Nursing: Key to Quality Improvement

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KEYWORDS

• Nursing • Quality • Nurse-sensitive indicators • NQF • NDNQI

In the past two decades, a great deal of evidence generated through empirical findings has suggested that nurses and effective nursing care contribute to quality patient outcomes;[1–5] however, most of these findings have been based on large-scale studies that have not included institutions that exclusively care for children. In addition, the Institute of Medicine has published several key documents that demonstrate strong links between nursing and patient quality.[6,7] Patients who are admitted to inpatient settings are there primarily for 24-hour surveillance of health care status (ie, vital signs, improvements, deterioration), to receive therapeutic regimens prescribed by physicians, as well as to receive nursing interventions driven by the patient's condition. All other types of care can be delivered in an outpatient setting. Disentangling nursing care and interventions linked to specific patient outcomes is complicated by two factors: (1) clinical or health information systems or electronic charting systems do not systematically collect nursing interventions in discreet data fields for adequate analysis, similar to how physician diagnoses and orders are captured for billing (eg, International Classification of Disease codes and diagnosis-related groups); and (2) nursing care has traditionally been included in the daily charge rate for reimbursement, which creates no real incentive for organizations to collect individual nursing actions.[8] In the coming months, these barriers must be addressed or organizations stand to lose millions in reimbursement because the Centers for Medicare and Medicaid Services have indicated reduced or no reimbursement for "never events," that is, adverse events that occur in the inpatient setting, many of which are nurse sensitive[9] as follows:

Object inadvertently left in after surgery
Air embolism
Blood incompatibility

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Catheter-associated urinary tract infection
Pressure ulcer (decubitus ulcer)
Vascular catheter-associated infection
Surgical site infection—mediastinitis (infection in the chest) after coronary artery bypass graft surgery
Certain types of falls and trauma
Surgical site infections following certain elective procedures, including certain orthopedic surgeries, and bariatric surgery for obesity
Certain manifestations of poor control of blood sugar levels
Deep vein thrombosis or pulmonary embolism following total knee replacement and hip replacement procedures

Although only a few of these current never events translate to the pediatric population, it is clear that this trend of not paying for adverse events will continue to enter the health care payment structure and undoubtedly include other payer types and adverse events.

Two key studies have used pediatric patient outcomes and nurse staffing. Both found that units with better staffing (eg, a lower nurse-to-patient ratio) had better quality outcomes.[10,11] Absent of additional studies using pediatric settings exclusively, there is no reason to assume that the same link between nurse staffing and patient outcomes does not exist. This article explains in detail the importance of nursing care in the quality agenda and explores the existing gaps in this field of science. In addition, key stakeholders and groups that advocate and focus on specific quality agendas within the field of pediatrics are briefly described. Pediatric health care uses a multidisciplinary model of delivery with physicians and nurses as key drivers of that care; however, each discipline uses specific domains of knowledge and interventions, making it difficult to separate them when evaluating patient outcomes. Much work needs to be conducted using health services research approaches that link and partition the overall and combined contribution of discipline-specific providers.

REGISTERED NURSES AND PATIENT OUTCOMES

The findings of numerous large-scale studies are very clear—greater numbers of registered nurses (RNs) positively impact the quality of patient care. The Agency for Healthcare Research and Quality published a meta-analysis of 94 studies that found an increased number of RNs was associated with decreased mortality, a shorter length of stay, and a lower risk of adverse events.[5] Most of these studies used staffing variables identified as RN full-time equivalents or a percentage concentration of RNs to other type of licensed and nonlicensed nursing personnel associated with specific types of gross patient outcomes such as mortality. A portion of these studies used patient outcomes aggregated at the hospital level, with a small group of studies using the nursing "unit" as the level of analysis. More refined studies have sought to understand the relationship between nurse staffing and specific patient outcomes deemed "nurse sensitive." Nurse-sensitive outcomes are those in which the actions (or lack of actions) of nurses impact patient outcomes. Experts who study this area of outcomes research have suggested a list of key indicators that are most likely nurse sensitive. They are urinary tract infections, pneumonia, shock, hemorrhage in the upper gastrointestinal tract, the length of stay in medical patients, and the failure to rescue in surgical patients.[4]

