Seeing the whole picture in enrolled and registered nurses' experiences in recognizing clinical deterioration in general ward patients: A qualitative study

Wei Ling Chua[a,*], Helena Legido-Quigley[b,c], Pei Yi Ng[d], Lisa McKenna[e], Norasyikin Binte Hassan[f], Sok Ying Liaw[a]

[a] *Alice Lee Centre for Nursing Studies, Yong Loo Lin School of Medicine, National University of Singapore, Singapore*
[b] *Saw Swee Hock School of Public Health, National University of Singapore, Singapore*
[c] *London School of Hygiene and Tropical Medicine, London, United Kingdom*
[d] *Department of Nursing Service, Khoo Teck Puat Hospital, Singapore*
[e] *School of Nursing and Midwifery, La Trobe University, Victoria, Australia*
[f] *Department of Nursing Education and Research, Changi General Hospital, Singapore*

A R T I C L E   I N F O

A B S T R A C T

Background: The implementation of early warning scoring systems and medical emergency teams that aim to reduce failure to rescue in general wards is only effective if frontline nurses can recognize and act on clinical deterioration in a timely manner. While much of the research to date has primarily focused on registered nurses as recognizers of clinical deterioration, little research has sought to explore the role of enrolled nurses in recognizing clinical deterioration and to provide a big picture of how enrolled and registered nurses recognize clinical deterioration in general ward patients.
Objectives: To conduct an exploration of the experiences of enrolled and registered nurses in recognizing clinically deteriorating patients in general wards.
Design: A qualitative, descriptive design.
Setting: General wards at a 1,000-bed acute general hospital in Singapore.
Participants: A purposive sample of 22 enrolled and registered nurses who had at least 6 months of nursing experience and who were working in the general wards.
Methods: Individual semi-structured interviews were conducted between October 2016 and February 2017. Interviews were transcribed verbatim and analyzed using thematic analysis.
Results: Four salient themes emerged from the data analysis. The first, 'Having a sense of knowing', illustrates how knowing a patient and past experiences facilitated the early recognition of clinical deterioration before the patient turned haemodynamically unstable. The second, 'Patient assessment practices', depicts the physical assessment skills that nurses used to detect clinical deterioration. The third, 'Delegation of routine patient care and assessment to enrolled nurses', demonstrates that nursing activities were delegated to enrolled nurses with lesser directional and supervisory aspects that "delegation" implies, which can potentially compromise patient safety. The fourth, 'Missing the big picture', identifies overwhelming workload and fixation on specific parameters of a patient as reasons for both enrolled and registered nurses missing the big picture of the patient's deterioration.
Conclusions: This study provides a snapshot of the recognition of clinical deterioration among enrolled and registered nurses in general wards. Our findings illuminate the need to support the roles of enrolled and registered nurses, with an emphasis on patient assessment and strengthening collaborative practices among nurses, to improve early recognition and timely treatment of clinically deteriorating ward patients.

© 2019 Elsevier Ltd. All rights reserved.

What is already known about the topic?

- As the professional group that carries the highest level of responsibility for patient surveillance and that has the highest degree of patient contact, ward nurses are in the best position to

* Corresponding author at: Alice Lee Centre for Nursing Studies, Yong Loo Lin School of Medicine, National University of Singapore, Level 2, Clinical Research Centre, Block MD11, 10 Medical Drive, 117597, Singapore.
  E-mail address: chuaweiling@u.nus.edu (W.L. Chua).

recognize and respond to clinical deterioration in general ward patients.

- The past decade has seen the devolvement of vital signs assessments to enrolled nurses as part of their nursing routine practice, thus placing them in a strategic position to recognize clinical deterioration.
- However, most of the existing studies have only paid attention to the role of registered nurses as recognizers of clinical deterioration, leaving knowledge gaps regarding the contribution of enrolled nurses in recognizing clinical deterioration and understanding the current clinical landscape of recognizing clinical deterioration in general ward patients.

What this paper adds

- This study identifies ineffective intra-professional nursing relationships between the enrolled and registered nurses resulting from suboptimal communication and teamwork and ineffective delegation skills, which affect the recognition of clinically deteriorating ward patients.
- Given that enrolled nurses may lack the clinical knowledge to relate vital signs changes to a patient's clinical condition, it is essential that registered nurses provide directions and supervision in the delegation process of vital signs assessment to enrolled nurses.
- This study confirms the disconnection between physical assessment skills taught in the pre-registration nursing curriculum and what is practiced in the clinical setting. Therefore, there is a need to review the scope of physical assessment skills fundamental to nurses in acute care settings and to develop an evidence-based approach to patient assessment that can support nurses in the early recognition of clinical deterioration.

1. Introduction

Patients in general wards can experience unexpected clinical deterioration that can lead to critical illness, unplanned intensive care unit admission, cardiac arrest, or even death. Most clinical deteriorations are manifested in patients' physiological signs, such as changes in respiratory rate, heart rate, blood pressure, and oxygen saturation, or deteriorating mental statuses (Andersen et al., 2016; Goldhill and McNarry, 2004; Jacques et al., 2006; Lighthall et al., 2009). However, these warning signs are often missed, overlooked, or not promptly acted on by nurses (Fuhrmann et al., 2008; Massey et al., 2008; McQuillan et al., 1998; National Patient Safety Agency, 2007b). Patient safety initiatives, such as physiological track and trigger systems and medical emergency teams, which aim to improve early recognition and ensure prompt delivery of appropriate interventions to clinically deteriorating patients, are only effective if nurses can recognize early warning signs and respond to clinical deterioration in a timely manner.

Internationally, the past decade has seen an expanded role and functions of enrolled nurses (also known as licensed practical nurses in the United States of America and Canada), engaging in an array of nursing activities ranging from basic patient care to more advanced activities such as assisting in procedures, performing patient assessment and administering prescribed medications and intravenous fluids (College of Licensed Practical Nurses of Alberta, 2015; Endacott et al., 2018; Mok et al., 2015; Singapore Nursing Board, 2018b). Therefore, previous studies that only focused on the role of registered nurses in detecting clinical deterioration may not depict the complete picture of how bedside nurses recognize clinical deterioration.

1.1. Background

Prompted by consistent evidence that frontline nurses can miss, misinterpret, or neglect signs of clinical deterioration, there is a growing body of nursing literature exploring frontline nurses' roles in detecting clinical deterioration in general wards and improving their roles in recognizing and responding to deteriorating patients. Level of clinical education (Liaw et al., 2011b; Massey et al., 2017), exposure to clinical deterioration situations (Liaw et al., 2011b; Odell et al., 2009; Purling and King, 2012), ability to undertake patient assessment (Liaw et al., 2011b; Massey et al., 2017; Purling and King, 2012), ward staffing level and workload (Purling and King, 2012), availability of experienced nurses on shift for consultation (Purling and King, 2012), and adequate functioning patient monitoring equipment (Liaw et al., 2011b; Massey et al., 2017; Odell et al., 2009; Purling and King, 2012) have been identified in previous literature reviews as factors influencing nurses' recognition of clinical deterioration. Notably, nurses' knowledge of a patient has consistently been reported as a key facilitator in recognizing at-risk or deteriorating patients among these reviews (Liaw et al., 2011b; Massey et al., 2017; Odell et al., 2009; Purling and King, 2012).

