

NURSE STAFFING

HOW EFFECTIVE ARE NURSING STAFF MIX AND NURSE-TO-PATIENT RATIO MECHANISMS IN IMPROVING NURSES' WORKLOADS?

Source

McGillis Hall, L., Pink, L., Lalonde, M., Tomblin Murphy, G., O'Brien-Pallas, L., Laschinger, H. et al. (in press). Decision Making for Nurse Staffing: Canadian Perspectives. *Policy, Politics and Nursing Practice*.

Objective

To evaluate and provide recommendations on mechanisms that measure nursing staff mix and nurse-to-patient ratios.

Background

By 1999, provincial ministries of health began to see the nursing shortage as a serious issue. Their efforts to identify strategies to strengthen health human resources planning in Canada uncovered the need for improved data and research on the nursing sector. While some studies have examined the use of nursing staff mix models, little is known about their effectiveness.

Methods

This study was conducted in three phases over six months.

- A literature review of mechanisms to measure nursing staff mix and nurse-to-patient ratios was completed. These mechanisms included workload measurement systems, management information systems and selected national frameworks for nurse staffing.
- Interviews were conducted with 22 key informants from across the country to explore the effectiveness of these mechanisms and assess how they affect nurses' workloads.
- The researchers analyzed barriers and facilitators to identifying appropriate nurse staffing as a cost-effective patient safety strategy.

Principal Findings

- Using nursing staff mix frameworks is an important first step for organizations to plan nurse staffing decisions in the broader context of the health-care system.
- The use of nursing workload measurement systems to guide decision-making for nurse staffing in Canada is a contentious issue. The data collected through this method often do not reflect true workload; staffing is often not adjusted accordingly; and the process takes too much time to complete.
- There is currently no evidence of the effectiveness of legislated nurse-to-patient ratios. Standardizing nurse-to-patient ratios would have both pros and cons. One potential negative effect is that nurses would be prevented from making independent decisions about nurse staffing. However, nurses would be protected from excessive workloads.
- While solid empirical evidence shows nursing staff mix has an impact on patient outcomes in acute care settings, this evidence has rarely been applied in practice settings.

What do the Study Findings Mean?

- Appropriate nursing staff mix, as defined in this research, will improve outcomes for patients, systems and nurses.
- Nurses and other stakeholders need to collaborate on effective strategies to raise awareness about the wealth of evidence on nurse staffing so that appropriate staffing will be implemented. Policy-makers must be brought into the discussion under the broader context of health human resources planning.
- Nurse leaders in Canada must make a clear commitment to the measurement of nursing workload and clarify the parameters of data collection.
- The pros and cons of standardizing nurse-to-patient ratios must be further examined before introducing such standards in Canada.

November 2006

RS 1-12

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The information presented here does not necessarily reflect the views of the CNA Board of Directors.*

NURSE STAFFING

BACCALAUREATE OR HIGHER NURSE EDUCATION RELATED TO FEWER SURGICAL PATIENT DEATHS

Source

Aiken, L. H., Clarke, S. P., Cheung, R. B., Sloane, D. M., & Silber, J. H. (2003). Educational levels of hospital nurses and surgical patient mortality. *JAMA*, 290(12), 1617-1623.

Objective

To examine whether hospitals with higher proportions of direct-care registered nurses (RNs) educated at the baccalaureate or graduate level in nursing have lower risk-adjusted patient mortality rates and lower rates of death in patients with serious complications.

Background

There is increasing evidence that nurse¹ staffing characteristics such as the number of patients assigned to each nurse and the proportion of RNs in the nursing staff mix influence quality of care in hospitals and patient safety. Little is known about what impact other characteristics of RNs in hospitals, such as their educational level, have on patient outcomes.

Methods

- In this cross-sectional study, outcome data for 232,342 patients who had general, orthopedic or vascular surgery in 168 adult acute-care general hospitals in Pennsylvania were linked with data collected from a survey of 10,184 RNs in the state and other data related to the patients' hospitalization.
- The two patient outcomes studied were:
 - death within 30 days of hospital admission; and
 - death within 30 days of hospital admission among patients who experienced serious complications (referred to as a "failure to rescue").
- Both patient outcome measures were risk-adjusted to take into account variations such as age, sex and whether the patient was admitted on an emergency basis.

¹ In this study, 'nurse' refers to registered nurses (RNs).

- The survey provided information on the RN's highest educational credential attained in nursing, number of patients assigned to the nurse on the last shift worked (nursing workload), and the number of years of experience working as an RN.
- Other variables included hospital characteristics (size, teaching status, level of technology) and whether the patient's surgeon was board-certified.

