

Nursing Assessment Using Indonesian, Gordon, and NANDA-I Diagnosis Standards in Determining Nursing Problems: A Quasi-Experimental Study

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ABSTRACT

Background: Nursing assessment is a crucial initial step, and several formats are commonly used. Currently, the Indonesian National Nurses Association has directed all educational institutions to use SDKI, SLKI, and SIKI for nursing process. **Objectives:** This research aimed to compare nursing assessment using SDKI, Gordon, and NANDA-I (North American Nursing Diagnosis Association International) categorisation in determining nursing problems by nursing students. **Methods:** A Quasi-experimental non-equivalent control group post-test-only design was used. A total of 88 nursing students divided into three groups using simple random sampling. The instruments used were the ability to analyse nursing problems with content validity index analysis by five experts, and nursing problem analysis with Fleiss' Kappa. **Results:** The results showed the ability to analyse problems had a mean value of 3.15, while SDKI, Gordon, and NANDA-I had values of 3.13, 3.13, and 3.17 respectively. The mean rank value obtained was 47.53, 44.82, 41.14 (p -value: 0.632). Furthermore, the post-hoc test using pairwise comparison Kruskal Wallis test showed that the mean difference was as follows SDKI - Gordon group was 62.64 (SD: 8.96, p -value: 0.710), SDKI – NANDA-I was 62.95 (SD: 11.31, p -value: 0.322), and Gordon – NANDA-I was 62.97 (SD: 12.53, p -value: 0.606). **Conclusion:** Nursing assessment using the SDKI, NANDA-I, and Gordon 11 Functional Health Patterns did not have a significant difference. However, the observation results showed that SDKI had accuracy, precision, and ease in determining nursing problems. Recommendation: This nursing assessment might use for education and hospitals in using assessments based on the SDKI format to provide work efficiency in enforcing nursing problems.

Keywords: Gordon Functional Health Patterns; NANDA-I; Nursing Assessment; Nursing Diagnosis; Nursing Problems; SDKI

INTRODUCTION

According to Indonesian Law Number 38 of 2014, a nurse is someone who has graduated from Higher Education in Nursing, either domestically or abroad, which is recognised by the provisions of the Laws and Regulations of the Government. Nursing is an integral part of health services provided in the form of interactions between Nurses and Clients to achieve the goal of fulfilling the needs and independence in care. The duties of nurses in carrying out care include conducting holistic assessments and diagnoses.

Based on the above law, nurses can determine diagnoses by the Indonesian Nursing Diagnosis Standards (SDKI). Diagnosis enforcement is an important aspect for students; hence, the Association of Indonesian Nurse Education Center (AINEC) includes the nursing process as one of the courses in the Indonesian Nursing Education Curriculum. Nursing assessment is the first step in five stages of nursing process including systematic and continuous data collection, sorting, analysis, organisation, documentation, and communication (Allen *et al.*, 2018; Palmer, 2018).

Received: January 15, 2025; Received in revised form: September 10, 2025; Accepted: September 21, 2025

Nursing diagnosis in Indonesia started using SDKI officially in 2016. The classification in the SDKI book adopts the International Council of Nurses (ICN) method which include 149 nursing diagnoses whereas divided into five categories and 14 subcategories. The determination is based on the nursing problems that arise and are classified into Actual, Risk, Potential, and Syndrome diagnoses (Tim Pokja SDKI DPP PPNI, 2017).

Based on the 2021, Indonesian Nursing Education Curriculum (Asosiasi Institusi Pendidikan Ners Indonesia, 2021) the duties and authorities of nurses in carrying out care have specifically been arranged in the Nursing Process and Critical Thinking Course. The Nursing Process starts with assessment, establishing a diagnosis, preparing a plan, implementation, and evaluation. The process of establishing a Nursing diagnosis begins with data collection, analysis, problem formulation, and decision-making based on materials and knowledge learned (Rodziewicz *et al.*, 2024). The nursing process serves as a framework that assists nurses in making informed clinical decisions and engaging in critical thinking and predicted patient outcomes (Togni *et al.*, 2025).

