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Why Some Nurses Obtain Specialty Certification and Others Do Not

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Abstract

OBJECTIVE—To determine whether there are modifiable characteristics of nurses and hospitals associated with nurse specialty certification.

BACKGROUND—Hospitals, nurses, and patients benefit from nurse specialty certification, but little actionable evidence guides administrators seeking higher hospital certification rates.

METHODS—A cross sectional, secondary data analysis of 20,454 nurses in 471 hospitals across 4 states.

RESULTS—Rates of certified nurses varied significantly across hospitals. Higher odds of certification were associated with Magnet recognition and better hospital work environments at the facility level, and with bachelor of science in nursing (BSN) education, unit type (most notably oncology nurses), older age, more years of experience, and full-time employment at the individual nurse level.

CONCLUSION—Two strategies that hold promise for increasing nurse specialty certification are improving hospital work environments and preferentially hiring BSNs.

Nurse specialty certification is “a mechanism for validation or formal recognition by documenting individual nurses’ knowledge, skills, and abilities specific to their specialty” (1; p. 15). It is a form of individual credentialing above and beyond entry-level education

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and licensing. By pursuing specialty certification, nurses exhibit a commitment to professional growth and lifelong learning while establishing competency in a specialized area of care such as oncology or medical-surgical nursing. The intended outcome of certification in nursing is to improve safety, quality of care, and health outcomes for those using healthcare services (1). A range of stakeholders, including administrators, clinicians, and patients, benefit from nurse specialty certification (2). Certified nurses report higher job satisfaction and their patients experience improved safety (3,4) and better clinical outcomes, including lower rates of infection (5), and lower odds of mortality and failure to rescue (6). Hospital administrators may provide special recognition or compensation to incentivize certification among their nursing staff and thereby improve the quality of care as well as recruitment and retention of nurses (7,8).

Efforts to increase nurse specialty certification are especially critical in hospitals pursuing Magnet status, an institutional accreditation recognizing excellence in nursing. Magnet hospitals must have a plan to increase or, once a threshold is achieved, maintain the level of specialty certification among their nurses. The Magnet program recognizes 350 certifications that contribute towards a hospital's overall certification rate. Despite the options available and incentive structures in place, many nurses do not elect to pursue specialty certification. Relatively little is known about what hospital and nurse characteristics are associated with specialty certification. Such information is critical for hospital administrators seeking to increase rates of nurse specialty certification. To address this gap, we examined whether hospital characteristics and individual nurse characteristics were associated with nurse specialty certification.

Methods

Design and Data

This was a retrospective, cross-sectional secondary data analysis of hospitals in 4 states (California, Florida, New Jersey, and Pennsylvania). We used 3 data sources: the 2016 RN4CAST survey of nurses, the 2016 American Hospital Association (AHA) Annual Survey of hospitals, and a list of Magnet recognized hospitals publicly available from the American Nurses Credentialing Center (ANCC), which were linked and merged using a unique hospital identifier. The University of Pennsylvania's institutional review board approved this study (protocol # 819470).

Setting and Sample

The final sample included 20,454 direct care nurses across 471 adult, non-federal, acute care hospitals in California, Florida, New Jersey, and Pennsylvania, including 82 Magnet hospitals. The 20,454 nurses who in our final sample participated in the 2016 RN4CAST survey, a large mail-based study of a random sample of registered nurses (RNs) in 4 states, reported on their individual characteristics including age, sex, education, and nurse specialty certification. They also served as frontline informants of staffing ratios, education of the nursing workforce, and hospital work environment. Individual nurse respondents to the RN4CAST survey identified their hospital of employment, which allowed us to generate facility-level measures of these nursing resources by aggregating responses within each

hospital. Each hospital in the study had, on average, 43 nurse respondents. The survey methodology, response rate, and strong representation of hospitals have been described in detail elsewhere along with the benefits of surveying front-line providers to study nurse staffing and other organizational characteristics of nursing (9).

Measures

Nurse Specialty Certification—Nurses self-reported certification status on the RN4CAST survey by answering the question “Are you currently certified in a specialty practice by a national nursing specialty organization?”.

