

**The Relationship Between Nursing
Certification and Patient Outcomes
A Review of the Literature**

ABNS Research Committee Subgroup

Melissa Biel

Lynne Grief

Leslie Anne Patry

Julie Ponto

Maria Shirey

2014

The Relationship Between Nursing Certification and Patient Outcomes A Review of the Literature

Nursing certification organizations and key partners in credentialing have joined together to identify and agree upon priorities for a unified, international research agenda supporting nursing certification. One of the identified research priorities is to examine the link between certification and patient outcomes. The American Board of Nursing Specialties (ABNS) Research Committee chose to conduct a synthesis of the existing research literature to determine the state of knowledge on certified nurse practice and the impact on patient outcomes.

Research synthesis allows practitioners to make informed decisions, condenses research findings for easier use by a variety of stakeholders, and provides information on the need for future research (Chalmers, Hedges & Cooper, 2002). The purpose of this synthesis was to analyze existing literature related to nursing certification and patient outcomes. This research synthesis consisted of an integrative or systematic review of existing studies that examined nursing certification as an independent variable and patient outcomes as a dependent variable.

Method

A search of the research literature that examined nursing certification and patient outcomes was conducted in 2011 and updated in 2013. The search included literature published in English, in peer reviewed journals, from 2000 to 2013. Studies that included nursing certification and patient outcomes as variables were examined for relevance. Nine studies were identified for inclusion in the synthesis. The studies are summarized in Table 1.

A subcommittee of the ABNS Research Committee conducted a systematic review of the articles. An evaluation framework was developed and applied to each of the articles. Each of

the reviewed elements of the articles was entered into a synthesis grid to facilitate comparisons. The assessment components can be found in Table 2. The Committee members conducted the article reviews independently and placed their findings on the synthesis grid. The grid was shared with the subcommittee reviewers who then independently identified themes that emerged from the article reviews. After the themes were compiled, the reviewers met to discuss and validate their findings.

Results

The results of these studies varied in terms of the effectiveness of nursing certification on patient outcomes. There were a number of statistically significant findings indicating improvements in clinical outcomes attributed to certified nursing practice. For example, nurses certified in wound, continence, and/or ostomy care, staged pressure ulcers more accurately than noncertified nurses (Hart et al., 2006). Nurses with OCN® certification documented a higher number of post admission fatigue assessments on patients (Frank-Stromberg et al., 2002). No difference was found in anesthetic complication rates or mortality rates in hospitals whose obstetrical anesthesia departments were staffed by CRNAs as compared with those staffed by anesthesiologists (Simonson et al., 2007). Interestingly, shorter patient length of stay in rehabilitation units was predicted by a higher proportion of nurses certified in rehabilitation (certified rehabilitation registered nurse, or CRRN®) (Nelson, et al., 2009). A unit's proportion of certified staff registered nurses was inversely related to rate of falls (Kendall-Gallagher & Blegen, 2009). As well, a 10% increase in baccalaureate prepared nurses on a unit, who were also certified in their specialty, was associated with a 2% decrease in patient mortality and "failure to rescue" (Kendall-Gallagher et al., 2011). Blegen (2012) in a commentary on the 2011

Kendall-Gallagher *et al* study acknowledges the research provides evidence that supports nurse certification lowers surgical patient mortality. However, she cautions “...it is premature to conclude that certification will generally improve patient care.” (Blegen, 2012, p. 55). She identifies issues that need to be addressed in future research, including: studying a wider selection of nurse sensitive outcomes; examining the effects of the different requirements for certification; determining if obtaining certification changes the way a nurse practices or if nurses who choose to pursue certification practice differently notwithstanding certification. She concludes that research that differentiates the types of certification and the associated changes in nursing practice is needed. Boltz et al. (2013) examined the amount and type of unit-level nurse certification with a focus on the care of the hospitalized older adult. Results showed an inverse relationship between nurse certification and fall rates; those units with a lower percentage of certified nurses were more likely to have falls.