In an earlier review of 14 studies of nurses' roles in detecting deteriorating patients in general wards, Odell et al. (2009) found that nursing staff frequently recognized clinical deterioration using their intuition. Of which, knowledge of a patient's clinical status and usual behavior, and pattern recognition played important roles in nurses' intuition (Odell et al., 2009). Knowledge of a patient enables the detection of any worsening in a patient's clinical status and behavior, while pattern recognition whereby repeated exposure to similar patients with specific conditions enables the recognition of deviations from the normal clinical course of an illness (Odell et al., 2009). These findings, consistent with subsequent literature reviews (Liaw et al., 2011b; Massey et al., 2017; Purling and King, 2012), suggest that nurses often recognized subtle changes in patients' conditions or early cues of clinical deterioration before measurable clinical signs are evident. However, the ability to identify subtle changes in a patient's condition requires nurses to be actively involved in direct patient care and patient observation activities over time (Kenward and Hodgetts, 2002; Minick and Harvey, 2003).

Traditionally, nursing services for patient care were undertaken solely by the registered nurses. "Second-level" regulated nurses, enrolled nurses who qualify and practice at a lower level than a registered nurse, were introduced into the nursing workforce as a solution to the increased demands of health care services (Jacob et al., 2015). Enrolled nurses were initially trained to work as assistants to registered nurses, and under their supervision, to undertake basic patient care such as assisting with activities of daily living and monitoring a patients' clinical status (Jacob et al., 2013). As the complexity of patient care has augmented exponentially over the past one to two decades, alongside acute shortages of nurses and increasing economic constraints, the scope of practice for enrolled and registered nurses has expanded considerably such that the health care system evolves to meet the new needs (Jacob et al., 2013; Pearcey, 2008). Registered nurses today have reduced involvement in bedside nursing care; they focus on complex patient care and play new roles in coordinating patient care among multidisciplinary teams and planning for patient discharge (Rhéaume et al., 2015). Routine patient-related tasks, such as monitoring and taking vital signs, changing simple wound dressings and assisting in procedures, which were traditionally the domain of registered nurses have now largely been delegated to enrolled nurses (Jacob et al., 2013; Rhéaume et al., 2015). The resultant close proximity of enrolled nurses to patients places them in a strategic position to detect clinical deterioration and alert registered nurses responsible for these patients.

Although enrolled nurses play an important role in recognizing and escalating care for deteriorating patients, scant attention has been given to them. Most studies included in the aforementioned literature reviews explored the role of registered nurses as first recognizers of and responders to clinical deterioration, with a couple of studies conducted in the Unit Kingdom, which examined the role of healthcare assistants in recognizing and responding to clinical deterioration (Hogan, 2006; James et al., 2010; Wheatley, 2006). Similarly, subsequent primary studies following the integrative review by Massey et al. (2017) have continued to focus on the roles of registered nurses in recognizing and responding to clinical deterioration (Gray et al., 2018; Hart et al., 2016; Mohammmed Iddrisu et al., 2018). In studies concerning healthcare assistants, it was reported that this group was limited in their abilities to perform overall patient assessment (Hogan, 2006; James et al., 2010; Wheatley, 2006). While healthcare assistants are trained to carry out vital signs assessments, they might not be qualified to interpret the results due to a lack of relevant knowledge of physiology and pathophysiology to assimilate the information (Beaumont et al., 2008; Wheatley, 2006). Notwithstanding, it is noteworthy that findings of these studies (Hogan, 2006; James et al., 2010; Wheatley, 2006) may not be extrapolated to enrolled nurses due to critical differences in educational preparations and job scopes between these two categories of nursing staff. Enrolled nurses undertake accredited training and are expected to practice in accordance with the legislations and competencies set by the nursing regulatory body (Jacob et al., 2012). In contrast, there is no universal minimum training standards for healthcare assistants and they are not regulated by any regulatory body (Francis and Humphreys, 1999). The education and training of enrolled nurses permit a wider range of skills and patient-related tasks than healthcare assistants.

To date, only one identified qualitative study has described the experiences of 15 enrolled nurses in recognizing and responding to deteriorating ward patients (Chua et al., 2013). Chua et al. (2013) established the pivotal role enrolled nurses have in recognizing and reporting clinical deterioration to registered nurses. However, the study also seemed to suggest a disengagement of registered nurses in patient observation activities and a growing reliance on enrolled nurses with knowledge gaps in recognizing clinical deterioration (Chua et al., 2013). Furthermore, ineffective communication regarding clinical deterioration between enrolled and registered nurses identified in the study may have serious implications on the timely treatment of deteriorating patients (Chua et al., 2013). These two striking findings, alongside the research gap on the current clinical landscape of recognizing clinical deterioration, pave the way for the current study which aims to explore the experiences of enrolled and registered nurses in recognizing clinically deteriorating patients in general wards. It is inferred from previous studies that clinical deterioration is mostly brought to the attention of registered nurses by enrolled nurses (Chua et al., 2013; James et al., 2010), even though in some cases, registered nurses first detect a patient's deterioration. Therefore, the recognition of clinical deterioration in this context includes the process of enrolled nurses alerting registered nurses about clinical deterioration. This study was part of a larger investigation on the recognition and escalation of care for clinically deteriorating patients in general wards.

2. Methods

2.1. Design

A qualitative, descriptive design using individual semi-structured interviews was selected to gain a rich understanding of nurses' experiences and perceptions regarding the recognition of clinically deteriorating patients.

2.2. Setting

This study was conducted in a 1,000-bed acute general public hospital in Singapore. The nursing workforce in Singapore comprises "first-level" registered nurses (78.8%) or registered midwives (0.3%) and "second-level" enrolled nurses (20.9%) (Singapore Nursing Board, 2018a), along with unregulated healthcare assistants (Ayre et al., 2007). A skill-mix of enrolled and registered nurses is the typical nursing team composition in acute care settings.

In Singapore, basic education for registered nurses can be attained through either a three-year nursing diploma or three-year nursing degree programme (Liaw et al., 2016). Thereafter, registered nurses can undertake an eight-month advanced diploma course to specialize in various clinical fields (Ayre et al., 2007). Enrolled nurses, on the other hand, undergo a two-year certificate programme whereby greater emphasis is placed on technical nursing skills (Liaw et al., 2016). The Singapore Nursing Board stipulates the core competencies of enrolled and registered nurses (http://www.healthprofessionals.gov.sg/snb/nursing-guidelines-and-standards) (Singapore Nursing Board, 2019).

Foreign enrolled and registered nurses are employed in Singapore to assist with addressing the local nursing shortage. It is not uncommon for foreign nurses with nursing diplomas or degrees to practice as enrolled nurses if they are assessed by the Singapore Nursing Board to be inadequate for licensure as registered nurses. As of 2017, there are 3,827 (44.3%) foreign enrolled nurses in Singapore (Singapore Nursing Board, 2018a). This indicates a considerable number of enrolled nurses holding nursing degrees.

