An Innovative Clinical Concept Map to Promote Clinical Judgment in Nursing Students

Nancy Eisenmann, PhD, RN

ABSTRACT

Background: Clinical judgment is an essential component of nursing education and a necessary skill for entry-level nurses. The use of traditional concept maps may not encourage adequate clinical judgment skills in nursing students. **Method:** Using the current NCLEX test plan, the National Council of State Boards of Nursing clinical judgment model, and the theoretical frameworks of Benner, Tanner, and Caputi, a new approach to concept mapping was developed. **Results:** Student feedback is positive, pointing to increased ability to prioritize nursing care and simplifying a significant amount of complex information and improved critical thinking and clinical judgment. **Conclusion:** This clinical concept map increases clinical judgment by assimilating and analyzing clinical information and integrating it into the nursing process. All components are on one sheet of paper, providing students with a succinct, global picture of nursing care. **[*J Nurs Educ*. 2021;60(3):143-149.]**

Dr. Eisenmann is Clinical Assistant Professor and Academic Practice Partner, University of Wyoming, Fay W. Whitney School of Nursing and Cheyenne Regional Medical Center, Laramie, Wyoming.

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Address correspondence to Nancy Eisenmann, PhD, RN, Clinical Assistant Professor and Academic Practice Partner, University of Wyoming, Fay W. Whitney School of Nursing and Cheyenne Regional Medical Center, 1000 East University Avenue, Office 435, Laramie, WY 82071; email: nrsnik21@hotmail.com.

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Nursing practice is evolving rapidly in an ever-changing health care environment. Nurses are required to care for highly acute, complex patients with multiple comorbidities, while juggling an increasing number of work-related tasks. Current nursing care delivery environments require nurses to apply a vast amount of knowledge in complex, variable patient care situations with positive outcomes. Nurse educators are now challenged with finding creative ways to teach students how to apply nursing knowledge to appropriately identify and intervene in patient care situations to develop safe and effective entry-level graduates. Clinical decision making is now a necessary competency for nursing students.

Clinical judgment is a focus area for undergraduate nurse educators based on the Next Generation NCLEX® project (NCSBN, 2019). The 2014 National Council of State Boards of Nursing (NCSBN) practice analysis found current nursing practice required licensed nurses to make increasingly more complex clinical decisions (NCSBN, 2019). The Next Generation NCLEX project will ask nursing graduates to answer questions designed to evaluate their ability to anticipate expected outcomes and make clinical decisions to obtain licensure (NCSBN, 2019). The future of the NCLEX influences the educational approaches nursing faculty take to facilitate nursing students' learning. Educators must find ways to integrate clinical judgment into nursing education. The clinical mapping tool presented in this article was developed from anecdotal gaps identified in the clinical reasoning skills of baccalaureate nursing students.

CONCEPT MAPPING

Concept mapping has been an educational strategy since the 1970s (Novak & Cañas, 2007). The use of concept mapping in science education preceded its use in nursing education (Daley et al., 2016). In 1992, nurse educators implemented the use of concept maps for students to show their learning and understanding of connections between clinical concepts (Daley et al., 2016). In 2000, concept mapping in the clinical area was used as an alternative to nursing care plans (Daley et al., 2016). The concept map has been widely used in nursing

education since then. A traditional concept map is a freehand map constructed by a student, representing their knowledge and understanding of connections among concepts.

The concept map is one tool for nurse educators to use to assess a nursing student's knowledge regarding nursing care in a clinical or learning environment. The students visually link and present the concepts related to nursing care to rationalize understanding of the complex delivery of nursing care. Nursing students "map" their patient care, identifying connections between various concepts such as disease processes, tests, and medications. The nursing process is a critical framework for the planning and execution of nursing care. However, more often, the nursing process is a separate element from the concept map in clinical experiences (Daley et al., 2016).

