

Oncology Nursing Certification: Relation to Nurses' Knowledge and Attitudes About Pain, Patient-Reported Pain Care Quality, and Pain Outcomes

Susan L. Beck, PhD, APRN, AOCN[®], FAAN, Jeannine M. Brant, PhD, RN, AOCN[®], FAAN, Rebecca Donohue, PhD, FNP-BC, AOCN[®], APNG, Ellen M. Lavoie Smith, PhD, APN-BC, AOCN[®], Gail L. Towsley, PhD, Patricia H. Berry, PhD, RN, ACHPN[®], FPCN, FAAN, Jia-Wen Guo, PhD, RN, Sharifa Al-Qaaydeh, MS, RN, Marjorie A. Pett, MStat, DSW, and Gary Donaldson, PhD

Beck is a professor and the Robert S. and Beth M. Carter Endowed Chair in the College of Nursing at the University of Utah in Salt Lake City; Brant is an oncology clinical nurse specialist and nurse scientist at the Billings Clinic in Montana; Donohue is an oncology nurse practitioner at the Cancer Center of Acadiana in Lafayette, LA; Smith is an associate professor and PhD program director in the School of Nursing at the University of Michigan in Ann Arbor; Towsley is an associate professor in the College of Nursing at the University of Utah in Salt Lake City; Berry is a professor in the School of Nursing at Oregon Health and Science University in Portland; Guo and Al-Qaaydeh are both assistant professors, and Pett is a professor emerita, all in the College of Nursing at the University of Utah; and Donaldson is a professor in the Department of Anesthesiology at the University of Utah.

This research was funded by the ONS Foundation/Oncology Nursing Certification Corporation and the Robert Wood Johnson Foundation Interdisciplinary Nursing Quality Research Initiative 58299.

Beck, Brant, Smith, Towsley, and Berry contributed to the conceptualization and design. Beck, Brant, Smith, Towsley, Berry, and Al-Qaaydeh completed the data collection. Pett, Donaldson, and Guo provided statistical support. Beck, Donohue, Guo, Pett, and Donaldson contributed to the analysis. All of the authors contributed to the manuscript preparation.

Beck can be reached at susan.beck@nurs.utah.edu, with copy to editor at ONFEditor@ons.org.

Submitted March 2015. Accepted for publication May 12, 2015.

Key words: pain; pain care quality; oncology; nurse certification; oncology nurses; pain attitudes and knowledge; outcomes

ONF, 43(1), 67–76.

doi: 10.1188/16.ONF.67-76

Purpose/Objectives: To (a) compare pain knowledge and attitudes between nurses with oncology certified nurse (OCN[®]) status, non-OCN[®]-certified nurses, and nurses ineligible for certification and (b) examine the relationships among OCN[®] status, nurses' knowledge and attitudes about pain, patient-reported quality of nursing pain care, and pain outcomes.

Design: Prospective, correlational survey design. Patients were nested within nurses.

Setting: Six inpatient oncology units in three hospitals: St. Vincent Healthcare in Billings, Montana; Norris Cotton Cancer Center at the Dartmouth–Hitchcock Medical Center in Lebanon, New Hampshire; and Huntsman Cancer Hospital in Salt Lake City, Utah.

Sample: 91 nurses in three states (28 OCN[®]-certified nurses, 37 noncertified nurses, and 26 not eligible for certification). Certification status was validated for 105 nurses who were matched with a sample of 320 patients.

Methods: Nurses completed a survey, and matched adult patients who were experiencing pain rated their pain care quality and pain experience during the past shift.

Main Research Variables: Demographic characteristics, certification status, and responses to the Nurse Knowledge and Attitudes Survey Regarding Pain (NKASRP), Pain Care Quality Survey–Nursing, and modified Brief Pain Inventory (Short Form).

Findings: OCN[®]-certified nurses scored significantly higher on the NKASRP (82% correct) compared to non-OCN[®] eligible nurses (76%) and non-OCN[®] ineligible nurses (74%) ($p < 0.001$). Only 43% overall achieved a benchmark of 80% correct. No statistically significant relationships existed between (a) certification status and pain care quality or pain outcomes or (b) NKASRP and care quality or outcomes ($p > 0.05$).