Principal Findings

- For each 10% increase in the proportion of RNs in a hospital holding baccalaureate or graduate degrees, the risk of death or failure to rescue decreased by 5% when patient and hospital characteristics were similar.
- Put another way, if the proportion of RNs with baccalaureate or higher degrees in all hospitals were 60% rather than 20%, 3.6 fewer deaths per 1,000 patients and 14.2 fewer deaths per 1,000 patients with complications would be expected.
- A 20% increase in the percentage of RNs with baccalaureate degrees would have a similar effect on mortality as a reduction of two patients in the average workload of RNs.
- If the nursing workforce comprised a higher percentage of RNs with education at the baccalaureate level or above **and** if workloads were decreased, mortality and failure to rescue rates would be substantially lower.

What do the Study Findings Mean?

- Increasing the proportion of RNs with baccalaureate or graduate degrees on surgical units can be expected to improve patient outcomes.
- Employers should consider that preventable deaths could be reduced by having the majority of nurses on a unit educated at the baccalaureate level or higher and, at the same time, lowering patient-to-nurse ratios.
- Diploma-prepared RNs require support and incentives from their employers to pursue higher education and educational programs that are accessible and flexible in meeting their needs.
- Strategies are needed to recruit and retain RNs with baccalaureate and graduate degrees in hospitals.
- In national nurse human resource planning, policy-makers should consider:
 - how to obtain an adequate future supply of RNs; and
 - how the educational composition of the nursing workforce can be altered to ensure that more highly educated nurses are providing direct patient care.

January 2005
RS 1-2

NURSE STAFFING

DECREASING RN STAFFING LEVELS MAY NOT RESULT IN EXPECTED COST SAVINGS

Source

Sovie, M. D., & Jawad, A. F. (2001). Hospital restructuring and its impact on outcomes: Nursing staff regulations are premature. *JONA*, 31(12), 588-600.

Objective

To describe restructuring in the organization and delivery of patient care, and the effects of nursing structure and processes on selected patient outcomes.

Background

In the 1990s, many cost-cutting measures were undertaken in acute care hospitals. Modifications were made in both the structure and processes of care. Changing the staff mix was one way the structure of patient care was altered. On many patient care units, the number of registered nurses (RNs) was reduced and the number of unlicensed assistive personnel¹ increased. As a result, RNs have been required to undertake greater supervisory responsibilities. This additional function contributes to the workload of RNs, which has already been affected by factors such as the increasing complexity of patients' needs. There has been little systematic study of the impact of cost reductions on the quality of patient care.

Methods

- This descriptive correlational study took place in 29 university teaching hospitals in the United States that had more than 300 acute operating beds.
- Uniform structure, process and outcome data were collected from each hospital as well as from an inpatient acute adult medical unit and a surgical unit designated by each hospital as the study units.
- Structural data included elements such as skill mix and hours worked per patient day for all staff and for selected categories of staff (e.g., RNs, unlicensed assistive personnel, and other staff²) and labour costs per patient discharge.

¹ In this study, the term 'unlicensed assistive personnel' refers to all assistive personnel, which includes patient care technicians, support attendants and nurse assistants. In Canada, assistive personnel such as nurse aides are often referred to as unregulated health care workers.

² Other staff includes managers, clerks, a small number of licensed practical nurses and unit staff not included elsewhere. The title for a practical nurse in Canada, with the exception of Ontario, is licensed practical nurse. In Ontario, the title for a practical nurse is registered practical nurse (RPN).

- Process data included a variety of management practices and organizational processes.
- Outcome data included rate of patient falls, pressure ulcers developing during hospitalization and urinary tract infections as well as scores from patient satisfaction surveys.

Principal Findings

This three-year study of restructuring provided a large amount of information about interventions in the structural processes of patient care, assessments by RNs of the processes of care and the impact of structure and process interactions on outcomes of care.

This research summary sheet focuses on principal findings related to nursing staff mix and hours worked by RNs and unlicensed assistive personnel.

- As the number of hours worked by RNs per patient day increased:
 - the rate of patient falls decreased; and
 - patients' reports of satisfaction with their pain management increased.
- As the number of hours worked by RNs per patient day increased and as inter-unit working relationships were judged to be better, patient satisfaction with hospitalization increased.
- The percentage of RNs on the medical and surgical units had no significant effect on the regionally adjusted labour costs per discharge.

What do the Study Findings Mean?

- Increasing the number of hours worked by RNs on medical and surgical units can be expected to decrease negative patient outcomes and increase patient safety and patient satisfaction with care.
- RNs need to be aware that the quality of their communication and collaboration with other nurses and physicians may influence how satisfied patients are with their hospital experience.
- Having a higher proportion of RNs in the nursing staff mix may not increase costs.

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RS 1-10

NURSE STAFFING

HIGHER LEVELS OF RN STAFFING ARE RELATED TO BETTER PATIENT OUTCOMES

Source

Needleman, J., Buerhaus, P., Mattke, S., Stewart, M., & Zelevinsky, K. (2002). Nurse-staffing levels and the quality of care in hospitals. *New England Journal of Medicine*, 346 (22), 1715-1722.

Objective

To examine the relationship between levels of nurse¹ staffing in hospitals and the rates of adverse outcomes among patients.