Nursing assessment can be defined as a planned, systematic, continuous, and deliberate process of collecting, classifying, and categorising individual information to recognise responses to health problems experienced by clients (Reis *et al.*, 2022). Comprehensive patient assessment constitutes a fundamental component of effective nursing care, and interventions aimed at bolstering patient safety are intrinsically linked to improved clinical outcomes. The assessment generates detailed and systematic data that supports nurses in making timely and evidence-based clinical decisions (Kelsey & Claus, 2016). Effective clinical decision-making involves the systematic identification and analysis of patient problems, critical evaluation of potential interventions, and the selection of the most appropriate solution an approach structured and implemented through the nursing process in clinical practice (Lotfi *et al.*, 2021).

Several nursing assessment models in Indonesia include the Nursing Assessment Using NANDA-I Taxonomy (Butcher & Jones, 2021) and Gordon's 11 Functional Health Patterns, which cover areas like Perception-Health Maintenance, Nutrition-Metabolism, and Sleep-Rest (Butcher *et al.*, 2024). NANDA-I, the most widely used international nursing diagnostic classification, compiles standards to improve the nursing process (Müller-Staub *et al.*, 2007). Gordon's functional health patterns, developed by Marjory Gordon, aid in the nursing assessment process (Edelman & Kudzma, 2021; Gordon, 2016). Comparative analysis of these tools is essential for evaluating students' analytical skills and critical thinking in establishing nursing diagnoses. Despite their similarities, improper placement of nursing diagnoses can undermine assessment quality, affecting diagnosis accuracy and overall nursing process effectiveness.

Research in Indonesia to support diagnosis enforcement based on the SDKI has not been widely carried out. Therefore, this research aimed to compare nursing assessment using SDKI, Gordon, and NANDA-I categorisation in determining nursing problems. The hypothesis of this study was that there would be a significant difference between nursing assessment using the SDKI, NANDA-I, and Gordon 11 Functional Health Patterns in determining nursing problems that can implemented in clinical practice.

METHODOLOGY

Research Design

This research used a quasi-experimental non-equivalent control group post-test-only design (Miller *et al.*, 2020), which is the aim of examining causality between an intervention and an outcome (Denny *et al.*, 2023). Respondents were assessed using the nursing problem analysis ability instrument.

Study Setting and Sample

This research was conducted at the Muhammadiyah Institute of Health Sciences and Technology Palembang on nursing program students, from the Faculty of Health Sciences. Simple random sampling was used due to target population are equally likely to be selected randomly. Then, randomly selecting using

computer-generated list to recruited the respondents (Sarfo *et al.*, 2022). As much as 88 nursing students were recruited based on the inclusion criteria, including had taken nursing process as well as critical thinking courses, and in semester 6.

Intervention

Nursing problem analysis ability was assessed using Gordon nursing assessment, NANDA-I, and SDKI categorisation, consisting of 20 statements. These statements described various nursing problem analysis skills, such as distinguishing relevant from irrelevant data, validation, organisation, categorisation, identifying patterns and relationships, drawing conclusions, and establishing problems.

Content Validity Index

The analysis of the nursing problem using the content validity index (Mean I-CVI) involved five experts, with each statement categorised as either relevant or irrelevant. The Mean I-CVI score was 0.97, indicating high validity for the nursing problem analysis skill question. The results also showed that the nursing problem analysis was highly relevant, with expert evaluations ranging from 1 to 0.97. Additionally, a consensus analysis based on Joseph and Rotty (2020) determined the priority nursing problems using a Likert scale. The four main nursing problems identified were ineffective airway clearance, chronic pain, nutritional deficits, and ineffective breathing patterns. The Fleiss' Kappa test for agreement among experts yielded a score of 0.452 (95% CI, 0.445 - 0.459), indicating a moderate strength of agreement, with 95% confidence that the true population value lies between 0.445 and 0.459 (Polit & Beck, 2021; Landis & Koch, 1977).

Data Collection and Analysis

Data collection was carried out on April 26, 2024, at the Muhammadiyah Institute of Health Sciences and Technology Palembang where 88 nursing students willingly participated in this research. The respondents were divided into three groups, namely 1 (SDKI assessment of 29 respondents), 2 (Gordon assessment of 30 respondents), and 3 (NANDA-I assessment of 29 respondents).

