The 'five rights' of clinical reasoning: An educational model to enhance nursing students' ability to identify and manage clinically 'at risk' patients
The ‘five rights’ of clinical reasoning: An educational model to enhance nursing students’ ability to identify and manage clinically ‘at risk’ patients

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ABSTRACT

Acute care settings are characterised by patients with complex health problems who are more likely to be or become seriously ill during their hospital stay. Although warning signs often precede serious adverse events there is consistent evidence that ‘at risk’ patients are not always identified or managed appropriately. ‘Failure to rescue’, with rescue being the ability to recognise deteriorating patients and to intervene appropriately, is related to poor clinical reasoning skills. These factors provided the impetus for the development of an educational model that has the potential to enhance nursing students’ clinical reasoning skills and consequently their ability to manage ‘at risk’ patients. Clinical reasoning is 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. Effective clinical reasoning depends upon the nurse’s ability to collect the right cues and to take the right action for the right patient at the right time and for the right reason. This paper provides an overview of a clinical reasoning model and the literature underpinning the ‘five rights’ of clinical reasoning.

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Introduction

Contemporary practice environments are dynamic, unpredictable and reactive. Increasing numbers of adverse patient outcomes are evident in Australia and internationally. Hospitals have a growing proportion of patients with complex health problems who are more likely to be or become seriously ill during their admission (Bright et al., 2004). Although warning signs often precede serious adverse events such as cardiac arrest, unplanned admission to intensive care and unexpected death (Buist et al., 2004), there is evidence that ‘at risk’ patients are not always identified; and even when warning signs are identified they are not always acted on in a timely manner (Thompson et al., 2008).

Nurses with poor clinical reasoning (CR) skills often fail to detect impending patient deterioration resulting in a ‘failure to rescue’ (Aiken et al., 2003). CR is an essential component of competence (Banning, 2008). However, contemporary teaching and learning approaches do not always facilitate the development of a requisite level of CR skills. A recent Australian report described critical patient incidents that often involved poor CR by graduate nurses (NSW Health, 2006). This report parallels the results of the Performance Based Development System, a tool employed to assess nurses’ CR, which showed that 70% of graduate nurses in the United States scored at an ‘unsafe’ level (del Bueno, 2005). The reasons for this are multidimensional but include the difficulties novice nurses encounter when differentiating between a clinical problem that needs immediate attention and one that is less acute; and a tendency to make errors in time sensitive situations where there is a large amount of complex data to process (O’Neill, 1994).

These factors provided the impetus for the development of an educational model that has the potential to enhance graduates’ CR skills and consequently their ability to identify and appropriately manage ‘at risk’ patients. This paper begins by providing an overview of a clinical reasoning model and the literature underpinning the ‘five rights’ of clinical reasoning.
Background

What is clinical reasoning?

In the literature the terms CR, clinical judgment, problem solving, decision making and critical thinking are often used interchangeably (Thompson and Dowding, 2002). Elstein and Bordage (1991) define CR as the way clinicians think about the problems they deal with in clinical practice. It involves clinical judgments (deciding what is wrong with a patient), and clinical decision-making (deciding what to do). Tanner (2006) conceptualises CR as the process by which nurses make clinical judgments by selecting from alternatives, weighing evidence, using intuition and by pattern recognition. In this paper we use the term CR to define a logical process by which nurses (and other clinicians) 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 (Hoffman, 2007). CR is not a linear process but can be conceptualised as a cycle of linked clinical encounters.

Nurses use different but interrelated patterns of CR. Although the cognitive thinking strategies used by nurses in decision-making and clinical reasoning have not been extensively examined, some studies have demonstrated differences between novice and expert nurses as well as between different groups of experienced nurses. Commonly used thinking strategies has been identified as “collection”, where patient data and information is obtained; “description”, where nurses describe facts and information; “selection”, the choosing of appropriate information; “inference”, making deductions about information; “synthesis”, putting information together; and “verification”, testing that information is correct (Jones, 1989; Higuchi Smith and Donald, 2002). In studies using verbal protocol analysis and problem behavior graphs the identification of cognitive strategies has been accomplished by identification from verbal protocols or a priori from the literature, or by a combination of both (Ericsson and Simon, 1984, 1993).

