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Review

Associations between characteristics of the nurse work environment and five nurse-sensitive patient outcomes in hospitals: A systematic review of literature

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ABSTRACT

Objective: To systematically review the literature on relationships between characteristics of the nurse work environment and five nurse-sensitive patient outcomes in hospitals.
Data sources: The search was performed in Medline (PubMed), Cochrane, Embase, and CINAHL.
Review methods: Included were quantitative studies published from 2004 to 2012 that examined associations between work environment and the following patient outcomes: delirium, malnutrition, pain, patient falls and pressure ulcers. The Dutch version of Cochrane's critical appraisal instrument was used to assess the methodological quality of the included studies.
Results: Of the initial 1120 studies, 29 were included in the review. Nurse staffing was inversely related to patient falls; more favorable staffing hours were associated with fewer fall incidents. Mixed results were shown for nurse staffing in relation to pressure ulcers. Characteristics of work environment other than nurse staffing that showed significant effects were: (i) collaborative relationships; positively perceived communication between nurses and physicians was associated with fewer patient falls and lower rates of pressure ulcers, (ii) nurse education; higher levels of education were related to fewer patient falls and (iii) nursing experience; lower levels of experience were related to more patient falls and higher rates of pressure ulcers. No eligible studies were found regarding delirium and malnutrition, and only one study found that favorable staffing was related to better pain management.
Conclusions: Our findings show that there is evidence on associations between work environment and nurse-sensitive patient outcomes. However, the results are equivocal and studies often do not provide clear conclusions. A quantitative meta-analysis was not feasible due to methodological issues in the primary studies (for example, poorly described samples). The diversity in outcome measures and the majority of cross-sectional designs make quantitative analysis even more difficult. In the future, well-described research designs of a longitudinal character will be needed in this field of work environment and nursing quality.

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What is already known about the topic?

- Nurse work environment is an important contributor for nurse outcomes, such as job satisfaction and burnout.
- Previous research showed associations between nurse staffing and patient outcomes, such as mortality and length of stay.
- High quality systematic reviews in this research area indicate methodological issues of primary studies.

What this paper adds

- Focusing on a limited set of five nurse-sensitive patient outcomes revealed that there were no eligible studies on delirium and malnutrition.
- Shows more favorable nurse staffing is associated with fewer patient falls and better pain management and conflicting results in relation to pressure ulcers.
- Finds that higher levels of experience and education and good collaborative relationships of professionals have favorable effects on the nurse-sensitive patient outcomes of falls and pressure ulcers.

1. Introduction

In 2004, the Institute of Medicine (IOM) published the report *Keeping Patients Safe: Transforming the Work Environment of Nurses*, emphasizing the importance of work environment in relation to the quality of nursing care (Institute of Medicine, 2004). Nurses constitute the largest group of employees in hospitals and deliver most of bedside patient care. Therefore, research on work environment factors influencing nursing quality is highly relevant to the healthcare field. McClure et al. (1983) were the first to explicitly identify some of the major characteristics of the nursing work environment, such as nurse staffing, nurse autonomy and collaboration with physicians (McClure and Hinshaw, 2002). Since then, several studies have focused on the measurement of nursing work environments, for example the Nursing Work Index (Kramer and Hafner, 1989), the Practice Environment Scale (Lake, 2002) and the Essentials of Magnetism (Kramer and Schmalenberg, 2004). A healthy work environment is defined as 'one in which leaders provide the structures, practices, systems and policies that enable clinical nurses to engage in the work processes and relationships essential to safe and quality patient care outcomes' (Schmalenberg and Kramer, 2008).

Donabedian's Structure–Process–Outcome paradigm is often used as a framework for assessing work environments in relation to quality of care (Donabedian, 2003). Structural variables refer to those characteristics affecting the ability of hospital units to meet health care needs and include organizational characteristics (e.g., staffing, skill mix), nurses' characteristics (e.g., education, experience) and patients' characteristics (e.g., age, complexity). Process variables refer to activities of nurses in providing care and include nurses' perception and nursing interventions. Outcome variables are the results of provided care. To date, the relationship between characteristics of nurse work environment and quality of nursing care has been the subject of many studies that have been summarized in several reviews (e.g., Butler et al., 2011; Kane et al., 2007; Lake and Cheung, 2006; Lang et al., 2004; Lankshear et al., 2005; Shekelle, 2013). Yet, previous reviews have almost exclusively focused on structural characteristics regarding staffing levels, such as nurse staffing and skill mix. For example, the review of Lang et al. (2004) showed that higher levels of nurse staffing are associated with lower failure-to-rescue rates, lower inpatient mortality rates, and shorter hospital stays. Kane et al. (2007) performed a meta-analysis on staffing ratios between 1990 and 2006 and found that increased ratios of registered nurses were associated with decreased mortality rates, decreased length of stay and fewer adverse events. Although these reviews greatly contributed to insight in the effects of nurse staffing on patient outcomes, there is a need for information about characteristics other than nurse staffing. Therefore, in the present review, in addition to nurse staffing, we will focus on a broader set of characteristics of work environment and their effect on patient outcomes.

We aim to accumulate knowledge in addition to previous research referring to outcome measures such as mortality, length of stay and healthcare-associated infections (i.e., Aiken et al., 2003; Needleman et al., 2011; Stone et al., 2008). The main objective of the present study is to systematically review the literature and to provide an overview of associations between characteristics of the nurse work environment (e.g., nurse staffing, nurse–physician collaboration) and five nurse-sensitive patient outcomes (i.e., delirium, malnutrition, pain, patient falls, and pressure ulcers). Nurse-sensitive patient outcomes are defined as 'those outcomes that are relevant, based on nurses' scope and domain of practice, and for which there is empirical evidence linking nursing inputs and interventions to the outcome for patients' (Doran, 2003; Maas et al., 1996). Focusing on a limited set of outcomes enables the opportunity for closer scrutiny on these five nurse-sensitive patient outcomes. Pain, patient falls and pressure ulcers are among the most commonly used nurse-sensitive outcome measures for benchmarking purposes in many countries (e.g., Canada, UK, and USA) (Doran et al., 2011). Additionally, delirium and malnutrition are less used in this context; however, their relevance is acknowledged, as in for example, the Netherlands it is mandatory for hospitals to publicly report these formal indicators of nursing quality (Dutch Health Care Inspectorate, 2012). We focus on articles published since 2004, which coincides with the release of the IOM-report mentioning the importance of quality of nursing care and the role of nurse work environments (Institute of Medicine, 2004).

2. Methods

2.1. Search strategy and inclusion criteria

The following electronic databases were used to extract relevant studies: Medline (PubMed), Cochrane Library, Embase and CINAHL. First, search terms were determined by screening abstracts and reference lists of reviews on nurse work environment. Fig. 1 shows the final search strings. Second, two reviewers who are experts in the