The traditional form of concept mapping was initiated 18 years ago (Daley et al., 2016). The environment nurses work in has changed dramatically during this time, demanding nurses to readily apply clinical knowledge to make decisions (NCSBN, 2020). According to Tanner (2006) and Caputi (2018), clinical decision making is done in the context of the nursing process. Nurses use the nursing process as a framework to prioritize and plan care. Therefore, incorporating the nursing process into students' knowledge construction is vital to developing clinical judgment. Gathering clinical information and data and deducing necessary information to formulate a patient-centered plan of care is a required skill of nurses. Entry-level nurses must have some deliberate experience in applying their assessment data and gathered clinical information to patient care to make accurate and timely clinical decisions (Caputi, 2018; NCSBN, 2019). The clinical concept map presented in this article gives deliberate experience with directing necessary data collection and applying the information to the nursing process to promote clinical decision-making skills.

The traditional concept map is rooted in constructivism learning theory, described as subjective representations of knowledge construction from the student's own experiences (Schunk, 2020). Because constructivism is a subjective representation of knowledge construction, the student's representation of knowledge may be incorrect. The application of incorrect or inaccurate knowledge in a nursing environment is problematic. One of the knowledge gaps noted with nursing students constructing a traditional concept map was the inability to explain the interconnectedness and impact of concepts on one another, demonstrating minimal knowledge depth at times. Students also do not consistently demonstrate the ability to retain the information and transfer previously learned knowledge by formulating a map. Because of the complex nature of disease and illness in today's nursing environment, there is a vast amount of information creating chaos and making prioritization difficult. Brune (2013) found that traditional concept maps do not increase critical thinking skills with nursing students. To make necessary clinical judgments and intervene appropriately, nurses must retain appropriate clinical information, make necessary cognitive connections, and further apply it to the patient situation. Simply connecting concepts does not demonstrate the higher level thinking necessary for nursing practice. Undergraduate nursing students need assistance in delineating clinically significant information and applying the information to clinical situations to retain for future practice (Cappelletti et al., 2014).

This new theoretically supported concept-mapping tool was developed to help prelicensure nursing students to make appropriate connections within the decision-making framework of the nursing process. The result is intended to improve clinical judgment and provide a clear picture of patient needs.

A NEW APPROACH: THEORETICAL FRAMEWORK FOR A NEW MAP

Benner's (2001) novice to expert theory identifies that clinical reasoning is generated from a combination of education and experience. As a nurse becomes more skilled in practice, they will apply clinical reasoning and judgment from intuition (Benner & Tanner, 1987). According to Benner et al. (1992), judgment arises from clinical experiences, recognizing patterns in situations that may be like something previously encountered. Further, the more experienced nurses use intuition to make clinical decisions. This nursing intuition develops from multiple experiences with clinical patient situations. The experienced nurse can make judgments based on previously seen patterns (Benner et al., 1992). Experience also allows the nurse to readily obtain vast patient information, multiple environmental cues, and patient assessment data and to establish nursing priorities based on essential patient needs (Benner et al., 1992). The nurse who has experienced clinical patterns can also sift through a large amount of data to predict what potential complications lie ahead and further make clinical decisions about appropriate nursing interventions (Fonteyn & Ritter, 2019).

Without experience, novice nurses use reasoning based on limited nursing knowledge developed through their education (Benner, 2001). According to Facione and Facione (1996), the experienced nurse makes vital, often limited clinical decisions using an organized approach to analyze, interpret, and identify patient needs based on previous patterns of patient responses. To establish nursing judgment, a nursing student must learn to prioritize the significant amount of patient information with little experience to draw from.

Prioritization is a learned skill and needs deliberate work in school to produce proficiency (Caputi, 2018). Novice nurses report feeling generally overwhelmed at the amount of information presented to them and have difficulty differentiating critical data without the familiarity of a nursing scenario (Lake et al., 2009). However, an expert nurse can easily prioritize patient data and assessment information, deduce necessary information, identify nursing options, and choose appropriate patient-centered interventions (Hinkle & Cheever, 2018). For the experienced nurse, prioritization is a normal practice occurrence. The nursing student must work to sift through multiple cues, identify what those cues mean, and determine an appropriate action for the patient circumstances.

