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The patient safety competency self-evaluation tool for nursing students: A validity and reliability study

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Abstract

Background: Nurses must pay attention to patient safety. The quality of learning in nursing students must be improved with valid and reliable instruments to evaluate safety knowledge, skills, and behaviors regarding patient safety.

Purpose: To determine the validity and reliability of the patient safety self-evaluation instrument, which was developed to evaluate patient safety in nursing students.

Method: The research design used an observational research type with a methodological study approach to determine the validity and reliability of Patient Safety Competency Self-Evaluation (PSCSE) instrument. The study took place from March to June 2024, Esa Unggul University, Jakarta. Using purposive sampling and the Slovin formula, 71 participants were selected, who met specific inclusion and exclusion criteria. Univariate statistical analysis was conducted, including used Pearson correlation and the reliability test used Cronbach alpha with a significance level of 0.05.

Results: The results of the validity test using Pearson Product moment on 6 knowledge questions with a value of ($r = 0.281-0.568$), 21 items of questions about skills ($r = 0.422-0.806$), 13 behavioral items ($r = 0.273-0.789$). Cronbach alpha (0.950) so that this instrument item is valid and reliable at a significant level of 0.05.

Conclusion: The patient safety self-evaluation instrument has met the validity and reliability criteria for measuring knowledge, skills and attitudes in nursing students.

Keywords: Nursing; Patient Safety; Self-Evaluation; Students.

INTRODUCTION

Patient safety in healthcare facilities is something that must always be considered because it is the cause of disability and patient death. It is estimated that 10-25% of patients treated in hospitals experience adverse events every year (Al-Worafi, 2023). Incidents in patient safety are mostly related to human factors, such as late administration of medication, inadequate supervision after activities, and malpractice related to treatment. Patient safety is an essential issue in health services and is the world's concern for this (Taskiran, Bacaksiz, & Seren, 2020).

WHO defines patient safety as "the prevention of errors and adverse effects to patients associated with healthcare". Nurses have a crucial role to ensure and maintain patient safety (Fisher, & Kieman, 2019). Compared to other health professionals, nurses will interact longer with patients so that they can recognize risk factors and conditions first. Thus, nurses can support patients not only patient safety but also reduce errors effectively, ensuring patient safety is closely related to the development of a safety culture in health institutions (Cho, & Choi, 2018). Therefore, it is very important to form a safety culture

where professionals are formed and informed about patient safety. Therefore, nursing graduates must have the knowledge, skills and attitudes to identify and emphasize factors that can not endanger patients in patient safety (Usher, Woods, Parmenter, Hutchinson, Mannix, Power, & Jackson, 2017).

Knowledge, skills and attitudes can improve patient safety and facilitate learning from mistakes can be achieved through education. Newly graduated nurses on average must develop clinical skills and critical thinking skills and 55% of nurses risk making mistakes in the first five years after graduation. With this data, it is necessary to develop patient safety competencies in nurses who have just graduated (Murray, Sundin, & Cope, 2019).

Patient safety competencies must have been developed during education in an educational institution. Instruments related to the evaluation of knowledge, skills, and attitudes related to patient safety are needed, to ensure that newly graduated nurses can provide patient safety during their transition from student to professional nurse (Jang, & Lee, 2017). Reviewing patient safety competencies and identifying missing competencies in newly graduated nurses is necessary. Several instruments, the Health Professional Education in Patient Safety Survey examine safety qualifications in nursing and nursing students (Girnsburg, Castel, Tregunno, & Norton, 2012).

In this case, using valid and reliable instruments that include the dimensions of nurses' attitudes, knowledge, and skills to ensure patient safety is very important. The Nurses' competence Tool for Patient safety competency Self-Evaluation (PSCSE), is one of the instruments that tests three domains, developed by South Korea (Lee, An, Song, Jang, & Park, 2014). This instrument is valid and reliable in assessing the competence of nurses to ensure patient safety for both nurses and nursing students in various clinical and educational institution situations. One strength of this instrument is one of the desired instruments because the design is based on the knowledge of nurses, attitudes, and skills in the patient safety area (Abdrbo, 2015).

RESEARCH METHOD

The research design used an observational research type with a methodological study approach

to determine the validity and reliability of Patient Safety Competency Self-Evaluation (PSCSE) instrument. The study took place from March to June 2024, Esa Unggul University, Jakarta. The independent variable was Patient safety competency Self-Evaluation while the dependent variables in this research are internal consistency, r table and cronchbach's alpha.