Background

Registered nurses (RNs) and others are concerned that patient safety and quality of care are threatened because nurse staffing levels are inadequate to match the increasing severity of illness of hospitalized patients. Although several studies have been undertaken, no definite conclusion has been reached about the relationship between the level of nurse staffing in hospitals and patient outcomes. Limitations of many of these studies include small sample size and the use of inconsistent measures of staffing levels. The current study aimed to overcome these and other weaknesses by using administrative data from a large multi-state sample of hospitals.

Methods

- A retrospective design was used to analyze patient discharge and nurse staffing data from 1997 from 799 hospitals from 11 states in the United States. The data covered 5,075,969 discharges of medical patients and 1,104,659 discharges of surgical patients.
- Two different staffing variables were examined:
 - the proportion of hours of care provided by licensed nurses (RNs and LPNs) that were provided by RNs; and
 - the number of hours of care per day provided by RNs, LPNs and nurse aides.
- Patient variables included length of stay and the rates of adverse outcomes. For both medical and surgical patients, 11 adverse outcomes were measured, including urinary tract infection, pressure ulcers, in-hospital death and failure to rescue.² Three other variables were measured for surgical patients only (wound infection, pulmonary failure and metabolic disturbances).

¹ In this study, 'nurse' refers to registered nurses (RNs), licensed practical nurses (LPNs) and nurses' aides (NAs). RNs and LPNs are referred to together as licensed nurses. In Ontario, the title for a practical nurse is registered practical nurse (RPN).

² Failure to rescue refers to the death of a patient with one of five life-threatening complications (pneumonia, shock or cardiac arrest, upper gastrointestinal bleeding, sepsis or deep vein thrombosis).

- These outcomes were selected for study because they have the potential to be affected by nurse staffing. For example, when nurses are able to identify complications early and initiate actions independently or with other members of the health care team, the risk of death from the complication may be reduced.
- To be able to make appropriate comparisons, differences in nursing care required by patients of each hospital, patients' risk of adverse events and factors such as age, sex and the presence or absence of 13 chronic diseases, were taken into consideration.

Principal Findings

For medical patients

- A higher proportion of RNs in the mix of licensed care providers (RNs and LPNs) and more RN hours a day were associated with:
 - shorter lengths of stay;
 - lower rates of urinary tract infections; and
 - lower rates of upper gastrointestinal bleeding.
- A higher proportion of RNs in the mix of licensed care providers was also associated with lower rates of pneumonia, shock or cardiac arrest and failure to rescue.

For surgical patients

- A higher proportion of RN hours in the mix of licensed care providers was associated with a lower rate of urinary tract infection.
- A greater number of RN hours a day was associated with a lower rate of failure to rescue.

What do the Study Findings Mean?

- Increasing the number of RNs or the proportion of RNs relative to LPNs on a hospital unit can be expected to reduce the number of negative outcomes experienced by patients.
- Hospitals require adequate RN staffing to ensure patient safety and improve quality of care.
- Strategies are needed to recruit and retain RNs in the hospital workforce.

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RS 1-5

NURSE STAFFING

HIGHER RN STAFFING LEVELS ARE RELATED TO FEWER DEATHS OF PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

Source

Person, S. D., Allison, J. J., Kiefe, C. I., Weaver, M. T., Williams, O. D., Centor, R. M., & Weissman, N. W. (2004). Nurse staffing and mortality for medicare patients with acute myocardial infarction. *Medical Care*, 42(1), 4-12.

Objective

To examine the relationship between nurse¹ staffing ratios and death in hospital of patients with acute myocardial infarction.

Background

To contain costs during the past decade, many hospitals have reduced their number of registered nurses (RNs) and increased their number of less qualified nursing personnel. As a result, there have been changes in the ratio of RNs to patients. Several studies have examined the relationship between nurse staffing levels and outcomes such as patient mortality on medical or surgical units. There has been little research focusing on the link between nurse staffing levels and outcomes for patients with a specific medical diagnosis such as acute myocardial infarction (AMI).

Methods

- This correlational retrospective study links national data on patients hospitalized with AMI from the Cooperative Cardiovascular Project in the United States with data on nurse staffing and other hospital characteristics from an American Hospital Association survey.
- The sample included 118,940 patients aged 65 and over from 4,401 hospitals.
- The main outcome measure was the death of the patient during hospitalization.

¹ In this study, 'nurse' refers to registered nurses (RNs) and licensed practical nurses (LPNs). The title for a practical nurse in Canada, with the exception of Ontario, is licensed practical nurse. In Ontario, the title for a practical nurse is registered practical nurse (RPN).

- Nurse staffing levels were measured by two separate variables: the ratio of full-time equivalent RNs to the average daily census (ADC) of patients in the hospital and the ratio of full-time equivalent LPNs to the ADC. For both RNs and LPNs, staffing ratios were reported in four categories, from the highest to lowest ratio of nurses to patients.
- Patient characteristics, treatment and hospital characteristics were considered when examining the relationship between nurse staffing levels and mortality.

