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# Clinical Reasoning on an Assignment: Baccalaureate Nursing Students' Perceptions / Raisonnement clinique à partir d'un travail écrit : la perception d'étudiantes au baccalauréat en sciences infirmières

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## Introduction

Clinical reasoning allows nurses to perform the complex analysis of multiple health conditions and to recognize and intervene in the case of deteriorating patients (Levett-Jones et al., 2010). It has been defined as the “process by which nurses collect cues, process the information, come to an understanding of a patient problem or situation, plan and implement interventions, evaluate outcomes and reflect on and learn from the process” (Levett-Jones et al., 2010, p. 516). The thinking skills required for clinical reasoning in nursing practice must be developed through undergraduate nursing education (Marchigiano, Eduljee, & Harvey, 2011), in fact, “the goal of nursing education is to develop independent, purposeful critical thinkers who can support the clinical reasoning necessary for practice” (Ellermann, Kataoka-Yahiro, & Wong, 2006, p. 220). According to the Canadian Association of Schools of Nursing [CASN] (2011, 2015), baccalaureate nursing education is responsible for providing a foundation for sound clinical reasoning.

## Background

In order to provide a foundation for clinical reasoning within undergraduate nursing education, it is important to understand how clinical reasoning skills develop and are used by undergraduate nursing students. Although there are some qualitative studies that have described the student experience of clinical reasoning either in practice (Di Vito-Thomas, 2005; Ellerman et al., 2006; Wotton, Davis, Button, & Kelton, 2010) or through clinical assignments (Abel & Freeze, 2006; Bartlett et al., 2008; Lee & Brysewicz, 2009; Paans, Sermeus, Nieweg, & Van Der Schans, 2010), the perceptions of these experiences are not well understood. Marchigiano et al. (2011) found that “little information is available regarding how students perceive their abilities to think and process information related to their delivery of patient care” (p. 145).

The department of nursing and health studies, in which this research was conducted, used a specific type of written assignment as a tool to promote and assess the clinical reasoning of nursing students. The researchers were interested in exploring students’ perceptions of their own clinical reasoning skills as they worked through the assignment. The assignment, described below, was based on a case study (patient scenario). The case presentation is a “time-honoured teaching and learning strategy,” and is one of a variety of strategies used to teach clinical reasoning (Banning, 2008, p. 10). The assignment also required students to apply the nursing process, which is an important tool for clinical reasoning (Alfaro-LeFevre, 2017). The purpose of this qualitative study was to explore the perceptions of the clinical reasoning skills of students who, during the third year of their baccalaureate nursing program, applied the nursing process to complete a clinical judgement exercise (CJE).

## Description of Assignment

The CJE was an existing component of theory courses at one Canadian college. It was similar to a three-phase assessment created at McMaster University, Ontario, known as the “triple jump” (Rideout, 2001). In the first phase of the triple jump, students were given a problem scenario, and they were expected to ask questions and formulate assessments, diagnoses, and interventions. The second phase was a time of independent study to increase understanding and evaluate the diagnosis and interventions. The final phase was the creation and submission of the nursing care plan (Lee & Brysiewicz, 2009). The CJE was given to students in each of the first three years of their baccalaureate program. At the time of writing the assignment, students were provided with a paper-based patient scenario appropriate to their year

in the nursing program and were expected to independently brainstorm questions about the client and identify, prioritize, and address the patient's problems. Following a pre-determined time of independent study, the students submitted a patient-specific care plan. Third-year students in particular were presented with a complex acute care scenario and were required to identify three key nursing diagnoses, determine a priority diagnosis with rationale, and develop a thorough nursing care plan for that diagnosis. They had one day to complete the assignment. An example of a third-year CJE assignment is provided in the Appendix.

### **Literature Review**

This literature review consisted of a preliminary and a secondary search. A preliminary review of the literature was carried out to inform the study in terms of clinical reasoning in nursing students or newly graduated nurses. The Matrix Method was used to search for, organize, and synthesize relevant literature on the topic (Garrard, 2011). A systematic search was performed using CINAHL and MEDLINE. The terms *nurs\** and *student* were used and synonyms for student were included using the Boolean operator "or". These terms were *baccalaureate* or *undergraduate* or *associate degree* or *education*. As the assignment was based on the nursing process, the terms *nursing diagnosis* or *nursing process* were added. The terms *critical thinking*, *clinical judgment*, and *clinical reasoning* were also added to the search string as these terms are often used interchangeably in the literature (Alfaro-LeFevre, 2017). Finally, the terms *assessment* or *assignment* were added. Studies were included based on the inclusion criteria of being peer reviewed and pertaining to student nurses' or new graduate nurses' critical thinking, clinical reasoning, or clinical judgement. The timeframe selected for this preliminary literature review was from 1990 to 2014.

A secondary search of the literature was performed using the same terms and the same data bases, in order to locate studies related to the emerging themes as well as to identify more recent literature related to the findings. In addition, this search included textbook resources and grey literature, particularly documents authored by the Canadian Association of Schools of Nursing (CASN) regarding the importance of clinical reasoning in nursing education. In total, 28 texts informed this study.

### **Historical Context**

The Delphi report credited to Facione (1990) offered the best possible conceptualization of critical thinking as "purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference" (p. 3). Facione and Facione (1996) utilized this definition to create teaching aids to engage nursing students in critical thinking. Profetto-McGrath (2003) also studied the critical thinking skills (CTS) and critical thinking dispositions (CTD) of baccalaureate nursing students using the Delphi definitions. Both Facione (1990) and Profetto-McGrath (2003) have been cited frequently and internationally in the nursing literature concerning critical thinking (CT), clinical judgment, and clinical reasoning.