Each respondent was given the same case with a nursing assessment format according to the group division including group 1-SDKI Categorisation Assessment, group 2-Gordon Assessment, and group 3-NANDA-I Assessment. Furthermore, respondents filled out the questionnaire provided to determine ability to analyse problems based on the assessment format used. Each respondent given time for 60 – 90 minutes to finished assessment and determined the nursing problems based on the signs and symptoms that appeared. Data analysis in this research used the ANOVA Test (the effect size, or magnitude of the differences between groups, Eta square= 0.00074), but after the normality test was carried out, the data was not normally distributed. Another alternative test was used in the form of a non-parametric test, namely the Kruskal Wallis (Table 3).

Ethical Consideration

This research received ethical approval from the Ethical Committee, IKesT Muhammadiyah Palembang, Indonesia, with reference number 000201/KEP on 4th March, 2024.

RESULTS

Table 1 shows the frequency distribution of nursing students' abilities in analysing and determining nursing problems across three assessment formats: SDKI, Gordon's Functional Health Patterns, and NANDA-I. The table presents students' self-reported responses on a 5-point Likert scale for 20 skill statements, covering key aspects like data identification, categorisation, and problem formulation. Most students responded with Agree to Strongly.

Agree, indicating moderate to high competence in nursing problem analysis. Mean scores ranged from 2.73 to 3.31, suggesting confidence in core analytical skills but some challenges in categorising problems and determining aetiology.

Table 1: Frequency Distribution of Students' Abilities in Analysing the Determination of Nursing Problems in Three Nursing Assessment Groups of SDKI, Gordon, and NANDA-I in Nursing Students in 2024 (n=88)

Questions	Analysis										Mean
	1		2		3		4		5		
	Strongly Disagree		Disagree		Agree		Strongly Agree		Totally Agree		
	n	%	n	%	n	%	n	%	n	%	
I can determine the main data in the assessment results	3	3.4	2	2.3	60	68.2	12	13.6	11	12.5	3.30
I can determine data that is related to nursing problems	3	3.4	6	6.8	59	67.0	14	15.9	6	6.8	3.16
I can distinguish data that is not related to nursing problems	1	1.1	6	6.8	52	59.1	23	26.1	6	6.8	3.31
I know the supporting data that can be used in determining the problem	4	4.5	10	11.4	40	45.5	24	27.3	10	11.4	3.30
I know the information that is useful in determining the problem	6	6.8	12	13.6	40	45.5	20	22.7	10	11.4	3.18
I do not include unimportant information in determining the problem	8	9.1	21	23.9	41	46.6	11	12.5	7	8.0	2.86
I distinguish important data in determining the problem according to clinical experience	1	1.1	17	19.3	45	51.1	20	22.7	5	5.7	3.13
I am sure that the assessment data is appropriate and correct for determining the problem	1	1.1	10	11.4	47	53.4	24	27.3	6	6.8	3.27
I cross -check the data to determine the assessment problem	3	3.4	6	6.8	52	59.1	19	21.6	8	9.1	3.26
I am sure that the assessment data is valid and accurate in determining the problem	0	0.0	17	19.3	41	46.6	19	21.6	11	12.5	3.27
I can easily group assessment data according to signs and symptoms	3	3.4	14	15.9	46	52.3	17	19.3	8	9.1	3.15
I can easily place data in the problem categorisation	1	1.1	18	20.5	44	50.0	21	23.9	4	4.5	3.10
I do not experience confusion in determining categories in determining the problem	6	6.8	35	39.8	27	30.7	17	19.3	3	3.4	2.73
The assessment format provides a clear flow for determining the problem	1	1.1	12	13.6	50	56.8	17	19.3	8	9.1	3.20
I can easily identify data with nursing problems that may arise	2	2.3	15	17.0	45	51.1	19	21.6	7	8.0	3.16
I know the relationship between data and problems according to their categorisation	2	2.3	17	19.3	38	43.2	25	28.4	6	6.8	3.18
I can identify the relationship between data and their categorisation	2	2.3	16	18.2	43	48.9	21	23.9	6	6.8	3.15
I can formulate nursing problems easily	3	3.4	15	17.0	46	52.3	16	18.2	8	9.1	3.13
I can determine nursing aetiology	4	4.5	17	19.3	49	55.7	14	15.9	4	4.5	2.97
I can identify signs and symptoms according to their categorisation	3	3.4	13	14.8	50	56.8	18	20.5	4	4.5	3.00

In summary, Table 1 shows that nursing students possess adequate but varied analytical abilities, with stronger skills in data identification and validation, and weaker performance in problem categorisation and distinguishing unimportant information.