Using purposive sampling and the Slovin formula, 71 participants were selected, who met specific inclusion and exclusion criteria. The inclusion criteria required active nursing students in their second year respondents who have undergone learning or clinical training related to patient safety. Willing to participate in the study by providing written informed consent. Understand the language used in the questionnaire without difficulty, while exclusion criteria nursing students who had no clinical experience or training on patient safety, respondents who did not complete the questionnaire completely or gave inconsistent answers. Students with certain conditions (e.g., cognitive impairment) that may affect their ability to understand and answer the questionnaires. Those who refused or withdrew consent to participate in the study.

The data collection process employed instruments, incorporating a total of 41 questions with a 5-point Likert scale. This scale was utilised for six items pertaining to knowledge, 21 items concerning skills, and 18 items relating to attitudes. The attitude items measured the level of agreement (5 = strongly agree, 1 = strongly disagree) regarding recognitions and behaviours associated with patient safety. The knowledge items determine the level of knowledge (5 = very knowledgeable, 1 = not knowledgeable) related to patient safety. The skills items measure the level of comfort (5 = very comfortable, 1 = very uncomfortable) in performing the tasks relevant to patient safety. The mean scores for each category, as well as the overall mean, were then calculated. Higher mean scores are indicative of greater competency regarding patient safety. The test was conducted utilising IBM SPSS 27. The validity test employed Pearson's correlation coefficient, while the reliability test utilised Cronbach's alpha with a significance level of 0.05.

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RESEARCH RESULTS

Table 1. Naming of Factors and Questions for Patient Safety Competency Self-Evaluation

Category	Question
Knowledge	
Factor K1. The concept of the components of patient safety culture	K1 Explain the factors in the creation of a safety culture (e.g., teamwork, leadership, effective communication) K2. Explain the role of human factors in assuring safety (e.g., physical, psychological limitations of human, interactions between human and instrument) K3. Explain the implications (benefits and limitations) of technology and information management care (e.g., bar codes, electronic medical record, medication pumps, automatic alerts and alarms) K4. Explain how gradients of authority (horizontal, vertical) influence teamwork and patient safety.
Factor K2. Failure concept and root cause analysis	K5. Distinguish among errors, adverse events, near misses, and hazards K6. Describe the processes used to analyse the cause of failure (e.g. root cause analysis).
Skill	
Factor S1. Error reporting and response to an error	S1. Error reporting via an organisational error reporting system S2. Enter error report accurately S3. Analysing a case to determine the cause of an error S4. Support and advise a peer who has to decide how to respond to an error
Factor S2. Communication related to error	S5. Revealing errors to faculty members S6. Communicate observations or concerns about hazards or errors to healthcare professionals S7. Communicate observations or concerns relating to hazards or errors with a patient who has been affected and with his or her family.
Factor S3. Resource utilization/evidence-based practice	S8. Locate evidence reports related to clinical practice topics and guidelines to define uncertainty in nursing care S9. Use high quality electronic sources of health information (e.g., online medical database) S10. Use technology and information management tools (e.g., bar codes, electronic medical record, automatic alerts and alarms) to support safe processes of care
Factor S4. Safe nursing practice	S11. Prevent and manage pressure ulcers S12 Use falls risk assessment tool to prevent falls S13 Give a blood transfusion according to transfusion policies for safe care. S14 Administer drug to patient according to medication policies for self care. S15 Check patient's identity accurately (e.g., a registration number, birth date, name).
Factor S5. Infection prevention	S16 Practice hand hygiene to prevent infection.

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Category	Question
Factor S6. Precise communication during handoffs	S17 Use standard infection control precautions for all patient encounters and other transmission precautions as appropriate S18 Use appropriate personal protective equipment (e.g., mask, goggles, gloves). S19 Apply aseptic technique when inserting invasive devices as appropriate for patient care procedures (e.g., foley catheter insertion, intravenous catheter insertion, dressing) S20 Follow communication practices that minimize risks associated with handoffs between and among providers and across transitions in care S21 Document hand-off communication according to institutional policies.
Attitude	
Factor A1. Patient safety promotion/prevention strategy	A1 Technology and information management tools (e.g., bar codes, electronic medical record, automatic alerts and alarms) should be used appropriately to support safe processes of care A2 Valuing the involvement of nurses in the design, selection, implementation and evaluation of information technology to support patient care. A3 Standardised procedures minimise risks associated with handover (e.g., transfer, shifts) within disciplines and across transitions in care.
Factor A2. Responsibility of health care professionals for patient safety culture	A4 Health care professionals should not tolerate uncertainty in patient care. A5 Learning how to improve patient safety is an appropriate use of time in health programs in school A6 Healthcare professionals should routinely share information about medical errors and what caused them A7 Patient safety is a high priority to health care professionals
Factor A3. Error reporting and disclosing	A8 Health care professionals should routinely report when certain errors occur. A9 Health care professionals should disclose errors to an affected patient and his or her family. A10 If there is no harm to the patient, there is no need to report an error
Factor A4. The components of patient safety culture	A11 If I saw an error, I would keep it to myself A12 Making errors in health care is preventable A13 Healthcare professionals should make an effort to improve patient safety