Hospital Nursing Resources—To generate an indicator variable for Magnet status, we used publicly available data from the ANCC, the credentialing organization for Magnet hospitals. Staffing was derived from nurse reports of the number of patients and nurses on their unit during their last shifts, which were aggregated across nurses to represent the average patient-to-nurse ratio in each hospital. Education at the hospital level represented the percentage of nurses with a baccalaureate or higher degree based on their response to the RN4CAST nurse survey. The work environment was measured using the 31-item Practice Environment Scale of the Nursing Work Index (PES-NWI), which has been endorsed by the National Quality Forum (10) and has an extensive history of use in the study of hospital nursing (11–15). The Practice Environment Scale consists of 5 subscales: Nurse Participation in Organizational Affairs; Nursing Foundations for Quality of Care; Nurse Manager Ability, Leadership, and Support of Nurses; Staffing and Resource Adequacy; Collegial Nursing Physician Relations (16,17). Nurses respond to questions within each subscale on a Likert-type scale to reflect the presence and strength of each element of the work environment in their primary job. The final measure for the nurse work environment is an average of these responses by hospital 1st within and then across subscales to create 1 composite measure. For regression analyses, we divided hospitals into ordinal categories based on quartiles: “poor” (1^{st} quartile), “mixed” (2^{nd} and 3^{rd} quartiles), and “best” (4^{th} quartile) work environments. Due to conceptual overlap with our direct measure of nurse-to-patient ratios, we excluded the Staffing and Resource Adequacy subscale from our final measure of the work environment. To generate an indicator variable for Magnet status, we used publicly available data from the ANCC.

Characteristics of Individual Nurses—To estimate individual nurse odds of certification we considered nurse characteristics including age (in years), sex (male/female), employment status (i.e. full-time, part-time, per-diem), years of experience, unit type (e.g. medical/surgical, intensive care, emergency department etc.), education, and an indicator for current enrollment in a nursing degree program. Nurses self-reported these characteristics in responding to the RN4CAST survey. Nurse reports of their highest nursing degree were dichotomized to contrast nurses with either a bachelor’s of science in nursing (BSN) and/or higher degree with nurses who reported lower degrees (i.e. hospital diploma, associate degree).

Hospital Characteristics—Hospital structural characteristics were derived from the AHA hospital survey data. The number of licensed beds determined the size of the hospital

(≤100 beds, 101-<250 beds, ≥250 beds). Technology status (high- or low-technology) indicated whether or not a hospital performed major organ transplants or open-heart surgery. The 3 teaching status categories were based on the ratio of medical residents or fellows to hospital beds (non-teaching, no medical trainees; minor teaching, 0-0.25 per bed; major teaching, ≥0.25 per bed).

Data Analysis—Analysis of the data began with describing the distribution of study hospitals across facility-level characteristics and the rate of nurse specialty certification within each category. Tests of significance for evaluating the difference in these certification rates included t-tests and F-tests from analysis of variance (ANOVA) models. Similarly, we examined the characteristics of individual nurses for all nurses and for certified nurses. Chi-square tests determined the level of statistical significance in certification differences across categories. Finally, multi-level logistic regression models were used to estimate the relationships between characteristics of hospitals and nurses and the individual odds of nurse certification. Huber-White sandwich estimators adjusted for the clustering of nurses within hospitals. All statistical analyses were conducted in STATA version 15.1 (StataCorp LLC. College Station, TX).

Results

As the column headers in table 1 and table 2 indicate, the final sample included 471 hospitals and 20,454 nurses, of which 8,132 (39%) were specialty certified. Table 1 presents the distribution of these study hospitals across facility characteristics as well as the mean and range of certification rates within each category. Hospitals were distributed across states in proportions that roughly mirrored the size of the state, with the most (41%) in California and the least (10%) in New Jersey. Eighty-two (17%) were Magnet hospitals. All but 12 (3%) hospitals were medium (40%) or large (58%) as defined by number of beds. The majority of hospitals were minor or major teaching hospitals (59%) and high-technology (60%) institutions. The study hospitals varied in terms of their nursing resources. In most (71%) hospitals, the average nurse cared for fewer than 5 patients per shift. In nearly three-quarters (73%) of all hospitals, ≥50% of the nursing workforce was BSN prepared. Hospitals were distributed, by design, across poor (25%), mixed (51%), and best (24%) quality categories of the work environment.

