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Deriving the Practice-Primed Decision Model from a naturalistic decision-making perspective for acute care nursing research

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ABSTRACT

Aim: The purpose of this article is to present the derivation of the Practice Primed Decision Model from a naturalistic decision-making framework for use in guiding future nursing decision-making research.
Background: Acute care nurses make decisions in demanding environments under the influence of many factors. The influence of these factors on nurse decision-making is not well understood leading to gaps in understanding how to best support acute care nurse decision-making.
Methods: The strategy of theory derivation was used in the development of a new model for use in nursing research. This model incorporates important elements identified in naturalistic decision making, a Recognition Primed Decision Model and an integrative review of nurse decision-making literature.
Conclusion: The new model, Practice Primed Decision Model, provides a new perspective to guide nurse decision-making research. This model includes factors influential to the nurse decision-making process that is more realistic in time limited, high stakes decision-making situations.

1. Introduction

Acute care registered nurses (RN) make decisions in a highly demanding environment. To better understand the complex nature of nurse decision-making in acute care, research guided by theory is needed. Theory guides the study of relevant influences as drawn from existing empirical results and organized into a framework that facilitates needed research into a problem. This article proposes a theoretical model to facilitate research into decision-making in acute care nursing. The framework was based in part upon results from a recent integrative literature review (Nibbelink & Brewer, 2017) and on application of the strategy of theory derivation. Theory derivation was useful in moving from a psychological theory, the *Recognition-Primed Decision* Model (Klein, 1993) to formulate a nursing model relevant to a practice context of acute care nursing.

Decision-making research in nursing has traditionally focused on a classical model (Cioffi, 2012). The *classical decision-making model* begins with a thorough examination of options and ends with a final selection of an ideal option (Lipshitz, Klein, Orasanu, & Salas, 2001). However, experienced decision makers found this classical decision-making model of minimal use in time limited real-world situations where decision-making drew from experience and contextual influences (Lipshitz et al., 2001). Clinical nurse specialists as well as professions outside of nursing (such as power plant operators and anesthetists) have found a *naturalistic* approach to decision-making, specifically the naturalistic decision making (NDM) model, as a perspective helpful in describing decision-making (Carvalho, dos Santos, & Vidal, 2005; Hepgul et al., 2012; Klein, Calderwood, & Clinton-Cirocco, 2010; Phipps & Parker, 2014).

2. Naturalistic decision making

The field of decision-making encompasses a wide variety of theories about how people make decisions, from an emphasis on rationality and achieving the ideal solution in traditional models to models that incorporate more realistic elements and decision outcomes. One significant influence was the ground-breaking work of Tversky and Kahneman (1974), who discovered that decisions more realistically were influenced by biases – often unconscious—and the use of heuristics rather than on systematic strategies and judgments. Their findings suggested that two 'systems' of thought were involved in judgments and decisions loosely corresponding to the following: One system being more intuitive, without conscious computation, or fast; and a second system more analytical, deliberative, or slow (Kahneman, 2011).

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Table 1
Key factors of RPM/NDM parent theory derived for nursing.

Parent theory key factors	Characteristics of acute care nursing practice
Ill-structured problems	Patient problems that may be unclear
Uncertain dynamic environments	Patient problems may be both uncertain and may change suddenly or gradually
Shifting, ill-defined goals	As patient problems change goals change
Action/feedback loops	Following nursing intervention, patient reassessment guides future decision-making
Time stress	Responses to patient problems often occur under significant time limitations
High stakes	Nurse interventions can have significant impact on patient status
Multiple players	Nurses collaborate with other nurses, physicians, respiratory therapists, and others
Organizational goals and norms	Nurses must follow established rules and incorporate evidence into their patient care
Experienced decision-maker	5 years or more working as a medical-surgical nurse
Pattern matching	Identification of a patient care situation as similar to previously experienced patient care situation

The naturalistic decision making (NDM) perspective for research emerged out of this and other work as an area of study of decision-making based on research outside the laboratory, as it occurs among professionals such as firefighters, airline pilots, psychotherapists, and military personnel (Klein, 1993). Naturalistic decision making incorporates characteristics of nursing practice in acute care settings as well, where the problems are ill-structured rather than well-structured, time is urgent rather than ample, the environment is dynamic and uncertain, and the stakes are high. The decision is not made in a vacuum but must be sensitive to organizational goals and values, and multiple players (Zsambok, 1997).

2.1. Situation awareness

A particular element of the naturalistic decision-making perspective, distinct from the classical model, is that decision-making begins with *situation awareness* (Endsley, 1997). Situation awareness includes perception of factors within the situation, understanding the significance of these factors, and projection of the potential consequences of these factors on the overall system. Effective decision-making relies on accurate perception of the situation, or situation awareness. Situation awareness, together with other factors identified in naturalistic decision-making models, provide a broad range of factors for nursing decision-making research.