Since January 2009, the hospital has implemented a single parameter track-and-trigger system whereby the medical emergency team can be triggered by any healthcare staff at any time of the day or night if any hospitalized patient breaches any of the calling criteria for a medical emergency team. The calling criteria for a medical emergency team consists of a set of vital signs with predefined thresholds, a range of abnormal observations such as threatened airway and declined neurological status, and the loose criterion of "seriously worried" about any hospitalized patient. For patients with abnormal vital signs or observations less severe than the calling criteria for the medical emergency team, enrolled or registered nurses can initiate a clinical review by the responsible attending medical staff.

2.3. Participants

Enrolled and registered nurses who were working in general wards with at least six months of nursing experience and had involvement in direct patient care were informed about the study through their nurse managers. Recruitment posters were also put up in staff tearooms and lifts. Nurses in more senior positions, such as nurse managers, nurse clinicians, nurse researchers, nurse educators, nurse administrators, and advanced practice nurses, were excluded. A purposive sample of enrolled and registered nurses who agreed to participate in the study were recruited using maximum variation sampling for number of years of nursing experience and ward specialty to yield diversity in experiences regarding the recognition of deteriorating patients.

2.4. Data collection

Data collection took place between October 2016 and February 2017. Before each interview, participants were asked to complete a

demographic information sheet regarding their age, clinical role, length of experience, educational level and ward specialty. Thereafter, with the use of a semi-structured interview guide (Appendix 1), a one-time, individual, face-to-face interview was conducted with each participant. The interview guide was pilot-tested before the proposed study's commencement. Each interview, lasting approximately 50 min to one hour, was audio-recorded and was conducted in English by one trained researcher in a room at the hospital that was selected for privacy. No prior interaction had occurred between the researcher and any of the participants. This helped to minimize influence of the researcher over the participants during the interviews. Data collection occurred concurrently with data analysis. This process facilitated the identification of thematic saturation, which was achieved with the seventh enrolled nurse and twelfth registered nurse. To confirm thematic saturation, one enrolled nurse and two registered nurses were additionally interviewed. However, further interviews did not bring about new themes or information.

2.5. Data analysis

Descriptive statistics, including frequencies and percentages for categorical data and means and standard deviations for continuous data, were used to summarize the sample characteristics. Interviews were transcribed verbatim and transcripts were checked for accuracy before being subjected to thematic analysis. The transcripts were read several times to achieve data immersion before two researchers independently coded the transcripts using the QSR International's NVivo 11 software (QSR International, 2015). The two researchers drew on grounded theory techniques, including line-by-line open-coding of the transcripts and naming each line and segment of data, using the constant comparative method and using subsequent interviews to test preliminary assumptions (Strauss and Corbin, 1990). Field notes and memos jotted down during the interviews were also referred to during the data analysis. The two researchers then met to compare the emergent themes and subthemes and refined them to generate a thematic map. Disagreements were discussed openly to reach a consensus on the final set of themes and subthemes in the presence of a third researcher.

2.6. Ethical considerations

Ethical approval was obtained from the National Healthcare Group Domain Specific Review Board (ref 2016/00577) prior to the commencement of the study. Before commencing each interview, written informed consent was obtained from each participant who voluntarily agreed to participate in the study. Participants were given the autonomy to withdraw from the study at any time. All audio-recordings and transcripts were linked with pseudonyms to ensure confidentiality and anonymity and were stored securely in password-protected files.

2.7. Rigor

Recommended guidelines by Lincoln and Guba (1985) were used to ensure the trustworthiness of the study. Credibility was strengthened by summarizing interpretations, clarifying any doubts and misinterpretations during the interviews and undertaking independent data analysis by two researchers. Transcripts were returned to the participants to ensure the accuracy of the recorded interviews. Dependability was enhanced by having one researcher conduct all interviews. The inclusion of participants' demographics and verbatim extracts facilitated transferability. To ensure confirmability of the findings, the researcher (WLC) kept a reflexive diary of her reflected thoughts about the topic and an audit trail for the entire research process.

3. Findings

Of the 22 nurses interviewed, 19 were female. Fourteen were registered nurses and eight were enrolled nurses. Participants' years of nursing experience ranged from one to 29 (mean 6.8). They worked in six different specialties (general medicine, general surgery, orthopedic surgery, cardiology, geriatric medicine, and rehabilitation medicine) and held various nursing positions. A summary of the participants' characteristics is presented in Table 1.

Four main themes emerged from thematic analysis of the interviews: (1) Having a sense of knowing, (2) Patient assessment practices, (3) Delegation of routine patient care and assessment to enrolled nurses, and (4) Missing the big picture. The section below qualitatively summarizes the themes and subthemes that emerged, along with verbatim quotations [(EN = enrolled nurse, RN = registered nurse) and yrs = years of nursing experience)].

3.1. Having a sense of knowing

This theme captures the two distinct ways of "knowing" that facilitated enrolled and registered nurses in the early recognition of changes in a patient's clinical status. They described feeling a premonition that something was going to happen to a patient, feeling that something was "not right" with a patient or feeling worried about a patient even before signs of hemodynamic instability were evident.

3.1.1. Knowing the patient
Despite differences in educational qualifications and job scopes, both the enrolled and registered nurses concurred that their knowledge about patients' clinical statuses, usual behaviors and patterns of response facilitated the early recognition of patient problems, even before patients' physiological observations were compromised, by comparing with the patient's previous recognized states. Continuity in patient care assignments, whereby enrolled and registered nurses were assigned to care for the same

Table 1
Participants' characteristics (n = 22).

Characteristics	Enrolled nurses (n = 8)	Registered nurses (n = 14)
Gender		
Male	2	1
Female	6	13
Clinical role		
Enrolled nurse	3	–
Senior enrolled nurse	4	–
Principal enrolled nurse	1	–
Staff nurse	–	9
Senior staff nurse	–	5
Years of experience as EN or RN		
Mean (SD)	5.5 (4.0)	9.2 (8.4)
Less than 1	0	0
1 – 2	1	4
3 – 5	1	4
6 – 10	5	4
More than 10	1	2
Highest level of education		
NITEC in Nursing or equivalent	4	–
Nursing diploma	–	2
Nursing advanced diploma	–	1
Nursing degree	4	11
Clinical work area		
Cardiology	1	0
General medical	2	7
General surgical/ orthopedic-surgery	4	6
Geriatric medicine	0	1
Rehabilitation medicine	1	0

Notes: EN – Enrolled Nurses; RN – Registered Nurses; NITEC in Nursing – National Institute of Technical Education Certificate in Nursing.

patient on a regular basis, was the most frequently reported enabler that contributed to nurses' knowledge about patients.

"If you were on afternoon shift the previous day and on morning shift the next day, as much as possible, you would be assigned to nurse the same patient. So, there's a continuity of patient care [. . .] When you're familiar with the patient, you would be able to detect that something is not right early." (EN4, 4yrs)

However, more than half of the enrolled and registered nurses shared that their familiarity with patients were hindered by frequent disruptions to continuity in patient care assignments.