The proportion of nurses with specialty certification varied widely by hospital. In the average Magnet hospital, over half (51%) of nurses were certified compared to only 34% of nurses in non-Magnet hospitals. This finding is also reflected in the distribution of certified nurses across states. New Jersey had the highest percentage of certified nurses (51%, $p<0.001$) but also a disproportionate share of Magnet hospitals. However, even within Magnet hospitals, certification rates ranged from 26% to 85%. At the hospital level, the percentage of certified nurses was associated with the proportion of BSN nurses, with an average of 28% of nurses certified in hospitals with less than 30% BSN nurses and an average of 44% of nurses certified in hospitals with at least 70% BSN (table 1). Likewise, the certification rate increased with the quality of the work environment, from 33% among hospitals with poor work environments to 45% among hospitals with the best work

environments. Both major teaching hospitals (42% certified), those with ≥250 beds (40% certified), and high-technology hospitals (38% certified) showed higher rates of certification.

Table 2 presents the demographic and other individual characteristics of all 20,454 nurses and a subset of 8,132 certified nurses in the study compared to their non-certified counterparts. Certification was more common among older, more experienced nurses. Nurses 50 years and older made up 51% of all nurses but 59% of certified nurses ($p<0.001$). Likewise, 71% of certified nurses had 15 or more years of experience compared to 61% of all nurses ($p<0.001$). The distribution of certified nurses across unit types differed in most areas compared to the total study sample of nurses. Most notably, adult medical-surgical nurses made up 24% of the total population but only 17% of certified nurses. The distribution of certified nurses across education categories was skewed towards higher degrees relative to the overall population.

Table 3 presents the individual odds of nurse specialty certification from logistic regression models. Model 1 in the first column displays results from a series of bivariate models, 1 for each individual and hospital characteristic listed by row. Most variables were statistically significant, and many had large effect sizes, most notably oncology unit type (OR 2.58, $p<.001$) and Magnet status (OR 1.87, $p<.001$). Model 2 presents the results of a single logistic regression model that included all the variables listed except for Magnet status. Both older and more experienced nurses were more likely to be certified (4% and 17% higher odds associated with 5 additional years of age or experience, respectively; $p<.001$). Part-time (OR 0.80) and per-diem (OR 0.53) nurses had significantly lower odds of certification relative to full-time nurses ($p<.001$). Most unit types differed significantly in terms of the odds of certification relative to nurses on medical-surgical units. Controlling for all other variables in Model 2 and relative to medical-surgical nurses, operating room nurses were more than twice as likely to be certified (OR 2.15, $p<.001$) and oncology nurses had 3.7 times higher odds of certification ($p<.001$). Higher odds of certification were also associated with other unit types including hospice (OR 1.97), maternity (OR 1.90), intensive care (OR 1.82), pediatrics (OR 1.80), and emergency department (OR 1.55), all of which achieved statistical significance at the $p<0.001$ level. The only unit type associated with significantly lower odds of certification was psychiatric units (OR 0.68, $p<.01$). The effects associated with all other unit types did not achieve significance at the $p<0.05$ level.

Both individual BSN and enrollment in a nursing degree program were associated with higher odds of certification in Model 2 (OR 1.70 & 1.48, respectively; both $p<.001$). Education measured at the hospital level (percent BSN-prepared nurses) maintained a significant effect size above and beyond that already attributed to individual characteristics (OR 1.09, $p<.001$). The odds of certification increased substantially with the quality of the hospital work environment. For each unit increase in the work environment (from “poor” to “mixed” or from “mixed” to “best”), the odds of certification for nurses practicing in that setting increased by 27% (OR 1.27, $p<0.001$). With the addition of Magnet status in Model 3, this effect size decreases but remains significant (OR 1.16, $p<0.01$) reflecting that both Magnet status and the PES are measuring the quality of work environments. Hospital-level education also diminishes and loses statistical significance, a result of Magnet hospitals more often having more BSN-prepared nurses. The effect associated with Magnet status

itself is large and significant. Nurses in Magnet hospitals had 59% higher odds of certification compared to non-Magnet hospitals (OR 1.59, <.001). The odds ratios for individual nurse characteristics were largely unchanged by the addition of Magnet in Model 3.