### **Theoretical Models**

Some researchers introduced or applied models designed to enhance or facilitate clinical reasoning in nursing students. For example, Ellermann et al. (2006) discuss the use of logic models, Tanner (2006) advocates for the use of a Clinical Judgment Model, and Chabeli (2007) proposes a model integrating critical thinking and the nursing process. The Outcome-Present State Test (OPT) model proposed by Pesut and Herman (1998) was described as a third-

generation nursing process model that used the facts of the client's story "to frame the context and content for clinical reasoning" (p. 31). Similarly, Bartlett et al. (2008) utilized the OPT model to improve clinical reasoning in undergraduate nursing students through practice with application of the model to patient care situations. Finally, Levett-Jones et al. (2010) proposed the linking of a clinical reasoning model to the "five 'rights' of clinical reasoning" (p. 517). The focus of the majority of these studies was on expanding the nursing process model to allow for less linear and more complex thought processes.

### **Nursing Process and Clinical Reasoning in Educational Strategies**

The nursing process (assessment, diagnosis, planning, intervention, and evaluation) has remained a central component of educational strategies designed to improve clinical reasoning (Alfaro-LeFevre, 2017). However, challenges have been identified in both the teaching and the learning of the nursing process (Lee & Brysiewicz, 2009; Palese, Silvestre, Valoppi, & Tomietto, 2009; Thompson & Stapley, 2011). Several studies have addressed how the nursing process might be taught differently in order to facilitate development of clinical reasoning in students (Burns, O'Donnell, & Artman, 2010; Lee & Brysiewicz, 2009; Marchigiano et al., 2011; Paans et al., 2010). High-fidelity simulation scenarios, for example, could be used to introduce students to the concept of the nursing process (Burns et al., 2010), as could playing a 3D simulation game where the game guides learners through the process (Koivisto, Multisilta, Niemi, Katajisto, & Eriksson, 2016).

### **Clinical Reasoning Process**

The process of clinical reasoning has been explored with both undergraduate and experienced nurses. Some authors have used a "think aloud" methodology where participants were asked to verbalize their thoughts as they worked through a patient scenario. Goudreau, Boyer, and Letourneau (2014) collected data in a "think aloud" study from first, second, and third-year nursing students as well as new graduates and experienced nurses. The findings revealed processes that were characteristic of each level of experience, and the authors proposed developmental stages of clinical reasoning, milestones of these stages, and a cognitive learning model of clinical reasoning (Goudreau et al., 2014). Forsberg, Ziegert, Hult, and Fors (2014) also collected "think aloud" data as experienced pediatric nurses worked to solve virtual patient cases. The authors found these nurses tried to consolidate a hypothesis by seeing a pattern and utilized experience with similar cases in decision-making (Forsberg et al., 2014). Similarly, in a qualitative study with experienced intensive care unit nurses, three themes emerged from the data concerning reasoning strategies: intuition, recognizing similar situations, and hypothesis testing (Ramezani-Badr, Nasrabadi, Yekta, & Tealeghani, 2009). Script concordance tests (SCT) have also been proposed as a method of assessing clinical reasoning in nursing students. (Dawson, Comer, Kossick, & Neubrandner, 2014; Deschênes, Charlin, Gagnon, & Goudreau, 2011). A script concordance test is a written test in which students are provided with a clinical scenario containing an element of uncertainty and are asked to respond to new information. The student responses are then compared with the responses of a panel of experts. The SCT makes it possible to "assess the quality of students' organization of knowledge" (Deschenes et al., 2011).

While research exists regarding how clinical reasoning and other related concepts such as critical thinking and the nursing process are taught by nurse educators, an understanding of the undergraduate nursing students' perceptions of their own clinical reasoning is lacking. Duchscher (2003) described the development of critical thinking (rather than clinical reasoning)

in newly graduated nurses as moving from no reflection and unable to see beyond the task, to critical thinking being woven into the nursing process, keeping an open mind, generating various perspectives, and, finally, to coping with uncertainty. Ellermann et al. (2006) collected qualitative data and asked students how they made decisions about care in the clinical setting. Content themes such as identifying priorities, assessing causes and solutions, logical thinking, and using the nursing process were identified. More recently, Herron, Sudia, Kimble, and Davis (2016) conducted a qualitative study where they interviewed students in their final semester and students within three months of graduation from a BSN program about the development of their clinical reasoning. They found the participants described a journey from “learning basic nursing skills to understanding the bigger picture in which the development of clinical reasoning related directly to safe and effective patient care” (p. 332). This study addresses a gap in the literature by providing qualitative data with respect to nursing students’ perceptions of their clinical reasoning on a written assignment.

### **Research Questions**

This study was guided by three research questions: (1) What are third-year baccalaureate nursing students’ perceptions of how they apply the nursing process to demonstrate clinical reasoning on this assignment? (2) What are their perceptions of how prior knowledge and experience inform their clinical reasoning? (3) How do they describe the impact of this assignment on future clinical reasoning with respect to other written assignments or patient care?