Conclusions: OCN[®]-certified nurses' knowledge and attitudes related to pain management were superior to noncertified nurses. Neither knowledge and attitudes nor OCN[®] status were associated with pain care quality or pain outcomes.

Implications for Nursing: Knowledge is necessary but insufficient to improve patient outcomes; providing optimal pain care requires action. Sustained efforts to improve cancer pain management are indicated.

Oncology nursing certification serves as an indicator of specialized knowledge that theoretically should result in improved quality of care and patient outcomes. In a position statement on certification, the Oncology Nursing Society ([ONS], 2015) stated, "Oncology nursing certification provides validation of the specialized knowledge and experience required for competent performance" (para. 1). Despite this, limited empirical evidence exists to support the relationship between status as an oncology certified nurse (OCN[®]) and nursing knowledge, quality of care, or patient outcomes.

Pain assessment and management are primary responsibilities of oncology nurses, and pain is a nurse-sensitive patient outcome (Given & Sherwood, 2005). The OCN[®] examination includes questions related to the assessment and management of pain, but little is known about whether certified oncology nurses have greater knowledge compared to noncertified oncology nurses and whether this increased knowledge is associated with improved patient outcomes. The authors' team launched a study funded by the Robert Wood Johnson Foundation to address this knowledge gap. The parent study focused on examining the reliability and validity of new tools designed to measure the quality of care related to pain management from the patient's perspective. The findings of the confirmatory factor analysis of these tools, including a table of patient demographic and clinical data, are reported elsewhere (Pett et al., 2013). A grant from the Oncology Nursing Certification Corporation (ONCC) enabled the authors to add data about oncology nurses to the patient-reported data. The aims of this study were (a) to compare pain knowledge and attitudes between certified, noncertified, and ineligible nurses and (b) to examine the relationships among oncology nursing certification status, pain knowledge and attitudes, quality of nursing pain care, or pain outcomes.

Background

Oncology Nursing Certification

Nursing certification is a specific process by which a nongovernmental agency ensures that an individual nurse has the knowledge and qualifications essential to practice in a specific functional or clinical area of nursing. ONCC administers the program for certification in oncology nursing and has established minimum standards for competency in specialty practice through a role delineation study (Fabrey & Irwin, 2012; McMillan, Heusinkveld, Chai, Miller Murphy, & Huang, 2002). ONCC (2015) meets the national standards established by the American Board of Nursing Specialties and the National Commission for Certifying Agencies. As of December 2015, more than 38,800 nurses have been certified by ONCC; about 82% of these nurses hold the OCN[®] credential, representing certification at the basic level in adult oncology (S. Bachner, personal communication, December 7, 2015).

Several national surveys have identified perceived benefits of certification from the perspectives of oncology nurses and nurse managers. In a study of more than 1,200 oncology nurses (Coleman et al., 1999), the primary reasons for seeking certification included looking for a personal challenge, having a desire to be recognized as a specialist, and wanting to pursue

career development. These intrinsic benefits are similar to results in studies in non-oncology nursing samples (Wade, 2009). However, in a second report with this same sample, very weak and nonsignificant correlations were found between certification status and group cohesion, organizational commitment, or job satisfaction (Hughes et al., 2001). In a subsequent national survey of 940 oncology nurses, Brown, Murphy, Norton, Baldwin, and Ponto (2010) included the Perceived Value of Certification Tool, a reliable instrument measuring 18 certification-related value statements. Findings were highly skewed with a high level of agreement with all but one of the value statements (certification increases salary). Findings confirmed that nurses associate high intrinsic rewards (specialized knowledge, enhanced confidence, and professional growth) with certification (Brown et al., 2010). Nurse managers scored even higher than staff nurses on the Perceived Value of Certification Tool. This finding is consistent with findings from a survey of nurse managers (N = 139) from varying types of specialties conducted by the American Board of Nursing Specialties. Respondents indicated a clear preference to hire certified versus noncertified nurses; a high percentage agreed that certified nurses have "a proven knowledge base in a given specialty (85.8%), demonstrate a greater professional commitment to lifelong learning (77.5%), and have documented experience in a given specialty (61.7%)" (Frank-Stromborg et al., 2005, p. 40).