"Today, I am familiar with all the cases [patients] already. But tomorrow, I'm rotated to another group of patients. All the patients are new to me [. . .] The doctor asked, 'How's the patient last night?' But I don't know how the patient was previously." (RN1, 2yrs)

When both levels of nurses did not have the luxury of continuity in patient care assignments, most of them considered listening to the concerns raised by patients or their family members and participating in shift handover reports as crucial factors to knowing the patients.

"During shift handover reports, we will know the diagnosis of the patient, doctors' plans, how the patient is, and etcetera. From there, you roughly know how sick the patient is and you make a mental note to yourself that you need to observe him or her more closely." (EN2, 29yrs)

3.1.2. Knowing through past experiences

Despite the absence of obvious physiological changes, the more experienced enrolled and registered nurses shared that their abilities to sense that something was "not right" with a patient was backed by their past experiences with clinical deterioration.

"Experience is the one that tells you something is not right. If you have more experience, it's easier for you to pick up [a deteriorating patient] compared to nurses with one or two years of nursing experience." (EN6, 7yrs)

"I have six years of nursing experience. For certain patients, even though the vital signs are okay, you just know that you have to activate the medical emergency team. Otherwise, he will just collapse." (RN13, 6yrs)

A few experienced enrolled and registered nurses also spoke about how their past experiences with patients who had similar conditions and symptoms enabled the recognition of clinical deterioration. One experienced enrolled nurse shared how she recognized salient cues of clinical deterioration by comparing the presenting cues of a patient against a list of common cues and patterns that were typical of specific conditions:

"Having looked after patients with similar conditions, you will be more familiar with the signs and symptoms. You compare these signs and symptoms with what your (present) patient is presenting, then you can pick up the deterioration. It takes some time and years of experience to develop this . . . " (EN7, 10yrs)

3.2. Patient assessment practices

This theme reveals that both enrolled and registered nurses performed minimal physical assessments that extended beyond vital signs assessments as part of their ongoing patient assessments. It also highlights a practice whereby both levels of nurses would consult more experienced nurses to confirm their suspicions of clinical deterioration.

3.2.1. Primacy of vital signs assessment

While both the enrolled and registered nurses highlighted the importance of undertaking thorough patient assessments, both

levels of nurses reported that vital signs assessments and general observations of patients such as overall skin colour, behavior, level of consciousness and obvious signs of respiratory distress constituted their core set of patient assessment skills used in detecting clinical deterioration. Although the more "complex" physical assessment skills such as palpating the abdomen and auscultating heart and lungs sounds were part of pre-registration nursing education curriculum for registered nurses, none reported the use of these physical assessment skills. Several nurses attributed the focus on vital signs assessments to the definitive way of convincing ward doctors to review deteriorating patients.

"When you call the doctor because the patient turns bad, the doctor will be asking, 'What's the vital signs now?' Then, you tell them, 'My colleagues are taking now, but the patient is visibly sick, can you come and see immediately?' Then, they will tell you, 'Oh, you call me back when the vitals are up.'" (RN11, 8yrs)

"Doctors normally would want to hear the vital signs or any objective complaint of the patient. Without any evidence, the doctor will not entertain you." (EN8, 7yrs)

3.2.2. "Complex physical assessments are the doctor's job"

Almost all enrolled and registered nurses shared a common perception that the more "complex" physical assessments should be the responsibility of doctors.

"It has been the culture that ['complex'] physical assessments are the doctor's job [. . .] It's not in our job description. That's the mindset." (RN13, 6yrs)

"For us nurses, we normally observe the patient's breathing patterns and monitor the oxygen saturation levels. Doctors are the ones listening to the lungs." (EN2, 29yrs)

Besides the perception that the more "complex" physical assessments belonged to the domain of the medicine profession, the perceived complexity, time and workload pressure, lack of confidence, and lack of role models to correct their practice were also seen as barriers to nurses' use of "complex" physical assessment skills.

"We learnt ['complex'] physical assessment in school, but I don't think we have the time to do [them]. I don't think we are empowered to do ['complex'] physical assessments, and we're not confident to do them as well. For the doctors, like the house officers, they have time to practice and someone to correct them. We have no one to correct us!" (RN8, 5yrs)

3.2.3. Seeking affirmation regarding patient assessment

All participants described a common practice whereby most nurses, regardless of their levels of expertise, would usually consult a more experienced nurse or confer with their peers to confirm patient deterioration.

"If there is [a] more senior staff in our ward or there is a nurse manager, we just ask them to see that patient. It is to confirm our assessments. So, if they think need to escalate, then we will escalate up." (RN4, 5yrs)

Despite differences in their job designations, it was not uncommon for novice registered nurses to seek advice from more experienced enrolled nurses. This was recounted by a few participants.

Sometimes, when working with the newly passed out or very junior staff nurses, they are not confident of their judgement. They would ask me,' Is the patient really deteriorating? What should I do? Should I call the doctor?' She [RN] may be holding a higher job status than me, but when it comes to experience, I have seen more [patient deterioration] than her." (EN8, 7yrs)

Accounts of several enrolled and registered nurses working in various wards suggested that this practice of seeking affirmations and supporting one another had been ingrained into the ward culture.

> "It's the culture in my ward to have someone supporting you from the back. So, if you are uncertain about certain things, it's not difficult to just ask another colleague." (RN13, 6yrs)

3.3. Delegation of routine patient care and assessment to enrolled nurses

This theme expounds on the diminishing involvement of registered nurses with routine patient care and increasing reliance on enrolled nurses to recognize and report clinical deterioration. From the findings, it seemed apparent that registered nurses may be delegating the task of routine patient assessments to enrolled nurses with a lesser directional and supervisory aspect that "delegation" implies.

3.3.1. Registered nurses' diminished involvement in bedside care

All participants acknowledged that the task shifting of registered nurses to increased administrative duties and patient care coordination had resulted in registered nurses being less involved in direct patient care. As such, enrolled nurses now had greater roles in routine patient care and were usually said to be the first to detect changes in a patient's condition.

> "Because of the division of work, ENs spend more time at a patient's bedside compared to RNs. RNs need to give medication and documentation, while ENs provide bedside care and do parameters taking." (EN4, 4yrs)
> "The first-hand staff to detect patient deterioration are the ENs because they are usually the ones taking the parameters and doing bedside care. They will tell me, 'You know, this patient doesn't look good. Usually, she's okay, but today, she's . . . ' That kind of thing." (RN2, 3yrs)

3.3.2. Reliance on enrolled nurses to perform and report vital signs assessments

All the registered nurses agreed that they were ultimately responsible for vital signs monitoring, and the measurement of vital signs was considered a shared responsibility between enrolled and registered nurses. However, all enrolled nurses shared that most registered nurses relied heavily on them to perform vital signs assessments. It was reported that registered nurses would usually perform vital signs taking only when they needed the vital signs readings immediately, but enrolled nurses were unavailable to perform the task.