Principal Findings

- Patients with AMI in hospitals with higher ratios of RNs to patients were less likely to die in hospital than patients in hospitals with lower ratios of RNs to patients.
- Patients with AMI in hospitals with higher ratios of LPNs to patients were more likely to die in hospital than those in hospitals with lower ratios of LPNs to patients.

What do the Study Findings Mean?

- Patients over 65 years of age with AMI may be less likely to die in hospital if cared for in environments with higher RN and lower LPN staffing.
- If the number of RNs on a unit is reduced, more patients with AMI may die.
- Patients with AMI benefit from RNs' knowledge, skill and clinical judgment.
- The more complex, acute and unpredictable the health care needs of the patient, the more necessary it is to have care provided by RNs.

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RS 1-7

NURSE STAFFING

INADEQUATE NURSE STAFFING AND POOR ORGANIZATIONAL SUPPORT AFFECT PATIENT SAFETY GLOBALLY

Source

Aiken, L. H., Clarke, S. P., Sloane, D. M. (2002). Hospital staffing, organization, and quality of care: Cross-national findings. *International Journal for Quality in Health Care*, 14(1), 5-13.^{1, 2}

Objective

To examine in an international sample of hospitals the effects of nurse³ staffing and organizational support for nursing care on nurses' job dissatisfaction, nurse burnout and quality of patient care as reported by registered nurses (RNs).

Background

The public and health care providers have expressed concern about the impact of changes in the health care system on the quality of hospital care. Among the challenges being experienced in the hospital sector are escalating costs, bed reductions and closures, an increase in the complexity of patient needs and a shortage of nurses. Earlier research in magnet hospitals⁴ in the United States demonstrated the importance of organizational features in attracting and retaining nurses. Little is known about how organizational factors affect patient outcomes or what their impact is on both nurse and patient outcomes in countries whose health care systems are organized and financed differently.

Methods

- A multi-site cross-sectional study was conducted in adult acute care hospitals in one state of the United States, in two provinces in Canada, and in England and Scotland (United Kingdom).
- The sample included 10,319 RNs employed on medical and surgical units in 303 hospitals in the five jurisdictions.

¹ These authors represent the International Hospital Outcomes Research Consortium, which includes interdisciplinary research teams from the U.S., Canada, England, Scotland and Germany. Staffing skill mix is one of the variables in the conceptual model that guides the work of the consortium. The model addresses mechanisms by which organizational features of the hospital affect patient and nurse outcomes. The reader is encouraged to review reports of other studies conducted by the consortium.

² This research summary was prepared with the permission of Oxford University Press.

³ In this study, 'nurse' refers to registered nurses (RNs) in Canada and the U.S. and to employed nurses in Scotland, England and Germany working in direct patient care roles comparable to those held by RNs in North America.

⁴ For further information on magnet hospital designation, see the website of the American Nurses Credentialing Center (www.nursingworld.org/ancc).

- The RNs were surveyed by means of a self-administered questionnaire mailed to their homes.
- RNs were asked to provide details about the staff on the last shift they worked, including the number of patients they were assigned, and to rate whether particular aspects of organizational support were present in their current jobs.
- The outcome variables included nurses' satisfaction with their current jobs, burnout as indicated by reported level of emotional exhaustion, and nurses' assessment of the quality of care on their unit.

Principal Findings

This research article reports on the preliminary findings of the nurse survey, one component of the larger International Hospital Outcomes Study.

- In all five jurisdictions, 38.3 to 48.1 per cent of RNs reported job dissatisfaction, and 32.9 to 54.2 per cent said they experienced burnout.
- Approximately 10 to 30 per cent of RNs in all five jurisdictions rated the quality of care on their units and on their last shift as fair or poor.
- RNs in lower-staffed hospitals (where there were more patients assigned per nurse) were 1.3 times more likely to rate the quality of care as fair or poor, when the effect of organizational support was controlled, as those in higher staffed hospitals (fewer patients assigned per nurse).
- In hospitals with lower staffing and weak organizational support, RNs were three times more likely to report low quality care than RNs in hospitals with higher staffing and strong organizational support.
- RNs in Canada were, in general, more likely to report job dissatisfaction, burnout and poor quality of care on their last shift than nurses in the United Kingdom but less likely than nurses in the United States.
- RNs who perceived organizational support for nursing practice to be weak were twice as likely to report job dissatisfaction and burnout as those perceiving organizational support to be strong.

What do the Study Findings Mean?

- Adequate RN staffing is essential for producing good patient outcomes.
- RNs who work in quality practice environments are more likely to report higher quality of care.
- Quality practice environments are those with characteristics such as adequate staffing, good working relationships, nursing control of its own practice and adequate support services to allow nurses to spend time with their patients.
- Poor quality practice environments can negate the positive effects of good RN staffing.
- Health administrators and nurse leaders in Canada can learn from other countries about strategies for improving quality of care and increasing recruitment and retention of nurses.