NURSING PREPARATION AND PATIENT OUTCOMES

A growing body of literature suggests that units staffed with nurses who have predominantly completed programs of study at least at the baccalaureate (BSN) level (4-year

programs) have better patient outcomes when compared with those staffed primarily with graduates of 3-year diploma (hospital-based programs) or 2-year associate degree programs. These studies have included gross and specific patient outcome measures.[12,13] What is not understood is how the nurses' role is improved given more education. The logic is that a more comprehensive education produces an RN with better surveillance, critical thinking, and technical skills, but these specific relationships have not yet been defined by this program of research. More refined work needs to be conducted to help clarify this phenomenon, as well as more funding allocated to do so.

NURSING SKILL MIX AND PATIENT OUTCOMES

In addition to good evidence suggesting that education and the concentration of RN full-time equivalents are important to quality, the skill mix of nursing personnel (including RNs, licensed vocational/practical nurses [LVN, LPNs], and nursing assistants [NAs]) impacts quality outcomes. Research has found that hospital units where more RNs are employed in comparison with LPNs and NAs have better outcomes than when this mix of staff is reversed.[14,15]

A detailed comprehensive reference for the link between nurse staffing and patient outcomes is provided in a key resource document from the Agency for Healthcare Research and Quality partially funded by the Robert Wood Johnson Foundation. The text, entitled "Patient Safety and Quality: An Evidence-Based Handbook for Nurses," can be obtained from the agency or downloaded from their Web site.[16,17] In addition, the chapter on pediatric safety is a valuable resource for children's care in general as well as key nursing issues.[18]

TWO KEY STUDIES

Two studies have used pediatric patients exclusively when examining the link between nurse staffing and patient outcomes.[10,11] The first study was conducted in 2003 with administrative data from seven academic, not-for-profit children's hospitals, including 16 medical/surgical, 5 oncology, and 12 intensive care units.[10] The study looked at the association between staffing and five outcomes: medication errors, central line infections, blood stream infections, intravenous infiltrations, and patient or family complaints. The findings indicated a strong inverse relationship between a greater concentration of RN hours to other types of nursing providers on units and the rates of central line and blood stream infections.

Other key findings offered insight into the use of "agency" or "float" nurses. Lower blood stream infections occurred when there were lower concentrations of these types of RNs on the unit. Agency nurses are those who are not employed by the hospital but rather contracted through a third-party staffing vendor. They may or may not know the hospital, its policies, or protocols.

Nurses who "float" are those who are hired to work on one particular unit but due to patient census are pulled to unfamiliar units to work shifts to complete the staffing rosters. They are disadvantaged in that they know less about the unit in terms of policies, patient diagnoses, and even where supplies are kept. In an emergency, knowing where equipment is kept may be a matter of life or death. We know little about the impact of agency and float nurses. As the nursing shortage grows and hospitals are forced to fill the gaps with these types of alternative providers, it will be imperative that we have better data to understand this potential impact on patient outcomes.

It is unreasonable to assert that any nurse can work any unit on any given day. The practice analogy for physicians is that a gastroenterologist can easily move to a cardiovascular unit to take a patient load, which would be unthinkable. Yet this practice is

performed on a regular basis in settings with nursing personnel. This type of administrative practice will be tested in the next few years as the need for more staff nurses increases due to the aging baby boomers and their increased consumption of health care goods and services. It is unclear through empirical studies how this impacts overall patient outcomes (adverse events) specifically, and much of this uncertainty is thought to be due to issues related to reporting these events, but, again, the paucity of evidence makes this an assumption and not a fact.

The second pediatric study examined mortality and other complications in children using a large administrative data set of 3.65 million hospital discharges from 288 general and children's hospitals within the state of California.[11] The methods used to describe RN staffing were more sensitive in this study in that they used the Medstat's Resource Demand Scale index (RDScale) calculated for each patient rather than the standard calculation of RN staffing which relies on the Centers for Medicare and Medicaid Services case mix method. The case mix method has been the predominant way in which these large-scale studies have been designed.

The findings from this study suggested that greater resource-adjusted RN care was related to significant reductions in postoperative blood infections, postoperative pneumonia, and pulmonary complications. There was also evidence of lower urinary tract infections but only within institutions with higher adjusted RN care. There was no significant relationship between adjusted RN care and mortality in this study.

