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Research Article

How to Teach Clinical Reasoning to Nursing Students: Insights from Case Report Analysis

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Abstract

Background: Clinical reasoning is an essential competency that prospective nurses must possess. Case reports applying the nursing process are primarily used as a teaching and learning method to enhance clinical reasoning skills during clinical practice. **Objective:** This study aims to analyze case reports written by students during their clinical practice to examine the aspects of nursing assessment and diagnosis within the nursing process and to provide foundational data for the development of effective teaching strategies. **Design**: This study employed a qualitative research method using document analysis. **Participants and Setting:** Case reports written by third-year nursing students currently enrolled in clinical practice courses were utilized for the analysis. **Methods:** The READ approach was used to systematically analyze the case reports. **Results:** Problem-focused and risk diagnoses were primarily used with no instances of health promotion diagnoses. Most students demonstrated a lack of clear understanding of the definitions of diagnostic indicators. There were frequent instances where important information was missing during the nursing assessment. **Conclusion:** The basic concepts of the nursing process and clinical reasoning must be systematically taught, and innovation in clinical practicum education through the application of various teaching and learning methods is required.

Keywords: Nursing process; Clinical reasoning; Nursing students; Nursing assessment; Nursing diagnosis

Introduction

In increasingly complex clinical settings, Evidence-Based Practice (EBP) is being emphasized to ensure patient safety, reduce medical costs, and improve the quality of care [1]. EBP is a problem-solving process aimed at making right clinical decisions [2], and clinical reasoning is essential to this process [3]. Clinical reasoning is a complex cognitive process involving the use of various thought strategies to collect and analyze patient information, assess the significance of that information, and prepare alternative courses of action [4]. To implement EBP, nursing students, as future nurses, must develop clinical reasoning skills, which can be cultivated through critical thinking, nursing knowledge, and learning experiences. For this reason, systematic education for undergraduate nursing students is necessary [5].

Several prior studies have highlighted the need for changes in nursing education to enhance nursing students' clinical reasoning skills. Kavanagh and Szweda (2017) [6] reported that about 77% of newly licensed nurses either fail to recognize or inadequately respond to changes in patient condition or urgency due to insufficient clinical reasoning skills [6]. Hunter and Arthur (2016) [7] argued that the current clinical training environment prevents clinical instructors from adequately assessing students' clinical reasoning skills [7]. Van Wyngaarden et al. (2019) [8] pointed out that nursing education for clinical reasoning skills should employ innovative, learner-centered teaching strategies rather than traditional teacher-centered approaches. Moreover, students need be provided with clinical practice environments where they can apply nursing theory to practice [8].

In the nursing process, nursing diagnoses are the outcomes of clinical reasoning based on a complete nursing assessment [9]. Case reports utilizing the nursing process are one of the main learning strategies used to enhance students' clinical reasoning abilities [3,10]. According to previous studies, education using unfolding case studies has a positive effect on improving students' critical thinking, self-efficacy [11], clinical reasoning, and self-directed learning [12]. Introducing case reports early in the nursing curriculum has also been recognized as a meaningful teaching strategy for enhancing clinical reasoning skills [13].

To improve nursing students' clinical reasoning skills, it is necessary to learn, practice, and apply various types of clinical reasoning techniques [14]. Additionally, effective teaching methods and improvements in both theoretical and practical education are required [3]. For effective clinical reasoning education, identifying the shortcomings of current educational methods should be prioritized. Therefore, this study aims to analyze case reports written by students during clinical practice, identify issues within the nursing process, and provide foundational data for the development of effective teaching strategies.

Materials and Methods

Study design

This study employed a qualitative research method using document analysis [15] to propose teaching-learning methods and improvements in clinical practice guidance aimed at enhancing the clinical reasoning abilities of nursing students. Specifically, the study analyzed case reports submitted by students during clinical practice. Document analysis has been utilized in various studies, such as analyzing nursing curricula related to EBP [16] and examining perspectives on health integrated into care plans based on NANDA-I diagnoses concerning individuals with bipolar disorder [17]. Document analysis is a systematic procedure for reviewing or evaluating documents, and in this study, the READ approach was used to systematically analyze the case reports [18]. This research was conducted after obtaining approval from the IRB of Nambu University (1041478-2022-HR-010).