### **Method**

An interpretive description (Thorne, 2016) qualitative design was used to explore baccalaureate students’ perceptions of clinical reasoning on a written assignment. Interpretive description is an inductive methodological approach, which seeks to understand patterns and relationships about a phenomenon. This method enabled the generation of new knowledge from the participants with respect to the use of clinical reasoning on an assignment, which then allowed application of this knowledge to nursing education practice. Interpretive description is an approach that takes newly generated insights and “not only shape[s] new inquiries but also translate[s] them into practice” (Thorne, 2016, p. 40).

Ethics approval was obtained from the institution where the data were collected and from the lead author’s university where she completed her master’s thesis (2015). The lead author (a nurse educator) did not have a current direct teaching relationship with any of the potential participants, and it was not anticipated that she would teach them in the future. If a faculty member has a direct teaching relationship with student participants, a power-over position may exist (Ferguson, Yonge, & Myrick, 2004). Thus, seeking participants for whom they do not have a direct teaching relationship may result in having “less power with regard to these students” (Ferguson et al., 2004, p. 5). Students interested in participating in the study contacted the researcher directly by email to ensure confidentiality. Prior to interviewing the participants, informed consent was obtained. The participants were informed that their participation in this study was voluntary and were aware that they could withdraw from the study at any time.

### **Setting and Sample**

Convenience and purposeful sampling were used by the lead author to invite participants from a group of nursing students who had completed three full years of study in a four-year baccalaureate program at an academic institution in Canada. Study participants were interviewed

at the beginning of their fourth year of the program and were asked to reflect on the development of their clinical reasoning skills, with particular attention to their thinking process during the most recent, third-year assignment.

The sample was comprised of eight students who volunteered to be in this study. The number of participants is in keeping with the interpretive description method which is intended for smaller-scale studies with small sample sizes (Thorne, Reimer-Kirkham, & O’Flynn-Magee, 2004; Thorne, 2016). All the students were female and described themselves as Caucasian. Five of the students were 19–24 years of age, two were 25–30 years of age and one student was 31–40 years of age. Seven of the students identified that they had taken some college/university courses prior to entering this baccalaureate-nursing program. All eight of the students had completed this assignment in their third year of the program.

### **Data Collection**

Data were collected using semi-structured, individual face-to-face interviews, conducted by the lead author, which took place at a mutually agreed upon location. The audiotaped interviews took from 25 to 50 minutes for each participant and were transcribed verbatim by the lead author. At the beginning of the interview the participants were told that they were being interviewed about the development of their clinical reasoning skills with the lead author providing the students with an explanation of the relationship between the more common term critical thinking and the more precise term clinical reasoning. The interview questions were developed by the lead author in consultation with the second author, keeping in mind the research purpose. Initial interview questions focused on asking the participants to describe how their clinical reasoning skills had developed or evolved over their time in the nursing program. These first questions provided an introduction to the interview topic and an opportunity for reflection prior to asking questions about specific types of thinking. Students were asked questions such as: “In thinking about your last CJE, walk me through your thought processes as you approached each phase of the assignment.” Questions from the interview guide were asked in a manner that corresponded with the flow of conversation in each interview. Prompts were used to elicit more in depth responses as required. After the interview guide questions had been exhausted, students were asked if they had anything else to add. The majority of the students took this opportunity to speak about the difficulties they had with the assignment and offered suggestions for improvement.

### **Data Analysis**

In keeping with the methodology of interpretive description, concurrent data collection and data analysis was carried out (Thorne, 2016). Data analysis began after transcription of the first interview. The first transcript was read and reread several times in order to achieve immersion in the data before beginning the coding process. The lead and second authors independently coded the first transcript and then collaboratively developed a preliminary code-book after the second interview. Each subsequent transcript was coded separately using the established code-book and then compared across the whole data set looking for relationships among instances in the data (Thorne, 2016). The lead author met frequently with the second and third authors to ensure that a deeper level of analysis of the data occurred. Initially, three main themes emerged, but deeper analysis revealed that there was one “overarching” core theme with two themes and several sub-themes.

## Rigour of the Study

Steps were taken to enhance the scientific quality of the study using the criteria of credibility, confirmability, dependability, and transferability (Lincoln & Guba, 1985). Credibility was garnered by interviewing students who were familiar with the assignment. Confirmability was established using an audit trail documenting the researchers' decisions and critical self-reflection made during data analysis of the emerging themes. Field notes were recorded following each interview about how the participants responded to the interview process, any other observations arising from the interviews, and any questions the participants had. As well, a detailed reflexive journal was kept to document how the lead researcher's personal beliefs may have influenced the interpretation of the data. Any potential biases were considered to ensure they were not influencing the analysis process to meet the criteria of dependability (Thorne, 2016). For example, reflexivity was important as the lead author was an instructor in the nursing program where the participants were enrolled. Transferability of the findings is a major limitation of this study as the sample size was small.

## Findings

An overarching theme and two main themes emerged during data analysis. The overarching theme of *over time* describes how students came to understand the evolution of their own clinical reasoning over the course of years in the program as well as the progression of their clinical reasoning skills during the time of writing the assignment. The two main themes of *understanding of clinical reasoning* and *making sense of the assignment* describe the changes in the students' clinical reasoning over time (see Table 1).