Discussion

Previous research suggests that both patients and nurses benefit from being in hospitals with higher proportions of nurses with specialty certification (3,6). Magnet hospitals must increase or, upon achieving a threshold, maintain a proportion of certified nursing staff. However, many nurses do not take advantage of opportunities presented by their employers to obtain specialty certification. Thus, nurse leaders are seeking research evidence that could inform their efforts to increase the proportion of their nurses who do achieve specialty certification. This study examined the association between nurse and hospital characteristics and the odds of nurses obtaining specialty certification. We found that facility-level rates of certification varied widely across hospitals suggesting that some hospitals were more successful in motivating their nurses to obtain certification than others.

What is unique about our study and most useful to nurse leaders seeking to increase the proportion of nurses with specialty certification are the findings identifying hospital-level attributes that were associated with increased odds of certification. Among these, the most significant factor was the quality of the work environment. For each unit increase in the work environment (from poor to mixed or from mixed to best), the odds of certification for nurses practicing in that setting increased by 27% (OR 1.27, $p<0.001$). The importance of the work environment is shown further in the higher rates of certification in Magnet hospitals. Nurses in Magnet hospitals were 1.6 times as likely to be certified as nurses in non-Magnet hospitals after controlling for all other hospital and nurse characteristics. Notably, the work environment maintained a positive and significant association with odds of certification even when the model included an indicator for Magnet status suggesting that improving work environments in non-Magnet hospitals is a promising strategy for increasing nurse certification as well as pursuit of Magnet status.

Characteristics of individual nurses were also associated with odds of certification. For example, older and more experienced nurses were more likely to be certified. Many certifications determine eligibility in part based on clinical practice hours, which may explain this association as well as the effect estimated for employment type (full-time nurses have the highest odds of certification). The effect size for experience was substantially larger than for age (1.17 vs. 1.04). While these variables are collinear in concept (age and experience increase at the same rate provided that a nurse is consistently practicing), each variable maintained an independent and statistically significant effect even when both variables were included jointly in the fully adjusted models (Model 2 and Model 3). Additionally, clinical practice areas were associated with the likelihood that a nurse would be certified. For example, oncology nurses had 3.6 times the odds of certification compared to a medical-surgical nurse. Specialty certification is generally voluntary but may be a prerequisite for work on these units to qualify nurses to administer chemotherapy. Similarly, operating room nurses had over twice the odds (2.15) of certification compared to medical-

surgical nurses. The association in this case may be related to the strength of OR culture and identity rooted in the technical skills required to work there, which specialty certification validates. Conversely, psychiatric nurses had lower odds of certification by a factor of 0.68 relative to medical-surgical nurses.

Baccalaureate education and enrollment in a nursing degree program were associated with substantially higher odds of certification (71% and 47%, respectively). Unlike the other nurse characteristics positively associated with odds of certification, these are more reasonably modifiable. Years of research have established the value of BSN education for patients, nurses, and hospitals (18–20). This study contributes to that evidence base, suggesting that an added benefit of BSN education is an increased likelihood of specialty certification. Above and beyond the effect of the BSN, any efforts to advance nursing education through a degree program were associated with increased odds of certification. The direction of this effect is difficult to interpret in the context of a cross sectional study. Higher odds of certification in this case may be a result of something gained through formally advancing education or a reflection of innate personal attributes that make a person more likely to pursue a degree program and certification alike. In either case, the finding complements prior research demonstrating that the nurse specialty certification is associated with improved patient outcomes, but only in the presence of BSN education (6). Increasing the proportion of BSN-prepared nurses is a means of both elevating rates of nurse specialty certification and ensuring that the resulting certified workforce improves patient outcomes.

Limitations

The study has several limitations. The cross-sectional design limits our interpretation to identifying associations; we cannot reach causal conclusions. Also, the data lack information on the presence and type of incentives to promote certification in place at the study hospitals, which limits our understanding of how nurses respond to different incentives. For example, some hospitals may offer bonus pay or special recognition to certified nurses. Others may require certification for professional advancement along an organization’s clinical ladder.