The CR model described in this paper is informed by the work of Alfaro-LeFevre (2009), Andersen (1991) and Tanner (2006). However, the primary foundation for the CR model is Hoffman’s (2007) doctoral project which provides detailed and deconstructed exemplars of CR from an examination of how novice and experienced nurses make decisions in the real world of practice. Hoffman used both a literature review and an examination of research data to identify commonly occurring thinking strategies used by both novice and expert nurses while caring for patients in an intensive care unit. The thinking strategies identified through this research and subsequently used by us in the development of the CR model were: describe the patient situation, collect new patient information, review information, relate information, recall knowledge, interpret information, make inferences, discriminate between relevant and irrelevant information, match and predict information, synthesise information to diagnose or identify a problem, establish goals, choose a course of action and evaluate. The study found that both novice and expert nurses used all of the thinking strategies while caring for patients in a real world situation, but that there were some differences between the novice and expert nurses. Expert nurses collected more cues than novice nurses and from a wider range of information than novices (Hoffman et al., in press). Experts also related more cues together than novices, and were better able to predict what may happen to a patient. They often practised proactively, collecting a wide range of cues to identify and prevent possible patient complications. In contrast, novices’ practice was more reactive, searching for patient cues and information once they had actually identified a patient problem. These differences may have implications for patient safety, with novice nurses detecting problems later than expert nurses.

The CR model has application for classroom teaching and provides a structure that links well with problem based and enquiry based learning. The phases and steps in the model are appropriate for self-directed learning and can be used to develop computerised learning packages and case studies. The CR model also provides an approach that can be used in simulated learning experiences using human patient manikins or standardised patients (actors). Most importantly, the model has relevance to clinical practice. Although the CR model is appropriate to many patient situations and contexts, the main focus in this paper is on the relevance of CR to the prevention and management of adverse patient incidents in acute settings.

A diagram of the CR model developed from Hoffman’s (2007) study is shown in Fig. 1. In this diagram the cycle begins at 1200 h and moves in a clockwise direction. The circle represents the ongoing and cyclical nature of clinical encounters and the importance of evaluation and reflection. There are eight main steps or phases in the CR cycle. However, the distinctions between the phases are not clear cut. While CR can be broken down into the steps of: look, collect, process, decide, plan, act, evaluate and reflect, in reality, the phases merge and the boundaries between them are often blurred. While each phase is presented as a separate and distinct element in this diagram, CR is a dynamic process and nurses often combine one or more phases or move back and forth between them before reaching a decision, taking action, and evaluating outcomes.

Why do nursing students need to learn how to engage in clinical reasoning?

‘Failure to rescue’, defined as mortality of patients who experience a hospital acquired complication, is directly related to the quality of nursing care and nurses’ CR skills (Needleman et al., 2001). According to the NSW Health Incident Management System (2008), the top three reasons for adverse patient outcomes are: failure to properly diagnose, failure to institute appropriate treatment, and inappropriate management of complications. Each of these is related to poor CR skills.

In practice experienced nurses engage in multiple CR episodes for each patient in their care. An experienced nurse may enter a room and immediately collect significant data, draw conclusions and initiate appropriate management. Because of their knowledge, skill and experience expert nurses may appear to perform these processes in a way that seems almost automatic or instinctive; and they often find it difficult to verbalise their thinking and explain cognitive processes that seem tacit and implicit. This automatic or instinctive processing is believed to occur as memory retrieval becomes faster from repeated practice, with additional instances being stored in the memory until responses are determined entirely by memory retrieval alone, bypassing normal processing (Ericsson and Simon, 1984; Palmeri, 1997). Modelling and explanation of these types of automatic process in decision-making can help students begin to understand what has often been referred to as an unconscious, intuitive reasoning. In order for students to learn to manage complex clinical situations and to identify ‘at risk’ patients, teaching approaches that make these seemingly automatic or instinctive cognitive processes explicit and clear. Thus, it is essential that students are taught the process and steps of CR. Learning to reason effectively does not happen serendipitously, nor does it occur just through observation of expert nurses in practice. CR requires a different approach to that used when learning more routine nursing procedures. It requires a structured educational model and active engagement in deliberate practice; as well as reflection on activities designed to improve performance (Ericsson et al., 2007).
The ‘five rights’ of clinical reasoning

Effective use of the CR model by nursing students and its application in practice by novice nurses is directly linked to the five rights of clinical reasoning, that is, the ability to collect the right cues and take the right action for the right patient at the right time and for the right reason.