Table 2: Frequency Distribution of Students' Abilities in Analysing the Determination of Nursing Problems in Each Nursing Assessment Groups of SDKI, Gordon, and NANDA-I in Nursing Students in 2024 (n=88)

Item	Nursing Assessment Using SDKI (n: 29)										Nursing Assessment Using Gordon (n: 30)										Nursing Assessment Using NANDA-I (n: 29)									
	1		2		3		4		5		1		2		3		4		5		1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
P1	0	0.0	1	1.1	24	27.3	4	4.5	0	0.0	3	3.4	1	1.1	17	19.3	3	3.4	6	6.8	0	0.0	0	0.0	19	21.6	5	5.7	5	5.7
P2	0	0.0	2	2.3	25	28.4	2	2.3	0	0.0	3	3.4	1	1.1	17	19.3	7	8.0	2	2.3	0	0.0	3	3.4	17	19.3	5	5.7	4	4.5
P3	0	0.0	2	2.3	17	19.3	10	11.4	0	0.0	1	1.1	1	1.1	19	21.6	6	6.8	3	3.4	0	0.0	3	3.4	16	18.2	7	8.0	3	3.4
P4	0	0.0	2	2.3	16	18.2	10	11.4	1	1.1	4	4.5	5	5.7	14	15.9	3	3.4	4	4.5	0	0.0	3	3.4	10	11.4	11	12.5	5	5.7
P5	1	1.1	2	2.3	15	17.0	11	12.5	0	0.0	1	1.1	6	6.8	15	17.0	4	4.5	4	4.5	4	4.5	4	4.5	10	11.4	5	5.7	6	6.8
P6	1	1.1	9	10.2	14	15.9	4	4.5	1	1.1	4	4.5	7	8.0	12	13.6	5	5.7	2	2.3	3	3.4	5	5.7	15	17.0	2	2.3	4	4.5
P7	0	0.0	3	3.4	19	21.6	7	8.0	0	0.0	1	1.1	5	5.7	14	15.9	7	8.0	3	3.4	0	0.0	9	10.2	12	13.6	6	6.8	2	2.3
P8	0	0.0	3	3.4	18	20.5	8	9.1	0	0.0	1	1.1	3	3.4	14	15.9	9	10.2	3	3.4	0	0.0	4	4.5	15	17.0	7	8.0	3	3.4
P9	1	1.1	3	3.4	17	19.3	6	6.8	2	2.3	1	1.1	2	2.3	19	21.6	4	4.5	4	4.5	1	1.1	1	1.1	16	18.2	9	10.2	2	2.3
P10	0	0.0	2	2.3	19	21.6	8	9.1	0	0.0	0	0.0	6	6.8	14	15.9	5	5.7	5	5.7	0	0.0	9	10.2	8	9.1	6	6.8	6	6.8
P11	0	0.0	4	4.5	17	19.3	8	9.1	0	0.0	1	1.1	1	1.1	20	22.7	5	5.7	3	3.4	2	2.3	9	10.2	9	10.2	4	4.5	5	5.7
P12	0	0.0	5	5.7	15	17.0	9	10.2	0	0.0	1	1.1	7	8.0	14	15.9	8	9.1	0	0.0	0	0.0	6	6.8	15	17.0	4	4.5	4	4.5
P13	1	1.1	8	9.1	13	14.8	7	8.0	0	0.0	4	4.5	12	13.6	8	9.1	4	4.5	2	2.3	1	1.1	15	17.0	6	6.8	6	6.8	1	1.1
P14	0	0.0	1	1.1	21	23.9	7	8.0	0	0.0	1	1.1	7	8.0	13	14.8	7	8.0	2	2.3	0	0.0	5	5.7	15	17.0	3	3.4	6	6.8
P15	0	0.0	4	4.5	14	15.9	10	11.4	1	1.1	1	1.1	7	8.0	16	18.2	5	5.7	1	1.1	1	1.1	4	4.5	15	17.0	4	4.5	5	5.7
P16	1	1.1	5	5.7	14	15.9	9	10.2	0	0.0	1	1.1	3	3.4	12	13.6	11	12.5	3	3.4	0	0.0	9	10.2	12	13.6	5	5.7	3	3.4
P17	0	0.0	7	8.0	13	14.8	8	9.1	1	1.1	0	0.0	3	3.4	17	19.3	8	9.1	2	2.3	2	2.3	6	6.8	13	14.8	5	5.7	3	3.4
P18	0	0.0	6	6.8	13	14.8	9	10.2	1	1.1	1	1.1	2	2.3	19	21.6	5	5.7	3	3.4	2	2.3	7	8.0	14	15.9	2	2.3	4	4.5
P19	1	1.1	5	5.7	18	20.5	5	5.7	0	0.0	2	2.3	3	3.4	20	22.7	4	4.5	1	1.1	1	1.1	9	10.2	11	12.5	5	5.7	3	3.4
P20	0	0.0	3	3.4	17	19.3	9	10.2	0	0.0	1	1.1	21	23.9	0	0.0	6	6.8	2	2.3	2	2.3	10	11.4	12	13.6	3	3.4	2	2.3