MAGNET HOSPITAL DESIGNATION AND PATIENT OUTCOMES

The Magnet Recognition Program is sponsored by the American Nurses Credentialing Center.[19,20] Magnet status has been referred to as the gold standard of practice environments for nursing personnel. It is the only recognition program that focuses exclusively on nursing practice issues and culture. Hospitals that obtain Magnet designation do so after a rigorous application process followed by an intense site visit by professional Magnet appraisers, and not all hospitals that apply obtain this distinction. The criteria for evaluation include demonstrated excellence in nursing practice which includes, but is not limited to, nursing autonomy, nursing research, and the opportunity for professional development through credentialing in specialty areas.

Research over the past 2 decades indicates that hospitals with Magnet designation have better nursing outcomes (turnover and satisfaction) as well as better patient outcomes.[2,21,22] Again, the assertion is that when nurses have more input in their professional practice environments and can implement research or quality improvement projects, patients are likely to benefit from this level of engagement.

INTERDISCIPLINARY TEAMS

Although nursing personnel represent the largest group of caregivers within the health care setting, the keys to success in improvement and quality regardless of the population are the collective efforts of nurses, physicians, and the wide range of provider types that support the pediatric client through the continuum of care. No single group of providers can do this work alone. It is an accurate assertion that physicians write the orders for medical care that must be administered to move the patient from illness to wellness or safe passage in palliative care; however, without nurses performing the interventions linked to these orders while continually monitoring the patients' reactions to them, there can be little hope that the patient and family will have safe passage through the systems of care. In addition, nurses have their own unique body of knowledge and nursing interventions that are based on the condition of the patient. This intersection of medical and nursing interventions is imperative to create the

environment needed to improve patient outcomes. Interdisciplinary teams and strong communication among patients, families, and providers are critical. The nurse, who spends more time with the patient than physicians, is the caregiver who can collect appropriate patient data (eg, test results, reactions to therapies) and monitor physician (eg, orders and protocols) and nursing inputs (medical and nursing interventions and the response to these interventions) to create a clear picture of the current status of the patient as well as facilitate discussions for subsequent orders that must be included in the plan of care.

Critical Communication Between Providers

In 2005 a report by the Joint Commission found that the root cause of 70% of more than 2400 sentinel events was communication failure between providers or between family and providers. In those 70% of events, 75% of the patients died due to this type failure.[22] Children are even more vulnerable because staff rely heavily on surrogates (eg, parents or advocates) to communicate for them about their history or reactions to certain drugs and therapies.[23]

Many studies suggest the importance of good communication between providers, even in settings where there is a more hierarchical nature (physician over the RN). To achieve the best outcomes for patients, critical communication in the culture of the unit or hospital must include the ability of provider exchange to get the person's attention, express concern, state the problem, propose an action, and reach a decision.[24] These actions must be conducted in a mutually respectful atmosphere without fear of retribution. The nature of trust, although not a part of this discussion, is paramount to the overall interchange required to ensure the patient does not get caught in the middle of dysfunctional communication between providers.

In an effort to address this critical communication between providers, a system called situation background assessment recommendation (SBAR) has been introduced into hospital systems. Although we are still determining the success of this system, it is far better than having no specific plan of action in transferring information, particularly when patient status is rapidly deteriorating and time is of the essence.[25]

PEDIATRIC-SPECIFIC EFFORTS

All specialty areas by population within health care have attempted to carve out unique contributions to move the quality agenda forward. The same is true for pediatric clients. Absent of a few, most of these groups are interdisciplinary in nature, if not by design then by implementation. For example, the American Academy of Pediatrics[26] has created standards of care for certain patient conditions, but without the implementation of these standards by nurses (or other types of providers such as physical, occupational, or respiratory therapists) in the day-to-day care of patients, there would be little opportunity to actualize these standards at the bedside or clinic environment. Likewise, most organizations that create standards of care have input from a wide variety of providers as well as consumers to ensure the standards are applicable in today's complex health care systems and with the current state of primary and third-party payers.

