

Editorial

The Significance of Situation Awareness in the Clinical Setting: Implications for Nursing Education

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Received: August 19, 2014; **Accepted:** August 20, 2014; **Published:** August 23, 2014

Editorial

A heightened awareness of patient safety has dominated healthcare for over a decade since the publication of the landmark Institute of Medicine (IOM) report [1]. A recent hospital survey on patient safety culture revealed 45% of respondents reported a patient adverse event within the past 12 months [2]. In addition, a recent review of data reviewing the root cause of reported sentinel events by the Joint Commission [3] continues to reveal persistent problems stemming from poor communication among healthcare providers as well as other human factors such as rushing, fatigue or distraction. In particular, consistent interruptions and distractions of healthcare providers during their daily routine have been identified in the literature as a contributing factor that has been linked to patient errors [4]. Situation awareness (SA) has been recognized as a critical, yet elusive factor for processing stimuli in work environments where the "information flow" can be quite high and poor decisions may lead to serious consequences [5]. The idea of SA has been found to be applicable across a variety of domains, originating around the time of WWI where the importance of this concept was highlighted with work on pilots and combat aircrafts. SA is defined by Endsley and colleagues as the perceptions of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future. Based on information processing theory, SA is discussed in terms of three levels; perception, comprehension and ability to forecast future events and dynamics.

The concept of situation awareness (SA) has been integrated into the education and training of professionals in a variety of disciplines that involve constant flow of information with high stakes outcomes. Most notably the evolution of SA as an area of study in human factors research has substantially evolved since the 1980's in both aerospace and military sectors. In the mid-1990 the literature began to reveal the worth of this concept in healthcare with direct implication for patient safety. Initially, this concept was investigated within the realm of the surgical suite focusing specifically on the role of the anesthesiologist and has subsequently expanded to other healthcare disciplines including nursing [6,7].

The study of SA has been conducted using a variety of measures. Subjective measurements of SA including self-assessments and trained observer ratings have met with mixed results in regards to measures of validity and reliability [5]. The *Situation Awareness Global Assessment Technique* (SAGAT) is an objective measure of situation awareness developed by Endsley and colleagues and has subsequently demonstrated some promise when applied to healthcare scenarios [8]. They proposed the value of the SAGAT in assessing SA in human patient simulation scenarios and subsequently Hogan and colleagues assessed the SAGAT to be a valid and reliable tool when utilized in a trauma simulation [9].

Investigation of SA in healthcare providers and possible interventions to foster this, have been suggested as strategies to improve the quality and safety of patient care [10].

For an illustration of this concept consider the following hypothetical case:

Ann is an ICU nurse caring for Mr. Smith and she notices a "change" in the patient's status. The patient is lethargic, pale, has an increased heart rate, fever and is breathing faster than usual. The blood pressure is 80/40. With the help of the ICU team, IV fluids are administered, but without any improvement in the blood pressure. During this time, Ann is collecting multiple cues from the patient, the environment and is processing all the information (perception). It is when she notices that the patient has not responded to IV fluids that she begins to focus her cues on the signs of impending septic shock. She assigns meaning to the situation based on her mental model of patients presenting in septic shock and with this information, understanding emerges in the form of comprehension. Based on this knowledge she acknowledges that time is critical and she is able to project her next steps and prioritize her work flow. In the healthcare arena, situation awareness is not linear, but remains a continuous process.

For healthcare providers, this element of SA relates to the way information is presented and processed since their cognition and decision making are affected by a variety of environmental stimuli. With the ultimate goal of patient safety at the forefront in healthcare, it is essential to identify strategies which can ultimately foster SA and ultimately, reduce the frequency of sentinel events.

Strategies that have been utilized as core SA training principles include [11]:

- Build up basic skill communicating
- Task management and prioritization skills
- Scanning the environment
- Train for "what should you be assessing and projecting?"
- Train on type of errors that people make

- Perform robust ‘pre-planning’ (for the unexpected and expected situations)
- Teach critical behaviors and team communication
- Build/train for mental models/schemas
- Provide ongoing feedback re: good/poor SA

In brainstorming the possible applications of these strategies in nursing education, consider the possible approaches integrating the above principles.

Development of Mental Models and Schema

Mental model are mechanisms whereby humans are able to generate descriptions of system purpose and form; explanation of system functioning and observed system states and prediction of future states (underlying basic, life and social sciences). Schemas are prototypical states of the mental models which lead to “Recognition primed decision making”. For example, focus on key processes as prototypical cases with critical cues:

- Oxygenation/perfusion
- Fluid/electrolytes
- Neuro/sensory
- Infection/inflammation

Emphasize Core Skills

- Communication(patient centered, interprofessional)
- Prioritization, planning with task management including an event interrupt strategy
- Gathering information including the process of “scanning the environment”
- Mastery of psychomotor skills (simulation scenarios)
- Self-reflection

Application to Clinical and Patient Settings

The what, so what, what now model [11]:

- What-what info do I have or still need?
- So What-what does this info mean-forming a coherent picture
- What Now-what will happen next, what should I be prepared for-the contingency plan

Putting it all together: Integration of Theory & Practice

- Integration of mental models, schema and clinical cases to reinforce the connection (for examples emphasis of the immune system, process of inflammation/infection and the patient with cellulites of the leg).
- Reinforce with case studies/video vignettes
- Ongoing feedback of SA abilities
- Reflective journaling

Employing teaching strategies that foster SA can lead not only to changes in behaviors and knowledge of students, but positively impact the overall outcomes of patient care. With the ultimate goal of evidence based teaching, the challenge is for investigators to conduct research in nursing education focusing on this vital area.

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