Table 1. The PSCSE is a student self-evaluation tool designed to assess patient safety competencies. It consists of 41 items with a 5-point Likert scale, of which six items are concerned with knowledge, 21 with skills, and 18 with attitude. The attitude items measure the level of agreement (5 = strongly agree, 1 = strongly disagree) regarding recognitions and behaviours associated with patient safety. The knowledge items determine the level of knowledge (5 = very knowledgeable, 1 = not knowledgeable) related to patient safety. The skills items measure the level of comfort (5 = very comfortable, 1 = very uncomfortable) in performing the tasks relevant to patient safety. The mean scores for each category, as well as the overall mean, were then calculated. Higher mean scores are indicative of greater competency regarding patient safety.

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Table 2. Validity and Reliability

Question	r table	Cronbach's Alpha
Knowledge		
K1		
K1	0.542	0.949
K2	0.465	0.949
K3	0.254	0.951
K4	0.239	0.951
K2		
K5	0.435	0.950
K6	0.442	0.949
Skill		
S1		
S1	0.605	0.948
S2	0.685	0.948
S3	0.621	0.948
S4	0.597	0.948
S2		
S5	0.386	0.950
S6	0.701	0.948
S7	0.659	0.948
S3		
S8	0.476	0.949
S9	0.733	0.947
S10	0.731	0.948
S4		
S11	0.663	0.948
S12	0.699	0.948
S13	0.590	0.948
S14	0.668	0.948
S15	0.735	0.948
S5		
S16	0.615	0.949
S17	0.736	0.948
S18	0.754	0.948
S19	0.731	0.948
S6		
S20	0.721	0.948
S21	0.790	0.947
Attitude		
A1		
A1	0.653	0.948
A2	0.683	0.948
A3	0.775	0.948

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Question	r table	Cronbach's Alpha
A2		
A4	0.669	0.948
A5	0.736	0.948
A6	0.611	0.948
A7	0.652	0.948
A3		
A8	0.472	0.949
A9	0.705	0.948
A10	0.475	0.949
A11	0.210	0.953
A4		
A12	0.224	0.951
A13	0.515	0.949

Based on table 2. PSCSE questionnaire items were found to be valid for measuring patient safety competencies, as indicated by an average value greater than the r table (0.2). The questionnaire demonstrated very high reliability, with a Cronbach's alpha value of 0.950.

Table 3. Pearson Correlation

Variable	r	p-value
Knowledge		
Skil	0.023	0.005
Attitude		

Tabel 3. Show the patient safety competency self-evaluation tool for nursing students verified to be valid and statistically reliable and significant, analyzed using the pearson correlation test, shows r-table of 0.023 and p-value of 0.005

DISCUSSION

Validity is measurement and observation which means the reliability of the instrument in collecting data. Validity tests are useful for knowing if there are any statements on the questionnaire that should be discarded/replaced because they are considered irrelevant (Ji, Lee, Lee, Choi, Lee, Kim, & Park, 2021). The first category is the validity of the content. This category looks at whether the instrument adequately covers all the content that should be related to the variable (Nursalam, 2017). Construct validity refers to whether the researcher can conclude the test values related to the concept being studied. Test the validity by looking at the value of each statement item where the instrument item is declared valid if the

calculation/result > r table. Reliability is the ability to reproduce consistent results in time and space, or from different observers, presenting aspects of coherence, stability, equality, and homogeneity (Heale, & Twycross, 2015).

This is one of the main quality criteria of an instrument. Reliability tests are useful for determining whether the instrument in which the questionnaire can be used more than once, at least by the same respondent will produce consistent data. The reliability of the instrument is required to obtain data according to the measurement objectives (Beni, Nursalam, & Hasinuddin, 2020). To achieve this, a reliability test was carried out using the alpha cronbach method measured based on the aplha cronbach scale of 0 to 1.