NURSING INITIATIVES

National Quality Forum

The National Quality Forum (NQF) is a not-for-profit group with strong private-public partnerships that seeks to improve quality for all citizens across the continuum of care.[27] Nursing quality is part of their agenda, with the full understanding that nurses

are principal caregivers in today's health care environment. In addition, the NQF recognizes that nurses act as follows:

> *…as the principal caregivers in any healthcare system, directly and profoundly affect the lives of patients and are critical to the quality of care patients receive. However, patient acuity and shorter lengths of stay, the nursing shortage, changing technology, expansion of public and community health services, and higher patient expectations have produced a greater demand for care, mounted financial pressure, and limited nursing resources. Today's nurses practice in a constrained environment that tests the core of their contribution to quality.*

National Quality Forum–endorsed National Voluntary Consensus Standards for Nursing-sensitive Care

The NQF has framed a variety of important issues when recognizing, reporting, and enriching the data that can be generated by nursing practice:[28,29]

> *As "nursing-sensitive," these consensus standards include measures of processes and outcomes—and structural proxies for these processes and outcomes (eg, skill mix, nurse staffing hours)—that are affected, provided, and/or influenced by nursing personnel—but for which nursing is not exclusively responsible.*
>
> *These consensus standards are intended for use by the public and other healthcare stakeholders to evaluate the extent to and ways in which nurses in acute care hospitals contribute to patient safety, healthcare quality, and a professional work environment.*

Three domains of nurse-sensitive measures reflect the proximity and types of nursing actions and inputs to the specific outcome group: (1) patient-centered measures, which focus on specific patient outcomes; (2) nursing interventions, which focus on the fundamental teaching and interventions for preventable adverse events linked to comorbid conditions; and (3) system-centered outcomes, which evaluate the provision of nursing care in terms of quantity and skill mix by the organization. The list in **Box 1** outlines these specific measures within each of these domains.[28]

As previously indicated, numerous studies have explicated the link between the educational level of RNs and patient outcomes.[12,13] This emerging science offers great opportunity to strengthen nurses. One additional key initiative for the nursing profession is to find ways to infuse quality language and education into nursing education, which has been by and large absent from accreditation standards in the past. The NQF advocates for the following:[28]

> *…recognizes the contribution of nurses to patient safety and healthcare outcomes. While measurable outcomes have been associated with higher levels of education it is difficult to determine the extent that variations in earnings, perception of health, smoking rates, voting patterns, and other outcomes are solely attributable to education and how much to other factors.*

National Database for Nursing Quality Indicators

The National Database of Nursing Quality Indicators (NDNQI) is a proprietary database of the American Nurses Association.[30] The database collects and evaluates unit-specific, nurse-sensitive data from diverse hospitals across the United States.

Hospitals that are part of the Magnet Recognition Program must participate in a national database to compare their patient outcomes with those of similar units.

Box 1
Three domains of nurse-sensitive measures

Patient-centered outcome measures

Death among surgical inpatients with treatable serious complications (failure to rescue): percentage of major surgical inpatients who experience a hospital-acquired complication and die

Pressure ulcer prevalence: percentage of inpatients who have a hospital-acquired pressure ulcer

Falls prevalence: number of inpatient falls per inpatient days

Falls with injury: number of inpatient falls with injuries per inpatient days

Restraint prevalence: percentage of inpatients who have a vest or limb restraint

Urinary catheter-associated urinary tract infection for ICU patients: rate of urinary tract infections associated with use of urinary catheters for ICU patients

Central line catheter-associated blood stream infection rate for ICU and high-risk nursery patients: rate of blood stream infections associated with use of central line catheters for ICU and high-risk nursery patients

Ventilator-associated pneumonia for ICU and high-risk nursery patients: rate of pneumonia associated with use of ventilators for ICU and high-risk nursery patients

Nursing-centered intervention measures

Smoking cessation counseling for acute myocardial infarction: percentage of patients with a history of smoking within the past year who received smoking cessation advice or counseling during hospitalization

Smoking cessation counseling for heart failure: percentage of patients with a history of smoking within the past year who received smoking cessation advice or counseling during hospitalization

Smoking cessation counseling for pneumonia: percentage of patients with a history of smoking within the past year who received smoking cessation advice or counseling during hospitalization