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Canadian Nurses Association

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NURSE STAFFING

LONG WORKING HOURS OF HOSPITAL RNs ASSOCIATED WITH INCREASED ERRORS

Source

Rogers, A. E., Hwang, W.-T., Scott, L. D., Aiken, L. H., & Dinges, D. F. (2004). The working hours of hospital staff nurses and patient safety. *Health Affairs*, 23(4), 202-212.

Objective

To examine the work patterns of hospital staff nurses¹ and to determine if there is a relationship between hours worked and the frequency of errors.

Background

The shortage of registered nurses (RNs) in many hospitals has resulted in nurses working longer shifts and more overtime shifts. Nurses also regularly report having fewer breaks during their shifts and less time to recover before returning to work. Changes in work patterns combined with increasingly demanding workloads related to greater complexity of patients' needs and shorter lengths of stay in hospital can challenge nurses' ability to provide safe patient care. Little is known about the impact of hours worked by RNs on patient safety.

Methods

- The sample for this study comprised 393 unit-based RNs, who were members of the American Nurses Association and who were working full time in hospitals across the United States.
- Study participants were mailed two logbooks, each covering a two-week period.
- On days they worked, RNs were asked to answer 40 questions about scheduled and actual hours worked, time of day worked, overtime,² sleep/wake patterns and errors and near errors; on their days off, RNs were asked to answer 17 questions about sleep-wake patterns, mood and caffeine intake.
- The majority of respondents completed both log books covering 28 days. A small percentage returned only one book.
- RNs in the sample provided data on 5,317 work shifts.
- The main outcomes studied were errors and near errors.³

¹ In this study, 'nurse' refers to registered nurses (RNs).

² A shift was considered overtime if the actual hours worked were longer than the scheduled hours or if the RN reported the shift was 'scheduled overtime'.

³ A near error was recorded when a nurse caught himself or herself before making an error.

Principal Findings

- RNs worked, on average 55 minutes longer than scheduled each work day and generally worked more than 40 hours a week.
- All RNs worked at least one overtime shift during the 28-day period; however, two-thirds of RNs reported working overtime ten or more times during that period. One-third of RNs reported working overtime each day they worked in the period.
- 199 errors and 213 near errors were reported; of these, almost 60 per cent involved the administration of medications.
- The likelihood of making an error increased:
 - as the number of hours worked increased;
 - when RNs worked overtime; and
 - when RNs worked more than 40 hours a week.
- The odds of making an error were three times higher when RNs worked shifts 12.5 hours or longer.

What do the Study Findings Mean?

- Current work patterns of unit-based RNs in hospitals can be a threat to patient safety.
- Fatigue experienced by RNs working long hours may increase the risk of making errors.
- Administrators, managers and RNs on hospital units must carefully consider the impact on patients of nurse staffing practices such as 12-hour shifts and overtime.
- Nurse staffing practices that contribute to patient safety are an important part of quality professional practice environments.

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RS 1-9

NURSE STAFFING

NURSE STAFFING MODEL INFLUENCES COST OF NURSING SERVICES

Source

McGillis Hall, L., Doran, D., & Pink, G. H. (2004). Nursing staffing mix models, nursing hours and patient safety outcomes. *JONA*, 34(1), 41-45.

Objective

To evaluate the effect of different nurse¹ staffing models on costs and patient safety outcomes.

Background

There is growing evidence of the relationship between nursing staff mix models with a higher proportion of RNs and positive patient outcomes. Costs associated with different nurse staffing models and how these costs may relate to patient outcomes have seldom been studied.

Methods

- This descriptive correlational study took place in 19 urban teaching hospitals in Ontario, Canada. The sample was composed of 77 adult medical, surgical and obstetric patient care units in these hospitals.
- Nurse staffing was categorized into four models according to the mix of nursing staff employed on the unit: 1) an RN/RPN staff mix; 2) an all-RN staff mix; 3) the proportion of regulated to unregulated staff (URW); and 4) an RN/RPN/URW staff mix.
- Patient safety outcomes included the rate of medication errors, wound infections, urinary tract infections and patient falls.
- The complexity of the patient's condition and the patient's age were taken into consideration when evaluating patient outcomes.
- Costs were determined by measuring the paid hours (both worked and received through benefits) of all RNs and RPNs allocated to a specific patient.

¹ In this study, 'nurse' refers to registered nurses (RNs) and registered practical nurses (RPNs). The title for a practical nurse in Canada, with the exception of Ontario, is licensed practical nurse (LPN). In Ontario, the title for a practical nurse is registered practical nurse (RPN).

Principal Findings

- The lower the proportion of RNs and RPNs on medical and surgical units:
 - the higher the number of medication errors and wound infections; and
 - the more nursing hours were used.
- The less experienced the RNs and RPNs on a unit are, the higher the number of wound infections.
- Older patients and those with more complex needs used more RN and RPN hours.