Conclusion

Hospitals, nurses, and patients benefit from nurse specialty certification. Administrators may seek to incentivize specialty certification, but the rates of certified nurses vary widely across hospitals, even among Magnet hospitals, which must increase or sustain certification levels to maintain their award status. Above and beyond the impact of Magnet recognition on odds of certification, better hospital work environments, BSN education, and unit type were each associated with higher odds of nurse specialty certification. Hospital administrators may consider these characteristics of hospitals and individual nurses when developing approaches to increase certification rates in their institutions.

Table 1.

Distribution of 471 Study Hospitals and Nurse Specialty Certification Rates

		Hospitals (n=471)	Certification Rate	p-value
Characteristic		**n (%)**	**mean % (min-max)**	
State	California	191 (41)	38 (5-78)	<0.001
	Florida	125 (27)	34 (6-67)	
	Pennsylvania	106 (23)	32 (5-71)	
	New Jersey	49 (10)	51 (19-85)	
Magnet	Non-Magnet	389 (83)	34 (5-68)	<0.001
	Magnet	82 (17)	51 (26-85)	
Bed Size	Small (≤100 beds)	12 (3)	30 (14-54)	<0.001
	Medium (101-<250 beds)	187 (40)	34 (5-71)	
	Large (≥ 250 beds)	272 (58)	40 (9-85)	
Teaching	Nonteaching	193 (41)	37 (5-76)	0.013
	Minor teaching	225 (48)	36 (5-83)	
	Major teaching	53 (11)	42 (11-85)	
Technology	Low-technology	191 (41)	35 (5-85)	0.033
	High-technology	280 (60)	38 (5-83)	
Staffing *Average patient-to-nurse ratio*	<4	166 (35)	37 (5-78)	0.918
	4-<5	170 (36)	37 (6-85)	
	5-<6	78 (17)	37 (6-75)	
	6-<7	42 (9)	35 (6-76)	
	≥7	15 (3)	36 (11-70)	
Education *Percent of nurses with BSN or higher nursing degree*	<30%	9 (2)	28 (6-53)	<0.001
	30-<40%	43 (9)	30 (6-64)	
	40-<50%	75 (16)	32 (6-70)	
	50-<60%	123 (26)	34 (5-76)	
	60-<70%	133 (28)	40 (5-85)	
	≥70%	88 (19)	44 (14-83)	
Work Environment	Poor	120 (25)	33 (6-68)	<0.001
	Mixed	235 (50)	35 (5-75)	
	Best	116 (25)	45 (15-85)	

Notes: P-values generated from t-tests and analysis of variance (ANOVA). Percent certified represents the mean percentage of certified nurses among hospitals within each category.

Table 2.

Characteristics of All Nurses and Certified Nurses

	N (%)			
Characteristic	**Nurses (n=20,454)**	**Certified (n=8,132)**	**Non-Certified (n=12,322)**	**P-value**
Age (*years*)				<0.001
<30	1,854 (9)	379 (5)	1,475 (12)	
30-<40	3,595 (18)	1,203 (15)	2,392 (19)	
40-<50	4,473 (22)	1,757 (22)	2,716 (22)	
50-<60	6,569 (32)	3,067 (38)	3,502 (28)	
≥60	3,963 (19)	1,726 (21)	2,237 (18)	
Experience (*years*)				<0.001
<5	2,856 (14)	434 (5)	2,422 (20)	
5-<15	5,180 (25)	1,900 (23)	3,280 (27)	
15-<25	4,269 (21)	1,875 (23)	2,394 (19)	
25-<35	4,418 (22)	2,125 (26)	2,293 (19)	
≥35	3,731 (18)	1,798 (22)	1,933 (16)	
Female	18,427 (90)	7,368 (91)	11,059 (90)	0.016
Enrolled in Nursing Degree Program	2,913 (14)	1,183 (15)	1,730 (14)	0.346
Employment Type				<0.001
Full-time	15,386 (76)	6,345 (79)	9,041 (74)	
Part-time	3,429 (17)	1,327 (16)	2,102 (17)	
Per-diem	1,391 (7)	382 (5)	1,009 (8)	
Unit Type				<0.001
Adult Medical or Surgical	4,863 (25)	1,409 (18)	3,454 (29)	
Oncology	573 (3)	356 (5)	217 (2)	
Pediatrics	358 (2)	163 (2)	195 (2)	
Maternity/Newborn	1,845 (9)	858 (11)	987 (8)	
Intensive Care Units	3,642 (18)	1,670 (21)	1,972 (16)	
Emergency Department	1,655 (8)	627 (8)	1,028 (9)	
Operating Room/Recovery	2,065 (10)	1,084 (14)	981 (8)	
Psychiatric	395 (2)	97 (1)	298 (2)	
Hospice/Palliative Care	72 (<1)	36 (<1)	36 (<1)	
Outpatient/Same Day/Procedures	1,323 (6)	426 (5)	897 (7)	
Rehab/Long-Term Care	257 (1)	78 (<1)	179 (1)	
Other Hospital Setting	2,793 (14)	1,047 (13)	1,746 (15)	
Education				<0.001
Hospital Diploma	1,801 (9)	669 (8)	1,132 (9)	
Associate degree	6,163 (30)	1,886 (23)	4,277 (35)	
Baccalaureate degree	9,990 (49)	4,022 (50)	5,968 (49)	