Despite the findings related to perceived benefits of certification, limited evidence exists to support an association between oncology nurse certification status, nursing knowledge, and oncology-specific patient outcomes. In a study conducted in one oncology-specific homecare agency, investigators hypothesized that outcomes (symptom management, adverse events, and care use) would be better for patients with cancer cared for by OCN[®]-certified nurses (Frank-Stromborg et al., 2002). The investigators conducted extensive chart reviews of patients with cancer and found no significant differences on any of the outcome variables when comparing the care provided by certified nurses to noncertified nurses. Study limitations that may have compromised the validity of these findings include the retrospective review in a single homecare agency that had an oncology focus. In a study by Coleman et al. (2009), investigators examined nurse knowledge and attitudes about pain and nausea and vomiting; audited charts for measures of care quality; and assessed patient-reported pain, nausea and vomiting, and patient satisfaction. Certified nurses scored higher than noncertified nurses on pain knowledge ($p = 0.02$), but differences in nausea and vomiting knowledge were not statistically significant. Measures of care quality from the chart audit, as well as patient outcomes, did not

differ based on certification. Further research to examine the association between certification, nurse knowledge, care quality, and patient outcomes is needed.

Pain as a Nurse-Sensitive Patient Outcome

Pain is an important nurse-sensitive patient outcome (Given & Sherwood, 2005) and an ideal outcome to consider relative to certification. Pain is highly prevalent in patients with cancer, affecting as many as 64% of those with advanced disease (van den Beuken-van Everdingen et al., 2007). Hospitalized patients may experience pain that is acute (postoperative, procedural, or treatment-related) or chronic because of advanced disease or comorbid conditions. Consistent evidence shows unrelieved pain and inadequate treatment of cancer pain in hospital settings (Beck, Towsley, Pett, et al., 2010; Bostrom, Sandh, Lundberg, & Fridlund, 2004; Corizzo, Baker, & Henkelmann, 2000; Dawson et al., 2002; Dulko, Hertz, Julien, Beck, & Mooney, 2010; Pett et al., 2013; Sherwood, Adams-McNeill, Starck, Nieto, & Thompson, 2000; Wells, 2000).

Many factors contribute to inadequate pain management, including inadequate knowledge and attitudes about pain and suboptimal pain management practices among health professionals (Institute of Medicine [IOM], 2011). Misconceptions exist regarding pain assessment, tolerance, and addiction, as well as the prevalence and inevitability of cancer pain; inadequate knowledge of opioid pharmacy is also an issue (Furstenberg et al., 1998; IOM, 2011).

In addition to knowledge and attitudes, the quality of pain management also influences patient outcomes. A series of studies have identified and validated the components of quality pain care from a patient-centered approach (Beck, Towsley, Berry, et al., 2010). The concept of being “treated right” corresponds to care provided by concerned nurses who are listening, anticipating problems, responding promptly, and believing the individual’s reports of pain. The patient feels that a plan and medications are available. Comprehensive nursing pain care includes patient education about side effects and how to manage them, as well as the use

of nonpharmacologic approaches to manage pain. The efficacy of pain management refers to using treatments that work and work quickly to relieve pain (Beck, Towsley, Berry, et al., 2010).

Theoretical Framework

A modified version of the Health Quality Outcomes Model (Mitchell, Ferketich, & Jennings, 1998) was used to guide this research (see Figure 1). The authors proposed the need to test the dynamic interplay of factors that influence patient outcomes, such as pain. These factors include characteristics of providers (i.e., nurses) and the quality of care, which were integrated into the modified model. The authors hypothesized that, when compared to noncertified nurses and ineligible nurses, OCN®-certified nurses would possess greater knowledge and attitudes regarding pain. The authors also hypothesized a significant association between (a) certification status and pain care quality and pain outcomes and (b) knowledge and attitudes scores and pain care quality and pain outcomes.