Table 1

### *Themes and Sub-themes*

Overarching Theme: Over Time	
Theme 1	Theme 2
Understanding Clinical Reasoning	Making Sense of the Assignment
Sub-themes	Sub-themes
Not Knowing	Not Knowing
Knowing	Knowing
Applying Knowing	Applying Knowing
Valuing Knowing	Valuing Knowing

### **Overarching Theme: Over Time**

Throughout the data, it was evident that students returned repeatedly to reflect on how their clinical reasoning had evolved from the beginning of year one, through to the completion of the third year of a four-year baccalaureate nursing program. The students spoke about the growth of their clinical reasoning, comparing their abilities at earlier points in time with their present capabilities. What emerged from the data appeared to be more than a description of clinical reasoning that developed over time but a recognition that their *understanding of clinical*

*reasoning* had deepened over time. As the students reflected upon their earlier experiences with clinical reasoning, they became aware of the learning that had occurred over the past three years.

*Over time* also emerged as an overarching theme from the data that described the writing of the assignment. Students spoke about how they used their clinical reasoning skills to make sense of the assignment in a progression of increasing knowledge and understanding that took place over the time it took to complete the assignment.

### **Theme One: Understanding of Clinical Reasoning**

*Understanding of clinical reasoning* refers to how students described how they had seen their clinical reasoning develop or evolve over their first three years in the program. In the beginning, students perceived they were unaware of both the definition and the practice of clinical reasoning. Once a foundational understanding of clinical reasoning was established, they perceived that additional knowledge could be added in order to increase understanding and begin application of clinical reasoning skills to nursing practice. Situated within theme one, the sub-themes were: *not knowing*, *knowing*, *applying knowing*, and *valuing knowing*.

**Not knowing.** Students described their clinical reasoning in the first year of the nursing program as “not knowing.” They described not knowing what to look for or what to do for the patient (S1), not knowing what to do with the information (S2), not knowing what is relevant (S2), and not knowing what clinical reasoning was (S7). Some students described a gap in being able to apply what they were learning to patients: “In first year... you don’t have any patient care experiences to relate it to” (S3). Similarly, another student related her experience in this way: “Being able to critically look at another person and be like, what do they need, was kind of difficult for me” (S5). She described herself as staring at the patient like “a deer in the headlights” (S5).

**Knowing.** In contrast to first year, students described second year as a time of acquiring knowledge and developing an ability to apply the information. For example, several students described a noticeable turning point in their thinking between years two and three. One student asked herself, “At what point does all the information come together and make sense to us?” She responded by stating, “It clicked for me between second and third year” (S2). Another student stated that prior to second year she “may have been able to kind of piece together a linear, or logical steps in helping somebody” but “second year really took [her] from just that kind of simple linear thinking to a deeper level of understanding” (S8).

**Applying knowing.** After completing three years of study, the majority of students perceived they could now apply their clinical reasoning skills to patient care. The three clinical reasoning skills the students’ described were 1) being better able to put things together, as one student described, “take all the information from ‘patho’ and nursing and pull it all together” (S1); 2) having a curiosity about why things were happening, as one student described an example of an elderly patient with a bladder infection not being prescribed antibiotics and her desire to understand why this was the case:

(She) didn’t have any signs of or symptoms of a urinary tract infection but was beginning to become confused and delirious, and so I was asking why she hadn’t been put on antibiotics because like often in the elderly, they present with confusion before anything else; (S1)

and 3) being able to see the relevant data in a situation, as one student described being able to “pick out the pertinent knowledge” (S2).

**Valuing knowing.** At the completion of third year, students were *valuing knowing*, in anticipation of transitioning to independent practice, as they were entering the final year of the nursing program. Students described that timely action was required for urgent needs, that there was an increased understanding of the complex connections in a patient’s presentation, and, lastly, that a recognition of the need to anticipate possible outcomes in their patient situation. A student summarized her perception of the need for clinical reasoning at this stage:

(If you) have a patient who all of a sudden goes sour right in front of you, you have to be able to think your way through it, you’re not going to have your textbooks to rely on and you know, if you’re in the situation and something does happen and you can’t critically think your way through it, something bad is going to happen. (S6)

## Theme Two: Making Sense of the Assignment

The students were asked questions about how they approached a specific assignment, known as the clinical judgment exercise (CJE). They reflected on the strategies they used to identify the main problem, as well as their utilization of the nursing process to establish a prioritized plan of care. There was a clear arc of time over the process of making sense of the assignment, which was similar to the progression of knowing seen in Theme One.

**Not knowing.** Within the sub-theme of *not knowing*, students described four elements related to the assignment: *not knowing what was going on with the patient, not enough time, meeting expectations, and not like in real life.*

*Not knowing what was going on with the patient.* Prior to beginning the assignment, students did not know what type of patient scenario they would receive. Once they received their scenario, students talked about “trying to figure things out” as their first step in making sense of the situation. Part of figuring out what was going on with the patient was to identify and prioritize the patient problems. A student stated, “there’s just so many avenues that the patient can take... it really depends on their presentation, your assessment” (S1). Some students spoke about changing their diagnoses many times and wrestling through the difficulties in choosing just one priority:

It was difficult because I had these two diagnoses that, well, both were very important... I had a really tough time with that one, I remember I ended (up) copy and pasting them back and forth I don’t know how many times, because... I just could not, could not decide (S5).

*Not enough time.* Students had less than 24 hours to complete the assignment. Many of the students described about how having to work quickly caused them stress as well as the discomfort or fear of having to work into the night to complete it. One student described the time pressure as “I get very stressed out when I’m rushed... I feel like as if somebody were breathing down my neck” (S5), “I don’t like to feel like I’m pressured inside a little box” (S5).

