ICU nurses' role in ventilation

Nurses' role in ventilation management stimulated an intensive care nurse to research the subject for his master's thesis.

By Mark Henderwood

Airway, breathing, circulation . . . to have breath is to have life. Perhaps the importance of breathing is most notable in its absence. When someone is unable to support their own breathing, they require specialised care; so a key part of "life support" is mechanical ventilation.

Interest in the role of nurses in ventilation management was the focus of my recently submitted master's thesis.[1] As well as investigating nurses' roles, the research examined the use of automated ventilation modes, which use software to manage, to a greater or lesser extent, ventilation. Uptake of automated modes in New Zealand intensive care units (NZICUs) has been significant. This article is based on the research findings and includes some of the implications of changing roles, ventilation management and automated modes.

Ventilation management refers to the decisions and actions that determine the ventilatory support administered to patients.[2] Previous comparable research on ventilation management collected data from nurse managers and intensivists, asking them to speak on behalf of clinical nursing staff.[3,4,5,6] However, as nurses are the health professionals most often present at the bedside, I wanted to collect data for this study directly from them.

Recruiting participants

The Nursing Council doesn't identify ICU as a category when reporting workplace statistics, so it's difficult to determine the number of nurses working in NZICUs at any one time. The lines can become further blurred when units have intensive care, cardiac and high dependency beds in the same unit. I approached the New Zealand College of Critical Care Nurses, previously NZNO's Critical Care Nurses Section, for access to its membership. This enabled communication with nurses working in the ICU specialty, without having to access workplaces separately. An invitation to participate in the online survey on ventilation management was sent to 776 college members. More than 200 nurses responded, creating a significant database to work with. This level of participation is crucial for research projects of this nature, as it means meaningful data can be collected. Most of the participants (85 per cent) were employed either as a staff nurse or in a coordinator role, engaged daily in ventilation management. The remainder had specialty or managerial nursing roles.

Ventilation management

The two main areas of ventilation management examined in this study were "fundamental decisions" and "setting changes". These categories were taken from previous research models.[4,5] Fundamental decisions included the choice of mode, initial settings, readiness to wean, stopping sedation, method of weaning and readiness to extubate. Setting changes included the choice of mode and increase or decrease of fraction of inspired oxygen (FiO_2), rate, pressure support, tidal volume and, in the case of adaptive support ventilation (ASV), percentage minute volume (%MV).

Data was also gathered on education, qualifications, staff ratios, use of protocols, perceived autonomy and perceived influence. Automated modes included in the survey were Smartcare®/PS (pressure support), ASV, mandatory minute ventilation (MMV) and proportional assist ventilation (PAV).

Fundamental decisions in ventilation management tend to be made collaboratively between nurses and doctors; nurses rarely act alone at this level. This is true in NZICUs, and is encouraging. Collaboration offers the chance for nurses to draw on experiences and strengths to advocate for a patient-centred approach to ventilation management.

In contrast to fundamental decisions, nurses readily made independent adjustments to ventilator settings. These "tweaks" (adjustments, titrations, setting changes) often fitted within protocols or guidelines. Other times they were made with more autonomy. Given that nurses are the clinicians most consistently at the bedside, it makes good sense that nurses are making these adjustments. The most frequently independently adjusted setting by participants was FiO_2, while inspiratory pressure was the setting least frequently independently adjusted.

We know that, generally, we have good nurse-to-patient ratios in NZICUs. After working in ICUs in Dublin and London for a few years around the turn of the century, I remember the relief in returning home, knowing I would be allocated fewer patients on a shift. The research confirmed this, with favorable ratios in NZICUs, compared to European ICUs, especially for nurses caring for patients receiving non-invasive ventilation.[4]

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The survey revealed further uptake of specialty education, which was encouraging. In 2008, researchers reported 54 per cent of NZICU nurses held a postgraduate qualification relating to the intensive care specialty.[5] Data gathered in the same study indicated that in Australia, 70 per cent of nurses had undertaken such a qualification.[5] Data from the current study found the number of ICU nurses with a postgraduate qualification had increased to 69.7 per cent.