> "Some senior staff nurse will take the initiative to help with vital signs taking [. . .] But overall, most RNs would rely on ENs to perform vital signs. Unless they [registered nurses] want to recheck the BP [blood pressure], but they cannot reach us, then they will recheck the BP." (EN4, 4yrs)

Several registered nurses attributed their reliance on enrolled nurses to perform vital signs assessments to their heavy workloads.

> "We, RNs have a lot of work. We cannot help ENs with vital signs all the time." (RN9, 3yrs)

A few enrolled nurses were frustrated with the heavy reliance on them to report vital signs changes to registered nurses. Given that vital signs assessments are a shared responsibility between enrolled and registered nurses, enrolled nurses reported the need for a greater involvement of registered nurses in performing vital signs assessments and checking patients' observation charts.

> "Some RNs will push the blame to you [EN] when the incoming shift RN questioned why the abnormal vital signs were not picked up or highlighted to the doctor. [. . .] Vital signs taking is a shared task between ENs and RNs, so RNs should also have the initiative to help and check [the readings] in the system. They cannot just rely on us, ENs. Sometimes, we are really very busy also and we may forget to inform." (EN3, 1.5yrs)

3.3.3. Inadequate guidance given to the enrolled nurses

Drawing on the accounts of enrolled and registered nurses, vital signs assessment may have been delegated to enrolled nurses with inadequate direction and supervision from registered nurses.

> "There were so many hourly parameters for my patients. After I finish one round, it is time for the next round. It just goes on and on... Sometimes, I don't even know what to look out for. The staff nurse didn't explain why the patient was on hourly parameters and what to look out for. I just do because she (staff nurse) asked me to do..." (EN6, 7yrs)
> "If you know that you are working with weaker ENs, the better RNs will specifically tell them that 'the patient is not well, you have to monitor the patient closely, for example the BP or SpO$_2$ [oxygen saturation]. Then you have to go and check on the monitoring. You can't just leave it to them and think that they will do it. But, honestly, we don't see much of this [practice] in the wards." (RN11, 8yrs)

In other examples, a few registered nurses shared their experiences of vital signs abnormalities that were not reported to them by enrolled nurses. While these incidents taught them the importance of checking patients' vital signs regularly and not relying on enrolled nurses to report vital signs abnormalities, these registered nurses may not have realized that some enrolled nurses require direction and supervision regarding patient assessment activities.

> "I already had the experience of her [EN] not reporting the abnormalities to me. So, I tend to be more cautious and will check [the patient's vital signs chart] every now and then or I will just ask her [EN], 'Have you taken the parameters? Any abnormalities?'" (RN5, 14yrs)

3.4. Missing the big picture

This theme identifies overwhelming workload and being narrowly focused on specific parameters of a patient as reasons for nurses missing the big picture of a patient's deterioration.

3.4.1. "Blinded" by overwhelming workload

Many enrolled and registered nurses illustrated accounts of overwhelming workload mismatched with inadequate staffing levels, which impaired their capabilities to "see" clinical deterioration.

> "Sometimes, we are held up with something else. We won't know how the other patients are. We won't know that the patient deteriorates unless another staff passes by [and says], 'Patient XX doesn't look good.'" (EN3, 1.5yrs)

The most challenging issue reported by nurses was struggling to provide close vigilance to patients during night shifts when there were significantly fewer staff.

> "There are fewer staff during night shifts. We can't monitor patients so closely. [. . .] I had to accompany one patient to the toilet. My EN was on break and other staff were occupied. When my EN returned from break, she found [that] patient X [had] collapsed." (RN9, 3yrs)

3.4.2. Not seeing a patient's parameters as a whole

A few registered nurses highlighted that the ability to see the big picture of vital signs changes was important to recognizing

clinical deterioration that was at a less progressive stage. However, some enrolled nurses were reported to have the tendency to look at the individual parameters of a patient in isolation and were unable to relate changes in a patient's vital signs to their clinical presentation.

> "Some enrolled nurses tend to go by [the] theoretical baseline and see things in isolation. For example, they will only tell you, 'The urine output is low.' But when you check the vital signs, the vitals, you could also see that the patient's heart rate is high, but they couldn't relate it to dehydration." (RN11/ 8yrs)

A few enrolled and registered nurses also emphasized the importance of staying vigilant and not just blindly monitor a patient.

> "When you make rounds, you don't just make rounds for the sake of it. [. . .] Sometimes, you can foresee that certain patients will turn bad, so you must watch them" (EN5, 8yrs)
> "With so many patients to look after, we need to know what to look out for. We shouldn't be just blindly monitoring . . . .." (RN11, 8yrs)

4. Discussion

This study brought together enrolled and registered nurses to explore frontline nurses' experiences in recognizing clinical deterioration in general ward patients. Consistent with existing literature, the abilities of both the enrolled and registered nurses in recognizing clinical deterioration were found to be influenced by their knowledge of patients, past experiences with clinical deterioration, patient assessment, and workload and staffing levels (Chua et al., 2013; Massey et al., 2017; Odell et al., 2009; Purling and King, 2012). However, our findings were unique in highlighting registered nurses' current scope of physical assessment practices to detect clinical deterioration, describing the impact of task shifting between registered and enrolled nurses on patient observation activities and shedding light on intra-professional relationships between enrolled and registered nurses in relation to clinical deterioration.

In congruence with a qualitative study that explored the experiences of 28 medical-surgical nurses with clinical deterioration events from five hospitals in the United States (Hart et al., 2016), being assigned to care for the same group of patients on a regular basis was highlighted by most nurses in this study as instrumental in contributing to knowing a patient. This finding is supported by seminal work from Tanner et al. (1993) who postulated that knowing a patient often required nurses' engagement and involvement in the care of the patient over time. In addition to facilitating the recognition of subtle changes in a patient's condition, continuity in patient care assignments can lighten nurses' workloads by reducing the need to learn about the patient and help to develop feelings of connection between a nurse and a patient (Allen, 2018). However, continuity of care in nurse-patient assignments in hospitals is frequently disrupted by assigning nurses to a new group of patients every shift. Recognizing the positive influences of continuity in patient care assignments on the quality of patient care and nursing work, our findings recommend nursing care delivery models that can support continuity in patient care.

Embedded in the practice of seeking affirmation regarding clinical deterioration suggests a lack of confidence among nurses in patient assessments and clinical judgements. Similarly, a recent systematic review by Chua et al. (2017) associated the need for nurses to consult more experienced nurses regarding medical emergency team activations with a lack of confidence in their patient assessment skills. However, it was reported in earlier studies that nurses, particularly new graduate nurses, were reluctant to consult their seniors if they had overriding fears of being deemed as silly (King and Clark, 2002) or receiving negative comments from more experienced nurses for consulting them (Ranse and Arbon, 2008). Contrastingly, nurses in our study described being supported by their colleagues when help was needed. Although having adequate numbers of experienced nurses on each shift is essential, it is equally imperative to have a supportive ward culture where nurses have no fear of consulting each other for advice or seeking for help.

