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Quantitative study—other

Having a greater proportion of registered nurses in a respiratory care centre is associated with fewer urinary infections and increased successful ventilator weaning

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Commentary on: **Yang PH, Hung CH, Chen YM, et al.** The impact of different nursing skill mix models on patient outcomes in a respiratory care center. *Worldviews Evid Based Nurs* 2012;**9**:227–33.

Implications for practice and research

- Policy makers and nurse leaders making staffing decisions must take into account the evidence linking nurse staffing, skill mix and patient outcomes.
- Researchers must continue to investigate staffing models to determine the most cost-effective model that supports quality care and take full advantage of the registered nurse workforce, especially given predicted shortages.

Context

This study explored the impact of skill mix model changes on patient outcomes in a critical care environment, specifically, a respiratory care centre based in a southern Taiwan medical centre. It identified that the cost of ventilator-dependent patients in Taiwan in 1999 was 3.5 billion New Taiwan dollars, equivalent to US\$ 121 million. In this context, controlling the costs of healthcare while maintaining quality care became critical. This research examined two skill mix staffing models, a mixed registered nurse (RN) and nursing aid model and a 100% RN model, and their impact on patient outcomes. Patient outcomes were pressure ulcers, respiratory and urinary tract infections, blood stream infections, days of hospitalisation and ventilator weaning.

Methods

This longitudinal research undertook a retrospective analysis of patient and staffing administrative data from a medical centre respiratory care unit in southern Taiwan over a 3-year period. The sample consisted of 487 patients who were admitted to the unit and received respiratory therapy between 1 July 2006 and 31 December 2008. Demographic data was collected from patient medical records; patient outcome data collected from hospital systems and nursing data was collected from the accounting office. Two time periods

were analysed, 247 patients from 1 July 2006 to 30 June 2007 (mixed RN and nursing aid model) and 240 patients from 1 January 2008 to 31 December 2008 (100% RN model). Nursing costs were used as an indirect measure of nursing hours. Data analysis utilised descriptive statistics for patient demographic data and Pearson's χ^2 test and t tests for comparing outcomes between the two staffing groups.

Findings

There were no significant differences in the demographic characteristics of the two patient groups. Respiratory diseases, followed by intracerebral haemorrhage, were the two most common underlying diseases.

The patient outcome analysis identified a statistically significant increase in bloodstream infection rates in the 100% RN sample of patients, but a significant reduction in the urinary tract infection rates. The 100% RN group also had a significantly higher rate of ventilator weaning. There were no statistically significant differences in the occurrence of pressure ulcers, respiratory infections and mean length of stay, mortality or nursing costs between the two groups.

Commentary

This study extends the examination of the relationship between nurse staffing and patient outcomes to the less researched area of critical care. The methodological approach was appropriate for the study purpose, but the design would have been strengthened if methods were used to account for the impact of patient characteristics on outcomes. There is considerable evidence suggesting that the vast amount of variance in outcomes, particularly mortality, arises from the risk associated with patient's own characteristics. In addition, nursing costs were determined by using hospital accounting data rather than hours in the hospital roster. The yearly average cost was divided by 12 to determine the monthly costs. Seasonal staffing

variations therefore would not be captured, and may have masked possible relationships with the patient outcomes under examination.

The authors suggest that RNs might not follow standard infection control procedures and this may account for the higher bloodstream infection rate in the 100% RN group. This logic is difficult to follow, as this would be true of both staffing groups as the RN provide central venous catheters care in both. It is more likely, had adjustments for individual patient risk been undertaken, that this variance could have been explained.

Significant increases in successful weaning from ventilator care would contribute to improved patient

outcomes which could provide a possible cost benefit to the medical centre. Further economic analysis in this regard would be informative.

Finally, determining the most appropriate nursing skill mix that maximises the benefit to patients, is cost-effective and utilises nursing resources wisely remains a challenge for nurse leaders, policy-makers and researchers. Whatever the best skill mix may be, there is a need to develop a framework that enables the RN to make safe delegation decisions while fully utilising supporting roles such as nursing aids.

Competing interests None.