System-centered measures

Skill mix: percentage of RN, LVN/LPN, unlicensed assistive personnel, and contracted nurse care hours to total nursing care hours

Nursing care hours per patient day: number of RNs per patient day and number of nursing staff hours (RN, LVN/LPN, and unlicensed assistive personnel) per patient day

Practice Environment Scale–Nursing Work Index: composite score and scores for the five subscales of (1) nurse participation in hospital affairs; (2) nursing foundations for quality of care; (3) nurse manager ability, leadership, and support of nurses; (4) staffing and resource adequacy; and (5) collegiality of nurse-physician relations

Voluntary turnover: number of voluntary uncontrolled separations during the month by category (RNs, advanced practice nurses, LVN/LPNs, NAs)

The NDNQI is primarily the database to which the majority of these institutions contribute information on the following nurse indicators:[30]

Nurse turnover
Patient falls/injury falls
Hospital- and unit-acquired pressure ulcers
Physical/sexual assault
Pain assessment/intervention/reassessment cycle

- Peripheral intravenous infiltration
- Physical restraints
- Nosocomial infections
  - Catheter-associated urinary tract infections
  - Central line–associated blood stream infections
  - Ventilator-associated pneumonia
- Staff mix
  - RNs
  - LPNs/LVNs
  - Unlicensed assistive personnel
- Nursing care hours provided per patient day
- RN education/certification
- RN survey
  - Practice Environment Scales option
  - Job Satisfaction Scales option
  - Job Satisfaction Scales–Short Form option

Translating Care at the Bedside

The Translating Care at the Bedside (TCAB) program is a funded initiative started by the Robert Wood Johnson Foundation and the Institute of Medicine.[31] This program focuses on nurse-driven identification of problem areas of care (patient outcomes) or process issues (eg, workflow). Front-line staff nurses are more likely to be attuned to the issues that involve their care environment and often know best how to solve their own problems. Hospitals and units are selected for funding by this initiative, but their selection is met by substantial resources, training, and continued coaching and mentoring of the TCAB nurses in order for them to succeed with their projects. To date, there are ten hospitals participating in this important initiative, and the reporting of outcomes is in progress. For a snapshot of this work, the reader may review the TCAB Web site or a series of articles in the *American Journal of Nursing*.[32]

PLANNING FOR THE PEDIATRIC HEALTH CARE WORKFORCE

It is difficult to imagine that if there was a pressing need to determine how many pediatric nurses there were in the United States one would not be able to do so; however, in 2008 Lacey and colleagues[33] found that there is no formal tracking of nurses who work in pediatric settings within any entity that collects nursing data. They presented a call to action for finding ways to determine a sound methodology for tracking the supply-demand chain of pediatric nurses to meet the demands of the future, which looks perilous as more children are diagnosed with chronic diseases and funding for children's health lacks stability. In addition, national nursing organizations must collaborate with physician groups to have the right provider with the right patient at the right time in their care, including pediatric patients.

SUMMARY

In light of the current and potentially long-term financial crisis in the United States, there will be significant competing demands for how the nation's budget is spent. Although the authors understand the need to shore up our financial and business markets, it is critical that we simultaneously address our crippled health care system. Economic experts agree that this must be part of the overall solution for fiscal health. If we do not have children who have adequate and appropriate access to health care not only for disease states but for prevention, we will fail to produce a viable and thriving

workforce that can contribute to the tax base and national productivity of goods and services to make us competitors in the world economy. It will take a collective effort not only by advocates for children but also by advocates for all citizens to move a different, more innovative agenda forward. Only then will we see a significant return on investment for human capital that will again put the United States on the road to prosperity and health for years to come.

Most importantly, those who care for all Americans must be taught basic concepts and application of quality improvement techniques.[34,35] We have continued for too long to add on to the list of concepts we must teach our students in nursing, medicine, as well as other professional programs of study. These curricular elements are as fragmented as our health care system. There is no perfect science in quality improvement, but basic understanding of core concepts is critical to address our current and future practice settings. Quality improvement is not for one department. It is incumbent on all of us to know these basic tenets and their application in health care. Perhaps it is time to form a common group of concepts, techniques, and language to be included across professional curricula so that all can function proficiently together regardless of the diagnosis or symptom each may encounter and across the continuum of care.

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