Conversely, there were three studies that did not find a statistically significant relationship between certification and improved patient outcomes. Stromberg et al. (2002) found no difference among certified and non-certified nurses with respect to assessment of pain at admission, number of pain assessments subsequent to admission, assessment of fatigue at admission, number of unplanned visits to care facilities, admissions to care facilities, and number of unscheduled home visits. In this same study, patients of OCNs® had a greater number of infections and fewer documented instances of patient teaching regarding infection. While not statistically significant, a higher proportion of RNs with CNOR® certification showed reductions in patient complications and mortality (Newhouse et al., 2005). Krapohl et al. (2010) found no significant relationship between the proportion of certified nurses on a unit and the

rate of nurse-sensitive patient outcomes. However, in this study, a positive relationship was found between the proportion of certified nurses on a unit and feelings of workplace empowerment.

Findings

Beyond the results of these outcomes studies, authors sought to capture insights into the research processes and identify commonalities, differences, and gaps in the research. The synthesis review generated the following methodological and theoretical findings:

- Identification of the certified nurse impact was mostly serendipitous as generally the studies did not set out to isolate and examine certified nursing practice. Most reported findings have nursing certification listed as a demographic variable examined against other study related outcomes. It might be that certified nursing practice and its impact is more complex than a nominal measure of certified versus non-certified.
- Study designs are mostly quantitative and therefore, fail to yield a rich understanding of what constitutes certified nursing practice. Secondary analysis of data is a prominent methodology, which limits variable associations.
- Certified nursing practice was most often studied within limited organizational contexts such as hospitals and primarily studied staff nurses.
- A visual representation or model to diagram what we currently know about certified nursing practice and its relationship to outcomes does not exist.
- The theoretical support for the studies analyzed demonstrates extremes in theoretical conceptualizations about certification. That is, the studies are either atheoretical

(lacking a theoretical or conceptual framework) or they use linear models (mostly Donabedian's Structures-Processes-Outcomes).

- Sampling techniques seemed limited mostly to convenience samples, which has inherent limitations.
- There is a lack of clarity regarding a unified definition of what constitutes certification. This results in uncertainty as to interpretation of findings and difficulty in conducting a reliable meta-synthesis of studies.

To summarize these findings, themes were identified.

Issues related to a lack of conceptual clarity:

1. There is confusion regarding a common definition of certification.
2. There is lack of an empirical understanding of what constitutes certified nursing practice and related mediating processes.
3. There is a linear conceptualization in studying certification, which limits interpretation of a multivariate concept.
4. There is a potential misconception that certification can be studied as a nominal variable.
5. When conducting certification research, there is a need to differentiate mandatory certification versus voluntary credentialing.
6. Numerous types of certifications with varying requirements for initial certification and recertification (i.e. years of experience, minimum degree required, clinical practice hours) may confound findings.

Issues related to research methodology/design

7. Most findings of certification-related outcomes are serendipitous.
8. Certification is not usually the primary study variable; certification is measured in combination with other variables and is not easily measured as a separate, distinct variable.
9. Study designs are descriptive/non-experimental.
10. Most studies were conducted in acute care environments.
11. Certification is often associated with personal nurse characteristics and not with patient or client impact.
12. Most studies have a homogeneous sample (e.g., unit, institution, health care system).
13. Certification may be an associated finding, but it is inconsistently predictive of outcomes. Certification may appear to result in improved outcomes--but this finding is not consistently statistically significant.
14. There is a lack of patient risk stratification (certified nurses may care for 'sicker' patients).

Considerations for Future Study

Based on the findings from this research synthesis, considerations for future research studies that examine nursing certification and its impact on patient outcomes are offered.

Conceptual Models/Conceptual Clarity

- Develop a model of relationships between certified practice and patient outcomes to better conceptualize the current empirical gaps and intentionally target them for study.

- Consider that certification is a non-linear concept and as such should be studied within a nonlinear theoretical framework reflecting the complexity of variables and relationships. Determine components of the non-linear framework.

Certified Practice

- Given that most of what has been studied is based on a direct link between certification and outcomes, the nature of certified nursing practice and the mediating processes that could be influencing the relationships between certification and outcomes is missing.
- Exploration of the nature of non-certified nursing practice may yield different results than what we have observed in the literature to date.
- Because there is not standardization across types of certification, the effects of certification requirements may impact the delivery of patient care in different ways.