*Meeting expectations.* Students expressed concern about meeting the expectations of the assignment and that they were doing everything they could to ensure they were getting the correct answer. Some students described being “so scared to make the wrong diagnosis” and being afraid of putting something down that was “completely wrong” (S4).

*Not like in real life.* Students felt frustrated with elements of the assignment that did not mimic how clinical reasoning would take place with real patients. For example, a student described how the assignment forced her to depict her actions sequentially, when in reality she would be “doing more than one thing at once” (S1). Similarly, other students commented that not having a visual representation of the patient limited the assessment data to which they had access: “(It’s) hard to visualize when you’re given symptoms, but you can’t see them (the patient)” (S4). Another student spoke about the difference between the assignment and real life being that in real life the patient talks to you, tells you what they’re feeling (S7).

**Knowing.** The second sub-theme, *knowing*, described the students thinking as they progressed through the assignment, which included the three elements of *making sense of the data*, *use of written resources*, and *checking with others*.

*Making sense of the data.* Students described how they made sense of the data in the assignment. Some of the students described using various strategies, for example, writing everything out (S1), going through everything (S1), writing it down in point form (S3) and doing a “head to toe on paper” (S4). In contrast to these linear strategies, several students described using concept mapping strategies, such as having a little map (S1), mapping it out in your head (S2), and arranging the data into signs and symptoms, making a concept map (S4). One student explained her concept map in more detail:

I had a big piece of paper... had sepsis, infection, drug use... lab values scribbled down and the relevant vitals beside each diagnosis... I had sticky notes so I could move it around... it’s kind of how it ended up making sense. (S4)

*Use of written resources.* Use of written resources was a significant part of the process of *knowing* how to complete the assignment. Several students related an iterative process of working on the assignment and checking with the literature. They would have an idea about the problem and then “look it up” and perhaps find a more appropriate diagnosis (S4) or “see if the book has the same data and how it would apply to the patient on the CJE” (S6).

*Checking with others.* Students stated that they shared ideas with other classmates, even though it was intended to be an independent assignment. One student stated that it didn’t make sense to do the assignment in isolation because in reality, the workplace is a collaborative environment (S5). Checking with others was seen to be a significant part of the sub-theme of *knowing* because the students indicated such a strong drive to check in with one another to make sure they were on the right track.

**Applying knowing.** The third sub-theme of *applying knowing*, described students’ awareness of the level of experience and prior knowledge they had accumulated over their three years in the program, which included two elements of *applying experience* and *applying prior knowledge*.

*Applying experience.* Students reflected upon previous patient care experiences in order to imagine what a patient would look like. For example, a student described how having actually cared for patient similar to the one described on the assignment was helpful: “When I read through the scenario, I was thinking hey, this is what that guy looked like and I just thought to myself ok, what did we do?” (S6).

*Applying prior knowledge.* Students used both experience and previously learned information to draw conclusions about the patient. For example, a student stated: “You use what

you already know, experiences that you already have, to try to picture in your head what this person may be like” (S2). Another student described in detail an example of how she was able to draw on previously learned information and apply it to the patient scenario on the assignment. She described hearing her lab instructor mention that elevated temperature is not an essential symptom for a diagnosis of sepsis and then asserted, “I made a little pocket for it in my brain... because I would’ve never thought of that” (S4). During the assignment, sepsis was a possible diagnosis for the patient, and she was able to use this piece of information to contribute to her clinical reasoning.

**Valuing knowing.** The fourth sub-theme, *valuing knowing*, referred to the students’ application of their learning from the assignment to their nursing practice and the impact of the assignment on their clinical reasoning skills. As the assignment was based on the nursing process, they also were able to articulate what the nursing process was beginning to look like in their own nursing practice. The students recognized both clinical reasoning and using the nursing process as important elements in clinical judgment. Within the sub-theme of *valuing knowing*, two other elements of *recognizing the learning from the assignment* and *recognizing the nursing process as a tool for clinical reasoning* emerged.

*Recognizing the learning from the assignment.* Students related the assignment had helped with the application of classroom learning to a real patient (S1) and that the “template” used on the assignment is “what we’re going to use in real life” (S2). Another student stated that she was now able to “dig a little deeper” into a patient’s presentation (S5). This same student described that the assignment helped her to be “a bit quicker.”

*Recognizing the nursing process as a tool for clinical reasoning.* Students described using the nursing process to assist their clinical reasoning in nursing practice. Students used the acronym ADPIE (assessment, diagnosis, planning, intervention, evaluation) as a way of referring to the nursing process during the interviews. One student noted, “[Using ADPIE helped] guide my clinical judgment, it helped me determine what I needed to do next and where I needed to go with it” (S5). The nursing process was seen as pivotal in moving the nurse beyond the assessment phase: “You have to quickly assess your patient first, so if you don’t have knowledge of ADPIE then you... kind of stop there” (S6).

## Discussion

The emergence of the sub-themes of *not knowing*, *knowing*, *applying knowing*, and *valuing knowing* suggested that the nursing students perceived their own clinical reasoning had developed over time. Goudreau et al. (2014) proposed a cognitive learning model of clinical reasoning in nursing, which was useful for situating the findings of this study with respect to Theme One, *Understanding Clinical Reasoning*. The findings from Theme Two, *Making Sense of the Assignment*, were explored in the context of Tanner’s (2006) conclusions regarding clinical judgment based on her review of the literature and Cappelletti, Engel, and Prentice’s (2014) additional conclusion. Clinical judgment is the outcome of clinical reasoning (Alfaro-LeFevre, 2017; Tanner, 2006).