As with earlier studies, registered nurses in this study rarely or had never performed more "complex" physical assessment skills such as auscultating heart and lungs sounds and palpating abdomen, despite these skills being taught in their pre-registration education (Birks et al., 2013; Cicolini et al., 2015; Osborne et al., 2015). The reported constraints to registered nurses' use of "complex" physical assessments in this study were remarkably similar to those reported in a cross-sectional survey exploring the scope of physical assessment practices of 434 acute care registered nurses and midwives working in one tertiary hospital in Australia (Osborne et al., 2015). Taken together, there is a need to review the set of essential physical assessment skills that every newly qualified nurse working in the acute care setting needs to be equipped with. Although Douglas et al. (2016) identified 16 core physical assessment skills for the early recognition of changes in a patient's condition using a Delphi methodology, the skills were mostly confined to vital signs assessments, inspections and general observations of patients. Surprisingly, assessment skills such as feeling for skin temperature, measuring capillary refill time, performing and interpreting electrocardiogram for abnormal changes and examining pupillary reaction and size, which were considered important in assessing deteriorating patients did not reach consensus (Liaw et al., 2011a). This suggests the need for further evidence-based recommendations on the core assessment skills that will enable nurses to recognize early changes in a patient's clinical status.

Good communication, supervision and teamwork lies at the core of effective delegation (Hopkins et al., 2012; Wagner, 2018). However, our findings indicate a lack of direction and supervision given to enrolled nurses concerning delegation of vital signs assessment. Furthermore, most registered nurses in this study considered the tasks of performing vital signs assessment as the responsibility of enrolled nurses. These findings were also reported in Chua et al. (2013). Moreover, in both our study and Chua et al. (2013), enrolled nurses were found to lack in clinical knowledge to relate vital signs changes into a patient's condition and to amalgamate cues gathered from patient observations to get an overall picture of a patient's condition. Thus, it is particularly worrisome that registered nurses relied heavily on enrolled nurses to perform and interpret vital signs assessments and report abnormal vital signs readings to them. Suboptimal delegations can have negative impacts on patient safety and care (Bittner and Gravlin, 2009; Kalisch, 2006). In a landmark study by Kalisch (2006), nurses and nursing assistants identified ineffective delegation as a contributing factor to missed nursing care. The ineffective delegation practices were related to a lack of communication and collaboration with nursing assistants in the delegation process, registered nurses failing to supervise nursing assistants and registered nurses viewing delegated nursing activities as primarily nursing assistants' responsibilities for assuring completion (Kalisch, 2006). Given the detrimental consequences of suboptimal delegation on patient safety, our study points to a need to develop the delegation skills of registered nurses, with a greater focus on communication, supervision and teamwork.

Communication breakdown between medical and nursing staff is frequently cited as a key impediment to the early recognition and timely treatment of clinically deteriorating ward patients (Andrews and Waterman, 2005; Johnston et al., 2014; Mushta et al., 2018; National Patient Safety Agency, 2007a). However, our findings, supported by Chua et al. (2013), suggest that communication breakdowns may exist intra-professionally within the nursing profession before communication extends to the medical profession. Findings of our study and those of Chua et al. (2013) demonstrate that the interdependency between enrolled and registered nurses to alert and respond to each other is hampered by either enrolled nurses failing to recognize or communicate abnormal patient observations to registered nurses or registered nurses failing to act on enrolled nurses' reports of clinical deterioration promptly. More effort is needed to improve the collaboration between enrolled and registered nurses in recognizing and responding to clinical deterioration.

4.1. Limitations

As with all interview studies, our findings were limited by self-reports and subjected to social desirability bias. While half of the enrolled nurses in our sample had nursing degrees, our findings did not demonstrate critical differences among experienced enrolled nurses with or without nursing degrees in recognizing clinical deterioration. Furthermore, the profile of the enrolled nurses in our sample is similar to those of the study setting and the Singapore's nursing workforce. The study-specific contextual factors and organizational policies or aspects of organizational culture unique to this organization may limit transferability of the findings. Nevertheless, the presentation of a clear description of the study setting, participants' characteristics, and interview excerpts will enable readers to exercise judgement on the transferability of findings.

5. Implications

The findings of this study have implications for clinical practice, nursing education and recommendations for future research. First, nurse leaders need to identify nursing care delivery models that can support continuity in patient care and evaluate its impact on positive patient outcomes. Second, nurse managers are instrumental in fostering collaborative ward environments where nurses, regardless of grade and years of experience, have no fear of backlash when consulting each other for advice or seeking help. Third, the disconnection between what is taught and what is practiced reflects the need for nurse educators and researchers to review and ascertain the scope of physical assessment skills that are fundamental to acute care nurses in their daily practices. The development of an evidence-based approach to patient assessments may be valuable in improving the early recognition of clinical deterioration by nurses. Fourth, nurse educators and managers should develop continuing education and training programmes to improve registered nurses' delegation practices and increase communication between enrolled and registered nurses about the goals and processes of patient care. More specifically, formalizing guidelines to supervise and provide directions to enrolled nurses in vital signs assessments may be beneficial for registered nurses in the delegation process of this and routine patient care. Besides ensuring that enrolled nurses are competent in undertaking delegated nursing activities, registered nurses need to recognize that being willing to help enrolled nurses during times when there are no urgent care issues can build effective relationships. To take it a step further, this study calls for an increased focus on developing nursing students' delegation skills in their pre-registration nursing curriculum so that newly qualified registered nurses can delegate nursing care effectively and safely in today's complex healthcare environment. Lastly, further exploration into intra-professional collaborative practice between enrolled and registered nurses in general wards in the context of clinical deterioration holds strong promises for improving early recognition and escalation of clinical deterioration.

6. Conclusion

As healthcare professionals at the forefront of patient care, enrolled and registered nurses have a pivotal role in recognizing clinically deteriorating ward patients through ongoing patient observations and assessments. However, this study suggests that both enrolled and registered nurses are not using physical assessment skills within their scope of nursing practice. Additionally, ineffective intra-professional nursing relationships between enrolled and registered nurses resulting from suboptimal communication and teamwork and ineffective delegation skills can have dire consequences for clinically deteriorating ward patients. It may be of value to pay closer attention and provide training programmes for enrolled and registered nurses working in acute care settings on topics relevant to patient assessment skills and collaborative practices.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.ijnurstu.2019.04.012.

References

Allen, S., 2018. The nurse-patient assignment process: what clinical nurses and patients think. Medsurg Nurs. 27 (2), 77–82.

Andersen, L.W., Kim, W.Y., Chase, M., Berg, K.-M., Mortensen, S.J., Moskowitz, A., et al., 2016. The prevalence and significance of abnormal vital signs prior to in-hospital cardiac arrest. Resuscitation 98, 112–117. doi:http://dx.doi.org/10.1016/j.resuscitation.2015.08.016.

Andrews, T., Waterman, H., 2005. Packaging: a grounded theory of how to report physiological deterioration effectively. J. Adv. Nurs. 52 (5), 473–481. doi:http://dx.doi.org/10.1111/j.1365-2648.2005.03615.x.