Research Methodology/Design

- Intentionally incorporate certified practice in the study design to include a focus on the study variables, research questions, and sample selection.
- To better understand the relationships between certification and patient outcomes, a better understanding of what constitutes “certified nursing practice” is needed. A first step may be to conduct qualitative research that may yield the specific research questions needed to design more targeted qualitative and quantitative studies.
- Study certified nurses in various organizational settings (outpatient, academic, post-acute settings) and isolate a common set of certified nursing practice indicators that may yield a better understanding of certified practice.

Summary and Conclusions

A synthesis was conducted of eight research articles that examined the impact of nursing certification on patient outcomes. The results were mixed; some studies indicated that specialty certification had a positive impact on patient outcomes, while others showed no such relationship. To focus future research on patient outcomes it is necessary to improve theoretical and methodological issues identified by this research synthesis.

Table 1. Summary of Nursing Certification and Patient Outcome Research Articles

Study	Purpose	Design	Sample/Setting	Data Collection Method	Results
Frank-Stromberg et al. (2002)	To test hypothesis that patients cared for by Oncology Certified Nurses (OCNs®) have superior outcomes compared to patients cared for by noncertified nurses.	Descriptive ex post facto.	20 nurses (7 certified; 13 non-certified) Medical records for 181 of their patients Homecare agency in the Midwestern United States.	Retrospective chart review.	The two groups did not differ with respect to: assessment of pain at admission, - number of pain assessments subsequent to admission, -assessment of fatigue at admission, number of unplanned visits to care facilities, admissions to care facilities, -number of unscheduled home visits. As hypothesized, the OCNs® documented a higher number of post admission fatigue assessments ($p < 0.05$). Contrary to hypothesis, patients of OCNs® had a greater number of infections and fewer documented instances of patient teaching regarding infection.
Newhouse et al. (2005)	To identify the relationship between RN staffing factors in the OR and surgical patient outcomes. Specifically, whether the level of RN staffing in the OR is related to	Descriptive, correlational.	Thirty-two hospitals (76%) in Maryland Hospitals that responded represented 1,894 patient discharges.	Survey of Perioperative directors at Maryland hospitals regarding OR staffing data. Data on patients discharged from Maryland	Non statistically significant relationship between certification and outcomes ($p > .05$) Staffing factors (i.e., night and agency staffing) had a significant effect on outcomes. Operating rooms

	postoperative complications, mortality, and length of stay (LOS) and whether certification, RN agency use, 24-hour staffing, and the performance of multidisciplinary code drills are related to complications, mortality, and LOS.			hospitals after abdominal aortic surgery were abstracted from the Health Services Cost Review Commission (HSCRC) State Inpatient Public Use Data.	without staffed night shifts commonly were in smaller, nonteaching hospitals with lower volumes.
Hart et al. (2006)	To determine the reliability of the NDNQI pressure ulcer indicator. Overall K values for pressure ulcer identification, staging, and sourcing indicate moderate to near perfect reliability.	Instrument development	55 hospitals in sample. 256 individuals at 48 National Database of Nursing Quality Indicators (NDNQI) member hospitals responded.	A 3-part criterion-referenced, web based test. High-quality digital pictures of ulcerous wounds were used in this study.	Findings suggest that nurses can accurately differentiate pressure ulcers from other ulcerous wounds in Web-based photographs, reliably stage pressure ulcers, and reliably identify community versus nosocomial pressure ulcers. Nurses have moderate to near perfect levels of reliability when staging pressure ulcers. However, nurses certified in wound, continence, and/or ostomy care, stage pressure ulcers more accurately than noncertified nurses ($p = .001$).
Simonson et al. (2007)	To identify differences in the rates of anesthetic complications in hospitals whose obstetrical anesthesia is	Descriptive.	68 hospitals in Washington that provide OB anesthesia services on a routine basis.	Washington State hospital discharge data were obtained from 1993 to 2004 for cesarean sections, and	After adjusting for comorbidities, hospital size, teaching status, patient transfers, and other potentially confounding