3. Recognition-Primed Decision Model

Several decision-making models were developed that share the basic characteristics of naturalistic decision-making. A familiar model and the one used in deriving this nursing theoretical framework, is the *Recognition-Primed Decision* (RPD) model (Klein, 1993). This model describes how individuals make decisions about difficult problems under time pressure. Initially this model was developed through in-depth interviews of fireground commanders reflecting on personal experiences in non-routine firefighting incidents. Experience factors important to the experts' decision-making processes were identified (Klein et al., 2010).

The RPD model describes a process of naturalistic decision-making whereby the individual employs their practice experience and knowledge to formulate patterns of decision-making situations that include relevant cues, expectancies, plausible goals and typical outcomes (Klein, 2008). When making subsequent decisions, they draw from their repertoire of patterns to match situation to an appropriate pattern. In addition to this “pattern matching” process, the person uses “mental simulation” to project the outcome of a given pattern in the current decision-making situation. This dual process is not unlike the two systems of judgment described previously (Tversky & Kahneman, 1974). The combined use of past experience and analysis generates the “first workable solution” without requiring too much time (Klein, 2008).

4. Model derivation: from RPD to the Practice-Primed Decision Model for nursing research

Theories or models used in nursing research may be derived from or modified from existing theoretical models and frameworks. Strategies for deriving one theory from another have been described by various scholars e.g. Walker and Avant (2011). The process begins with evaluation of a parent theory identified as possibly appropriate for use in nursing research. The parent theory in this case was Klein's (1993) RPD model from the naturalistic decision-making perspective, referred to in this article as NDM/RPD. Klein's theoretical work provided a fresh approach for developing nursing-theory guided research. In addition, the basic components of the theory were judged as aligning with the phenomenon of interest; the decision-making context addressed by the RPD model was congruent with the contexts in which acute care nurses had to make decisions, which involved ill-structured problems in patient care within limited time frames and uncertain and serious conditions.

The model derivation was also based upon findings from a integrative literature review (Nibbelink & Brewer, 2017), which identified important characteristics involved in decision-making among acute care nurses. This review generated concepts that were already identified in the existing decision-making models used for the parent theory (NDM/RPD), and concepts that had not been identified in these psychological models of naturalistic decision-making but were critical to decision-making in acute care nursing. Concepts borrowed from the existing RPD model were useful in providing a context for the model derivation in terms of guiding the structure of the overall model and how the variables were related to each other. These concepts are as follows: Ill structured problems, uncertain dynamic environments, shifting ill-defined goals, action/feedback loops, time stress, high stakes, multiple players, organizational goals and norms, experienced decision makers, and pattern matching. Table 1 outlines the congruence between the parent theory (NDM/RPD model) concepts and characteristics of decision-making in acute care nursing practice.

Concepts newly identified from this literature review (Nibbelink & Brewer, 2017) became variables within the derived model. These are situation awareness (understanding of patient status) that initiates decision making, and the six variables that influence the decision-making process as depicted in Fig. 1: Experience, nursing unit culture, education, autonomy, colleague collaboration, and RN bias (see Table 2 for a list of the variables and their definitions). Note that “RN bias” was added based upon the classic work of Tversky and Kahneman (1974).

5. The derived nursing model for decision making in acute care nursing practice

From the key components of the RPD model and the results of the integrative literature review, a new nursing model was derived, the Practice-Primed Decision Model (PPDM) (see Fig. 1). The variables (as concepts that can be measured) in the derived theoretical model

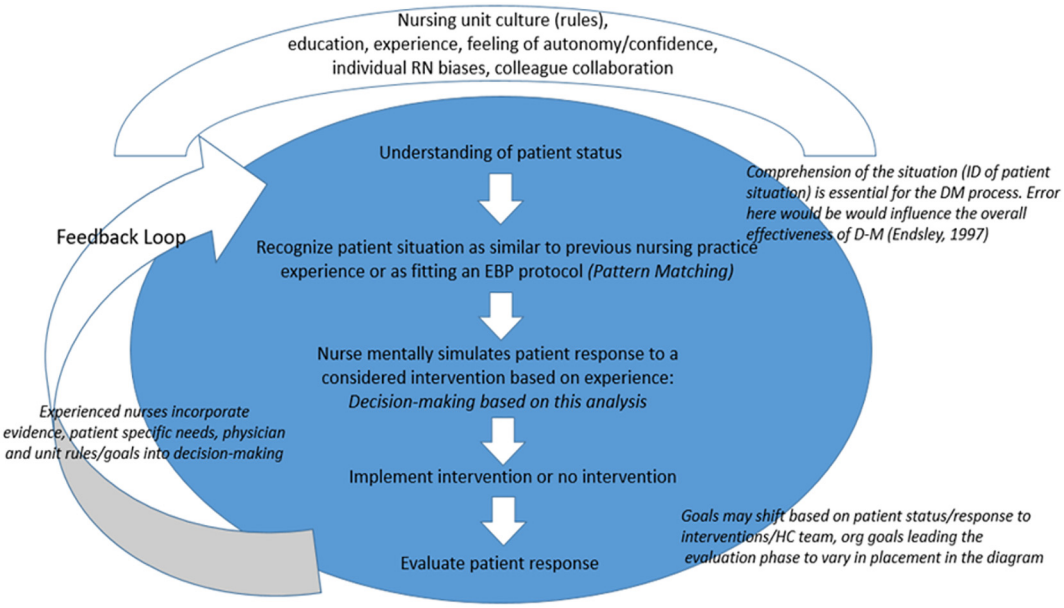

Fig. 1. Diagram of the Practice-Primed Decision Model (PPDM).

relevant to acute care nurse decision-making are as follows: Experience, nursing unit culture, education, autonomy, colleague collaboration, and RN bias as they influence a seventh variable, understanding of patient status/situation awareness. These seven variables are considered important in understanding factors that facilitate acute care nurse decision-making.

