



## Registered nurses' clinical reasoning skills and reasoning process: A think-aloud study



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### ARTICLE INFO

#### Article history:

Received 4 February 2016

Received in revised form 6 July 2016

Accepted 9 August 2016

Available online xxxx

#### Keywords:

Content analysis

Clinical reasoning

Registered nurses

Think-aloud

### ABSTRACT

**Background:** As complex chronic diseases are increasing, nurses' prompt and accurate clinical reasoning skills are essential. However, little is known about the reasoning skills of registered nurses.

**Objective:** This study aimed to determine how registered nurses use their clinical reasoning skills and to identify how the reasoning process proceeds in the complex clinical situation of hospital setting.

**Design:** A qualitative exploratory design was used with a think-aloud method.

**Methods:** A total of 13 registered nurses (mean years of experience = 11.4) participated in the study, solving an ill-structured clinical problem based on complex chronic patients cases in a hospital setting. Data were analyzed using deductive content analysis.

**Results:** Findings showed that the registered nurses used a variety of clinical reasoning skills. The most commonly used skill was 'checking accuracy and reliability.' The reasoning process of registered nurses covered assessment, analysis, diagnosis, planning/implementation, and evaluation phase.

**Conclusions:** It is critical that registered nurses apply appropriate clinical reasoning skills in complex clinical practice. The main focus of registered nurses' reasoning in this study was assessing a patient's health problem, and their reasoning process was cyclic, rather than linear. There is a need for educational strategy development to enhance registered nurses' competency in determining appropriate interventions in a timely and accurate fashion.

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### 1. Introduction

Patients with complex chronic diseases, who suffer from at least two or three chronic conditions, are in need of health plans tapping a range of medical resources (Garcia-Fernandez et al., 2014). When a patient with complex chronic disease is admitted to a hospital with an acute condition, the nurse's clinical practices are required not only accurate nursing skills, but complex thinking processes to analyze and integrate a large amount of subjective and objective data (Smith Higuchi and Donald, 2002).

Clinical reasoning is a complex, multi-dimensional, and recursive cognitive process for developing strategies to determine nursing practices appropriate for individual client circumstances (Simmons et al., 2003). Later, Simmons (2010) modified a definition of clinical reasoning as "a complex cognitive process that uses formal and informal

thinking strategies to gather and analyze patient information, evaluate the significance and weigh alternative actions" (pp. 1155). Therefore, it is an innovative form of assessment by which nurses focus on clinical reasoning and clinical decision-making (Forsberg et al., 2014), and clinical reasoning skills are a necessary component of expert and competent nursing practices (Banning, 2008). Critical thinking is knowledge based discipline, which does not consider patient contextual situation. Otherwise, clinical reasoning is a combined concept that includes nurses' knowledge with clinical experiences. In other words, clinical reasoning is relevant to patient situation based on critical thinking (Benner, 1984; Jones, 1988). As this process relying on critical thinking, clinical reasoning is affected by professional attitudes and philosophical perspectives, the expertise, experience, and intuition of nurses (Simmons et al., 2003).

Studies on clinical reasoning competency seek to compare novice and expert nurses. Previous research has found experienced nurses to be more proactive in problem solving, collecting varied data and clustering cues, in comparison to novice nurses (Hoffman et al., 2009). Experienced nurses use cognitive strategies such as conversion to form

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detailed problem representations and to find solutions (Sarsfield, 2013). In addition, expert nurses use working knowledge and patterns (Gerber et al., 2015). They evaluate patients' symptoms and signs, and the results of physical examinations and laboratory tests, to find patterns and generate hypotheses based on their accumulated experience. Experienced nurses have a salient competency in requesting the prioritized questions for the patients and family members. Based on patients' assessment, nurses make a nursing plan and implement appropriate care services for patients (Forsberg et al., 2014).

There is a need to identify what cognitive strategies and reasoning processes nurses use to assess patients' health problems, and to develop and execute solutions in fast-paced complex clinical situations. However, little research has been conducted on this topic. Funkesson et al. (2007) have described that nurses used usual thinking process for the patient wound care. Clinical reasoning content was related to nurses' knowledge, clinical experience although there were differences by individual career background. In 2011, Fossum and colleagues have stated that the most commonly used thinking strategy used in the clinical reasoning of nursing home nurses for the prevention of malnutrition and pressure ulcers was 'making choices' for nursing interventions.

Therefore, the aim of this study was to explore what clinical reasoning skills and reasoning processes were used in nurses' problem solving using cases of patients with complex chronic disease admitted to a hospital with an acute condition.