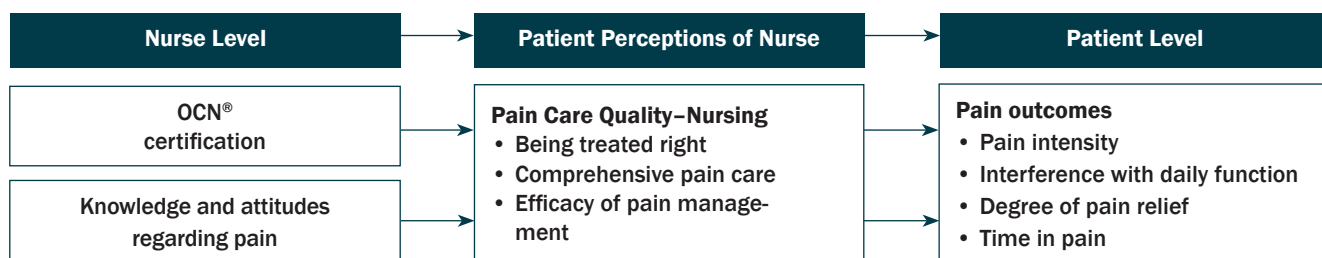
Methods

Design, Sample, and Setting

This prospective, correlational study was conducted in three hospitals in three states. Two were academic medical centers (Norris Cotton Cancer Center at the Dartmouth–Hitchcock Medical Center in Lebanon, New Hampshire, and Huntsman Cancer Hospital in Salt Lake City, Utah), and one was a community-based hospital (St. Vincent Healthcare in Billings, Montana). The institutional review boards at each site approved this study.

RNs and patients were sampled from six inpatient oncology units. RNs, including agency or travel nurses, were included if they worked at least 60% of the time on the selected units. RNs with advanced OCN (AOCN®) status were excluded. Each unit provided a list of all nurses who met the eligibility criteria; this group (N = 134) comprised the sampling frame and received a survey inviting their participation in the

FIGURE 1. Diagram of the Model Guiding the Study



study. Hospitalized patients were included if they were aged 18 years or older; spoke English; were diagnosed with cancer or a hematologic disorder, or underwent surgery for possible cancer; and were expected to have a hospital stay of longer than 24 hours. To determine presence of pain and confirm eligibility, patients were asked, "Have you experienced pain or taken any medication for pain in the past 12 hours?" Patients were excluded if they did not meet the pain eligibility criteria, had an overt psychiatric disorder, or were cognitively or physically unable to participate in an interview or complete a brief questionnaire.

Nurse Measures

The oncology nurse survey included demographic variables, nursing educational background, certification status, ONS membership, and years of experience. The survey incorporated the Nurse Knowledge and Attitudes Survey Regarding Pain (NKASRP) (City of Hope, 2014). Items include true or false ($k = 21$), multiple choice ($k = 15$), and case-based scenarios ($k = 4$) for a total of 40 items. Construct validity was evaluated through score comparison in nurses with varying levels of pain expertise in which score discrimination was validated. Test-retest reliability was established using repeat testing for a group of staff nurses ($r > 0.8$). Internal consistency is supported by a coefficient alpha of greater than 0.7 (City of Hope, 2014). In this sample, alpha was 0.65; because no specific item deletion improved the alpha coefficient, the authors analyzed the test as directed by the originators to allow for comparisons with previous research.

Surveys were distributed to RNs at each study site. A list of eligible nurses was obtained from the unit manager, and each nurse's oncology certification status was verified with ONCC. Each eligible nurse was assigned an identification number, and surveys were coded with the corresponding identification number. A survey packet that included a cover letter, a survey, and a \$5 bill to acknowledge the time required to complete the survey was delivered through the hospital unit's mail distribution. The cover letter outlined the purpose of the survey, steps taken to maintain nurse confidentiality, voluntary participation, implied consent (i.e., returned survey), and instructions on how to return the survey. Postcard reminders were sent 10 days after the initial distribution, and a second survey (excluding the \$5 bill) was sent to nonrespondents several weeks after initial distribution.