	provided solely by CRNAs compared to hospitals with only anesthesiologists			were merged with a survey of hospital obstetrical anesthesia staffing. Anesthetic complications were identified via ICD-9-CM diagnosis codes.	variables, no difference was found in anesthetic complication rates in hospitals whose obstetrical anesthesia departments were staffed by CRNAs compared with those staffed by anesthesiologists ($p = .85$). No difference was found in mortality rates either ($p = .91$).
Nelson et al. (2009)	To describe rehabilitation nurse staffing patterns to validate the impact of rehabilitation nursing on patient outcomes, and to test whether existing patient measures on severity and outcomes in rehabilitation could be used as a proxy for burden of care to predict rehabilitation nurse staffing ceilings and daily nurse staffing requirements.	Two year, prospective observational study.	Randomly selected a representative sample of 54 units from a pool of 806 rehabilitation units participating in Uniform Data System for Medical Rehabilitation (UDSMR), stratified by geographical regions. The sample included every inpatient and every direct-care nursing staff person (RN, LPN, NA) over a 30-day period.	Data were collected prospectively using surveys, logs, and an extant database.	8.1 total nursing hours per patient day (HPPD) in rehabilitation 50% registered nurse (RN) staff nominal use of agency nurses reported across sites. Nurse staffing levels varied by geographic region. Positive nurse managers' perception of non-RN staff competency in rehabilitation nursing practice was most predictive of improved patient outcomes, defined as FIM(TM) gain and discharge FIM(TM) score. A shorter length of stay (LOS) was predicted by three variables: a higher proportion of nurses certified in rehabilitation (certified rehabilitation

					registered nurse, or CRRN®) ($p < .0001$), decrease in RN years of rehabilitation experience, or decrease in average daily census.
Kendall-Gallagher & Blegen (2009)	To explore the relationship between the proportion of certified staff nurses in a unit and risk of harm to patients.	Hierarchical linear modeling. Secondary data analysis.	48 intensive care units from 29 hospitals.	N/A	Unit proportion of certified staff registered nurses was inversely related to rate of falls ($p = .04$), and total hours of nursing care were positively related to medication administration errors ($p = .006$). Specialty certification and competence of registered nurses are related to patients' safety.
Krapohl et al. (2010)	To determine whether the proportion of certified nurses on a unit is associated with the rate of nurse-sensitive patient outcomes.	Correlational, descriptive.	450 nurses in 25 ICUs in Southeast Michigan	Anonymous surveys: [a] Laschinger's Conditions for Work Effectiveness Questionnaire-II (CWEQ-II) + [b] certification status, combined with patient data outcome measures.	No significant relationship was found between the proportion of certified nurses on a unit and patients' outcomes. The association between nurses' perception of overall workplace empowerment and certification, however, was positive and statistically significant ($r = .397$, $p = .05$). Although a link between certification and nurse sensitive outcomes was not established, the association between workplace empowerment and the proportion of

					certified nurses on a unit underscores the importance of organizational factors in the promotion of nursing certification.
Kendall-Gallagher et al. (2011)	To determine if proportion of hospital staff nurses with specialty certification is associated with risk-adjusted inpatient 30-day mortality and failure to rescue/FTR (deaths in surgical inpatients following a major complication).	Secondary analysis of available hospital/patient data; Survey research [nurses].	652 hospitals (80%) of adult acute care nonfederal hospitals in CA, PA, FL, NJ; 28,017 staff nurses in CA, PA, FL, NJ; 1,283,241 patients 21yo or older admitted to a hospital in CA, PA, FL, NJ in 2005-2006 w/DRG of general, orthopedic, or vascular surgery.	Hospital data were obtained from AHA annual survey; nurse data obtained via survey mailed to random sample of nurses in each state with RN license; Patient data obtained from hospital discharge abstracts.	Significant effect of % of BSN nurses and % of BSN nurses who are certified on mortality and FTR ($p = .01$); 10% increase in BSN nurses is associated with 6% decrease in mortality/FTR; 10% increase in BSN and certified is associated with 2% decrease in mortality/FTR.
Boltz et al. (2013)	To examine the relationship between nurse certification and unit-level, nursing sensitive quality indicators in units that primarily serve older adults.	Retrospective descriptive design.	44 medical and medical-surgical units in 25 NICHE hospitals.	Sample NICHE (Nurses Improving Care for Healthsystem Elders) acute care hospital site coordinators provided unit level data through web-based data entry system.	Certification in any specialty was a significant predictor of falls ($p = .05$). Units with a lower percentage of certified nurses were more likely to have falls. Gerontological certification was not a significant predictor of any nursing-sensitive quality indicators. Nurse characteristics were not a significant predictor.

