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Nurse-related variables associated with patient outcomes: A review of the literature 2006–2012[1,2]

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Abstract Maintaining cost-effective care while optimizing patient outcomes becomes more challenging because the complexity of health care increases. Numerous variables impact patient outcomes. The purpose of this article is to describe recent empirical literature regarding nurse-related variables that impact patient outcomes. Multiple variables are described, including the work environment, Magnet status, nurse–physician communication, job demands, staffing, level of education, years of nursing experience, and certification. Staffing remains the most consistent positive influence on patient outcomes.

The complexity and rapid expansion of knowledge in health care create challenges when investigators examine influences on patient outcomes. The public, health insurance companies, and the federal government demand increased accountability to maintain cost-effectiveness while simultaneously producing positive patient outcomes. The Institute of Medicine (IOM; 2011) report identified four goals to improve the health care in the United States specifically related to nursing. This article describes a meta-analysis of empirical findings from the past 6 years (2006–2012) that describe nursing variables that impact patient outcomes.

A variety of databases (CINAHL, MEDLINE, EBSCOhost, Proquest) yielded extensive research on patient outcomes. Search words included *nurse characteristics*, *nurse qualities*, *patient outcomes*, *nurse physician relationships*, *nurse environment*, *nurse commitment*, *nurse staffing*, and *staffing ratio*. Reference lists in the articles obtained provided additional sources of information. The selection criteria for this report included studies that (a) were published in 2006 or more recent; (b) included data from 2003 or more recent; (c) were quantitative in nature; (d) included samples from the United States; and (e) investigated nurse-related variables and patient outcomes. This report excluded reviews of the literature. The selection criteria resulted in 16 studies. Table 1 provides an overview of the studies.

1. Categories of nurse-related variables

Recent literature revealed eight categories of nurse-related variables that impact patient outcomes. These include (1) nurse work environment, (2) Magnet status, (3) nurse–physician communication, (4) job demands, (5) staffing, (6) education, (7) years of experience, and (8) certification.

The multitude of patient outcomes consist of adverse events, cost of care, nurse-rated quality of care, and expected outcomes of care. Adverse events include infections (ventilator associated pneumonia, blood stream infections related to central catheters, sepsis, urinary tract infections,

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methicillin-resistant *Staphylococcal aureus*), pressure ulcers, prolonged length of stay, mortality rates, failure to rescue, medication errors, patient falls, postoperative hemorrhage, acute myocardial infarction, congestive heart failure, stroke, and craniotomy. Expected outcomes of care include self-care ability and readiness for discharge. The multitude of variables, patient outcomes, and measurement tools inconsistently utilized in the research complicate the development of a framework describing nursing's impact on patient outcomes and actions to improve patient care.

2. Nurse work environment

Hospital work environment is difficult to measure because of its multidimensionality (Aiken, Sloane, et al., 2011). Patient outcomes correlate with nurse work environment. The Practice Environment Scale of the Nursing Work Index (PES-NWI) was used to evaluate nurse work environment in several studies (Aiken, Cimiotti, et al., 2011; Aiken, Sloane, et al., 2011; Flynn et al., 2010; Manojlovich et al., 2009; Manojlovich & DeCicco, 2007). This tool consists of five subscales: staffing resource adequacy, nurse manager ability and leadership, nurse–physician relations, nurse participation in hospital affairs, and nursing foundations for quality of care (Aiken, Sloane, et al., 2011).

Nursing practice environment predicted pressure ulcers and deficiency citations in 63 nursing homes studied (Flynn et al., 2010). As the practice environment improved, pressure ulcers and deficiency citations decreased. Manojlovich et al. (2009) found a significant positive relationship between work environment and ventilator-associated pneumonia. Manojlovich and DeCicco (2007) found that as work environment improved, medication errors decreased. Aiken, Cimiotti, et al. (2011) demonstrated that a better work environment, along with adequate nurse staffing, reduced the odds of death and failure to rescue.

Hatler (2006) found that cost of care was related to patient days and registered nurse (RN) vacancy in the catheterization laboratory. Furthermore "nurses' perceptions of access to information, support and resources, and opportunities for growth and learning at work served as significant predictors of efficiency" (p. 251) resulting in decreased costs and length of stay for patients.

3. Magnet status

Manojlovich et al. (2009) proposed that the five subscales of the PES-NWI represent Magnet hospital properties. Magnet recognition, awarded by the American Nurses Credentialing Center, "is not a checklist of achievements, but rather an enculturation of values, standards, vision, commitment, and pride" (Pinkerton, 2008; p. 324).

Lake et al. (2010) found a 5% lower patient fall rate (not as a result of higher RN staffing) in Magnet hospitals compared with patient falls in non-Magnet hospitals. Although none of the participating hospitals in the study by Manojlovich et al. (2009) earned Magnet recognition, the five properties of Magnet hospitals demonstrated no relationship to the patient outcomes.

Goode et al. (2011) found that no significant relationship existed between hospital type (Magnet or non-Magnet) and failure to rescue, length of stay, or mortality rates for CHF and MI. Slightly fewer hospital-acquired pressure ulcers developed in Magnet hospitals. Infections from intravenous catheters and postoperative sepsis fared worse in Magnet hospitals compared with non-Magnet hospitals.

4. Nurse–physician communication

Manojlovich and DeCicco (2007) found that workplace environment, evaluated as empowerment, and Magnet properties predicted 47% of the variance in nurse–physician communication. Nurse–Physician communication impacts care and patient outcomes. Manojlovich et al. (2009) explored the relationship between nurse–physician communication and patient outcomes (ventilator-associated pneumonia, bloodstream infection associated with central line, and pressure ulcer). No association emerged between total communication and patient outcomes. Timeliness of communication was found to relate inversely to pressure ulcers. Miscommunication between nurses and physicians correlated with greater incidence of ventilator-associated pneumonia. Nurse–Physician communication was found to relate inversely to medication errors (Manojlovich & DeCicco, 2007).

Technology is changing health care communication and documentation. In the hospitals included in their study, Kutney-Lee and Kelly (2011) found that 7% utilized a basic electronic health record system, and among these settings, nurses reported fewer medication errors, improved quality of care, and increased readiness for discharge. In contrast, Blegen et al. (2011) reported that technology demonstrated no effect on patient outcomes.

5. Job demands

Nurse work schedules and job demands during these worked shifts impact patient outcomes. Trinkoff et al. (2011) identified psychological and physical components of job demands. This study linked adverse working conditions (high job demand and unfavorable work schedules) with increased mortality and patient complications. Increased psychological demands correlated with increased pneumonia and a 70% greater likelihood of postoperative pulmonary embolism and deep vein thrombosis. Deaths from congestive heart failure related to nurses being sick or working long shifts. Respiratory failure complications correlated positively with long shifts and inversely with physical demands. An increased likelihood of developing infections existed when nurses reported that they did not