Table 2 shows the frequency distribution of student's abilities in analysing the determination of nursing problems in the three groups including SDKI, Gordon, and NANDA-I. The mean value was 3.15, (minimum: 2.73; maximum: 3.30), indicating that the nursing assessment used can help in determining, selecting, and establishing nursing problems, with the majority falling in the agreed category.

The student's ability in nursing assessment had a mean of 3.13, 3.13, and 3.17 in the SDKI, Gordon, and NANDA groups respectively. This indicates that students' abilities to analyse the determination of nursing problems were not significantly different, with the majority falling in the agreed category.

Table 3: Mean Scores of Students' Ability in Determining Nursing Problems Using SDKI, Gordon, and NANDA-I (n=88)

Nursing Assessment	Mean Rank	P value
SDKI (n: 29)	47.53	0.632
Gordon (n: 30)	44.82	
NANDA (n: 29)	41.14	

$\alpha = 0.005$

As shown in Table 3, NANDA-I assessment had the lowest mean value in establishing nursing problems, at 41.14, while SDKI had the highest value at 47.53. The test results obtained a p -value = 0.632, suggesting no significant difference between the use of the SDKI, Gordon, and NANDA-I assessment formats. However, based on the mean rank value, SDKI (47.53) had a higher value compared to Gordon and NANDA-I.

Table 4: Mean Differences in Students' Ability to Identify Nursing Problems Using SDKI, Gordon, and NANDA-I (n=88)

Variable	Mean	SD	Min - Max	P value
SDKI - Gordon	62.64	8.96	43 - 88	0.710
SDKI - NANDA-I	62.95	11.31	48 - 100	0.322
Gordon - NANDA-I	62.97	12.53	43 - 100	0.606

$\alpha = 0.005$

To determine the mean difference between the groups, the Mann-Whitney U Test was used because the post hoc test could not be carried out using the Kruskal Wallis pairwise comparison. As shown in Table 4, the mean difference in students' abilities to determine nursing problems was as follows SDKI - Gordon group was 62.64 (SD: 8.96, p -value: 0.710), SDKI - NANDA-I was 62.95 (SD: 11.31, p -value: 0.322), and Gordon - NANDA-I was 62.97 (SD: 12.53, p -value: 0.606). The results showed that there was no significant difference in the mean analytical abilities of students across the three groups.

Table 5: Percentage of Students' Ability in Identifying Nursing Problems Using SDKI, Gordon, and NANDA-I (n=88)

Nursing Diagnosis	Group 1		Group 2		Group 3	
	f	%	f	%	f	%
Ineffective airway clearance	5	16.67	6	20.00	6	20.69
Chronic pain	0	0.00	1	3.33	4	13.79
Nutrition deficit	24	80.00	15	50.00	17	58.62
Ineffective breathing pattern	17	56.67	5	16.67	18	62.07
Mean percentages	38.33		22.50		38.79	

Further analysis regarding the percentage of nursing problem determination by students (Table 5) showed that nutritional deficits and ineffective breathing patterns were most frequently reported, followed by ineffective breathing patterns in each group, while chronic pain had the lowest percentage.