What do the Study Findings Mean?

- Increasing the proportion of unregulated health care workers on medical and surgical units can:
 - influence patient safety; and
 - increase nursing costs.
- Nurse managers need to consider the complexity of patient needs, the experience level of the nurses and the mix of nursing staff when determining appropriate unit staffing.
- Less experienced RNs and RPNs need supports such as mentoring and unit-based orientation and education to improve their practice and increase patient safety.
- Strategies are needed to recruit and retain experienced nurses.

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RS 1-3

NURSE STAFFING

NURSES' EDUCATION LEVEL CAN INFLUENCE PATIENT AND SYSTEM OUTCOMES IN COMMUNITY HOME NURSING

Source

O'Brien-Pallas, L., Doran, D. I., Murray, M., Cockerill, R., Sidani, S., Laurie-Shaw, B., & Lochhass-Gerlach, J. (2001). Evaluation of a client care delivery model, part 1: Variability in nursing utilization in community home nursing. *Nursing Economic\$, 19*(6), 267-276.

O'Brien-Pallas, L., Doran, D. I., Murray, M., Cockerill, R., Sidani, S., Laurie-Shaw, B., & Lochhass-Gerlach, J. (2002). Evaluation of a client care delivery model, part 2: Variability in client outcomes in community home nursing. *Nursing Economic\$, 20*(1), 13-21, 36.

Objective

To examine the influence of client, provider and agency characteristics, agency behaviours and complexities in the work environment on nursing utilization (the number and length of home visits) and on client outcomes in community home nursing.

Background

With the shift from institutional to community-based care, there has been a substantial increase in money spent on home care. Nursing services account for a large proportion of home care costs. One option for reducing costs is to substitute less skilled nursing personnel for RNs. With earlier hospital discharges, the needs of clients in the community are often more complex and acute than in the past. Little is known about how to predict and measure the way nurses¹ are used in the community. There is also little information about the factors that influence the cost and quality of home care services.

Methods

- A longitudinal design was used to test the Client Care Delivery Model for Community Home Nursing. The OMAHA Problem Rating Scale² was utilized to measure clients' knowledge (what a client knows and understands about a specific health related problem), behaviour (what a client does – the client's practices, performances, and skills), and status related to health care needs (a client's conditions or circumstances and how these improve, remain stable or deteriorate).
- Other variables examined included:
 - client characteristics (e.g., nursing diagnosis, medical diagnosis), and overall self-reported health status);
 - provider (i.e., nurse) characteristics (e.g., educational level, years of experience in nursing and community nursing, professional status – RN or RPN);

¹ In this study, 'nurse' refers to registered nurses (RNs) and registered practical nurses (RPNs). The title for a practical nurse in Canada, with the exception of Ontario, is licensed practical nurse (LPN). In Ontario, the title for a practical nurse is registered practical nurse (RPN).

² Martin, K., & Scheet, N. (1992). *The OMAHA system: Applications for community health nursing*. Philadelphia: W.B. Saunders.

- agency characteristics (e.g., geographic location, visit type);
 - agency behaviours (e.g., caseload, skill mix assignment, continuity of care); and
 - environmental complexity factors (e.g., competing demands, unanticipated case complexity).
- Through a convenience sample of 38 RNs and 11 RPNs from one not-for-profit visiting nurse agency in a large Canadian metropolitan city, a sample of 751 clients (6,840 visits) was obtained.
 - Data were collected by these nurses at client admission and discharge and/or during each visit depending on the variable.

Principal Findings

The study findings reported in the two journal articles confirm the complexity of client care delivery in the community home nursing sector and draw attention to the many factors that influence nursing utilization and client outcomes. While client factors had the most impact on the outcomes of this study, provider (nurse) and agency characteristics were also important.

This research summary focuses on principal findings related to nurse characteristics.

- Clients cared for by RNs had more positive status outcomes related to their condition at discharge than those cared for by RPNs.
- The knowledge scores of clients improved when nurses had more years of experience in community nursing.
- Baccalaureate-prepared RNs were more satisfied with the adequacy of time available for visits to meet both the treatment and prevention needs of the client.
- Clients cared for by baccalaureate-prepared RNs:
 - demonstrated, on average, an 80 per cent greater likelihood of improvement in knowledge scores and a 120 per cent greater likelihood of improvement in behaviour scores in relation to their health condition at discharge than clients cared for by non-baccalaureate prepared nurses; and
 - required fewer home visits.

What do the Study Findings Mean?

- Strategies are needed to recruit and retain experienced nurses in community care.
- The professional status and educational level of nurses should be considered an investment when nurses are recruited to care settings requiring greater practice independence and highly autonomous nursing decision-making.
- The services of RNs in the community, especially baccalaureate-prepared RNs, are cost-effective. Clients' needs may be met more efficiently during each visit, thereby requiring fewer visits.

