest, enhancing academic performance, accommodating diverse learning styles, promoting critical thinking, and boosting motivation, thereby ultimately improving student competencies and patient safety outcomes.

Introduction

Nursing students have not yet achieved patient safety competencies.^{1,2} The level of competence among postgraduate nursing students in implementing patient safety across the six domains is low.³ Factors influencing the low level of patient safety competence among students include the curriculum, the number of semester credit units, learning strategies, and student characteristics such as age, gender, duration of admission to the clinic, and educational level.⁴ In developing the educational process, it is essential to consider these determinant factors in teaching and learning activities, especially in clinical education. These factors are individual aspects that encompass interest, learning motivation, learning styles, and cognitive abilities.⁵

Nursing students with low patient safety competence are at risk of making mistakes when providing treatment or actions to patients. More than half of the nursing students in the last year were found to be incompetent in terms of their level of knowledge about patient safety.⁴ This low level of knowledge decreases the implementation of patient safety, which could increase the risk of patient safety incidents.⁶

Studies have shown that nursing students generally have satisfactory levels of patient safety competency, although there are still areas for improvement. For instance, a study involving 191 nursing students in Northern Cyprus found that while their overall knowledge, skills, and attitudes towards patient safety were satisfactory, they scored the lowest in the knowledge dimension.⁷ Another study in Iran demonstrated that educational interventions could improve patient safety competencies over time, particularly

in areas such as addressing broader patient safety issues and comfort in speaking about patient safety.⁸ Indonesia is a developing country, and many healthcare workers lack a comprehensive understanding of patient safety concepts and definitions.⁹ No standardized modules or guidelines are available for patient safety training, leading to significant knowledge gaps.^{10,11}

Patient safety training in Indonesia is not well established and does not meet the needs of healthcare workers. Effective communication and building a patient safety culture were identified as priority areas for training.¹¹ Clinical education plays a crucial role in achieving patient-safety competencies among nursing students. Studies have shown a significant relationship between implementing clinical education and achieving patient safety goals.¹² The prevalence of patient safety competency in Indonesia is hindered by inadequate training, insufficient integration of clinical education, systemic issues in incident reporting, and government support. Addressing these challenges through comprehensive training programs, improved clinical education models, and more substantial government involvement is essential for enhancing patient safety competencies in Indonesia.^{11,12}

Therefore, implementing teaching and learning activities must be carefully considered and adjusted for the factors that affect each student.⁵ However, research in this area has been limited. This study aimed to investigate the correlation between nursing students' determinant factors, including the cumulative grade point average (GPA), interest, learning motivation, learning style, level of acquired knowledge, critical thinking skills, and students' patient safety competencies.

Materials and Methods

Study design

This study was conducted between 2021 and 2022. It employed a descriptive cross-sectional design to investigate the association between the cumulative GPA, interest, learning style, learning motivation, critical thinking ability, level of patient safety knowledge, and patient safety competencies.

Participants

The respondents were 232 nursing students recruited using a purposive sampling technique. Inclusion criteria included students at the clinical stage in a teaching hospital who were willing to be respondents and had signed the informed consent form. The exclusion criteria were students who did not pass the subject of clinical practice and nursing students who had worked in hospitals. This study was conducted at a private teaching hospital in Semarang, Indonesia.

Data collection

Six instruments were used to collect data in this study. These included cumulative GPA, student interest, learning motivation, critical thinking ability, level of knowledge, and learning style assessed using a high and low scale. Learning style was measured based on kinesthetic and audiovisual scales.

GPA was measured using a questionnaire on demographic characteristics in the form of closed-ended questions. Students were requested to choose one of the available answers based on the classification of the cumulative GPA, as determined in the Regulation of the Minister of Education and Culture of the Republic of Indonesia No. 3 of 2020, according to the National Standards for Higher Education. Students' interests were collected

using a learning interest questionnaire in the form of closed questions. The overall scores on this questionnaire were divided into low and high.¹³ Learning motivation was measured using a questionnaire comprising 19 statements. Similarly, critical thinking skills were measured using a questionnaire containing 17 statements with 5 answer choices. The level of acquired knowledge about patient safety was measured using a patient safety questionnaire with 15 statements.¹⁴ The instrument used to measure patient safety competencies, developed by Sari,¹⁵ was adapted from the Joint Commission International. All instruments were tested for validity and reliability, with valid and reliable results. The interest, motivation, and learning style questionnaires were declared valid with p-values of 0.541-0.939, 0.581-0.906, and 0.455-0.916, respectively. Similarly, the critical thinking and level of acquired knowledge questionnaires were also declared valid, with p-value ranges of 0.518-0.913 and 0.459-0.832, respectively. Dependent variable data were collected using an observation sheet, and independent variable data were collected using a structured questionnaire. No names were indicated on the questionnaire or observation sheet to ensure anonymity.