The right cues

The recognition of cues and clusters of cues, termed “cue acquisition” by Elstein and Bordage (1991) and “noticing” by Tanner (2006), is the fundamental basis of CR. Cues are identifiable physiological or psychosocial changes experienced by the patient, perceived through history or assessment and understood in relation to a specific body of knowledge and philosophical beliefs. Cues also include the context of care and the surrounding clinical situation.

The acquisition of cues can be influenced by many factors including the expertise and working knowledge of the decision-maker, anxiety, confidence and time pressures (O’Neill et al., 2005). When the correct cues are not acquired all of the actions that follow may be incorrect (Andersen, 1991). Making judgements or decisions based on incomplete information is a leading cause of mistakes (Alfaro-LeFevre, 2009); and early subtle cues when missed can lead to a ‘failure to rescue’.

Cues refer to available patient information (for example, handover reports, patient history, patient charts, results of investigations and nursing/medical assessments previously undertaken), current clinical assessment data, and also the recall of knowledge. This includes a broad and deep knowledge of physiology, pathophysiology, pharmacology, epidemiology, therapeutics, culture, context of care, ethics and law etc. as well as an understanding of evidence based practice. For students this is challenging because it requires the ability to not only recall facts, but to also synthesise and apply their knowledge to clinical situations which are often complex and fluid. For example, CR requires the nurse to both identify oliguria, hypotension and tachycardia, and recall that these signs may indicate hypovolaemic shock.

Research has identified a number of differences between how experienced and novice nurses collect cues (refer to Table 1). For these reasons, nursing students must be helped to understand how to pay attention to relevant cues and contextual issues, how cues shape clinical decisions, and the connection between accurate cue collection and patient outcomes (Benner, 2001).

Stereotypes, prejudices and assumptions may impede the cue collection process. Preconceptions such as “elderly people often have dementia”, colour the types and range of cues collected as well as their interpretation. For example, McCarthy’s (2003) theory of situated CR explains how nurses’ overarching philosophies related to ageing impact their cue collection and influence the ways in which they manage older hospitalised patients experiencing symptoms of delirium. Failure to identify delirium and treat its underlying causes can lead to serious consequences, including progression to permanent brain damage and death (Kiely et al., 2009). Conversely, appropriate cue collection which allows for early recognition and management can effectively restore an older person to premorbid health and functioning (Schuurmans et al., 2001).

Thus, in preparation for CR nursing students must be provided with opportunities to reflect on and question their assumptions and prejudices; as failure to do so may negatively impact their cue acquisition/CR ability and consequently patient outcomes.

Right patient

The right patient, in this instance, refers to a patient at risk of critical illness and/or a serious adverse event. Nursing students need to learn how to identify and prioritise patients in need of immediate care. Although Tanner (2006) suggests that it is background knowledge and relationships with patients that are the basis upon which nurses initially grasp the clinical situation, definitive physiological parameters also need to be comprehended if the ‘right’ patient is to be recognised in a timely manner. Nurses are often the first link in the causal chain between identification of
complications and eventual rescue; consequently, their ability to recognise clinically ‘at risk’ patients is crucial (Clarke and Aiken, 2003).

Systems such as early warning scores (EWS) and modified early warning scores (MEWS), use physiological measurements to help identify patients who are, or who may become, critically ill. Jacques et al. (2006) identified and categorised early and late warning signs of patients at risk of serious adverse events (such as death, cardiac arrest, severe respiratory problems or transfer to a critical care area) (refer to Table 2). These types of warning signs are particularly useful for helping novice nurses to recognise deteriorating patients.