Table 2. Research Articles Assessment Components

Article Citation [full article citation]
Abstract
Literature Review <ul style="list-style-type: none">• What are the objectives of the article/study?• What are the goals, hypotheses or research questions?• What is the importance of this work:<ul style="list-style-type: none">a) To whom is the article important?b) What is its value?• What is known about the research question/hypothesis? (briefly summarize in a few bulleted points the review of the literature; define and discuss the context of the research)
Methodology <ul style="list-style-type: none">• Sample<ul style="list-style-type: none">a) Sizeb) Sampling methodology (convenience, random, stratified, etc.)b) Demographic characteristicsc) Response rate• Variables<ul style="list-style-type: none">a) Independent variable(s)b) Dependent variables(s)c) Control variable(s)d) Other variable(s)• Measures<ul style="list-style-type: none">a) Instruments used to gather data• Methods<ul style="list-style-type: none">a) Research design (non-experimental, qualitative methodology, quasi-experimental, etc.)

b) How the data collection was carried out

Results (Summary of findings)

Discussion

- What is the practical meaning of the article?
- Limitations?
- Gaps in knowledge? What still needs to be known or what is not yet known?
- Areas for future research?

References

- Blegen, M.A. (2012). Does Certification of Staff Nurses Improve Patient Outcomes? *Evidence Based Nursing*, 15(2), 54-55.
- Boltz, M., Capezuti, E., Wagner, E., Rosenberg, M., & Secic, M. (2013). Patient safety in medical-surgical units: Can nurse certification make a difference? *MedSurg Nursing*, 22(1), 26-37.
- Chalmers, I., Hedges, L.V., & Cooper, H. (2002). A brief history of research synthesis. *Evaluation & the Health Professions*, 25(12), 12-37.
- Frank-Stromberg, M., Ward, S., Hughes, L., Brown, K., Coleman, A., Grindel, C.G., et al. (2002). Does certification status of oncology nurses make a difference in patient outcomes? *Oncology Nursing Forum*, 29(4), 665-672.
- Hart, S, Bergquist, S, Gajewski, B., & Dunton, N. (2006). Reliability testing of the National Database of Nursing Quality Indicators pressure ulcer indicator. *Journal of Nursing Care Quality*, 21(3), 256-265.
- Kendall-Gallagher, D., Aiken, L.H., Sloane, D.M. & Cimiotti, J.P. (2011). Nursing specialty certification, inpatient mortality, and failure to rescue. *Journal of Nursing Scholarship*, 43(2), 188-194.
- Kendall-Gallagher, D. & Blegen, M.A. (2009). Competence and certification of Registered Nurses and safety of patients in intensive care units. *American Journal of Critical Care*, 18(2), 106-116.
- Krapohl, G., Manojlovich, M., Redman, R., & Zhang, L. (2010). Nursing specialty certification and nursing-sensitive patient outcomes in Intensive Care Unit. *American Journal of Critical Care*, 19(6), 490-498.
- Nelson, A., Powell-Cope, G., Palacios, P., Luther, S.L., Black, T., Hillman, T., et al. (2007). Nursing staffing and patient outcomes in inpatient rehabilitation settings. *Rehabilitation Nursing*, 32(5): 179-202.
- Newhouse, R.P., Johantgen, M., Pronovost, P.J., & Johnson, E. (2005). Perioperative nurses and patient outcomes: mortality, complications, and length of stay. *AORN Journal*, 81(3):508-509, 513-522, 525-528.
- Simonson, D., Ahern, M., & Hendryx, M. (2007). Anesthesia staffing and anesthetic complications during Cesarean delivery: A retrospective analysis. *Nursing Research*, 56(1), 9-17.