Clinical judgment is a logical process nurses move through to make decisions regarding a patient situation. According to Caputi (2018), the process of clinical judgment includes collecting and processing data, understanding the problem, planning and implementing nursing interventions, and evaluating effectiveness. The process of clinical decision making should

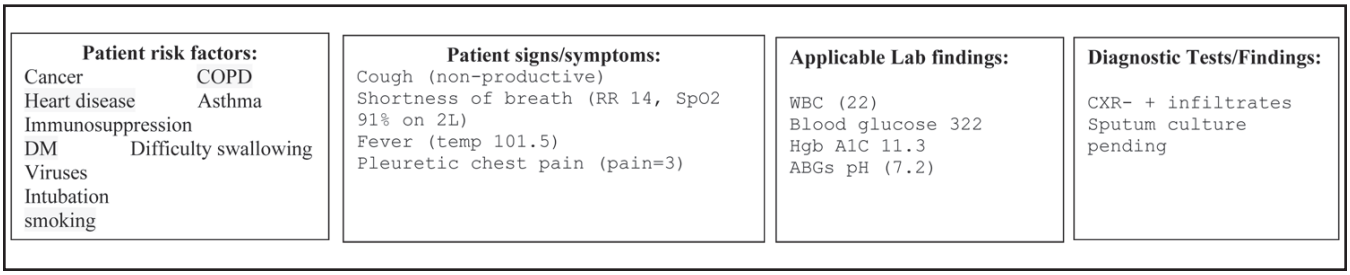

Figure 1. Top of the map. Note. COPD = chronic obstructive pulmonary disease; DM = diabetes mellitus; RR = respiratory rate; SpO2 = oxygen saturation; 2L = 2 liters of oxygen; WBC = white blood cell count; Hgb A1C = measure of average blood sugar on hemoglobin; ABGs = arterial blood gases; pH = acid base balance in blood; CXR = chest radiograph.

be deliberate (Caputi, 2018). This tool encourages clinical judgment with a deliberate process of collecting data, processing the data, and planning nursing interventions in the context of the whole clinical picture.

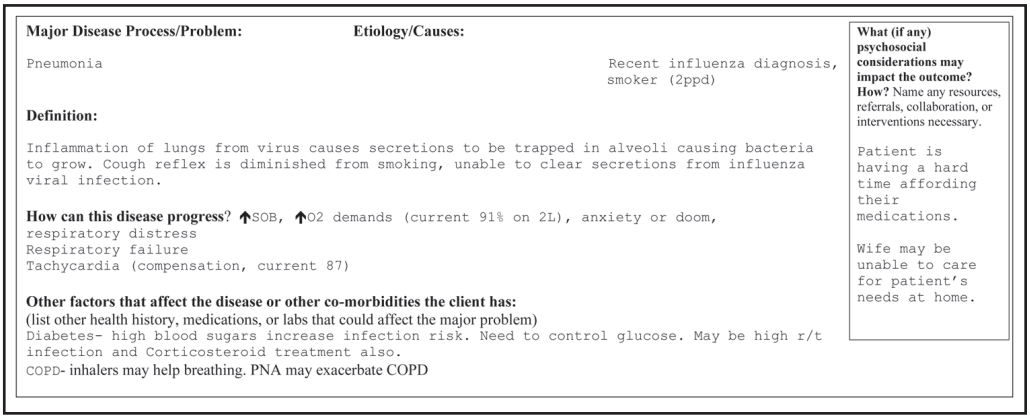

Figure 2. Middle of the map. Note. ppd = pack per day (measure of smoking); SOB = shortness of breath; O2 = oxygen; 2L = 2 liters of oxygen; r/t = related to; COPD = chronic obstructive pulmonary disease; PNA = pneumonia.

