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ORIGINAL ARTICLE

Quality of patient care in the critical care unit in relation to nurse patient ratio: A descriptive study

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Complications;
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Summary
Background: Intensive care is one of the most resource-intensive forms of medical care due to severely ill patients that are cared for in units with high staffing levels. Nursing's impact on the health of patients has shown that the number of nurses per patient and nurse education effects patient outcome. However, there are a lack of studies investigating highly specialised nurses in intensive care and their relation to patient outcome.
Method: This is a retrospective study of critical care registry data (all patients >15 years) in general critical care units at seven university hospitals.
Results: Patient care and complications in relation to nurse/patient ratio showed that unplanned extubations occurred in 3—5.7% of cases. A difference between hospital patients' length of time on ventilation was found with the hospitals with the least amount of patients and with 0.5—0.6 specialist-nurse/patient a longer time on ventilation was noted. The length of ICU stay showed differences between the hospitals and nurse/patient ratios, with higher nurse/patient ratio with the longer length of ICU stay.
Conclusion: Despite similarities between hospitals in relation to SAPS III on admission to critical care, there was a difference in nurse/patient ratios ranging from 1:1 to 0.5:1 and mean time on both invasive and noninvasive ventilation.

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Implications for Clinical Practice

- Our study raises awareness of current nurse/patient ratios and the impact on ventilator time and complications such as unplanned extubations.
- Our results show that the development of clinical practice (e.g. sedation strategies) could have a negative impact on patient safety (e.g. unplanned extubations) if there is not a team approach to perform a consistency analysis before implementation.
- Not only does the level of professional education have an impact on patient outcomes but also organisational attributes.
- Health care staff with the appropriate level of education to care for critically ill patients have a positive impact on patient outcomes.
- The optimal educational level of nurses and the composition of health care staff to provide high quality care in intensive care should be investigated further.

Introduction

Intensive care is one of the most resource-intensive forms of medical care. This is due to patients' severity of illness, who typically have several life-threatening conditions and are cared for in units with high staffing levels (both in amount and competence) within a high-tech environment. Critical care units in Sweden care for approximately 50,000 patients each year and in addition approximately 45,000 patients are cared for in close proximity to the ICU (post-operative recovery room and cardiac-intensive care). Critical care consumes about 1/10 of the cost of somatic care with a daily cost 35—50,000 Skr depending on the degree of specialisation (Swedish Society of Anesthesia and Intensive care, SFAI). In order to reduce the lack of knowledge of intensive care long-term outcomes and the impact on patients, a national quality register has collected data since 2001 (www.icuregswe.org). The goal of the registry is to collect and publish optimal medical and nursing-related outcomes as measured by indicators such as mortality, complications, quality of life and functional status after intensive care. Among these indicators, only the frequency of ventilator associated pneumonia (VAP) and catheter-related sepsis coincides for intensive care patients with scientifically approved nursing indicators for nursing care (Kurtzman and Corrigan, 2007; Montalvo, 2007). To date, there is a lack of data that describes how these indicators are a useful measure of Swedish intensive care from the nursing perspective. However, there are quality reports from SFAI suggesting that Sweden has a standardised mortality rate that is low compared to international reports. One possible explanation is that Sweden has a greater amount of staff with higher levels of competence among both physicians and nurses compared to other countries. In Sweden, nursing studies is part of higher education. For nurses there are three years of education (bachelor degree) to become a registered nurse (180 ECTS credits) plus an additional one-year (60 ECTS) for advanced level (Master degree) to become a specialist nurse in critical care. Swedish intensive care units employ both registered nurses with or without specialisation in intensive care to provide basic nursing care, pharmacological, medical and ventilator support alongside nursing assistants. Nursing's impact on the health of patients by hospital has been debated in the scientific literature (Aiken et al., 2013; Aiken et al., 2014b; Neuraz et al., 2015). Aiken et al. (2013) have shown that the number of nurses per patient and nurse education to bachelor level, affect the frequency of complications measured by mortality, infections and higher patient satisfaction with more nurses (Kendall-Gallagher et al., 2011). In a related study regarding intensive care, McGahan et al. (2012) concluded that the education level of basic level nurses did not affect mortality and morbidity in ICU patients (McGahan et al., 2012). However, there is a scarcity of literature that discusses how the number and level of higher education among specialised nurses per patient affect quality of intensive care nursing. Therefore, we aimed to investigate in a national study if the number of specialist nurses plays a role in relation to direct patient care. Specifically this study will identify and discuss the direct result of care such as patient time on non invasive and invasive breathing support during intensive care in order to evaluate the specialist nurse role for the quality of patient care in general critical care units.

Methods

Objectives and setting

This is a retrospective survey of critical care from registry data of all patients (>15 years) receiving care in general critical care units at University hospitals and is included in SIR during the years 2010—2014. Comparisons between seven general ICU University Hospitals will be performed.

In Sweden there are three hospital types; university hospitals (teaching hospitals that provide highly specialised care), County hospitals (provide general and to some extent specialised care) and local hospitals (provide general care). Sweden has eleven university hospitals and all ICU's are included in a national quality register (SIR). We identified the seven university hospitals located throughout Sweden (north to south), which provide general ICU care for patients >15 years with both medical and surgical patients.

Procedure

Data from SIR was collected. Demographic variables such as: age, gender, geographic location, SAPS III admission score, estimated mortality rates (EMR) and 30 days mortality. Process measures: Proportion of patients and length of stay in ICU. Performance Measure: mortality during ICU care,