Data analysis

The tabulated results were used for statistical analysis. The data were analyzed using IBM's Statistical Package for the Social Sciences (SPSS) Version 21.0. A descriptive analysis was performed on the demographic characteristics of respondents, sub-variables of the cumulative GPA, interest, learning style, learning motivation, critical thinking ability, level of patient safety knowledge, and patient safety competencies. These are represented as percentages, based on the findings of each research variable. An inferential analysis using a chi-square test and multivariate analysis was performed using logistic regression.

Ethical consideration

This study was approved by the Ethics Research Committee of Sultan Agung Islamic University, Semarang, Indonesia (no. 079/A.I/FIK-SA/XI/2021) on November 19, 2021. Before the study, all respondents signed written informed consent after receiving an explanation of the procedures, rights, and obligations involved in the research. Informed consent was obtained through ensuring anonymity, confidentiality, fidelity, and autonomy.

Results

Most respondents were female (203, 87.5%), while 29 (12.5%) were male. All respondents were aged 21 to 25. Furthermore, all participants had received orientation and training on patient safety (Table 1).

Bivariate analysis showed that patient safety competencies were related to the cumulative GPA ($p=0.017$, $OR=2.548$; 95% CI: 1.181-5.499), interest ($p=0.004$, $OR=3.211$; 95% CI: 1.455-7.130), learning motivation ($p=0.039$, $OR=0.45$; 95% CI: 0.210-0.962), critical thinking ($p=0.004$, $OR=0.309$; 95% CI: 0.139-0.686), and level of patient safety knowledge ($p=0.010$, $OR=2.718$; 95% CI: 1.270-5.819). Furthermore, patient safety competence was not related to learning styles ($p=0.358$). The results of bivariate analysis are presented in Table 2. Variables in bivariate analysis with a score of <0.25 were included in the logistic regression, namely cumulative GPA, interest, learning motivation, critical thinking ability, and level of patient safety knowledge. Table 3 shows the results of the multivariate logistic regression analysis. It was found that students' characteristics affecting patient safety competencies

were GPA ($p < 0.004$, $OR = 2.424$; 95% CI: 1.324), interest ($p < 0.001$, $OR = 2.927$; 95% CI: 1.556), learning motivation ($p < 0.023$, $OR = 0.490$; 95% CI: 0.265), critical thinking ability ($p < 0.001$, $OR = 0.309$; 95% CI: 0.163), and level of patient safety knowledge ($p < 0.038$, $OR = 1.904$; 95% CI: 1.035).

Discussion

The results of the logistic regression test indicated that among all variables correlated with patient safety goals, the strongest influences were, in order of interest, GPA, learning style, level of

knowledge, learning motivation, and critical thinking. These findings have key implications for nursing education and practice. The study showed that cumulative GPA, interest, learning motivation, critical thinking skills, and the level of patient safety knowledge were associated with the implementation of patient safety competencies of nursing students. A previous study also showed a relationship between the cumulative GPA and the intelligence of nursing students in achieving competence.¹⁶ Another study reported that students' interest affects their involvement and motivation in learning,¹⁷ and interest influences learning achievement.¹⁸ Previous research has shown a positive and significant relationship between learning motivation and achievement, with a correlation coefficient of 0.462.¹⁹ Learning motivation affects learning achievement,²⁰

Table 1. Frequency distribution of nursing student characteristics at University Hospital in Semarang City (n=232).

Variable	Frequency (f)	Percentage (%)
Gender		
Male	29	12.5
Female	203	87.5
Age		
21-25 years	232	100
25-30 years	0	0
Hospital orientation		
Yes	232	100
No	0	0
Exposure patient safety		
Received	232	100
Never received	0	0

Table 2. Patient safety competence-related factors in pre-licensure nursing students (n=232).

Variable	Indicator scale	Patient safety competence				p-value	Odds ratio	95% CI
		High		Low				
		f	%	f	%			
GPA	High	86	72.3	33	27.7	0.006	2.144	1.241-3.702
	Low	62	54.9	51	45.1			
Interest	High	85	72.6	32	27.4	0.005	2.192	1.268-3.792
	Low	63	54.8	52	45.2			
Learning Motivation	High	55	55	45	45.0	0.015	0.513	0.298-0.882
	Low	93	70.5	39	29.5			
Learning Style	Kinesthetics	85	66.4	43	33.6	0.358	1.286	0.751-2.203
	Audiovisual	63	60.6	41	39.4			
Critical Thinking	High	65	54.2	55	45.8	0.002	0.413	0.237 - 0.719
	Low	83	74.1	29	25.9			
Level of knowledge	High	86	71.6	35	28.9	0.016	1.942	1.128 -3.342
	Low	62	55.9	49	44.1			

Table 3. Analysis results of the multivariate logistic regression test.