DISCUSSION

The results (Table 4) showed that there was no significant difference in the assessment format used in establishing nursing problems. This may be influenced by several factors, including students' early exposure to nursing assessment formats such as NANDA-I, Gordon's Functional Health Patterns, and the Indonesian Standard Nursing Diagnosis (SDKI). Since 2016, the Indonesian National Nurses Association (PPNI) has mandated SDKI use in academic and clinical settings, fostering the growth and collaboration of various

Standardised Nursing Languages, including NANDA-I. Despite differences in domains, NANDA-I and SDKI share similarities in the nursing problems they identify, which aids students in analysing and determining nursing problems. The absence of significant differences between the three assessment formats could be attributed to students' familiarity with these tools. Notably, SDKI had a higher mean rank compared to Gordon and NANDA-I. Overall, SDKI, NANDA-I, and Gordon can be used when there is continuity between the assessment and the nursing problem list (Tiranda, 2023). Comparisons between assessment instruments did not reveal significant differences in determining nursing problems.

SDKI categorisation is not considered a reference for use in both academics and clinics. However, the suitability of the categories and sub-categories provides convenience in determining nursing problems accurately and effectively. The framework of 11 functional health patterns can be used to comprehensively describe health status (Butcher *et al.*, 2024). The use of the Gordon 11 functional health pattern assessment model in the care of heart failure patients has strong significance in terms of improving quality of life and reducing readmission rates (Türen & Enç, 2020). Regarding NANDA-I, 72% of research uses the NANDA-I terminology (Kamitsuru *et al.*, 2021) which has an impact on the quality of nursing documentation (Tastan *et al.*, 2014) and provides benefits in clinical practice (Rodríguez-Suárez *et al.*, 2023). Understanding the elements of the NANDA-I terminology, including defining characteristics and related factors, is crucial for accurately identifying nursing diagnoses (Yalcinkaya *et al.*, 2025).

Nursing process is an important indicator in clinical practice, but some students still have difficulty in implementing this aspect (Park & Jeong, 2022; Parvan *et al.*, 2021), inadequate knowledge, limited clinical experience, and insufficient educational exposure represent key barriers to the effective implementation of the nursing process by students (Shahzeydi *et al.*, 2024). To improve the quality of the nursing process, specifically assessments, the role of educators, both academic and clinical, in developing innovative methods is crucial. The achievement of nursing competencies is an immediate result of the educational framework (Purabdollah *et al.*, 2025). The systematic use of simulation methods can increase self-confidence as well as cognitive, affective, and psychomotor learning abilities. For example, in the application of the nursing process system using North American Nursing Diagnosis Association International (NANDA-I), Nursing Outcomes Classification (NOC), and Nursing Interventions Classification (NIC), nurses aim to determine the right diagnosis for patients, NOC indicators, and NIC labels. Appropriate and comprehensive nursing assessment of patients is the main key to preventing unexpected events (Burdeu *et al.*, 2021). Therefore, nursing assessments are carried out based on the evidence obtained (Butler, 2018). Nursing assessments support the accuracy of the determination by recognising a number of defining characteristics (De Groot *et al.*, 2019).

Nursing assessment is very crucial for the development of patient health status. This shows that nursing assessments have a very important role in analysing and evaluating patient development status periodically and comprehensively (Gasperini *et al.*, 2021). Based on different research, nurses still do not complete nursing assessments (Lindo *et al.*, 2016) as observed in more than 60% of records in three hospitals within Jamaica. Iula *et al.*, (2020) reported that assessments of pain and nutritional status were not recorded in 12,513 nursing records in Italy. Other deficiencies that often occur include functional and fall assessments, as well as pressure ulcers (Bail *et al.*, 2021; Zembrato *et al.*, 2019). Similar conditions also occur in Indonesia where the quality and continuity of nursing care are still not optimal. Incomplete nursing assessments occur due to the complexity of clients and nurses workloads, varying terminology and classifications, persistent use of printed form as well as variations in instruments (Aleandri *et al.*, 2022; Zembrato *et al.*, 2019).