COMPONENTS OF THE TOOL

Top of the Map: Assessment and Reduction of Risk Potential

The top of this correlation map asks students to identify the risk factors for the patient's current disease process, signs and symptoms, laboratory tests, and medical tests (**Figure 1**). The boxes at the top of this correlation map represent the data nurses use to identify patient risks, safety issues, and health promotion needs to incorporate in patient care. An effective educational approach with the top of the map is to list all the risk factors and symptoms of the disease process and choose the symptoms the patient is complaining of or exhibiting on assessment. This information allows the student to see the whole disease picture to facilitate the experience of a clinical picture and develop an understanding of potential differences in disease-specific patient responses.

The top of this map allows students to work through clinical information to identify priority information or see missing information to ask about. For instance, a student may prioritize nursing care around the patient's primary complaints and anticipate interventions. If the student identifies a history of smoking, diabetes, and chronic obstructive pulmonary disease (COPD), they are also able to see how the chronic disease processes contributes to and influences the acute issue. The student may further identify the need for collaboration with medical professionals with missing data. Reduction of risk potential is an important component in nursing education for future nursing practices and the NCLEX.

Middle of the Map: Disease Process and Trajectory of Illness

The middle component of this map is the alteration in health identified by the student (**Figure 2**). This part of the paperwork assists the student in understanding the disease process of the patient or population they are studying in class or caring for in clinical (Tanner, 2006). Nursing care is centered on patient needs stemming from their medical diagnosis. Interpretation of data begins in the middle of the map with formulating a good understanding of disease processes. Good foundational understanding of pathophysiology provides a framework for the student to prioritize and plan necessary care. Using pathophysiology of the disease process within a nursing plan of care helps future nurses to better understand the context of the nursing interventions implemented to help patient outcomes with a specific disease. Students are encouraged to write out their own lay definition, or nonmedical understanding, of the disease process and to evaluate their understanding and increase their experience with interpretation to provide patient education.

Identifying the trajectory and progression of the disease process and the influence of other factors on the disease process is important for students to develop clinical reasoning skills. This information assists students to predict any potential complications or worsening of the disease process to establish how to act, should the patient's status require intervention. Novice nurses will need help in identifying possible complications, and this map provides a framework to foresee possible issues (Benner, 2001). By writing the disease trajectory, students deliberately learn how to identify complications

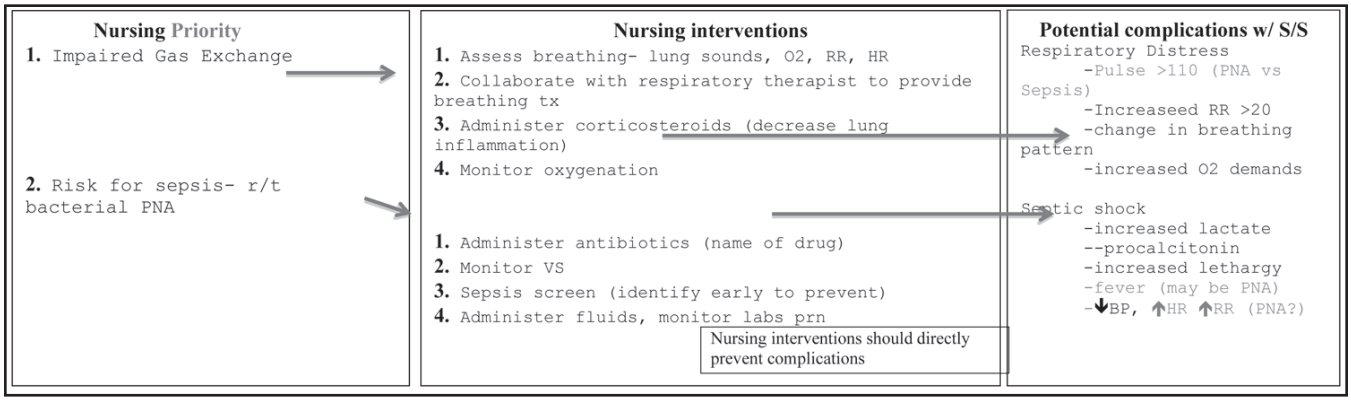

Figure 3. Bottom of the map. Note. r/t = related to; PNA = pneumonia; O2 = oxygen; RR = respiration rate; HR = heart rate; tx = treatment; VS = vital sign; prn = as needed; S/S = signs and symptoms; BP = blood pressure.