Variable	Coefficient	S.E.	Wald	df	p-value	OR	95% CI
GPA	0.885	0.308	8.241	1	0.004	2.424	1.324
Interest	1.074	0.322	11.108	1	0.001	2.927	1.556
Learning motivation	-0.713	0.313	5.168	1	0.023	0.490	0.265
Learning style	0.650	0.318	4.189	1	0.041	1.915	1.028
Critical thinking	-1.175	0.325	13.077	1	0	0.309	0.163
Level of knowledge	0.644	0.311	4.293	1	0.038	1.904	1.035
Constant	-2.648	1.049	6.369	1	0.012	0.071	

including the achievement of patient safety competencies. A cross-sectional study in South Korea showed that critical thinking is positively correlated with the performance and achievement of nursing students' academic competencies.²¹ Nurses' compliance with patient safety principles is influenced by their level of patient safety knowledge, attitudes, and perceptions about safety issues.²²

This study's findings emphasize that nursing education institutions must enhance student quality factors, such as average cumulative GPA, interest, learning motivation, critical thinking abilities, and knowledge, to improve patient safety outcomes. These characteristics will enhance students' execution of patient safety, consequently diminishing the likelihood of patient safety incidents.⁶ Averted patient safety incidents will strengthen the quality of recognition services.²³

The findings of this study are pertinent to research indicating that students' determining factors include interests, learning motivation, learning styles, and critical thinking, all of which are associated with attaining student competence.⁵ However, a limitation of this study is that it only examined the factors determining students' achievements in patient safety competencies. Future research should broaden its scope to include factors beyond those related to students, such as the influences of clinical educators and the learning facilities. Critical thinking skills are crucial for healthcare professionals as they directly influence patient safety, particularly in critical situations. Nurses, especially those in intensive care units, need to develop strong critical thinking abilities to manage complex patient care scenarios effectively. Nursing programs emphasize the development of critical thinking as a core competency, which is necessary for accreditation and ensuring high-quality patient care. This focus on critical thinking is reflected in the curriculum design and assessment methods used in healthcare education.²⁴ Engaging students in interactive and innovative learning experiences, such as simulations and case-based learning, enhances their critical thinking skills and prepares them for real-world clinical challenges; these methods help students apply theoretical knowledge to practical scenarios, improving their decision-making and problem-solving abilities.^{25,26} Interest and critical thinking in students significantly predict patient safety goals because they directly impact students' capacity to make sound clinical decisions, prevent errors, and ensure high-quality patient care. Educational programs that prioritize the development of these skills through interactive and innovative learning experiences are essential for preparing health care professionals to meet patient safety standards.

Implications

Nurses should participate in ongoing professional development to improve their patient safety skills. This includes staying current with the latest information on patient safety and actively engaging in training that enhances critical thinking and problem-solving abilities. Therefore, experienced nurses should mentor nursing students and emphasize the importance of interest, motivation, and critical thinking in patient safety. By sharing their experiences and strategies, they can help students understand and effectively apply patient safety principles. Nurses should actively seek feedback and reflect on their practices to identify areas of improvement. By fostering a culture of safety and promoting an environment in which patient safety is a priority, they contribute to reducing safety incidents. This research has implications for nursing students, who should strive to maintain a high cumulative GPA, as it correlates with better patient safety competencies. This means dedicating adequate time and effort to their studies and seeking help when necessary to achieve academic excellence. Students

should actively engage in their learning process by developing a strong interest in patient safety and maintaining high motivation levels. This includes participating in extracurricular activities and seeking opportunities for practical experience. Collaboration among healthcare institutions, educational organizations, and community groups can foster initiatives aimed at improving nursing education and patient safety. This may include joint programs, funding for research, and public awareness campaigns.

Limitations

This study focused solely on student characteristics, excluding potentially influential factors such as clinical educators, learning facilities, and educational methods. Future research should conduct longitudinal studies to examine causal relationships, explore additional influencing factors, and evaluate interventions designed to enhance student motivation, interest, and critical thinking related to patient safety competencies.

Conclusions

This study emphasizes the critical role of student characteristics – such as academic performance, motivation, critical thinking skills, and patient safety knowledge – in achieving patient safety competencies, suggesting that nursing education should prioritize these areas during clinical training to enhance quality of care, prevent safety incidents, and foster a healthcare culture of shared responsibility among competent professionals, thereby improving patient outcomes.

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