	N (%)			
Characteristic	**Nurses (n=20,454)**	**Certified (n=8,132)**	**Non-Certified (n=12,322)**	**P-value**
Master's degree	2,305 (11)	1,442 (18)	863 (7)	
DNP/PhD or other doctorate	129 (<1)	85 (1)	44 (<1)	

Notes: All p-values are derived from chi-square tests. Number of nurse respondents may not sum to column header because of missing data. The minimum number of nurse respondents reporting on all characteristics was 19,436.

Table 3.

Individual Nurse Odds of Certification (471 hospitals)

	Model 1 Bivariate	**Model 2 Nursing Resources**	**Model 3 + Magnet**
Individual Nurse Characteristics			
Age[1]	1.02***	1.04**	1.04***
Female	1.12*	0.95	0.95
Employment Type			
Full-time	1.28***	*(reference)*	*(reference)*
Part-time	0.94	0.80***	0.80***
Per-diem	0.55***	0.53***	0.53***
Experience[1]	1.16***	1.17***	1.17***
Unit Type			
Medical-surgical	0.54***	*(reference)*	*(reference)*
Oncology	2.58***	3.67***	3.62***
Pediatrics	1.28	1.80***	1.77***
Maternity	1.37***	1.90***	1.90***
Intensive care unit	1.37***	1.82***	1.82***
Emergency department	0.93	1.55***	1.55***
Operating room	1.80***	2.15***	2.15***
Psychiatric	0.49***	0.68**	0.68**
Hospice	1.53	1.97*	1.96*
Outpatient	0.71***	0.86	0.84*
Rehabilitation	0.66**	0.93	0.90
Other	0.90*	1.03	1.05
BSN	1.71***	1.70***	1.71***
Enrolled	1.04	1.48***	1.47***
Hospital Characteristics			
Magnet	1.87***	-	1.59***
Staffing	0.97	1.03	1.05*
Education[2]	1.20***	1.09**	1.04
Work Environment	1.34***	1.27***	1.16**
State			

	Model 1 Bivariate	Model 2 Nursing Resources	Model 3 + Magnet
California	1.04	1.09	1.19 *
Florida	0.78 ***	0.98	1.03
New Jersey	1.74 ***	1.57 ***	1.54 ***
Pennsylvania	0.92	*(reference)*	*(reference)*
Bed Size			
Small (<100)	0.64 **	*(reference)*	*(reference)*
Medium (101-<250)	0.76 ***	1.18	1.13
Large (>=250)	1.35 ***	1.26	1.19
Technology			
Low-tech	1.15 *	*(reference)*	*(reference)*
High-tech	0.87 *	1.12	1.04
Teaching			
Non-teaching	0.92	*(reference)*	*(reference)*
Minor teaching	0.92	1.07	1.11
Major teaching	1.29 **	1.00	1.00

Notes:
*
p<0.05;
**
p<0.01;
***
p<0.001
1
the variables “age” and “experience” are scaled such that a 1-unit increase represents 5 years.
2
the variable “education” is scaled such that a 1-unit increase represents 10% more BSN-prepared nurses on staff.

Abbreviations: BSN, Bachelor of Science in Nursing degree.

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