Materials

The subjects who submitted case reports for this study were third-year students from a nursing college located in the southern region of South Korea. The participants were intentionally sampled, as they were all guided by the same full-time faculty member responsible for the clinical practice course. These students had completed courses on critical thinking, the nursing process, and basic nursing practice in the skills lab during their second year, and they began clinical practice in the first semester of their third year. At the time of the study, the students had completed one or two clinical practice courses. Each student participated in a total of 90 hours of clinical practice over two weeks. The case reports, submitted before a group discussion held during the second week of practice, primarily focused on patients who had undergone joint replacement surgery at a specialized joint center. The reports involved applying the nursing process to these surgical cases. To maintain confidentiality, personal information was removed from the case reports, and the file names were replaced with serial numbers. Reports that did not include data related to nursing diagnoses were excluded from the analysis. Of the 27 submitted reports, one was unusable due to file corruption, and four were excluded because they lacked objective and subjective data. Consequently, 22 reports were included in the final analysis.

Extract data

The researcher developed and utilized a data extraction form using an Excel spreadsheet. The extracted data included Operation Name (OP), Post-Operative Day (POD), number of nursing diagnoses, names of nursing diagnoses, related/risk factors, and defining characteristics (subjective and objective data). For subjective data, the researcher copied and organized the exact sentences written by the students, while the objective data were organized in the order presented by the students. Data extraction was conducted by the researcher, and all information was used as described by the students without modification.

Analyze data

Quantitative and qualitative analyses were conducted using the extracted data. For the general characteristics of the collected data, a frequency analysis was performed on the types of surgery, post-operative days (POD), and the number of nursing diagnoses. The extracted nursing diagnoses were categorized into domains and classes based on the NANDA-I classifications [9], followed by a frequency analysis. Additionally, the nursing diagnoses were classified as problem-focused, risk, or health promotion, and a frequency analysis was performed to identify the types of diagnoses used by students.

To evaluate whether the nursing diagnoses made by students were based on appropriate nursing assessment data, a panel was formed, consisting of the researcher responsible for clinical practice guidance, two professors teaching nursing process courses, and one professor responsible for adult nursing theory courses related to joint replacement surgery. The panel used the data extraction form to discuss the appropriateness of the related/risk factors and defining characteristics for each nursing diagnosis. The panel first reviewed the diagnosis definitions and diagnostic indicators provided by NANDA-I for each extracted nursing diagnosis and conducted discussions in sequential order based on serial numbers. They assessed the appropriateness of the nursing diagnoses,

related/risk factors, and defining characteristics by categorizing them as "Yes" or "No." For diagnoses evaluated as "No," the panel discussed the reasons, and the researcher documented the discussions in the data extraction form. After completing the evaluation, the researcher summarized the discussion outcomes and shared them with the panel to ensure the accuracy of the interpretation.

Distil Findings

Quantitative analysis data were presented narratively or in tables, while qualitative data were categorized based on the issues identified in the nursing diagnosis process during the panel discussions. To enhance the readers' understanding, relevant examples were provided alongside the categorized findings from the case reports.

Results

Results of quantitative analysis

General characteristics of case reports

Among the collected case reports, 15 cases (68.2%) involved total knee arthroplasty (TKA), and 7 cases (31.8%) involved Total Hip Arthroplasty (THA). The most frequent Post-Operative Day (POD) was the 3rd day with 5 cases (22.7%), followed by the 1st and 2nd days with 4 cases each (18.2%). The 5th and 6th days had 3 cases each (13.6%), while the 4th, 7th, and 10th days each had 1 case (4.5%). In terms of the number of nursing diagnoses, 3 diagnoses were the most common, occurring in 14 cases (63.6%), while 4 and 5 diagnoses appeared in 4 cases each (18.2%).

Characteristics of extracted nursing diagnosis

A total of 16 unique nursing diagnoses were extracted from the 22 case reports (Table 1). Of these, 9 diagnoses (56.3%) were problem-focused, while 7 diagnoses (43.8%) were risk-focused. The most frequently diagnosed condition was acute pain, identified in 22 cases (95.7%). This was followed by risk for infection in 16 cases (69.6%) and risk for adult falls in 15 cases (65.2%).