Unit size influenced the role of nurses.

While nurses in larger units more frequently made changes in titrating oxygen and, in the case of ASV, %MV, nurses in smaller units generally "stepped up" to ventilation management roles after-hours, when doctors were less available. Although larger units were more likely to have ventilation protocols, the presence of a protocol did not statistically influence the likelihood of a nurse independently titrating any of the 12 ventilator settings surveyed.

Experience, measured in years of work in ICUs, had a curious influence on some of the variables. For instance, nurses with less experience were more inclined to increase the positive end expiratory pressure. Experienced nurses worked more collaboratively with their medical colleagues than less experienced nurses.

Nurses reported less autonomy and more influence in decision-making about ventilation management than their managers reported in earlier studies.[5] These differences point to the value of including nurses as participants when gathering data on bedside practices, rather than asking management for estimates.

Inter-professional relationships

How nurses work with doctors has been discussed for as long as we have worked alongside our colleagues. Differences in that collegial relationship can have a significant impact on our work and our roles. This research indicated a variety of experiences. Descriptions of the workplace ranged from positive, collegial and autonomous, to controlling and bullying settings, where nursing autonomy was discouraged and inter-professional trust was low.

Recently, I asked the Health and Disability Commissioner, Anthony Hill, if he had a message for the 100-odd nursing students I would be presenting to the following day. He was keen that I communicate the importance of how nurses wish to *be* in the clinical environment. He said he would encourage nurses to instigate open, collaborative and communicative working environments. We can only be responsible for our own behaviour; however, we all play a part in determining workplace culture. The role of nurses in ventilation management in NZICUs is not uniform, but influenced in part by workplace environment, levels of inter-professional trust and unit culture.

New approach to ICU practice

Automated modes introduce a new approach to one of the fundamental aspects of ICU practice. Modes use software to manage, to a greater or lesser extent, ventilation. Automated modes in mechanical ventilation have been compared with the "autopilot" function in aviation where, although humans are involved in decision-making and manual adjustments, technology also takes a role.

Adoption of automated ventilation modes is clearly on the rise in New Zealand. In this study, 69 per cent of participants were using automated modes, and 75 per cent of these nurses used them more than 50 per cent of the time. These figures suggest uptake is significant. To preserve anonymity, regional data was not collected, but I noticed, anecdotally, that geographical uptake varied and some regions seemed reticent about adopting automation in ventilation. The two most common modes used in NZICUs are Smartcare®/PS and ASV. Smartcare/PS provides an automated weaning protocol and is available on Dräger ventilators. Hamilton ventilators offer ASV, a mode that adapts ventilation parameters from intubation through to extubation.

Feeling supported in change is important. What piqued my interest in automated ventilation management was the introduction of ASV as a default ventilation mode in the ICU where I worked. This meant every patient would go onto ASV and stay on it, unless a decision was made to change mode. The ICU was the first in Australasia to adopt an automated mode as the default mode and it was a brave decision. This required a lot of staff support and education, but consequently also led to a familiarity with, and trust in the mode.

What does automation mean for roles in ventilation management? What is the impact? Although this hasn't yet been looked at in detail, the implication is that the ventilator itself is taking up an increasing amount of the clinician's role and decision-making.

'Task-shifting'

Traditionally, professional roles emerge as "task-shifting" takes place.[8] For example, until reasonably late last century, it was generally seen as the doctors' role to obtain a blood pressure.[9] As our medical colleagues take on new roles, some tasks are held less tightly and nurses are delegated/take up these roles until they eventually became a normal part of our skill-set. This phenomenon of task shifting is also true for nurses in ventilation management, although there are always variations in personal and regional culture that guide the level of delegation.