Patient Measures

The Pain Care Quality–Nursing (PainCQ-N[®]) survey was used to collect data on the patients' perception of nursing care quality related to pain management during the past shift. Responses were recorded using

a six-point Likert-type scale ranging from 1 (strongly disagree) to 6 (strongly agree). Confirmatory factor analysis supports the validity of a 14-item, three-factor structure, as well as the reliability of each subscale in this sample. The PainCQ-N measured three constructs: being treated right ($k = 7$ items; $\alpha = 0.92$), comprehensive nursing pain care ($k = 4$ items; $\alpha = 0.8$), and efficacy of pain management ($k = 3$ items; $\alpha = 0.92$) (Pett et al., 2013).

The Brief Pain Inventory (Short Form) (BPI-SF) was adapted from the 24-hour time frame to measure pain during the past shift, congruent with the measure of pain care quality (Cleeland, 1989). The authors also excluded the body diagram because pain location was not a focus of the study. The pain intensity subscale consists of four items rated from 0 (no pain) to 10 (pain as bad as you can imagine). Pain is rated at its worst, least, on average, and now. Degree of pain relief is rated from 0%–100%. Finally, a 0–10 scale rates degree of interference with the following: general activity, mood, walking, relationships with others, sleeping, and enjoyment of life. The "interference with work" item was excluded because it was not applicable to hospitalized patients. The BPI-SF has been studied in multiple populations, and significant evidence supports its reliability and validity (Daut, Cleeland, & Flanery, 1983; Lin & Ward, 1995; Serlin, Mendoza, Nakamura, Edwards, & Cleeland, 1995). In this sample, alpha was 0.89 for the pain intensity subscale and 0.9 for the interference with function subscale. Based on recommendations that cross-sectional pain intensity may not capture the experience of pain during a certain time period, the authors also used two questions to assess how much time the patient experienced pain and severe pain during the past shift (Gordon et al., 2002). The questions from the Total Pain Management Quality Tool (Paice, Toy, & Shott, 1998) were categorical from 0 (not at all) to 5 (constantly) based on percent time (e.g., occasionally equals 5%–25% of the time). In the current study, these items were analyzed and reported separately.

The inpatient charge nurse or unit manager completed the initial eligibility screening; a trained nurse research partner or research assistant confirmed eligibility and obtained written informed consent from each patient. Research staff assisted patients who had difficulty completing the surveys by reading the questions to the patient and recording the answers. Research staff also collected demographic and clinical information from the medical record.

Data Analysis

Data were double-entered into a Microsoft[®] Access database, compared and cleaned, and then imported into SPSS[®], version 16.0, and Mplus for analysis.

TABLE 1. Demographic Characteristics of Nurse Participants (N = 91)

Characteristic	Overall		Not Eligible (n = 26)		Eligible But Not Certified (n = 37)		OCN® Certified (n = 28)		F	p
	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD		
Age (years)	37.47	11.49	30.63	9.15	40.71	11.4	39.39	11.25	6.33	0.002
Characteristic	n		n		n		n		χ^2	p
Sex									1.83	0.4
Female	80		23		31		26			
Male	8		1		5		2			
Missing data	3		2		1		-			
Ethnicity										
Not Hispanic or Latino	82		23		32		27			
Hispanic or Latino	4		1		2		1			
Missing data	5		2		3		-			
Racial background^a										
Caucasian	83		24		32		27			
Asian	2		-		2		-			
Native American or Alaska Native	2		1		1		-			
More than one ethnicity	1		1		-		-			
Missing data	5		2		3		-			
Marital status									12.3	0.015
Single (never married)	17		9		6		2			
Separated or divorced	15		-		8		7			
Married or partnered	56		15		22		19			
Missing data	3		2		1		-			
Nursing education level									10.4	0.107
Diploma in nursing	6		-		2		4			
Associate degree	28		5		16		7			
Bachelor's degree	52		19		17		16			
Master's degree	2		-		1		1			
Missing data	3		2		1		-			
Overall education level									6.58	0.583
Diploma in nursing	5		-		2		3			
Associate degree	20		4		11		5			
Bachelor's degree	56		19		20		17			
Master's degree or higher	7		1		3		3			
Missing data	3		2		1		-			

^a Respondents could choose more than one answer.

Missing data patterns were evaluated according to Little and Rubin's (2002) framework. Descriptive statistics (frequencies, means, and standard deviations) were used to examine demographic variables. To maximize power, three distinct datasets were used in the analysis.

