



## The effect of a web-based educational program on nursing practice in recognising and responding to deteriorating ward patients: A qualitative evaluation study



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### ABSTRACT

**Introduction:** There is an international interest for optimising nursing performance in detecting and responding to deteriorating patients.

**Aim:** To explore nurses' perspective of a web-based educational program on their clinical practice in recognising and responding to deteriorating ward patients.

**Methods:** This study used an exploratory descriptive qualitative study design. Five focus groups were conducted with 26 nurses who encountered deteriorating patients in their workplace after they completed the 3-h web-based educational program on the care of patients with clinical deterioration. Interview transcripts were analysed using thematic analysis.

**Results:** Four themes emerged on the impact of the educational program on nurses' clinical practice: 'Understanding vital sign changes' heightened the nurses' awareness of performing vital signs monitoring; 'Application of knowledge in patient assessment', in which the nurses were able to perform physical assessments; 'Communicating deterioration' using the communication and triggering tool that has both positive and negative impacts in escalating clinical deterioration; 'Optimising effectiveness' of the educational program could include better accessibility, protected time, an element of assessment, and a hands-on simulation. Across themes, the participants reported barriers that inhibited their practice.

**Conclusion:** A web-based educational program on clinical deterioration has a significant potential to empower nurses in caring for deteriorating ward patients. Future implications were identified from the reported barriers to optimise nurses' roles. These include the availability of electronic systems for continuous vital signs monitoring, strategies to help nurses cope with stressors, and education to highlight the importance of the 'serious concern' criterion for triggering early deterioration.

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## 1. Introduction

In contemporary acute healthcare settings, patients who are admitted are sicker than in the past as they are older, have more co-morbidities, and are more likely to become seriously ill during their hospital admission (Rogers, Dean, Hwang, & Scott, 2008), leading to significant adverse events such as unplanned intensive care unit admissions and cardiopulmonary arrests (Taenzer, Pyke, & McGrath, 2011). In response to the changing acuity of acute hospital patients, patient safety agencies worldwide have commissioned guidelines on recognising and responding to clinical deterioration (Australian Commission on Safety and Quality in Healthcare, 2010; National Institute for Health and Clinical Excellence, 2007; National Patient Safety Agency, 2008).

A patient safety initiative called the Rapid Response System (RRS) was widely implemented in acute care hospitals across several countries including the United Kingdom, North America, Australia, Netherlands, Scandinavia, and New Zealand (Sakai & DeVita, 2009; Winters et al., 2013). This system consists of an afferent limb and an efferent limb (Jones, DeVita, & Bellomo, 2011). The afferent limb involves detecting patient deterioration using a set of predetermined objective criteria known as the Early Warning Scoring System or the Modified Early Warning Score (Gao et al., 2007). This is followed by the efferent limb in which the response team, commonly termed interchangeably as the Medical Emergency Team, Rapid Response Team, or Critical Care Outreach Team, treats and prevents further deterioration of the patient (Sandroni & Cavallaro, 2011). Despite the implementation of these systems, ward staff do not necessarily comply with the criteria protocol and continue to fail in detecting patient deterioration (Shearer et al., 2012; Trinkle & Flabouris, 2011). Without the relevant clinical knowledge and skills of nurses, these systems alone are insufficient to provide optimal care (McDonnell et al., 2013; Tait, 2010).

It has long been recognised that patients exhibit signs of clinical deterioration including a period of abnormal vital signs for minutes to hours prior to developing an adverse event (Fagan, Sabel, Mehler, & MacKenzie, 2012; Hands et al., 2013). These abnormal vital signs form the basis of criteria for triggering the RRS. Close monitoring of the vital signs is essential to detect patients at risk, yet vital signs are not consistently measured, recorded, or reported by ward nurses (Chen et al., 2009; Van Leuvan & Mitchell, 2008). A lack of knowledge among nurses has been known to lead to a misconception and an underappreciation about the changes in vital signs. A misconception about low blood pressure as the first indicator of deterioration and respiratory rate as the least important indicator was reported by nurses in a previous study. The knowledge of physiological compensatory mechanisms underpinning vital signs changes is important to develop nurses' clinical reasoning ability to interpret signs of clinical deterioration (Mok, Wang, Cooper, Ang, & Liaw, 2015).