Levels of these influences, identified through literature review, may vary among nurses (for example, years of education or levels of autonomy may vary), and this is typical of a model, which consists of factors (variables) that vary but still are proposed to be part of the decision-making process in some significant way. Further, the factors in the newly derived model are interrelated and may influence each other, as they work together to influence decision-making. For instance, experience could influence autonomy in that the nurse previously may have cared for another patient in a similar situation, which then enabled the nurse's ability to make decisions independently. The nursing unit culture may also support autonomy in nurse decision-making. Nurse education and evidence (including protocols) may support autonomous nurse decision-making. More experienced nurses may feel more likely to access protocols for decision support when making decisions in unusual situations.

5.1. Steps in decision-making

According to the newly developed model, the PPDM, the decision-making process in acute care nursing is proposed to occur as follows: The decision-making process begins with situation awareness/understanding patient status. The six variables mentioned above and listed in Table 2 importantly influence this understanding as well as influence other components of decision making. Similar to situation awareness, understanding *patient status* includes effective assessment of the patient's condition, accurate understanding of the significance of the assessment findings and an ability to consider possible patient outcomes that may occur as a result of the patient's current condition. Experienced nurses then identify the patient situation as similar to previous patient care situations and consider how this patient would respond to the intervention considered using a mental simulation process. Following the mental simulation and determination that the identified intervention would be successful, the nurse decides to proceed with the intervention. Following the intervention, the nurse would reassess to determine if the patient condition had improved or if further decisions and interventions are required. The reassessment triggers the decision-making cycle to restart with understanding patient status. Throughout this process, nurses would use previous experiences to guide their decision-making for a current patient care situation.

6. Future research directions

Decision-making in acute care nursing practice involves a complex array of influential factors. Future research needs to include a better understanding of nurse decision-making and improve decision support for among acute care nurses. An important element in planning such research is to apply a theoretical model that provides a perspective of the problem and serves as a guide for asking research questions targeted to study relevant and measurable variables and their inter-relationships.

This newly derived nursing model may guide new research into decision-making in acute care nursing practice. Exploring the influence

Table 2
Concepts and definitions in the derived theoretical model: Practice-Primed Decision Model.

Concept	Definition
Experience	Time nurses spend working in clinical practice
Nursing unit culture	Organization and nursing unit norms and influences that influence nurse decision-making
Education	Formal or informal nursing programs in nursing colleges or clinical settings designed to improve nursing practice
Autonomy	Nurse sense of independence for clinical decision-making and utilization of resources
RN bias	Unconscious use of heuristics to guide decision-making
Colleague collaboration	Discussion with other nurses to provide advice or corroboration of thinking to support decision-making
Understanding patient status/situation awareness	Understanding of the current patient condition that serves as the basis for patient care decision-making

of key factors as identified in the PPDM used by experienced and inexperienced acute care nurses may help identify decision support tools for less experienced nurses. Qualitative research exploring distinctions in decision-making between experienced and inexperienced acute care nurses could provide a broader perspective than is currently available in nursing research today. Improved understanding of acute care nurse decision-making could guide development of decision support tools. Quantitative research could measure the effects of selected variables as they relate to understanding patient status and to decision-making outcomes in patients.

Possible research questions to guide future study include:

Qualitative:

- What is the process of steps that acute care nurses describe using in decision-making?
- How do nurses with greater than and less than five years of experience compare to each other in reference to their descriptions of selection of interventions when caring for an acute care patient? [The criterion of five years is based on Benner and Tanner's (1987) research, which includes peer identification of expert nurses.] – from the Benner research?

Quantitative:

- How do each of the six variables listed in Table 2 contribute to the understanding of patient status (situation awareness) and the process of decision-making in acute care nursing?
- Do acute care nurses experience less stress or burnout when making patient care decisions using process outlined in the PPDM model?

7. Conclusion

The PPDM provides a unique and innovative approach to understanding factors important to the naturalistic decision-making processes employed by experienced acute care nurses. The Classical Decision Making approach required the decision maker to spend too much valuable time in option selection in making decisions during high stakes, time limited circumstances. Instead, the PPDM presents a more realistic perspective of decision-making for nurses. In addition, concepts included in this newly derived model may include important factors that currently are absent from evidence-based protocols. A particular focus for research based upon this model is examination of how the six variables listed in Table 2 contribute to the understanding of patient status (situation awareness) and the process of decision-making in critical care nursing.

Conflicts of interest and source of funding

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