Ayre, T.C., Gerdtz, M.F., Parker, J., Nelson, S., 2007. Nursing skill mix and outcomes: a Singapore perspective. Int. Nurs. Rev. 54 (1), 56–62. doi:http://dx.doi.org/10.1111/j.1466-7657.2007.00518.x.

Beaumont, K., Luettel, D., Thomson, R., 2008. Deterioration in hospital patients: early signs and appropriate actions. Nurs. Stand. 23 (1), 43–48. doi:http://dx.doi.org/10.7748/ns2008.09.23.1.43.c6653.

Birks, M., Cant, R., James, A., Chung, C., Davis, J., 2013. The use of physical assessment skills by registered nurses in Australia: issues for nursing education. Collegian 20 (1), 27–33. doi:http://dx.doi.org/10.1016/j.colegn.2012.02.004.

Bittner, N.P., Gravlin, G., 2009. Critical thinking, delegation, and missed care in nursing practice. J. Nurs. Adm. 39 (3), 142–146. doi:http://dx.doi.org/10.1097/NNA.0b013e31819894b7.

Chua, W.L., Mackey, S., Ng, E.K.C., Liaw, S.Y., 2013. Front line nurses' experiences with deteriorating ward patients: a qualitative study. Int. Nurs. Rev. 60 (4), 501–509. doi:http://dx.doi.org/10.1111/inr.12061.

Chua, W.L., See, M.T.A., Legio-Quigley, H., Jones, D., Tee, A., Liaw, S.Y., 2017. Factors influencing the activation of the rapid response system for clinically deteriorating patients by frontline ward clinicians: a systematic review. Int. J. Qual. Health Care 29 (8), 981–998. doi:http://dx.doi.org/10.1093/intqhc/mzx149.

Cicolini, G., Tomietto, M., Simonetti, V., Comparcini, D., Flacco, M.E., Carvello, M., Manzoli, L., 2015. Physical assessment techniques performed by Italian registered nurses: a quantitative survey. J. Clin. Nurs. 24 (23-24), 3700–3706. doi:http://dx.doi.org/10.1111/jocn.12997.

College of Licensed Practical Nurses of Alberta, 2015. Competency Profile for Licensed Practical Nurses. College of Licensed Practical Nurses of Alberta., Canada.

Douglas, C., Booker, C., Fox, R., Windsor, C., Osborne, S., Gardner, G., 2016. Nursing physical assessment for patient safety in general wards: reaching consensus on core skills. J. Clin. Nurs. 25 (13-14), 1890–1900. doi:http://dx.doi.org/10.1111/jocn.13201.

Endacott, R., O'Connor, M., Williams, A., Wood, P., McKenna, L., Griffiths, D., et al., 2018. Roles and functions of enrolled nurses in Australia: perspectives of enrolled nurses and registered nurses. J. Clin. Nurs. 27 (5-6), e913–e920. doi:http://dx.doi.org/10.1111/jocn.13987.

Francis, B., Humphreys, J., 1999. Enrolled nurses and the professionalisation of nursing: a comparison of nurse education and skill-mix in Australia and the UK. Int. J. Nurs. Stud. 36 (2), 127–135.

Fuhrmann, L., Lippert, A., Perner, A., Ostergaard, D., 2008. Incidence, staff awareness and mortality of patients at risk on general wards. Resuscitation 77 (3), 325–330. doi:http://dx.doi.org/10.1016/j.resuscitation.2008.01.009.

Goldhill, D.R., McNarry, A.F., 2004. Physiological abnormalities in early warning scores are related to mortality in adult inpatients. Br. J. Anaesth. 92 (6), 882–884. doi:http://dx.doi.org/10.1093/bja/aeh113.

Gray, E., Currey, J., Considine, J., 2018. Hospital in the Home nurses' recognition and response to clinical deterioration. J. Clin. Nurs. 27 (9-10), 2152–2160. doi:http://dx.doi.org/10.1111/jocn.14076.

Hart, P.L., Spiva, L., Dolly, L., Lang-Coleman, K., Prince-Williams, N., 2016. Medical-surgical nurses' experiences as first responders during deterioration events: a qualitative study. J. Clin. Nurs. 25 (21-22), 3241–3251. doi:http://dx.doi.org/10.1111/jocn.13357.

Hogan, J., 2006. Why don't nurses monitor the respiratory rates of patients? Br. J. Nurs. 15 (9), 489–492. doi:http://dx.doi.org/10.12968/bjon.2006.15.9.21087.

Hopkins, U., Itty, A.S., Nazario, H., Pinon, M., Slyer, J., Singleton, J., 2012. The effectiveness of delegation interventions by the registered nurse to the unlicensed assistive personnel and their impact on quality of care, patient satisfaction, and RN staff satisfaction: a systematic review. JBI Libr. Syst. Rev. 10 (15), 895–934. doi:http://dx.doi.org/10.11124/jbisrir-2012-65.

Jacob, E., Sellick, K., McKenna, L., 2012. Australian registered and enrolled nurses: Is there a difference? Int. J. Nurs. Pract. 18 (3), 303–307. doi:http://dx.doi.org/10.1111/j.1440-172X.2012.02037.x.

Jacob, E.R., Barnett, A., Sellick, K., McKenna, L., 2013. Scope of practice for Australian enrolled nurses: evolution and practice issues. Contemp. Nurse: J. Aust. Nurs. Prof 45 (2), 155–163. doi:http://dx.doi.org/10.5172/conu.2013.45.2.155.

Jacob, E.R., McKenna, L., D'Amore, A., 2015. The changing skill mix in nursing: considerations for and against different levels of nurse. J. Nurs. Manag. 23 (4), 421–426. doi:http://dx.doi.org/10.1111/jonm.12162.

Jacques, T., Harrison, G.A., McLaws, M.-L., Kilborn, G., 2006. Signs of critical conditions and emergency responses (SOCCER): a model for predicting adverse events in the inpatient setting. Resuscitation 69 (2), 175–183. doi:http://dx.doi.org/10.1016/j.resuscitation.2005.08.015.

James, J., Butler-Williams, C., Hunt, J., Cox, H., 2010. Vital signs for vital people: an exploratory study into the role of the Healthcare Assistant in recognising, recording and responding to the acutely ill patient in the general ward setting. J. Nurs. Manag. 18 (5), 548–555. doi:http://dx.doi.org/10.1111/j.1365-2834.2010.01086.x.

Johnston, M., Arora, S., King, D., Stroman, L., Darzi, A., 2014. Escalation of care and failure to rescue: a multicenter, multiprofessional qualitative study. Surgery 155 (6), 989–994. doi:http://dx.doi.org/10.1016/j.surg.2014.01.016.

Kalisch, B.J., 2006. Missed nursing care: a qualitative study. J. Nurs. Care Qual. 21 (4), 306–313. doi:http://dx.doi.org/10.1097/00001786-200610000-00006.

Kenward, G., Hodgetts, T., 2002. Nurse concern: a predictor of patient deterioration. Nurs. Times 98 (22), 38–39.