### ***Understanding Clinical Reasoning* and Goudreau, Boyer, and Letourneau’s (2014) Cognitive Learning Model**

In our study, the eight undergraduate nursing students were interviewed at only one time, at the beginning of their fourth year. They reflected on the development of their clinical

reasoning over their previous three years in the program. In Goudreau et al.'s study, there were a total of 66 participants with 11–14 participants in each of five groups. From the analysis of their data, the authors identified five stages in a cognitive learning model of clinical reasoning in nursing, which were: I need to know what to do, I need to justify my interventions using evidence-based resources, I adapt my interventions to each clinical situation, I adapt my interventions to the unit's routines, and I adapt my interventions to a specific nursing domain (p. 9). Interestingly, the student participants in our study described and reflected upon their thinking in each year of their program; their reflections have some similarities with the first three stages of Goudreau et al.'s model.

The student participants in our study spoke about the first year of their nursing program as a time of *not knowing*. Goudreau et al. (2014) described the stage of students at the end of their first year as “I need to know what to do” (p. 9). First-year students searched for missing information, they realized they didn't know, and must somehow find out (Goudreau et al., 2014).

The sub-theme *knowing* emerged from the data in Theme One and was illustrated by student participant comments about second year being a time of acquiring knowledge, especially with respect to pathophysiology, and having to “look things up”. The second-year students in this previous study were said to be in a stage described by “I need to justify my interventions using evidence-based resources” (Goudreau et al., 2014, p. 9).

In our study, the student participants provided data that led to the emergence of *applying knowing* as a sub-theme describing how they perceived their clinical reasoning in third year. *Applying knowing* was characterized by nurturing curiosity, noticing connections, and attending to relevant data. Some students mentioned they were careful to watch for “exceptions to the rule”. Each of these perceived skills would be utilized in making decisions within unique clinical situations. The clinical reasoning of the third-year students in Goudreau et al.'s study was described as “I adapt my interventions to each clinical situation” (Goudreau et al., 2014, p. 9).

The fourth sub-theme in our study was *valuing knowing*. The beginning fourth year student participants spoke about the importance of being able to think critically for the benefit of the patient, recognizing a need to think and act quickly to attend to a patient with urgent care needs, developing an appreciation of increased complexity of patient presentation and being able to anticipate what could happen with a patient in their care. Not having interviewed newly graduated nurses, our findings are different from the fourth stage of Goudreau et al.'s model. They found that newly graduated nurses attended to rules of practice, routines, and protocols more than hypothesis generation when making clinical judgments.

It is interesting to note that in using Goudreau et al.'s (2014) study for comparison, an objective analysis of “think aloud” data resulted in identification of stages that were comparable to the student participants' perceptions of their own clinical reasoning at similar junctures in their nursing education. Thus, if nurse educators are provided with varying types of evidence that clinical reasoning takes time to develop, and that a preceding level of understanding must be solidified in order to build on the next stage, it may have an impact on how and when clinical reasoning content is delivered in the curriculum.

## ***Making Sense of the Assignment and Tanner (2006) and Cappelletti et al.'s (2014) Conclusions Regarding Clinical Judgment in Nursing***

Tanner's (2006) work in the area of clinical judgment in nursing was explored with the intention of deepening the understanding of Theme Two: *Making Sense of the Assignment*. Tanner (2006) drew five conclusions regarding clinical judgment in nursing from her extensive review of the literature, which focused on studies conducted with experienced nurses. Tanner used her conclusions to formulate her Clinical Judgment Model and explicitly recommended it for use in nursing education (Tanner, 2006). In addition, Tanner's five conclusions were supported by Cappelletti et al. (2014). From this more recent systematic review, a sixth conclusion was proposed in response to the prevalence of studies regarding educational interventions. These six conclusions were used to increase the depth of understanding of the findings from our study.

Student participants in our study brought their prior knowledge and experience to the assignment. They described the source of their knowledge (textbooks, peers, class notes, instructors, nurses on the unit) and the source of their experience (clinical placement, work as an undergraduate nurse employee (UNE), life experience). They discussed how and when they accessed this information in order to put it to use in reasoning to make decisions about the patient scenario in the assignment. Tanner (2006) described the first conclusion as "clinical judgments are more influenced by what nurses bring to the situation than the objective data about the situation at hand" (p. 205).

Students in our study expressed that the assignment did not mimic a real-life situation in that the patient could not be visualized or questioned. Without the opportunity to engage with a patient, our students found it difficult to know, for example, what questions they should be asking. Tanner's second conclusion was "sound clinical judgment rests to some degree on knowing the patient and his or her typical pattern of response as well as an engagement with the patient and his or her concerns" (p. 206).

Although in our study the clinical judgments that occurred on the assignment did not occur with a real patient in the context of a nursing unit, context was a significant contributing factor to the quality of the clinical reasoning on the assignment. The students described the context of the assignment as being stressful in relation to the limited time, having to meet expectations, and the scenario not having the same elements as a real-life situation. All the students described stress during the writing of the assignment as negative, while some students also associated this stress with performing poorly on the assignment. Tanner's third conclusion was "clinical judgments are influenced by the context in which the situation occurs and the culture of the nursing care unit" (Tanner, 2006, p. 206).