Aside from the traditional nurse/doctor negotiation of roles, I'm particularly interested in the delegation that occurs between human and machine. Delegation of authority to manage ventilation is essentially what occurs when a clinician uses an automated mode. Rather than human clinical judgment, algorithms, based on parameters such as lung compliance and airway resistance, are entrusted to direct management. For some clinicians, this level of delegation can be too big a leap of faith; for others, it's a logical step to take.

Modern ventilators provide an increasing amount of monitoring. I encourage clinicians to familiarise themselves with monitoring parameters, which may include, for instance, real-time lung compliance, airway resistance and occlusion pressures. Gaining increased familiarity with, and competence in, the technology can lead to more patient-centred outcomes, for instance, by refining management of the patient's work of breathing.[10]

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Anecdotally, automated modes bring unique challenges. I use the term anecdotally, as there is limited published material on the experience of using automated modes. Nurses and doctors alike are cautious about delegating the responsibility of clinical decision-making to a machine. Colleagues sometimes raise concerns about an erosion of their role, suggesting they lose basic skills and clinical judgment, as they become reliant on the software to make decisions.

Automated software is increasingly becoming standard-issue. As uptake of automated modes increases, how we respond is important. In educating practitioners on the use of automated ventilation, I always urge them to allow the machine to micro-manage, as this is what software does very well. This delegation can allow the clinician to stand back and maintain a patient-centred, big-picture view. Automated modes offer an opportunity to let go of the "micro" and be more actively present in the more fundamental "macro". This can surely enhance a patient-centred approach in this complex and technologically-driven care context. •

* *I would like to acknowledge the help of the New Zealand College of Critical Care Nurses in recruiting nurses for this research.*

* *References for this article are on p40.*

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Nurse suspended for disconnecting callers

Shabnam Sharia Ali, RN

The Health Practitioners Disciplinary Tribunal has the power to discipline all nurses and to request that all its decisions be published in *Kai Tiaki Nursing New Zealand* and other relevant publications. The full decisions are on the tribunal's website.

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AT A Health Practitioners Disciplinary Tribunal hearing in April 2015, an Auckland registered nurse had her registration suspended for three months for compromising the health and safety of people ringing a health consumers' telephone assistance line.

Between January and March 2013, Shabnam Sharia Ali released or disconnected telephone calls on 33 separate occasions. On two of these occasions, she released the calls while having an online conversation with another staff member; on 17 of these occasions, she deliberately disconnected callers and/or documented inaccurate records of the calls; and on 27 of these occasions, she failed to document contacts with the callers. There was no direct evidence that callers were at any significant risk at the time the calls were disconnected.

Ali, who attended the hearing and was represented, agreed with the summary of facts, admitted her conduct amounted to professional misconduct and that it warranted disciplinary sanction. Ali, who trained in Fiji and registered in New Zealand in 2003, expressed sincere regret for her conduct, which she described as very unprofessional. She referred to the "extreme stress" she was under at the time. Ali was found guilty of professional misconduct.

In its decision, the tribunal stated that, having heard Ali's evidence, it believed the period of her life during which the offending occurred was now behind her, that she had realised her conduct was wrong and was seeking to make good. It believed any penalty imposed should reflect her acceptance of her wrongdoing and encourage rehabilitation. But a message must be sent to the nursing profession that behaviour of this kind would be treated seriously. *"Only in this way can the public be protected and standards maintained,"* the tribunal stated.

As well as having her registration suspended for three months from April 27, 2015, Ali was censured and fined $7200 in costs, to be shared equally between the tribunal and the professional conduct committee which brought the charges. When Ali resumes practice, she must be supervised for 12 months and the Nursing Council-approved supervisor must report three monthly to the Nursing Council. Ali must also work at a place of employment approved by the Nursing Council for 12 months and provide a copy of the tribunal's decision to any employer for three years.

The tribunal directed that a copy of the decision and a summary of it be published on its website (www.hpdt.org.nz), and a notice stating the effect of the decision be published in *Kai Tiaki Nursing New Zealand* and the Nursing Council's newsletter *News Update*. The decision number is 698Nur14/300P. •

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