

Baccalaureate Nurses and Hospital Outcomes: More Evidence

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HEALTH SERVICES RESEARCH IMPACTS DEBATE

In a highly controversial decision in 1965, the American Nurses Association called for the baccalaureate degree in nursing (BSN) to be required for licensure of professional nurses by 1985.¹ However, hospital diploma education—the pathway to nursing for most students in 1965—gave way not to bachelor's education but largely to associate degree education, fueled by public subsidies to community colleges. Meanwhile, many other countries, including Canada, Australia, New Zealand, Norway, Spain, Philippines, and many in South America, standardized entry into professional nursing at the baccalaureate level. In the United States, where physicians have the most years of education of any country in the world, nursing education pathways remain varied and confusing to prospective nurses, employers, and consumers alike, and two thirds of new RNs still enter practice with less than a baccalaureate degree.² However, a decade of health services research showing better patient outcomes associated with better educated nurses has had a remarkable impact on employer preferences for nurses with baccalaureate qualifications,³ the return of 100,000 RNs to school to obtain BSNs,⁴ and may well be the catalyst for achieving in the future a largely bachelor's educated nurse workforce in the United States after decades of debate.

The breakthrough in health services research came with the reconceptualization of nurses' education as a modifiable property of a health care organization,⁵ much like the Institute of Medicine's redefinition of patient safety as a property of an organization.⁶ In both cases, new definitions served as catalysts for action on old problems by putting the onus on health care organizations to respond. The initial paper defining BSN education as a modifiable property of hospitals was a study of outcomes following general surgery in 168 Pennsylvania hospitals in 1999. Each 10% increase in the proportion of BSN staff nurses was associated with 5% lower odds on death and failure to rescue after taking into account how sick the patients were and other characteristics of hospitals that had been shown to be associated with mortality rates, including physician qualifications.⁵ A front page story about these findings in the Newark Star Ledger published the names of major New Jersey hospitals linked to the proportion of their bedside nurses who were bachelor's qualified, an illustration of the action potential for changing practice by engaging employers for the first time in a meaningful way.⁷ The American Organization of Nurse Executives, a subsidiary of the American Hospital Association, issued a historic statement not long after the publication and extensive media coverage of the paper supporting the BSN as the desired credential for hospital nurses. From a methodological perspective, nurses' education as an organizational property, operationalized as the percentage of bedside care nurses with BSNs or higher, was a reasonably straightforward dashboard measure that could be monitored by individual organizations and included in large-scale studies of hospital performance.

Other studies followed, replicating and expanding the evidence of an association between BSN qualifications and better patient outcomes.^{8,9} Replications in other countries

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The author declares no conflict of interest.

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ISSN: 0025-7079/14/5210-0861

with differently organized and financed health care yielded remarkably similar findings, including Canada,¹⁰ 9 countries in Europe,¹¹ and China¹² where patient satisfaction was the outcome measure because of the absence of standardized mortality data. Recently, researchers expanded from cross-sectional to hospital panel data to probe causality in the relationship between BSNs and patient outcomes. Results show that hospitals that increased their proportion of nurses with BSNs over time have greater reductions in mortality and failure to rescue than do hospitals that did not.¹³

RESEARCH DRIVING CHANGE

The 2010 Institute of Medicine's (IOM) recommendation in its report on *The Future of Nursing* that the nation move to a nurse workforce comprising 80% BSNs by 2020 would not have been made in the absence of a robust evidence base.¹⁴ The goal set by the IOM is daunting as only a little over half of the nurses have BSNs, and those who do are not distributed equally by geography, reflecting variations in the state support for baccalaureate nursing education. A recent report suggests that Pennsylvania hospitals, for example, would have to increase employment of BSNs by 78% overall between 2006 and 2020 to meet the IOM target of 80% BSNs.¹⁵ Moreover, although some hospitals have moved to all bachelor's-qualified nurses, as of 2006, the latest comprehensive data on the distribution of proportion of BSNs at the hospital level, there was significant variation across hospitals in BSN employment with at least 10% of hospitals employing <20% of nurses with BSNs.⁸

To make such a large change, employers need evidence that it is in their interests to do so. The paper by Yakusheva et al in this issue of *Medical Care* is an innovative and timely study contributing to the development of the business case in support of hospitals making the transition to a largely BSN nurse workforce.¹⁶ The authors depart from the design of previous large-scale studies of nurses' education and patient outcomes and focus on a single hospital in which they overcome a limitation of previous studies by linking specific nurses with specific patients. They determined from nurses' assessments entered into a patient's electronic medical record, matched with hospital administrative records, whether the nurse responsible for each patient had a BSN. The BSN proportion was measured by the ratio of the number of nurse assessments made by a nurse with a BSN to the total number of nurse assessments during a patient's hospitalization, with appropriate adjustments for length of stay. They found that a 10% increase in BSN proportion reduced the odds of mortality by 10.9%, an effect size larger than reported in previous studies in which specific nurses could not be matched to specific patients and where effect sizes ranged from 4% to 7% reduction in the odds of mortality.