to anticipate patient needs. For example, pneumonia would be influenced by COPD and influenza. The disease can progress to respiratory distress. Writing out the pathophysiology of the disease process helps the student to understand why pneumonia can be influenced by these secondary disease processes and how it could progress to further breathing difficulty. This makes the student dig deeper than simply making a connection from a history of COPD to pneumonia.

The middle section of the map also includes an area to tie in any psychosocial concerns a student would anticipate having the potential to affect patient outcomes. This is an important component of nursing care to incorporate in the plan of care, as nurses play a crucial role in the coordination of psychosocial needs. Different nursing care delivery environments may encounter psychosocial concerns in varying degrees of priority; however, this is important information for nursing students to address to provide holistic care.

Bottom of the Map: The Nursing Process

According to Tanner (2006), nurses develop clinical reasoning by using different types of data. Nursing students must learn to effectively use their gathered clinical data (e.g., assessments, laboratories, tests, complaints) to determine appropriate nursing priorities. With experience, nurses begin to develop reasoning patterns, eventually leading to an intuitive grasp of these clinical situations (Benner & Tanner, 1987). To accomplish this, the clinical data are applied to the nursing process that was used to establish a plan of care and to work through clinical decisions. This tool purposefully combines the clinical data and disease process with the nursing process to give students a succinct, global picture of patient care (**Figure 3**).

When a student is asked to evaluate assessment data and clinical information in the top of the map, they relate this information from the disease process and begin formulating hypotheses of patient needs, nurse priorities, and complications. Clinical data are integrated into the nursing process at the bottom of the map to formulate goals and identify appropriate interventions to meet the identified patient goals. Establishing a plan of care with clinical data is how experienced nurses work; therefore, students benefit from working with this type of concept map.

The medications and medical interventions should also be applied to the nursing plan of care, as nurses are assessing the patient response to the disease and treatment. For example, pneumonia could be diagnosed with a chest radiograph, through the patient's high white blood cell count, when arterial blood gases show respiratory acidosis, or if their oxygen saturation reading is low. If the patient has a history of COPD and is positive for influenza, they could be at risk for pneumonia. If the patient has an allergy to multiple antibiotics, it places them at risk for further complications from treatment. The nursing priority in this case is impaired gas exchange. The student should be able to identify the supporting data (evidence) from the top of the map and correlate this information to support nursing interventions. Other nursing priorities may be important risks to mitigate for the patient—in this case, the risk for sepsis. The worst anticipated scenario from the pathophysiology of pneumonia is respiratory distress and sepsis.

The nursing interventions should be steps that the nursing student takes to prevent the worst-case scenario to meet patient goals. The interventions should involve the components of assessment, screening, monitoring, administration, education, and any other necessary measures nurses use to prevent poor patient outcomes. In this scenario, the nurse will assess respiratory status (i.e., respiration rate, lung sounds, skin color), monitor oxygen saturation and heart rate, administer oxygen as needed, administer corticosteroids, monitor patient responses, and educate the patient on the need for oxygen and the plan of care. The nurse may also administer other medications as part of the care plan. Medications such as antibiotics specific to the problem should be listed as interventions. Nursing interventions should relate specifically to the clinical data and nursing goals. The entire map should make sense and relate.

Prior to the development of this tool, nursing students were instructed to add interventions from boxed care plans that may not make sense for the individual patient. Nursing care related to the patient's priority problem should prevent the potential complications, as the goals of nursing are to improve or maintain the current state of health. As the nursing student works to analyze the clinical information to formulate interventions within a nursing care plan to prevent a complication, they be-

gin to understand how to apply the basic components of clinical judgment.