The results found 14 nursing problems, with four considered priorities based on existing cases (Table 5), namely ineffective airway clearance, chronic pain, nutritional deficits, and ineffective breathing patterns. Differences in nursing problems experienced by students are not only attributed to the use of various assessments but also associated with several other factors. These include student knowledge, different critical thinking skills, as well as understanding the nursing process comprehensively. Nursing assessment is part of the process where there are several challenges in determining problems, including the level of accuracy oriented toward medical and physiological problems (Freire *et al.*, 2018). In addition, several obstacles to effective implementation are knowledge, competence, skills, as well as attitudes in formulating and implementing the nursing process that starts during assessment and data collection (Asmirajanti *et al.*, 2019; Iula *et al.*, 2020; Khatiban *et al.*, 2019). The diversity of the 14 nursing problems identified suggests that students demonstrate critical thinking in analysing

nursing problems from various perspectives. However, it also indicates that students may lack a clear understanding of how to accurately determine nursing diagnoses, which could affect patient outcomes. Clinical experience plays a crucial role, as prior knowledge of a case influences diagnosis identification. Additionally, nursing students must assess patients' complaints, signs, and symptoms based on their responses, not solely on medical diagnoses.

Immonen *et al.* (2019) emphasised the need for nursing students to improve their competence in critical thinking, decision-making, and collaboration to become professional nurses. Increasing study hours could enhance students' competence in developing nursing processes (Kamblash *et al.*, 2024). Despite using various assessment formats like SDKI, NANDA-I, and Gordon's 11 Functional Health Patterns, the nursing process remains challenging due to factors such as nurses' routine changes, knowledge, experience, and patient load. Standardised nursing terminologies help implement care plans aligned with nursing procedures, improving patient outcomes and supporting evidence-based practices and global data sharing (Zhang *et al.*, 2021). Clinical experience significantly influences students' critical thinking and clinical decision-making skills. Insufficient preparation in education may result in inadequate analytical skills and confidence, with inconsistencies in how universities communicate professional values to students.

Determining the right diagnosis can help care in formulating goals and nursing actions needed by the client. Conversely, wrong nursing diagnosis causes errors in compiling a plan, potentially leading to negligence and malpractice (Hariyati *et al.*, 2020; Reis *et al.*, 2022). It is important to have a system that helps nurses establish the right diagnosis based on data obtained during assessments. To improve accuracy in establishing nursing problems and diagnoses, there needs to be a change in critical thinking, reasoning skills, and clinical judgment among nurses on an ongoing basis (Paans *et al.*, 2012). Nurses should be able to make accurate diagnoses in problem-solving based on the use of critical thinking as well as skills in decision-making to provide safe, effective, and efficient services (Bertocchi *et al.*, 2023).

Limitations

The limitations associated with this research include using only one educational institution, no initial screening of students critical thinking ability, and failure to evaluate the effect of assessment format on the accuracy and precision of nursing problems. Using the right and easy-to-understand nursing assessment format by nurses could affect patient outcomes.

CONCLUSION

It is seen that nursing assessments using the SDKI, NANDA-I, and Gordon 11 Functional Health Patterns categorisations did not have statistically different significance. This indicates that the use of nursing assessment formats does not have an impact on the identification of nursing problems. However, based on the ranking, the use of the SDKI assessment format tends to be better than other assessment formats, although the difference is not statistically significant. Based on the results, it recommended that the nursing assessment can be used as a reference for education and hospitals in using assessments based on the SDKI or NANDA- I or Gordon to provide work efficiency in enforcing nursing problems. However, further research is needed on students critical thinking, specifically in determining nursing problems. It is also necessary to determine the accuracy of enforcing nursing problems based on the assessment format used in clinical service settings as well as nursing and specialist education students in Indonesia. Further research could also focus on cultural adaptations, the accuracy of nursing diagnoses, and the potential for new tools or technologies to enhance assessment effectiveness. Additionally, studies could examine the role of these frameworks in improving patient outcomes and refining nursing curricula through more practical, hands-on training.

Conflict of Interest

The authors declare that they have no competing interests.

ACKNOWLEDGEMENT

The authors are thankful to IKesT Muhammadiyah Palembang, Indonesia for the scholars and all participant in this study.

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