Dataset 1 included all nurses who completed the survey. Ninety-three of 134 nurses completed the survey (69% return rate); because of incomplete responses on two surveys, 91 cases were included in the final analysis of the NKASRP. To test the extent of difference in nurses' knowledge and attitudes, an estimated sample size was calculated based on a one-way analysis of variance. Certification status (three groups) was the independent variable, and the NKASRP score was the dependent variable. A mini-

imum of 21 nurses per group was estimated as needed to provide 80% power ($p < 0.05$) to detect a moderate effect size ($d = 0.4$) (Hintze, 2013). The actual sample (28 OCN®-certified nurses, 37 noncertified, and 26 ineligible for certification) exceeded this number. The authors also set an arbitrary benchmark of 80% correct as an indicator of adequate knowledge; chi-square analyses were used to evaluate the differences in the numbers of nurses who correctly answered 80% of items among the three groups.

Dataset 2 included all patient data and certification status of the nurse who cared for those patients during the past shift. Of 411 potential patients, 400 were eligible, and 337 (84%) consented to participate. Nurse certification status was verified with ONCC for 105 nurses. Complete patient data matched with valid

nurse certification status were available for two groups with 320 patients total with 25 OCN[®]-certified nurses (81 matched patients) and 80 non-OCN[®]-certified nurses (239 matched patients).

Dataset 3 included cases where nurse survey data (N = 65 nurses, 24 certified and 41 noncertified) were matched with patient data (n = 189). The authors conducted an a priori sample size calculation for the planned regression analyses based on the sample required to have 90% power to detect an R² of 10%, conservatively adjusted to an alpha of 0.001 to address Type I error inflation. With the small intraclass correlations (ICCs) obtained, these computations remain valid in the multilevel context. Post hoc evaluation of sample size adequacy was confirmed by examination of the 95% coefficient confidence intervals.

The analytic approach for Dataset 2 and Dataset 3 was mixed effects multilevel modeling (patients nested within nurses) using a stepwise backward regression. In the simplest model, the ICC is the ratio of the nurse variance to the total (nurse plus within) variance, with high ICCs indicating high dependence of patient observations within a cluster (patients are clustered or nested within a nurse). The analysis included the regression components of the overall recursive model (PainCQ-N factors predicted by certification status and NKASRP score and pain outcomes predicted by certification status, NKASRP score, and PainCQ-N factors). The correlations between PainCQ-N subscales and outcomes have been previously reported (Pett et al., 2013).

Results

Participants

The majority of the nurses completing the survey were female (91%) and Caucasian (94%); mean age was 37.5 years (range = 22–59). Nurses not eligible for certification were younger (p = 0.003) and single (p = 0.015) compared to noncertified nurses and eligible or certified nurses. Because of low numbers, the authors did not compare the groups based on ethnicity or race. Demographic characteristics of the nurse sample are included in Table 1.

The patient participants (n = 337) ranged in age from 19–97 years (\bar{X} = 54, SD = 15.5) and were 56% (n = 190) female, predominantly Caucasian (92%, n = 311), and mostly married (65%, n = 220). The primary cancer sites were highly variable; 33% (n = 111) had advanced stage disease. The most common reason for hospitalization was supportive care and management of complications. The mean worst pain intensity (0 = low; 10 = high) during the past shift was 6.2 (SD = 2.54); more than 30% were in frequent or constant pain during the last shift. Additional details are reported elsewhere (Pett et al., 2013).

Difference in Knowledge and Attitudes by Certification Status

The first analysis used Dataset 1 to compare the NKASRP total score (percent correct) by certification status (see Table 2). OCN[®]-certified nurses scored statistically significantly higher on the NKASRP survey (82%) compared to noncertified nurses (76%) and ineligible nurses (74%) (p < 0.001). In addition, OCN[®]-certified nurses were significantly more knowledgeable than noncertified and ineligible nurses on three questions regarding long-term opioid therapy, opioid withdrawal, and opioid side effects (p < 0.05). When analyzed based on the percentage achieving 80% correct, the differences between groups were also statistically significant. Overall, only 43% of the 91 nurses completing the survey achieved the 80% benchmark.