To further develop clinical judgment, nursing students should place patient-specific information in this correlation map. For instance, the student should indicate the vital signs of their patient, as well as how they anticipate these vital signs would change should the condition worsen, next to the anticipated complication. Evaluating this clinical information causes the student to generate expected solutions ahead of complications and anticipate necessary interventions. Further, the student should be ready for a possible change in the plan of care. For example, with the pneumonia, the patient's oxygen saturation is 94% on 2 liters (2L) of oxygen and their pulse rate (per minute) is 86. Next to respiratory distress, the student should indicate signs of worsening: dyspnea, respiratory rate increases to 28 breaths per minute, tachycardia with pulse of 115, and oxygen saturation of 91% on 2L of oxygen. The student should be able to explain their expected changes to vital signs. Further, the student should explain what interventions would be necessary should they assess a possible decline; this generates solutions for a problem and establishes clinical judgment (NCSBN, 2019).

DISCUSSION

The educational tool introduced in this article helps nursing students take a significant amount of clinical data and begin the process of prioritization. A student begins their education with abstractions, and this paperwork allows for them to see a more global picture of nursing care. The use of this tool in clinical experiences or in theory courses allows nursing students to deduce relevant clinical information and learn to establish a pattern of potential clinical scenarios with each disease experience. Data are appraised within the nursing process to establish a meaningful experience with individual patient needs. A pattern of educational opportunities with disease processes in the nursing framework establishes clinical patterns and facilitates the development of clinical judgment.

When assessing and planning within this new map, the nursing student can identify missing information, inconsistencies, distinguish relevant and irrelevant clinical information and assessment data, and validate information with evidence. The students also have a framework to determine expected normal and abnormal assessment findings based on a disease process.

Anecdotal gaps were identified in the evaluation of free-hand concept maps, including the ability to make meaningful patient-centered connections or overwhelming amounts of information leading to chaotic connections. Students were able to draw lines to connect the appropriate concepts of nursing practice while demonstrating an inability to understand the depth of nursing care involved with each connection or the directions of a connection. At times, appropriate connections are made between concepts despite the student's inability to verbalize why they are making some of their connections. Further, a hand-drawn concept map does not allow for clinical decision-making priorities with expected normal and abnormal assessment data related to the patient's condition. For example, if a student understands the pathophysiology and symptoms of a pulmonary embolism, the student can predict an expected normal level of chest pain and further monitor a patient for symptoms of respiratory distress. If the student identifies a history of anxiety in a patient with no cardiac history, the student can identify further assessments and interventions that may acutely help if the patient complains of chest pain with an increase in respiration rate. Chest pain is an expected finding with this pathophysiology, and an increase in the patient's respiratory rate may be due to increasing anxiety. The symptoms the patient is exhibiting may be related to either their medical history of anxiety or the current medical issue of the pulmonary embolism. Knowing the expected findings and linking them to the medical history, the student may begin intervening in both or rule out anxiety by medicating the patient. With this map, the student can also identify missing data. For example, the patient does not have laboratory tests ordered to measure bleeding time. With further research, the student identifies the patient is receiving rivaroxaban and has a template to help indicate whether they should dig deeper to evaluate why there are no laboratory tests ordered. This new tool allows for higher level cognitive processing than simply drawing lines between pulmonary embolism, rivaroxaban, surgical history, and anxiety. This tool provides direction and a framework for students to facilitate learning as they experience a multitude of complex clinical scenarios.

Cognitive Processes and NCLEX

With a traditional hand-drawn correlation map, the connections and processes are only as good as what the student develops. With this new tool, the student can integrate clinical patient data into the nursing process to see the whole patient care picture. Further, this map assists with developing essential knowledge in a way to prepare them for both the NCLEX and future entry-level practice.