Their approach is intuitively appealing and provides additional evidence validating the association found in multihospital studies between baccalaureate nursing education and better outcomes for patients. This study, like that of Needleman et al¹⁷ on the impact of nurse staffing on mortality in a single hospital, illustrates the value of researchers

using different designs to address similar research questions, especially if the findings of earlier studies have been considered controversial by some stakeholders. There has been a useful order in how research on the association between nurse education and nurse staffing on patient outcomes evolved with studies "too large to ignore" first capturing stakeholder attention^{5,8,10,11} and setting the stage for the innovative single-hospital study in this issue¹⁶ to have greater impact than might have been the case in the absence of the larger studies. The success of single-site studies with novel designs by Yakusheva et al,¹⁶ and by Needleman et al,¹⁷ in producing significant results should send a cautionary message to those who would use null findings from a single institution and small studies to try to discount mounting evidence from more rigorous research. Null findings may be less a reflection of the absence of an association between the factors of interest and more a reflection of study design and measurement limitations.

BUSINESS CASE FOR 80% BSN WORKFORCE

The economic evaluation of the 80% BSN nurse workforce recommendation ploughs new ground and is valuable from a number of perspectives. The paper provides compelling evidence that the employment of a largely BSN nurse workforce can return financial value to institutions and third-party payers, as well as better outcomes for patients. This has been difficult to examine in previous studies that have operationalized BSN contribution as the percentage of bedside care nurses qualified at the BSN level or higher because there are still relatively few entire hospitals with 80% BSN nurses. The strategy of calculating the "dose" of BSN care at the individual patient level enables a reasonable test of whether there is a threshold effect on certain patient outcomes that have been difficult to discern in previous research. Readmissions and length of stay are important examples relevant to the business case. Hospital readmission rates have been found to be associated with nurse staffing and the quality of nurse work environments,¹⁸ and thus with CMS penalties for excessive readmissions,¹⁹ but not with the proportion of nurses qualified at the baccalaureate level. The paper in this issue, like previous research, did not find a significant association between nurses' education and readmissions and length of stay using continuous measures of proportion of BSNs. However, significant associations were found between the proportion of BSNs and readmissions and length of stay when individual patients got $\geq 80\%$ of their care from BSN-qualified nurses. This finding of a threshold effect may help explain why other research has not documented the expected association between readmissions, length of stay, and BSN education, and suggests new research strategies in the future, especially as more hospitals achieve the 80% target.

Economic simulations revealed for the study hospital that increasing the BSN dose to 80% for every patient could potentially result in \$5.6 million in savings annually, primarily due to decreased readmissions and slightly shorter lengths of stay that would more than offset annual costs of about \$1.8 million in increased salaries associated with BSN qualifications. For the many hospitals that do not provide a

salary differential for nurses with BSNs, the business case would be stronger. Admittedly, these are best estimates and do not take into account potential savings that might be achieved through improved patient outcomes not measured in this study, such as infection reduction, or potential costs for achieving the 80% BSN target, including, for example, tuition and other institutional costs associated with assisting already employed RNs obtain BSN education. In addition, as noted by the authors, value-based purchasing is still evolving and does not yet fully reward hospitals for cost savings that often accrue to public and private payers even though the hospital largely bears the costs.

There will undoubtedly be naysayers who will be tempted to critique some details of the study's design and variable measurement. Estimating the proportion of BSN care provided to a single patient using the educational credentials of the RN completing recorded nursing assessments in the electronic health record is creative and may be accurate. However, as the authors note, it was not possible to take into account skill mix and other details of direct care provision, largely because electronic health records are still evolving and do not yet encompass many important elements of professional nursing care.

Yakusheva et al are to be congratulated for significantly adding to our understanding of relationships between nurses' education and patient and economic outcomes of hospital care. Their findings will stimulate other research innovations that will continue to advance outcomes research and impact practice and policy decisions. The study's findings of a business case supporting an 80% BSN nurse workforce should serve as a catalyst to hasten a transition that has been a long time in the making and remains in the public's interest.

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