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ORIGINAL ARTICLE

Nursing job satisfaction, certification and healthcare-associated infections in critical care

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KEYWORDS
Certification;
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Multilevel modelling;
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Work environment

Summary
Objective: The purpose of this study was to examine the relationship between nursing job satisfaction and healthcare-associated infections (HAIs) in adult critical care.
Methods: Multilevel modelling was used to examine the relationship between nursing job satisfaction and two HAIs, ventilator-associated pneumonia (VAP) and central-line associated bloodstream infections (CLABSI).
Results: Units with nurses that reported satisfaction with organisational policies were associated with a 6.08 decrease in VAP ($p = 0.013$) and units with nurses reporting favourable perception of task requirements were associated with a 7.02 decrease in VAP (.014). Positive perception of organisational policies was associated with lower rates of CLABSI ($p = 0.002$). Unexpected findings include a positive relationship between perception of pay and autonomy and CLABSI as well as perception of interactions and VAP. Units with a higher proportion of Critical Care Registered Nurse (CCRN) certified nurses were associated with lower rates of both CLABSI ($p < 0.001$) and VAP ($p = 0.037$).
Conclusion: This study provides preliminary evidence to support the relationship between nursing job satisfaction and HAIs in critical care, although some relationships were counterintuitive. A secondary finding included significant relationships between CCRN certified nurses and HAIs.
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Implications for Clinical Practice

- This manuscript highlights the importance of job satisfaction and a healthy work environment for nurses working in critical care.
- Healthcare-associated infections are a significant contributor to patient morbidity, mortality and cost and are related to nursing job satisfaction.
- Nurses who earn additional certifications are expected to have expertise in their respective specialty areas. Units with certified nurses were associated with a decreased incidence of HAIs in this study.

Introduction

According to the World Health Organization (WHO), 30% of Intensive Care Unit (ICU) patients experience at least one healthcare-associated infection (HAI) in high-income countries. Moreover, lower income countries' incidence of HAI may exceed 60% of all ICU patients (WHO, 2011). Worldwide incidence of HAIs was 47.9 per 1000 patient days, which is three times higher than the US (Allegranzi et al., 2011). HAIs are defined as ''infections caused by a wide variety of common and unusual bacteria, fungi and viruses during the course of receiving medical care'' (Centers for Disease Control, 2012). Around the globe, millions of patients are dying from HAIs.

The financial burden of HAIs is tremendous. In Europe, HAIs account for approximately €7 billion per year. Even more costly, in the United States, medical costs associated with HAIs range from $28 billion to $45 billion (Scott, 2009), with more recent estimates at $96–147 billion (Marchetti and Rossiter, 2013).

In critical care units, two of the most serious and frequent HAIs are central line-associated bloodstream infections (CLABSIs) and ventilator-associated pneumonia (VAP) (CDC, 2012). Both CLABSI and VAP were identified by the U.S. National Quality Forum (NQF) as ''nurse-sensitive'' patient outcomes and are linked to quality of nursing care (NQF, 2004). Nursing care quality is directly related to work environment and job satisfaction. More importantly, healthy nursing work environments are associated with superior patient outcomes (Manojlovich and DiCicco, 2007; Manojlovich et al., 2009). Of concern is a 2013 report of critical care work environments in the United States reporting a decline in the nursing work environment since 2008 (Ulrich et al., 2014). Nurses from Germany, Italy, France, The Netherlands, Belgium, Poland, Slovakia and China reported frustration with the nursing profession specific to the disparity between high effort and low reward (Li et al., 2013).

Nurse job satisfaction is associated with a positive nursing work environment (Lake, 2002; Gabriel et al., 2013). Work environments perceived as favourable by the nursing staff are associated with fewer adverse nurse-sensitive patient outcomes and increased patient satisfaction (Boev, 2012; Boyle, 2004; Manojlovich and DiCicco, 2007; Manojlovich et al., 2009). Unfavourable practice environments were also associated with higher 30-day mortality (Aiken et al., 2008; Friese et al., 2008). The present study addressed a gap in the literature by examining the relationship between nursing job satisfaction and HAIs in the critical care setting, where VAP and CLABSI are most prevalent (CDC, 2012, WHO, 2011).

Mounting evidence indicates that nurse burnout is a common problem in the ICU. ICUs are disproportionately affected by high vacancy rates and turnover compared to general care areas (AACN, 2014) due to their fast-pasted high-stress environments. This instability has significant potential for negative impact on care delivery outcomes, with vacancy rates greater than 12% resulting in higher incidences of adverse effects (Aiken et al., 2002). Nurse job dissatisfaction has been the primary predictor of intent to leave. Although extensive studies have examined the relationship between nurse intent to leave and patient outcomes, evidence is limited in understanding whether nurse job satisfaction affects patient outcomes.

Evidence is also limited in understanding the relationship between nursing certification and patient outcomes in ICUs. Critical care nurses must meet stringent practice competencies (Alspach, 2007) to safely meet the needs of this acutely ill patient population. Two pioneer studies explored nursing certification in relation to patient outcomes in ICUs (Embriaco et al., 2007; Krapohl et al., 2010). Higher proportions of certified nurses were found to be linked to lower rates of falls (Krapohl et al., 2010); however, no significant relationships were found between certification and HAIs (Embriaco et al., 2007; Krapohl et al., 2010).

The conceptual framework of nurse staffing and patient outcomes (Fig. 1) is informed this analysis (Kane et al., 2007). This comprehensive framework illustrates the complexity of the work environment as well as how multiple factors within the hospital environment are related to patient outcomes. The variables within the conceptual framework, which include patient factors, nurse characteristics and nurse staffing, mirror the variables controlled for in the present study. The primary independent variable in the present study, nursing satisfaction, is directly linked to patient outcomes in this framework. Therefore, the specific aims of this study are:

1. Describe nursing work satisfaction within this sample of ICU nurses.
2. Examine the relationship between nursing job satisfaction and HAIs in adult critical care using specific nurse, patient and unit level variables that are highlighted in Fig. 1.
3. Explore the role of nursing certification in relation to HAIs in critical care.

It is important to further investigate nursing job satisfaction and HAIs in critical care because of the potential to improve patient safety and save lives.

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