Nurses are required to apply knowledge and skills in practice, and this correlation map requires students to apply higher level cognitive processes within Bloom's taxonomy (Anderson, 2013). The mapping tool requires the student to fill in the clinical information they gather. This requires analysis to evaluate the patient data and identify pertinent data to include and unnecessary data to exclude, as well as the relationship between the data and the disease process. According to Bloom's taxonomy, synthesis of information involves piecing information together to form a whole picture (Anderson, 2013). This map requires the student to synthesize assessment and clinical information to incorporate into the nursing process. Evaluating and creating are the highest cognitive processes according to Bloom's taxonomy (Anderson, 2013). The student is creating a plan of care using current knowledge or researching new unknown information. The student then must evaluate the impact of their interventions on the patient outcome. The student is demonstrating strategic knowledge versus factual or conceptual knowledge using these methods with higher levels of cognitive processes (Anderson, 2013).

The goal for any nursing education program is to prepare students to be successful practitioners and to pass the

NCLEX. This concept map not only encourages clinical judgment but is designed to fit the client needs categories using one of the major integrated processes of the NCLEX examination: the nursing process (NCSBN, 2018). The top of this correlation map is geared toward health promotion and maintenance and reduction of risk potential. Students identify the patient risks that require intervention and education to reduce further illness for a patient. Laboratory values and assessment information reveal potential risks to identify and mitigate. Understanding diagnostic tests and findings is identified as necessary nursing knowledge from the basic care and comfort test category (NCSBN, 2018).

Establishing priorities is a significant component of management of care, a subcategory of a safe effective care environment (NCSBN, 2018). Management of care requires the application of knowledge of pathophysiology in establishing priorities for interventions, prioritization of care, and evaluation and revision of the plan of nursing care (NCSBN, 2018). Physiological adaptation encompasses a large part of the total NCLEX (NCSBN, 2018). The client needs category includes illness management, understanding pathophysiology, identification of client responses to interventions (expected and unexpected), and alterations in body systems (NCSBN, 2018). The clinical concept map ties in all these client needs categories and provides real clinical learning and experience for application to future patient care scenarios. Physiological integrity (i.e., infection control and safety) are easily integrated into this map with the nursing process. Psychosocial needs, another major client needs category, is easily incorporated in the middle section of the correlation map, addressed with a specific, patient-centered question. This map encourages students to incorporate and apply knowledge and skills that will make them successful both in nursing practice and on the NCLEX.

Future Research

Safe nursing practice requires nurses to have sound clinical judgment. Patient safety is identified as an ongoing issue by the recent NCSBN (2020) environmental scan. Medical errors and health care–acquired infections continue to be problems nurses face in practice (NCSBN, 2020). Advances in nursing care coupled with the current safety and infection issues will require more knowledge application and clinical judgment. Entry-level nurses should be able to readily identify risks to their patients and prioritize interventions to prevent errors, safety risks, and, ultimately, poor patient outcomes.

The NCSBN environmental scan (2020) also identifies that the future practice of RNs should incorporate the diagnostic process. Nurses have to ability to work with other diagnosticians to assist in increasing the accuracy and efficiency of diagnosis and implementation of necessary medical care. Incorporating diagnostics into the future practice of the RN will further demand development of excellent clinical reasoning and judgment in nurses.

Early feedback from student use of this clinical concept map is overwhelmingly positive. A convenience survey was provided to students following clinical experiences after two semesters of use (approximately 90 students). All (100%) of the students surveyed reported an increase in critical thinking with this specific map. A better understanding of the disease process and nursing care was reported by 92% of students, and 96% of students reported this map was beneficial to their learning. Nursing faculty observed students feeling more confident in their ability to explain their patient care in the context of the disease process. Prioritization improved immensely with the use of this clinical concept map versus a traditional student-constructed map. Future research is planned to study the impact of the tool's use on clinical judgment with nursing students. Further research will give insight into information provided by students' experience with the tool and quantitative impact on clinical judgment.

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