## 2. Background

Information processing theory (IPT) was a process of gathering information and making judgments to select an optimal alternative (Newell and Simon, 1972). This theory is based on the assumption that the amount of information that can be stored in short-term memory is limited. IPT has formed the basis of many nursing studies on clinical reasoning using a think-aloud method (Fossum et al., 2011; Hoffman et al., 2009; Simmons et al., 2003). Therefore, IPT served as a methodological framework in this study.

The think-aloud method has proven to be an effective way to identify problem solving processes (Fonteyn et al., 1993; Van Someren et al.,

1994). This is a qualitative technique to collect verbal data, and is an effective approach to access the cognitive processes of a participant in clinical reasoning (Simmons et al., 2003). The benefits of the think-aloud method, in comparison to other observation methods, is that it links cognitive processing with concurrent perceptions, thus revealing information available in working memory (Lundgren-Laine and Salantera, 2010).

Alfaro-LeFevre (2013) explained how nurses can apply clinical reasoning skills in nursing process. A total 17 clinical reasoning skills were presented with a practical guide for nurses to easily implement them in a complex clinical environment (Table 1). In this study, clinical reasoning skills were used as a qualitative criterion to examine nurses' clinical reasoning ability and identify their reasoning processes.

## 3. Methods

### 3.1. Design

This study entailed qualitative research using the think-aloud method to investigate clinical reasoning strategies and reasoning processes used by nurses for problem solving in caring for complex chronic disease patients.

### 3.2. Participants

The participants were registered nurse with more than five years of clinical experience, who had obtained a master's degree or above and certification as a Korean Advanced Nurse Practitioner. This approach excluded novice nurses and targeted participants who could actively participate with full understanding of the complicated scenario developed for this study. A snowball sampling method was used for recruitment, and potential participants were contacted by phone and email. A total of 13 participants were selected. All participants' average total clinical experience was 11 years and 4 months. Approximately 50% of the participants ( $N = 6$ ) were advanced practice nurses with an average of 3 years and 10 months' experience.

**Table 1**  
Clinical reasoning skills with definitions.  
Adapted from Alfaro-LeFevre (2013).

Clinical reasoning skills	Definitions
Identifying assumptions	Recognizing when something is taken for granted or presented as fact without supporting evidence
Assessing systematically and comprehensively	Using an organized, systematic approach that enhances your ability to discover all the information needed to fully understand a person's health status
Checking accuracy and reliability (validating data)	Collecting more data to verify whether information you gathered is correct and complete
Distinguishing normal from abnormal and identifying signs and symptoms	Analyzing patient data and deciding what is within normal range and what is outside the range of normalcy; then deciding whether abnormal data may be signs or symptoms of a specific problem
Making inferences (drawing valid conclusions)	Making deductions or forming opinions that follow logically, based on patient cues (subjective and objective data)
Clustering related cues (data)	Grouping data together in a way that you can see patterns and relationships among the data
Distinguishing relevant from irrelevant	Deciding what information is pertinent to understanding the situation at hand and what information is immaterial
Recognizing inconsistencies	Realizing when pieces of information contradict each other
Identifying patterns	Deciding what patterns of health, illness, or function are indicated by patient data
Identifying missing information	Recognizing gaps in data collection and searching for (missing) information to fill in the gaps
Promoting health by identifying and managing risk factors	Maximizing well-being by detecting and managing factors that evidence shows contribute to health problems
Diagnosing actual and potential problems	Ensuring that the actual and potential problems your patient has are correctly named, based on evidence from the health assessment and patient records.
Setting priorities	Defined in two ways: (1) differentiating between problems needing immediate attention and those requiring subsequent action, and (2) deciding what problems must be addressed in the patient record
Determining patient-centered (client-centered) outcomes	Describing exactly what results will be observed in the patient to show the expected benefits of care at a certain point in time
Determining individualized interventions	Identifying specific nursing actions that are tailored to the patient's needs and desires and designed to (1) prevent, manage, and eliminate problems and risk factors, (2) reduce the likelihood of undesired outcomes and increase the likelihood of desired outcomes, and (3) promote health and independence
Evaluating and correcting thinking (self-regulating)	Reflecting on thinking for the purpose of safety and improvement – for example, looking for flaws, deciding whether your thinking is focused, clear, and in enough depth – then making adjustments as needed
Determining a comprehensive plan/evaluating and updating the plan	Ensuring that the priority problems and corresponding outcomes and interventions are recorded on the patient record; keeping the plan up-to-date

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