Student participants in our study reported that that they looked at the assessment data provided and then began to compare what they were seeing with what was in the textbook. The student participants also described their struggle to make a decision when they recognized that there were several possibilities from which to choose. In order to make a decision, they used strategies such as using criteria for prioritizing, writing everything out, and making a concept map. Tanner's fourth conclusion was that "nurses use a variety of reasoning patterns alone or in combination" (p. 207). The first of these reasoning patterns is analytic process (Tanner, 2006). Analytic processes are applied when essential knowledge is lacking. Beginning nurses perform an assessment and then compare the assessment data with signs and symptoms listed in the

textbook (Tanner, 2006). Analytic processes are used by nurses when there are multiple diagnoses or interventions to choose from and the pros and cons of each must be weighed out in order to make a decision (Tanner, 2006).

Some of the student participants in our study described visualizing themselves caring for a similar patient and used this reflection to generate interventions for the patient. Intuition was the second clinical reasoning pattern used by experienced nurses (Tanner, 2006). Although the intuition of student nurses is constrained by their lack of experience, several of the students described how they used their experiences with similar patients to enhance their clinical reasoning when writing the assignment. Pattern recognition was cited in the literature review as being part of intuition (Tanner, 2006).

The students in our study described an inability to really understand what the patient was thinking as one of the stressful elements of the assignment and described it as being “not like in real life.” Tanner (2006) identified narrative thinking as the third reasoning pattern used by experienced nurses. This pattern requires being able to enter into the patient’s story in order to make sense of the particular case.

Tanner’s (2006) fifth and final conclusion regarding clinical judgment in nursing was “reflection on practice is often triggered by a breakdown in clinical judgment and is critical for the development of clinical knowledge and improvement in clinical reasoning” (p. 207). Tanner’s conclusion can be applied to our study in that reflection on clinical judgment was triggered when students discovered what they had done wrong or why certain choices would have been better than others on the assignment.

Nurse educators may want to consider their methods of providing both positive and constructive feedback on clinical reasoning assignments in relation to the findings from this study and Tanner’s fifth conclusion. With respect to the assignment given in our study, only summative feedback was provided. Therefore, consideration might be given to providing formative feedback to the students in order to increase their opportunities to reflect more on the process. In addition, if nurse educators could provide additional feedback prior to the completion of the assignment, this may also reduce students’ stress related to not knowing if they were “on the right track”. For example, this might be accomplished if the assignment was submitted in two parts or if several shorter assignments were given instead of a single, high-stakes assignment.

During the interviews, the student were asked about what had had an impact on their clinical reasoning skills. The majority of the students perceived that context-based learning (CBL), including class discussions and thinking through scenarios, increased their clinical reasoning. Simulation was also perceived as a type of experience that had helped them to work on their clinical reasoning. Additionally, clinical experience was described by most students as being essential to the development of clinical reasoning skills. Finally, students highlighted a variety of assignments that had helped them to make connections and see the relationships between concepts. A concept map assignment pertaining to a real patient in the clinical area, a concept paper requiring the comparison of two nursing concepts, as well as the leveled CJE assignments were named as educational interventions that had positively affected clinical reasoning skills. The sixth conclusion that emerged from the work of Cappelletti et al. (2014) is that “education strategies to improve clinical judgment may influence what a nurse brings to the situation” (p. 453). This conclusion was proposed as it reflected some recent studies that

investigated education strategies such as simulation, concept-based learning, and cognitive maps to improve clinical judgment in beginning nurses (Cappelletti et al., 2014).

### **Limitations**

The limitations of this study were a small sample size and data collection from one institution at a single point in time. These factors limit the transferability of the findings, so caution must be used in transferring the findings to other populations. Additionally, all the participants were female and identified themselves as Caucasian, which did not allow the inclusion of variation in terms of gender or ethnicity within the data. Collection from one institution at a single point in time did not allow for space or time triangulation, which may have improved study quality by capturing “a more complete and contextualized portrait of key phenomena” (Polit & Beck, 2017, p. 563). The data may also have been affected by recall bias as students were reflecting on an assignment that they completed several months prior to the interviews. In addition, the use of the term critical thinking to clarify the concept of clinical reasoning during the interviews may have created bias in the findings.

### **Implications and Recommendations**

The recommendations derived from the findings of this study focus on the nursing domains of nursing education and nursing research.

#### **Nursing Education**

Facilitating the development of clinical reasoning skills has increasingly become a focus in nursing education programs (Dawson et al., 2014). CASN supports this focus with their statement that baccalaureate programs should prepare students to demonstrate the “use of clinical reasoning, nursing knowledge and other evidence to inform decision-making in diverse practice situations” (CASN, 2015, p. 13).

An understanding of how students view the evolution of their own clinical reasoning is important to nurse educators as they develop curriculum and design classroom and clinical experiences to promote the development of clinical reasoning skills. With increasing knowledge about clinical reasoning development, educators may be more able to level learning and assessment strategies to specific cohorts of students (Newton & Moore, 2013). Educators may also wish to utilize educational approaches that promote a variety of problem-solving strategies. For example, some student participants described their preference for systematic, linear processes, while others described success with creating a concept map. Additionally, some studies in the literature found students preferred journaling assignments with a clinical reasoning component (Marchigiano et al., 2011).