There is a need to assess beyond the vital signs in order to detect early patient deterioration (Chua & Liaw, 2016). Early cues of a patient's deterioration, such as the patient's colour and restlessness, may appear even before any significant changes in the vital signs due to the body's homeostatic compensatory mechanisms (Liaw, Scherpbier, Klainin-Yobas, & Rethans, 2011). Changes in the vital signs are considered late signs, when the body is no longer able to compensate for its deterioration. However, nurses were reported to use a narrow set of physical assessment skills which limits their abilities to capture the subtle cues of a patient's deteriorating status and provide timely intervention. A lack of confidence was found to affect their abilities in performing physical assessment tasks. The need to increase the scope of the nursing assessment skill set beyond the taking of vital signs was highlighted

(Osborne, Douglas, Reid, Jones, & Gardner, 2015). The ABCDE (Airway, Breathing, Circulation, Disability, and Exposure) mnemonic has been incorporated into the training program for nurses to undertake a systematic approach in assessing and managing deteriorating patients (Liaw, Rethans, Scherpbier, & Klainin-Yobas, 2011).

Following the patient assessment, effective communication from all levels of ward nurses is crucial to seek for further help in the escalation of clinical deterioration. While better communication by non-registered nurses is important for commanding the attention of the registered nurse-in-charge, an effective communication by registered nurses is crucial to get the doctor's attention to review the patient promptly. However, barriers have been reported in both nurse–nurse communication and nurse-physician communication due to the differences in communication style, a lack of structure, and hierarchy (Chua, Mackey, Ng, & Liaw, 2013; Shearer et al., 2012). To overcome these barriers, nurses were trained to use the ISBAR (Identity, Situation, Background, Assessment and Recommendation) mnemonic to communicate with healthcare staff about a patient's condition. The tool was found to make nurses more confident in their clinical judgement and empower them to formulate recommendations of immediate actions based on their patient assessment (De Meester, Verspuy, Monsieurs, & Van Bogaert, 2013).

Pre- and post-registration education should focus on helping nursing students and nurses to develop clinical knowledge and skills in assessing, managing, and reporting clinical deterioration (Liaw, Scherpbier et al., 2011; Tait, 2010). The use of simulation for the development of these knowledge and skills has received much attention, particularly in pre-registration nursing education. Previous studies demonstrated the benefit of a mannequin-based simulation program using the ABCDE and SBAR mnemonics on nursing students' clinical performance (Liaw, Rethans et al., 2011) but also highlighted the importance of regular reinforcement with follow-up training to maintain competency (Liaw, Chan, Scherpbier, Rethans, & Pua, 2012). Given the resource intensive nature of a mannequin-based simulation, it has constraints in providing sustainable training (Youngblood et al., 2008). With the possibility of situating simulations in web-based learning, also known as web-based simulation, this simulation allows repetitive training and thus provides a more feasible learning strategy for mitigating the decay of clinical performance over time. Furthermore, a web-based simulation would be a viable option for training large numbers of hospital nurses as part of the continuing nursing education (Karaman, 2011; Liaw, Chan, Chen, Hooi, & Siau, 2014). A review of literature reported a high level of acceptance for web-based simulation in nursing education (Cant & Cooper, 2014).

A web-based program, known as e-RAPIDS (Rescuing A Patient in Deteriorating Situations), was developed to address the educational needs of nurses about clinical deterioration. The immediate outcome of the e-RAPIDS in improving nursing competency in assessing and managing clinical deterioration was demonstrated in a simulated environment using a randomised control trial study (Liaw, Wong, & Ang et al., 2016). Following the study's outcome, the program was implemented in an acute care tertiary hospital to support the afferent limb of the RRS. As part of the continuous nursing education, nurses from general ward settings were scheduled to undertake the 3-h e-RAPIDS. A previously conducted pre- and post-intervention study revealed the effectiveness of the e-RAPIDS in improving the triggering rates of deteriorating patients (Liaw, Wong, & Lim et al., 2016). Using a qualitative study approach, the primary aim of this study is to explore the effect of the e-RAPIDS on nurses who encountered deteriorating patients in their workplace. By understanding the reasons underlying the impact of the e-RAPIDS, the secondary aim of this study is to identify further strategies to strengthen the afferent limb of the RRS.

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