Table 1. Domains, classes, and nursing diagnoses according to the NANDA-I

Domain	CLASS	Nursing Diagnoses	n	%
Activity / rest	Activity/exercise	Impaired physical mobility *	7	30.4
	Cardiovascular / pulmonary responses	Risk for thrombosis	1	4.3
Comfort	Physical comfort	Acute pain *	22	95.7
		Nausea *	1	4.3
Coping / stress tolerance	Coping responses	Anxiety *	1	4.3
Elimination and exchange	Gastrointestinal function	Constipation *	4	17.4
	Urinary function	Impaired urinary elimination *	1	4.3
Nutrition	Hydration	Risk for electrolyte imbalance	1	4.3
Perception / cognition	Cognition	Deficient knowledge *	2	8.7
Safety / protection	Infection	Risk for infection	16	69.6
	Physical injury	Risk for adult falls	15	65.2
		Impaired skin integrity *	2	8.7
		Risk for bleeding	1	4.3
		Risk for delayed surgical recovery	1	4.3
		Risk for peripheral neurovascular dysfunction	1	4.3
	Thermoregulation	Hyperthermia *	2	8.7

* = problem-focused nursing diagnosis

Results of qualitative analysis

Issues related assessment

Most students demonstrated a lack of clear understanding of the definitions of diagnostic indicators, such as defining characteristics, related factors, or risk factors, often confusing them with associated conditions. Additionally, many students presented defining characteristics (DCs) when diagnosing risk-based conditions, indicating a misunderstanding that risk nursing diagnoses require risk factors, while problem-focused diagnoses require defining characteristics and related factors. Some students also appeared to confuse subjective and objective data when identifying DCs.

There were frequent instances where important information, such as pain assessment (#16) or surgical site assessment (#1,5), was missing during the nursing assessment. Students often presented only vital signs and lab results as objective data (#1,5), neglecting other critical assessment details. In some cases, additional assessment was necessary to arrive at a more accurate diagnosis, but these opportunities were missed (#22). Students were also uncertain whether to classify elevated body temperature as a defining characteristic or as a nursing diagnosis itself (#1,5). There were also instances of students including irrelevant information indiscriminately in their assessments (#13) (Table 2).

Issues related to diagnosing

There were cases where the nursing diagnoses did not align with the defining characteristics (#3, #16). Students also tended to choose broad diagnoses (e.g., Risk for infection) rather than more specific diagnoses (e.g., Risk for surgical site infection) (#18) (Table2).

Table 2: Examples of nursing diagnosis based on assessment data.

Number of case report	Nursing diagnosis	Related /Risk factor	Subjective data	Objective data
1	Acute pain	Surgery	My knee really hurts I couldn't sleep because of the pain. The surgery site doesn't feel like it's my leg.	OA, TKA Observed facial grimacing. Pain assessment_Rt.Knee, NRS 5-6
	hyperthermia	Infection	I feel like I have a fever. I've got chills, and I feel cold.	Vital signs, Lab-ESR, CRP
3	Risk for peripheral neurovascular dysfunction	none	Shouldn't I avoid walking right now? This feels uncomfortable; I don't want to use it.	THA Observed frequently not wearing IPC (Intermittent Pneumatic Compression).
5	Acute pain	Surgery	The leg I had surgery on really hurts. Frequently observed showing irritation and complaining of pain to the caregiver. Groaning and grimacing due to pain were often observed during position changes. Skin with a flushed appearance was noted.	Warmth noted upon skin palpation (no specific area mentioned). Pain assessment-NRS 4-5 Body temperature-38.2~39.0 Lab_RBC, Hb, WBC
	hyperthermia	Surgical site	I keep feeling hot and cold. I keep breaking out in cold sweats. I took a fever reducer, but my fever isn't going down.	Body temperature-38.2~39.0 Lab_RBC, Hb, WBC
6	Risk for adult falls	Surgery	Can you hold me?	Unstable gait when using a walker. Fall risk assessment score presented (no specific tool mentioned).
9	Risk for infection	Invasive procedure	None	Foley, Hemovac Lab results presented
11	Impaired physical mobility	Disease	I feel suffocated. When do you think I'll be able to go to the bathroom on my own?	TKA, Bedridden. Knee brace applied to reduce knee flexion.
13	Acute pain	Surgery	I can't sleep because of the pain. My knee is throbbing and hurting.	TKA, PCA, V/S, Pain assessment-QS Facial grimacing, Lab results presented
16	Acute pain	Surgical site	My knee feels cold and throbbing with pain.	THA, Tramadol, Pethidine
	Anxiety	Pain	The pain keeps coming, and I can't sleep. My leg hurts so much, I can't walk.	None
18	Risk for infection	Invasive procedure	None	THA, dressing on the surgical site (+).
22	Impaired urinary elimination	Dysuria	I don't feel like peeing. I haven't peed at all today.	Palpation result_bladder distension

Discussion

Nursing diagnoses are clinical judgments concerning human responses derived through clinical reasoning [9]. This study aimed to identify issues that arise during the nursing assessment and diagnosis processes by analyzing nursing process case reports submitted by students during clinical practice. Additionally, it sought to explore guidance strategies to improve students' clinical reasoning skills.