Understanding how the student participants used clinical reasoning to complete the CJE assignment may give insight to nurse educators about the benefits and drawbacks of using such an assignment as a strategy to promote or assess clinical reasoning. In reflecting on their clinical reasoning process after the assignment, some students identified they were able to learn from their mistakes. Nurse educators may wish to consider giving written or verbal summative feedback that assists the student to identify their errors in clinical reasoning on the assignment. The learning experience could be further enhanced by providing formative feedback from the instructor regarding decision points during the assignment.

Some of the students found writing the assignment independently in a 24-hour period to be stressful. Providing more time to write the assignment, may decrease this stress and designing

the assignment to be completed in pairs or small groups may increase synergy and decrease concerns about not being able to check with others. Such a recommendation is supported by others who have examined the benefits when experienced nurses or students worked in pairs or small groups on clinical reasoning scenarios (Forsberg et al., 2014; Glynn, 2012; Parsons & Teel, 2013; Van Horn, 1999). Finally, simulation or virtual patient scenarios could be considered as an alternative to the written assignment as these strategies have the visual and unfolding elements unavailable in the written assignment (Forsberg et al, 2014).

### **Nursing Research**

A finding that emerged from this study was that students perceived that their understanding of clinical reasoning had developed over time as they progressed through their nursing program. Further qualitative research may yield a greater understanding of this phenomenon. A recommendation would be to use a method that includes data collection from focus groups, which may add an element of synergy and increase the richness of the data. Further research might also involve exploring the perceptions of clinical reasoning abilities of students in different years of their nursing program. The perceptions of students in the earlier years of their program may be different than those of third- or fourth-year students reflecting on their thinking in previous years. Further research using a variety of methodologies is recommended to substantiate the work of researchers such as Goudreau et al. (2014). Utilization of the cognitive learning model in a variety of contexts may contribute to understanding how nursing education would assist students to develop their clinical reasoning at specific stages of their nursing education.

Finally, students' description of how they used clinical reasoning in order to write the assignment was not fully explored. Research methodologies other than semi-structured interviews may yield additional perspectives on how nursing students use clinical reasoning. For example, studies using a "think aloud" methodology are prevalent in the literature seeking to describe the thinking of nurses as they employ clinical reasoning to a patient scenario. The collection and analysis of "think aloud" data from students working through a scenario or a written assignment may contribute to the understanding of the clinical reasoning skills being employed during the process.

### **Conclusion**

This study explored the perceptions of clinical reasoning skills of students who applied the nursing process to complete a patient scenario assignment. The main conclusions were as follows: 1) The students' perceptions of the development of their clinical reasoning skills over time corresponded to the first three stages of the cognitive learning model proposed by Goudreau et al. (2014); however, the fourth theme of *valuing knowing* was a unique finding with respect to how the students beginning their fourth year of the program understood the significance of clinical reasoning. 2) In *making sense of the assignment*, some students were aided by knowledge and experiences with similar patients as well as being able to employ a variety of reasoning patterns. Several of the students' challenges with clinical reasoning on the assignment were related to not being able to see or question the patient. Some students perceived that they benefitted from an opportunity to reflect on their incorrect choices on the assignment. All of these findings were consistent with Tanner's (2006) conclusions regarding clinical judgment in nursing. 3) Students perceived that understanding of the patient's problem and the required nursing actions deepened over the time of completing the CJE assignment. This assignment is

one education strategy which may improve clinical reasoning. In summary, the findings of this study contribute to a better understanding of how students perceived the development of their clinical reasoning skills and how they perceived their application of clinical reasoning skills to a patient scenario on a written assignment.

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## Appendix

### Example of Third-Year CJE Assignment

Beverly is a 67-year-old woman presenting to the emergency room. You note that she is moderately obese and is wearing a soiled night gown. At a glance, you notice that she has deep, even respirations and is relaxed but drowsy. During conversation, you observe that she is confused and has a foul odour about her. Her husband reveals that for the last week or so, she has not taken her insulin regularly because she has not been eating. He also states that Beverly had a left heel spur removed six weeks ago and was diagnosed with Type 2 diabetes 15 years ago.

#### Beverly's chart tells you:

Hgb: 160 g/L (Normal 120-160)

K: 5.8 mmol/L (Normal 3.5-5.5)

Na: 110 mmol/L (Normal 135-145)

Glucose: 35 mmol/L (Normal 3.5-7.0)

Vital signs: HR: 120 regular, BP: 88/64, T: 39.5 °C, R: 28 deep and even

Confused x 12 hrs, needed help with toileting x 3 days, abdominal pain x 3 wks. with nausea and emesis, pain to left heel x 3 wks.

#### Your assessment reveals:

Skin is flushed, hot and dry. Her mucous membranes are dry, and she has poor skin turgor. You note she has a decreased level of consciousness and only arouses to gentle shaking. Her bowel sounds are hypoactive, and her abdomen is soft. She has a 7 cm open wound to the left heel, with a foul odour. The wound is painful to the touch and when you move her heel she moans. You insert a large bore IV into her right arm and a Foley catheter to urometer and await further physician orders.

1. What assessments would be necessary to complete for your client in this scenario? Include your rationale.
2. Identify the 3 key nursing diagnoses for your client in this scenario.
3. Out of the 3 key nursing diagnoses, what would your priority nursing diagnosis be? Provide your rationale for choosing that as your priority.
4. What is the expected outcome for your client, related to the priority nursing diagnosis?
5. What are the 5 most important nursing interventions required to address the priority nursing diagnosis? Provide rational for these interventions.
6. How would you evaluate the expected outcome related to the priority nursing diagnosis you have chosen?