The results of the study showed that PSCS on the knowledge instrument had a greater validity value than r tables. This shows that this instrument is very valid to be used as a measurement of nurse safety competencies in Nursing students. Items 1-6 describe

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safety concepts related to safety culture and root cause analysis (Kim, Yoon, Hong, & Min, 2019). Concepts related to patient safety culture consist of healthcare system complexity, human factors, information technology, electronic healthcare systems, leadership, communication, and work teams. Understanding patient safety culture is essential to providing safe care and contributing to a safe environment in nursing (Farokhzadian, Eskici, Molavi-Teleghani, Tavan, & Farahmandnia, 2024).

The second factor, the concept of error and cause analysis, is found in the items that ensure knowledge of the types of errors and their cause analysis. Nursing students must have competence in conducting systematic analyses of the types of errors and the causes and mechanisms of errors. Nursing students will be able to implement actions and strategies to prevent errors in the clinical field (Bartonickova, Kohanova, & Ziakova, 2023).

The skill categories on the PSCSE emphasise how nursing students can comfortably practise practical skills to provide patient safety. The first factor, error reporting and response to errors, consists of competencies to report errors with reporting systems, systematically analyse the causes of errors, and support colleagues to engage in errors correctly. Such supports as well as contributes to a positive culture in the organisation related to patient safety (Braithwaite, Wears, & Hollnagel, 2015). This competency is consistent with the error reporting factor related to patient safety. The absence of an error reporting and feedback system equates to a disconnection from formal information and education related to errors in reporting methods, a disconnection from error reporting in the clinical environment (Alnawafleh, Al-Momani, & Alhalaiqa, 2022).

The second factor is related to communication. Error-related communication, ensuring nursing students can communicate effectively with patients and families, nurses, managers, and other healthcare personnel. Communication during handover, consists of ensuring the preparation of communication skills to provide accurate information and document it according to institutional rules. In addition, communication related to hazards or errors is included in the safety competency (Eskici, Kanig, Ugur, & Seren, 2021). During the weigh-in, poor communication will cause accidents in patients,

therefore communication competence and recording accurate information on handover are essential to reduce errors. Interprofessional education and the importance of effective teamwork and communication are emphasized in the literature. Although communication competence in reporting and closing errors is important, some instruments that previously did not include communication in their assessment (Okuyama, Martowirono, & Bijnen, 2011).

The third factor, Resources Utilization/evidence-Based Practice, is included in this instrument to ensure that nursing students can use clinical data, information technology, and electronic health service systems based on evidence-based practice (Kong, Zhu, He, Chen, Yang, Qi, & Peng, 2019). Health professionals must understand the effects of the environment such as personal, occupational factors. The professional workforce must be able to use resources with critical thinking skills (Willman, Bjuresater, & Nilsson, 2020).

The fourth factor, Safe Nursing Practice, and the fifth factor, infection prevention, are included in the item to ensure that nursing students can practice safely, with a focus on practice guidelines. As errors can occur at any stage in patient care, risk management can be associated with healthcare at any level (Vincent, 2011).

In the attitude category, the PSCSE instrument confirms in patient safety. The first factor, designated as 'patient safety support/prevention strategy', encompasses four items designed to ascertain the extent to which a strategy aimed at error prevention and enhancing patient safety is grounded in a patient safety framework. The second factor, the responsibility of healthcare professionals for patient safety culture, includes items related to the obligations of healthcare professionals, such as creating a culture of patient safety. As the habits of healthcare professionals can have a direct impact on patient safety, it is recommended to always monitor ethical issues, be responsible in practice and maintain clinical competence through continuous learning. (Levett-Jones, Andersen, Bogossian, Cooper, Guinea, Hopmans, & Seaton, 2020). Safety cannot be obtained only by individuals or short learning, it will be through continuing education in institutions. In the reporting section, it cannot be included in the instrument because the validity value is below the r

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table, namely in the self-reporting section of the mistakes made by oneself (Tella, Liukka, Jamookeah, Smith, Partanen, & Turunen, 2014).

CONCLUSION

The patient safety self-evaluation instrument has met the validity and reliability for measuring knowledge, skills and attitudes in nursing students. This research supports the development of patient safety competencies in nursing education and healthcare settings.

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