King, L., Clark, J.M., 2002. Intuition and the development of expertise in surgical ward and intensive care nurses. J. Adv. Nurs. 37 (4), 322–329. doi:http://dx.doi.org/10.1046/j.1365-2648.2002.02105.x.

Liaw, S.Y., Rethans, J.-J., Scherpbier, A., Klainin-Yobas, P., 2011a. Rescuing a patient in deteriorating situations (RAPIDS): a simulation-based educational program on recognizing, responding and reporting of physiological signs of deterioration. Resuscitation 82 (9), 1224–1230. doi:http://dx.doi.org/10.1016/j.resuscitation.2011.04.014.

Liaw, S.Y., Scherpbier, A., Klainin-Yobas, P., Rethans, J., 2011b. A review of educational strategies to improve nurses' roles in recognizing and responding to deteriorating patients. Int. Nurs. Rev. 58 (3), 296–303. doi:http://dx.doi.org/10.1111/j.1466-7657.2011.00915.x.

Liaw, S.Y., Wu, L.T., Holroyd, E., Wang, W., Lopez, V., Lim, S., Chow, Y.L., 2016. Why not nursing? Factors influencing healthcare career choice among Singaporean students. Int. Nurs. Rev. 63 (4), 530–538. doi:http://dx.doi.org/10.1111/inr.12312.

Lighthall, G.K., Markar, S., Hsiung, R., 2009. Abnormal vital signs are associated with an increased risk for critical events in US veteran inpatients. Resuscitation 80 (11), 1264–1269. doi:http://dx.doi.org/10.1016/j.resuscitation.2009.08.012.

Lincoln, Y.S., Guba, E.G., 1985. Naturalistic Inquiry. Sage Publications, Beverly Hills, Calif.

Massey, D., Aitken, L.M., Chaboyer, W., 2008. What factors influence suboptimal ward care in the acutely ill ward patient? Aust. Crit. Care 21 (3), 127–140. doi:http://dx.doi.org/10.1016/j.aucc.2008.05.051.

Massey, D., Chaboyer, W., Anderson, V., 2017. What factors influence ward nurses' recognition of and response to patient deterioration? An integrative review of the literature. Nurs. Open 4 (1), 6–23. doi:http://dx.doi.org/10.1002/nop2.53.

McQuillan, P., Pilkington, S., Allan, A., Taylor, B., Short, A., Morgan, G., et al., 1998. Confidential inquiry into quality of care before admission to intensive care. BMJ Br. Med. J. 316 (7148), 1853–1858.

Minick, P., Harvey, S., 2003. The early recognition of patient problems among medical-surgical nurses. Medsurg Nurs. 12 (5), 291.

Mohammmed Iddrisu, S., Hutchinson, A.F., Sungkar, Y., Considine, J., 2018. Nurses' role in recognising and responding to clinical deterioration in surgical patients. J. Clin. Nurs. 27 (9-10), 1920–1930. doi:http://dx.doi.org/10.1111/jocn.14331.

Mok, W.Q., Wang, W., Liaw, S.Y., 2015. Vital signs monitoring to detect patient deterioration: an integrative literature review. Int. J. Nurs. Pract. 21 (Suppl. 2), 91–98. doi:http://dx.doi.org/10.1111/ijn.12329.

Mushta, J., Kathy, L.R., Andersen, E., 2018. Failure to rescue as a nurse-sensitive indicator. Nurs. Forum 53 (1), 84–92. doi:http://dx.doi.org/10.1111/nuf.12215.

National Patient Safety Agency, 2007a. Recognising and Responding Appropriately to Earlysigns of Deterioration in Hosptial Patients. NHS; National Patient Safety Agency, London, UK.

National Patient Safety Agency, 2007b. Safer Care for the Acutely Ill Patient: Learning From Serious Incidents. National Patient Safety Agency, London.

Odell, M., Victor, C., Oliver, D., 2009. Nurses' role in detecting deterioration in ward patients: systematic literature review. J. Adv. Nurs. 65 (10), 1992–2006. doi:http://dx.doi.org/10.1111/j.1365-2648.2009.05109.x.

Osborne, S., Douglas, C., Reid, C., Jones, L., Gardner, G., 2015. The primacy of vital signs - acute care nurses' and midwives' use of physical assessment skills: a cross sectional study. Int. J. Nurs. Stud. 52 (5), 951–962. doi:http://dx.doi.org/10.1016/j.ijnurstu.2015.01.014.

Pearcey, P., 2008. Shifting roles in nursing–does role extension require role abdication? J. Clin. Nurs. 17 (10), 1320–1326. doi:http://dx.doi.org/10.1111/j.1365-2702.2007.02135.x.

Purling, A., King, L., 2012. A literature review: graduate nurses' preparedness for recognising and responding to the deteriorating patient. J. Clin. Nurs. 21 (23-24), 3451–3465. doi:http://dx.doi.org/10.1111/j.1365-2702.2012.04348.x.

QSR International, 2015. NVivo For Windows Qualitative Data Analysis Software (Version 11) [Computer Software]. QSR International Pty Ltd., Melbourne, Australia.

Ranse, J., Arbon, P., 2008. Graduate nurses' lived experience of in-hospital resuscitation: a hermeneutic phenomenological approach. Aust. Crit. Care 21 (1), 38–47. doi:http://dx.doi.org/10.1016/j.aucc.2007.12.001.

Rhéaume, A., Dionne, S., Gaudet, D., Allain, M., Belliveau, E., Boudreau, L., Brown, L., 2015. The changing boundaries of nursing: a qualitative study of the transition to a new nursing care delivery model. J. Clin. Nurs. 24 (17-18), 2529–2537. doi:http://dx.doi.org/10.1111/jocn.12846.

Singapore Nursing Board, 2018a. Annual Report 2017. Singapore Nursing Board, Singapore.

Singapore Nursing Board, 2018b. Core Competencies of Enrolled Nurse. Singapore Nursing Board, Singapore.

Singapore Nursing Board, 2019. Nursing Guidelines and Standards (January 15) Retrieved from. . http://www.healthprofessionals.gov.sg/snb/nursing-guidelines-and-standards.

Strauss, A.L., Corbin, J.M., 1990. Basics of Qualitative Research: Grounded Theory Procedures and Techniques. Sage Publications, Newbury Park, Calif.

Tanner, C.A., Benner, P., Chesla, C., Gordon, D.R., 1993. The phenomenology of knowing the patient. J. Nurs. Scholarsh. 25 (4), 273–280. doi:http://dx.doi.org/10.1111/j.1547-5069.1993.tb00259.x.

Wagner, E.A., 2018. Improving patient care outcomes through better delegation-communication between nurses and assistive personnel. J. Nurs. Care Qual. 33 (2), 187–193. doi:http://dx.doi.org/10.1097/ncq.0000000000000282.

Wheatley, I., 2006. The nursing practice of taking level 1 patient observations. Intensive Crit. Care Nurs. 22 (2), 115–121. doi:http://dx.doi.org/10.1016/j.iccn.2005.08.003.