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RS 1-6

NURSE STAFFING

NURSE STAFFING AND PATIENT DEATH

Source

Tourangeau, A. E., Giovannetti, P., Tu, J. V., & Wood, M. (2002). Nursing-related determinants of 30-day mortality for hospitalized patients. *Canadian Journal of Nursing Research*, 33(4), 71-88.

Objective

To understand the effect of nursing-related hospital variables on 30-day mortality rates for hospitalized patients with acute medical conditions.

Background

In the last decade cost-cutting measures were undertaken in the delivery of nursing services to decrease health care spending. Many hospitals reorganized their nursing workforce through elimination and reduction of registered nurse (RN) positions, substitution of RNs with less qualified nursing personnel, and closure of clinical units. As a result, RNs were moved from one unit to another through a process referred to as “bumping”. Through this process, RNs may have been moved from a nursing unit in which they had developed clinical expertise with a particular group of patients to one where they had limited knowledge and experience.

These changes and others such as the reduction of clinical resources needed to support nurses¹ were made without understanding the effects these strategies would have on patient outcomes such as mortality. Mortality rates are important indicators of the quality of hospital care.

Methods

- A retrospective design was used to test the 30-day Mortality Model. In this model, 30-day mortality rate measures the proportion of patients admitted to hospital who die within 30 days of admission regardless of whether the death occurred in hospital or after discharge. The mortality rate is adjusted to take into account various patient risk factors such as age and pre-existing conditions.
- The model includes such variables as nurse staffing dose (total inpatient nursing worked hours divided by the Ontario case weight²), nursing skill mix (proportion of RN hours of care to all nursing hours of care including

¹ In this study, ‘nurse’ refers to registered nurses (RNs) and registered practical nurses (RPNs). The title for a practical nurse in Canada, with the exception of Ontario, is licensed practical nurse (LPN). In Ontario, the title for a practical nurse is registered practical nurse (RPN).

² Ontario case weight is a measure of relative total resource consumption by patients.

RNs, RPNs and unlicensed assistive personnel), availability of professional role support, years of RN experience on the clinical unit, nurse capacity to work, condition of nursing practice environment, continuity of care, physician expertise, hospital status and location.

- The sample consisted of 46,941 patients discharged from 75 acute-care teaching and community hospitals in Ontario who had a diagnosis of acute myocardial infarction, stroke, pneumonia or septicemia.
- The mortality rate for these patients was linked to nurse staffing and skill mix data and to responses from 3,998 RNs working in the 75 hospitals to the Ontario Registered Nurse Survey of Hospital Characteristics.

Principal Findings

Three predictor variables from the 30-day Mortality Model were statistically significant: nursing skill mix, years of nurse experience in the clinical unit and nurse capacity to work.

- A 10 per cent increase in the proportion of RNs in all hospital types was associated with five fewer patient deaths for every 1,000 patients who were discharged.
- Each additional mean year of RN experience on the clinical unit was associated with six fewer patient deaths for every 1,000 discharged patients in urban community hospitals and four fewer deaths for every 1,000 discharged patients in non-urban community hospitals.
- In non-urban community hospitals only, fewer patients died when RNs in these hospitals missed more shifts.³

What do the Study Findings Mean?

- Increasing the proportion of RNs on a unit is associated with a reduction in the number of patients who die within 30 days of admission to hospital.
- If the number of RNs on a unit is reduced or RNs are substituted with lesser qualified care providers, more patients may die.
- When experienced nurses are transferred to other nursing units because of over-supply or practices such as bumping within collective bargaining agreements, more patients may die.
- Strategies are needed to recruit and retain experienced RNs.

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³ This is an unexpected finding that is difficult to explain. Nurses in non-urban community hospitals use considerably less sick time than their urban colleagues. It may be that RNs in these hospitals are not taking adequate time to recuperate. When they return to work, their ability to detect and intervene with serious patient complications may be reduced. This may contribute to higher 30-day mortality rates.

NURSE STAFFING

COLLECTING BASELINE PATIENT OUTCOME DATA SHOULD PRECEDE NURSE STAFFING CHANGES

Source

Potter, P., Barr, N., McSweeney, M., & Sledge, J. (2003). Identifying nurse staffing and patient outcome relationships: A guide for change in care delivery. *Nursing Economic\$, 21(4)*, 158-166.

Objective

To determine a baseline measure of nurse-sensitive patient outcomes in acute care hospitals and to examine the relationship between these patient outcomes and nurse¹ staffing at the unit level.

Background

During the 1990s, in an attempt to control costs, many acute care hospitals took steps that resulted in changes in the way care was delivered to patients. Reducing the number of registered nurses (RNs) and increasing the number of unlicensed assistive personnel (UAPs) on hospital units were two frequently employed restructuring methods. Such changes were often made without a thorough understanding of their impact on the quality of patient care. Before administrators and managers make nurse staffing decisions in a hospital or on a unit, it is important that they have baseline data on patient outcomes that are affected by nursing care and on the relationship between nurse staffing and patient outcomes. Collecting similar data after the implementation of nurse staffing changes would allow for comparisons to be made about impact of the changes on the quality of patient care.