The third-year students participating in this study primarily used problem-focused and risk diagnoses, with no instances of health promotion diagnoses observed. This finding aligns with the study by Park and Jeong (2022) [19], which analyzed the characteristics of nursing diagnoses in case reports written by fourth-year students. A health promotion diagnosis is a clinical judgment concerning a patient's motivation and willingness to improve health behaviors [9]. To make such judgments, adequate communication with the patient or caregiver is necessary, and the diagnosis should be refined through in-depth consultations following the initial assessment. However, students tended to adopt an analytic pattern [20], relying on objective data such as nursing records or diagnostic tests rather than directly consulting with the patient to identify problems. This tendency is likely due to the observation-focused clinical practice environment and the students' underdeveloped therapeutic communication skills.

To address this, educators should collaborate with clinical instructors to provide students with opportunities to directly consult with patients. Additionally, instructional methods such as coaching [21]and unfolding case studies [22] should be employed to help students thoroughly assess patient problems and refine their nursing diagnoses, thereby enhancing their clinical reasoning abilities.

Moreover, instructors need to ensure that students have a clear understanding of the components of nursing diagnoses during clinical practice. Most students participating in this study perceived associated conditions, such as medical diagnoses or surgical procedures and devices, as objective data, despite being supportive information. These students had completed theoretical coursework on the nursing process in their second year and were applying that knowledge in clinical practice to write case reports, indicating a potential difficulty in directly applying theoretical knowledge to practice.

To address this, learning support strategies are necessary, such as applying instructional methods like the flipped learning method [23,24] in clinical practice courses, which would allow students to reconfirm relevant concepts before writing case reports. Additionally, it may be beneficial to improve the format of the case reports to facilitate understanding of related concepts.

Above all, students must acquire knowledge of key nursing concepts and learn how to engage in clinical reasoning. The analysis of this study revealed that students lacked the ability to organize collected data into information. Rather than deriving nursing diagnoses based on nursing assessment data, they tended to present diagnoses and fit the assessment data to them. Furthermore, students showed a deficiency in identifying what information to collect to understand patient problems and what additional information might be needed. This led to instances of collecting important information inadequately during nursing assessments or producing nursing diagnoses that did not align with the assessment data.

Nursing diagnoses can be seen as the product of a decision-making process that judges collected data through clinical reasoning. Gonzales et al. [25] also emphasized the importance of systematic clinical reasoning education and provided concrete guidelines for applying concept-based learning. Therefore, clinical practice education should be improved to incorporate a variety of instructional methods, such as inquiry-based learning [26], concept-based learning [14,27,28], simulation-based learning [29,30], and questioning techniques [31] during clinical practice courses.

This study analyzed the nursing assessment and diagnosis processes of students with limited clinical practice experience and identified areas for improvement in practical education to enhance clinical reasoning skills. However, caution should be exercised when generalizing the findings of this study to other educational settings, as the participants were nursing students from a single university. Additionally, since the study involved a document analysis of case reports submitted by students from the same clinical ward, it may not have captured all the issues related to the nursing process that the students experienced. Therefore, it is necessary to expand the participant pool and diversify data collection methods, such as incorporating interviews, to conduct further research.

Conclusion

This study revealed that students with limited clinical practice experience lack fundamental theoretical concepts related to the nursing process, particularly nursing assessment, as well as clinical reasoning skills. With the Next Generation NCLEX emphasizing the importance of clinical judgment skills for prospective new nurses through real-world case studies [32], changes in practical education are needed in addition to classroom innovation. To achieve this, it is essential to identify various factors that influence clinical reasoning skills, beyond just the students' education year and clinical practice duration [33]. Most importantly,

improvements in current practical education should be assessed alongside understanding students' needs, thereby necessitating innovations in both the practical education curriculum and the practice environment.

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Declaration of Interest

The author declares no conflict of interest.

Author Contribution

Chieun Song PhD, RN: Conceptualization, Data curation, Methodology, Investigation, Formal analysis, Writing -Original Draft, Writing-Review and Editing, Visualization, Funding acquisition.

Ethical Consideration

This study was approved by the Institutional Review Board of Nambu University (1041478-2022-HR-010).

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