Jacques et al. (2006) reported that the likelihood of an adverse outcome was significantly increased in patients who exhibited 2–3 late warning signs. The warning signs of unresponsiveness to verbal commands, hypoxia, oliguria and alteration in blood gases were considered to be the most important warning signs signalling at risk patients. Smith and Poplett (2002) recommend that urgent attention should be given to the education of undergraduate nursing and medicine students about the identification of abnormal values and subsequent management of at risk patients. The CR model helps to facilitate the development of nursing students’ ability to recognise deteriorating patients.

Right time

Within clinical contexts that are often complex and unpredictable, nurses engage in multiple CR episodes each day for each patient in their care. Thompson et al. (2004) observed nurses engaging in up to 50 significant CR encounters in one 8 h shift in a medical admissions unit. Similar patterns of multiple judgements and choices in bounded time frames were identified by Bucknall (2000) who found that intensive care unit nurses faced a clinical judgment or decision every 30 s.

Time is a critical issue in CR. The ‘right’ time refers to a nurse’s ability to identify clinically at risk patients in a timely manner and to undertake nursing interventions at the right time and in the right sequence. Failure to rescue occurs not only when early signs and symptoms fail to be recognised or acted upon in the so-called ‘golden hour’ when nursing/medical interventions are started too late. Expertise influences the amount of time needed to come to a decision (Hamers et al., 1997) with novice nurses requiring more time to engage in CR (Schmidt et al., 1990) and multiple opportunities to practice CR in real or simulated environments.

**Right action**

Nursing ‘action’ is defined as “the behaviour following on from a judgement or decision” (Thompson and Dowding, 2002, p. 14). This stage of the CR cycle is comprised of practical skills, intellectual activities and communication skills. The nurse has to decide which part of the plan takes priority, who is best placed to undertake the nursing action/s, which procedures and policies are involved, who should be notified and when.

Too often documented abnormalities are not followed up by action (Jacques et al., 2006). Thompson et al. (2008) identified that half of avoidable arrests had clinical signs of deterioration recorded in the preceding 24 h but were not acted on. Similarly, Goldhill (2001) reported that even critical alternations to the so-called nursing basics such as pulse rate, respiratory rate, and oxygenation are often not acted upon. These undesirable responses to critical situations may be explained, at least in part, by arguing that not all nurses are adequately skilled in CR.

Nursing students need to be taught how to synthesise facts and inferences to make a definitive nursing diagnosis, to identify clinically at risk patients and to select a course of action between different alternatives available. Thompson et al. (2008) suggest that when taking action, such as to call a MET (medical emergency team), nurses must first acquire cues and compare this assessment to their personal decision framework. At this point they weigh up whether or not to take action, and what action to take based upon their estimate of the amount of risk. However, too often nurses do not possess a framework that allows them to confidently distinguish clinical noise from those clinical data that signal risk; this is a crucial causative factor in nursing errors.

At times the ‘right’ action is for the nurse to relay their concerns about a patient’s deteriorating clinical condition to senior staff. Nursing students need to become confident and skilled in communicating with members of the healthcare team so that they can signal their need for immediate action and support when required. Safe healthcare delivery depends on effective communication be-

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### Table 1

<table>
<thead>
<tr>
<th>Experienced nurses</th>
<th>Novice nurses</th>
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<tr>
<td>Select relevant and specific cues</td>
<td>Less focused in their selection; tend to ‘over-select cues’</td>
</tr>
<tr>
<td>Select cues that are context dependent</td>
<td>Follow rules when collecting cues, ignoring context</td>
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<tr>
<td>Collect information on a range of factors in addition to the patient’s presenting symptoms</td>
<td>Concentrate on presenting symptoms only</td>
</tr>
<tr>
<td>Have a way of ‘being with a patient’ and instantly knowing the patient after scanning him/her; they know what to pay attention to and what questions to ask</td>
<td>Focus on tasks and technology, rather than the patient, and often miss important cues</td>
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### Table 2