Methods

- This prospective correlational study took place in an 879-bed tertiary care university teaching hospital in a large metropolitan area in Missouri.
- The sample comprised all 32 acute inpatient units in the hospital.

¹ In this study, 'nurse' refers to registered nurses (RNs), licensed practical nurses (LPNs) and unlicensed assistive personnel. The title for a practical nurse in Canada, with the exception of Ontario, is licensed practical nurse (LPN). In Ontario, the title for a practical nurse is registered practical nurse (RPN). In Canada, unlicensed assistive personnel such as nurse aides are often referred to as unregulated health care workers.



- Patient outcomes measured included: 1) administrative records of adverse events such as falls and medication errors; 2) self-reports from inpatients of symptom management, self-care and health status; and 3) post-discharge patient satisfaction.
- Nurse staffing variables included the average number of hours of nursing care per patient day on the day shift and the average percentage RN and average percentage UAP hours of direct care.
- The percentage of float nurses² and patient acuity were taken into account when examining the relationship between nurse staffing and patient outcomes.

Principal Findings

- As the percentage of hours of nursing care provided by RNs on the nursing units increased:
 - the level of pain perceived by patients decreased;
 - patients' perception of their self-care ability and their health status increased; and
 - satisfaction reported by patients post-discharge increased.

What do the Study Findings Mean?

- Increasing the number of hours worked by RNs on acute care units can be expected to improve patients' pain management as well as increase patients' satisfaction with care during hospitalization and their ability to care for themselves following discharge.
- Important indicators of quality care provided by RNs include:
 - managing patients' pain; and
 - increasing patients' self-care ability.
- Administrators and managers can use a tool such as the one described in this study to establish a database of quality patient outcomes in their hospitals to use as a benchmark when making evidence-based decisions about levels of nurse staffing and staff mix changes.
- Outcome databases can be used to plan professional development and continuing competence programs, quality improvement initiatives and clinical research.

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² Nurses from other hospitals or from outside the hospital who worked on the unit on the day shift.

NURSE STAFFING

A HIGHER PROPORTION OF RNS AND RPNs ON INPATIENT UNITS MAY RESULT IN MORE POSITIVE PATIENT OUTCOMES

Source

McGillis Hall, L., Doran, D., Baker, G. R., Pink, G. H., Sidani, S., O'Brien-Pallas, L., & Donner, G. J. (2003). Nurse staffing models as predictors of patient outcomes. *Medical Care*, 41(9), 1096-1109.

Objective

To evaluate the impact of different nurse¹ staffing models on patient outcomes of functional status, pain control and patient satisfaction with nursing care.

Background

With hospital restructuring in the last decade came many changes in the mix of staff providing nursing care to patients, including the introduction of unregulated workers (URWs). An increasing number of studies have examined the impact of these changes on nursing outcomes. For the most part, this research has explored the negative outcomes of nursing care such as patient mortality and the occurrence of adverse events such as falls, medication errors and hospital-acquired infections. There has been less focus on the positive and expected effects of nursing care such as pain management and improvements in physical, mental or emotional functioning.

Methods

- This repeated-measures study was conducted in 19 teaching hospitals in Ontario, Canada.
- The patient sample was composed of 742 medical-surgical patients and 741 obstetrical patients.
- Nurse staffing was categorized into four models according to the mix of nursing staff employed on the unit: 1) RNs and RPNs; 2) all RNs; 3) RNs, RPNs and URWs; and 4) RNs and URWs.
- Patient outcomes included functional status, pain and patient perceptions of nursing care.
- Most variables were measured within 48 hours of admission (within 8 hours for obstetrical patients), at discharge and six weeks following discharge.
- The patient's age, health status on admission, complexity of illness and other factors were taken into consideration when evaluating patient outcomes.

¹ In this study, 'nurse' refers to registered nurses (RNs) and registered practical nurses (RPNs). The title for a practical nurse in Canada, with the exception of Ontario, is licensed practical nurse (LPN). In Ontario, the title for a practical nurse is registered practical nurse (RPN).

Principal Findings

- A higher proportion of regulated nursing staff (that is, RNs and RPNs) on the unit was associated with the following outcomes at hospital discharge:
 - improved independence in functioning and improved social functioning for medical-surgical patients; and
 - increased satisfaction with nursing care for obstetrical patients.

What do the Study Findings Mean?

- An important role of RNs and RPNs is assisting patients to recover their ability to function independently after being ill and to manage symptoms such as pain.
- Maintaining or increasing the proportion of RNs and RPNs on medical-surgical and obstetrical units may result in positive outcomes for patients.
- Increasing the proportion of URWs on nursing units may lead to less positive outcomes for patients.

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