<table>
<thead>
<tr>
<th>Early warning signs</th>
<th>Late warning signs</th>
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<tbody>
<tr>
<td>SpO2 90–95%</td>
<td>SpO2 &lt;90%</td>
</tr>
<tr>
<td>Urine output &lt;200 mL over 8 h</td>
<td>Urine output &lt;200 mL over 24 h or anuria</td>
</tr>
<tr>
<td>PaO2 50–60 mm Hg</td>
<td>PaO2 &lt;50 mm Hg; PaCO2 &gt;60 mm Hg</td>
</tr>
<tr>
<td>Glasgow Coma Scale (GCS) &lt;9–11 or a fall in GCS by &gt;2</td>
<td>Glasgow Coma Scale (GCS) &lt;8</td>
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<tr>
<td>Alteration in mentation</td>
<td>Unresponsive to verbal commands</td>
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<tr>
<td>Partial airway obstruction (excluding snoring)</td>
<td>Airway obstruction/stridor</td>
</tr>
<tr>
<td>Respiratory rate 5–9 or 31–40 breaths per minute</td>
<td>Respiratory rate &gt;40 or &lt;5 breaths per minute</td>
</tr>
<tr>
<td>Systolic blood pressure 80–100 mm Hg or 181–240 mm Hg</td>
<td>Systolic BP &lt;80 mm Hg</td>
</tr>
<tr>
<td>Pulse rate 40–49 or 121–140 beats per minute</td>
<td>Pulse rate &gt;140 or &lt;40 beats per minute</td>
</tr>
<tr>
<td>Chest pain</td>
<td>Cardiac arrest</td>
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<tr>
<td>Poor peripheral circulation</td>
<td>pH &lt;7.2</td>
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<tr>
<td>Greater than expected fluid loss from drains</td>
<td></td>
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<tr>
<td>Newly reported pain or uncontrolled pain</td>
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<tr>
<td>Any seizure activity</td>
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<tr>
<td>Blood glucose level 1–2.9 mmol/L</td>
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</tbody>
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Schmidt et al., 1990) and multiple opportunities to practice CR in real or simulated environments.
between healthcare professionals and a body of literature points to the positive benefits of education about clinical communication. Use of acronyms such as ISBAR (refer to Table 3) have been reported as effective in streamlining the way doctors and nurses communicate during telephone calls and patient handover and in increasing patient safety [Mikos, 2007]. Acronyms provide a framework to communicate in a consistent way and are particularly useful for novice nurses.

The right reason

When considering the ‘right reason’ there are multiple implications. In this context, ‘right’ does not only mean that the correct reasoning processes have been employed but also that the reasoning is ethical, legal and professional. The ‘right’ reason does not apply just to the process of reasoning; it is about the underpinning rationale. Consequently, when discussing this ‘right’ these other dimensions must be considered.

“Right” may refer to the result of the reasoning, that is, the right conclusion being reached or it may refer to the process, or preferably both. Accuracy in clinical decision-making is not a pure process that exists in isolation from the person making the judgement. CR depends on the experience and confidence of the decision-maker (Cioffi, 2002). CR can also be influenced by the personal attributes, role orientation, education of the nurse/nursing student and the culture and context of care (Hoffman et al., 2004). The decisions that are made are influenced by the motivation of the nurse and their willingness to put all the data together into a complete picture (Di Vito-Thomas, 2005), as well as how completely the nurse has come to know the patient, not just a source of data to be reasoned through, but as a person with their own unique needs, values and individual response to the situation.

The knowledge that underpins the CR process and the consequent decisions and actions have also been found to have a social context that involves the culture of the unit, the value placed on the actual work and even the power differentials between work groups (Ebright et al., 2003). An example of this may be observed in nurses’ CR related to falls prevention where the imperatives ofwork to communicate in a consistent way and are particularly useful for novice nurses.

When the “five rights” of CR are not understood and applied, nurses’ clinical judgments may be inaccurate and associated with inappropriate interventions that can lead to increased and ultimately patient mortality. This paper has profiled a model of CR that has the potential to improve nursing students’ CR skills and to increase their preparedness for professional practice.

References


Table 3

<table>
<thead>
<tr>
<th>ISBAR adapted from Mikos (2007).</th>
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<tbody>
<tr>
<td><strong>I</strong> Identify</td>
</tr>
<tr>
<td><strong>S</strong> Situation</td>
</tr>
<tr>
<td><strong>B</strong> Background</td>
</tr>
<tr>
<td><strong>A</strong> Assessment</td>
</tr>
<tr>
<td><strong>R</strong> Request/recommendation</td>
</tr>
</tbody>
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