Significant Associations Between Certification Status or Knowledge and Attitude Scores and Pain Care Quality and Outcomes

The authors first conducted a mixed-effects analysis using Dataset 3 with matched nurse (n = 65) and patient surveys (n = 189), allowing for modeling of nurse knowledge and attitudes. No statistically significant effects were found for OCN[®] status or NKASRP score, either independently or modeled as an interaction, on any pain care quality or pain outcome.

The authors chose to use Dataset 2 for the main analysis of effects of certification. Although eliminating

TABLE 2. Correct Scores on the Nurse Knowledge and Attitudes Survey Regarding Pain (Dataset 1)

Certification Status	Amount of Correct Answers						Nurses Achieving 80%		
	N	Range	\bar{X}	SD	F	p	n	χ^2	p
Not eligible	26	25–34	29.42	2.28			6		
Eligible but not certified	37	22–37	30.51	3.21			13		
OCN [®] certified	28	25–36	32.64	3.16			20		
Overall	91	22–37	30.86	3.2	8.36	< 0.001	39	14.39	< 0.001

Note. Nurse Knowledge and Attitudes Survey Regarding Pain scores range from 0–40, with higher scores indicating more knowledge.

use of the NKASRP, this approach increased the sample size of nurses (n = 105) and patients (n = 320). The ICCs (all 0.069 or less) were very low (see Table 3); therefore, “nurse” accounted for little variation in the patient scores. No statistically significant associations were found between certification status and any pain care quality or pain outcome. Therefore, the data presentation was simplified to show comparisons in PainCQ-N and BPI-SF scores between certified and noncertified nurses. As previously reported, 21% of the variance in pain outcomes was explained by the PainCQ-N subscales. The statistically significant correlations between the subscales of the PainCQ-N and the intensity subscale on the BPI-SF were as follows: being treated right (r = -0.26), comprehensive pain care (r = -0.12), and efficacy of pain management (r = -0.41) (Pett et al., 2013). Efficacy of pain management was also strongly correlated with the pain relief subscale on the BPI-SF (r = 0.55, p < 0.001).

Discussion

The findings from this study add to the limited empirical research on the association between oncology nursing certification status, knowledge of nurses, quality of care, and patient outcomes (Coleman et al., 2009; Frank-Stromborg et al., 2005). The study improved on previous research designs by trying to match data from the nurse delivering care with the patients’ perceptions and outcomes during a limited time frame (a specific shift of care). The conceptual model was useful in organizing and testing relationships that included measures from nurses and patients. The analysis of the knowledge and attitudes of nurses also distinguished between nurses who were

TABLE 3. Results of Mixed Model Analysis With Differences Based on Certification Status (Dataset 2)

Characteristic	ICC	Not OCN® Certified (N = 80 nurses and 239 patients)		OCN® Certified (N = 25 nurses and 81 patients)		p
		EMM	SE	EMM	SE	
PainCQ-N®						
Treated right	0.021	5.46	0.06	5.36	0.11	0.38
Comprehensive pain care	0.069	4.04	0.11	3.95	0.19	0.69
Efficacy of pain management	0.0	5.02	0.08	4.78	0.14	0.14
Total score	0.031	4.96	0.07	4.82	0.11	0.29
TPMQT						
Time in pain	0.017	2.71	0.09	2.87	0.16	0.39
Time in severe pain	0.0	1.62	0.09	1.75	0.15	0.45
BPI-SF pain items						
Worst pain	0.002	6.21	0.16	6.31	0.28	0.76
Least pain	0.0	2.16	0.13	2.51	0.23	0.18
Average pain	0.0	3.76	0.13	4.04	0.26	0.28
Pain now	0.0	3.16	0.14	3.53	0.24	0.19
Percentage pain relief	0.011	74.23	1.7	68.11	2.9	0.07
General activity	0.0	4.79	0.21	4.41	0.36	0.38
Mood	0.0	4	0.21	4.09	0.35	0.83
Walking	0.0	4.42	0.21	4.34	0.36	0.86
Relations with others	0.0	2.91	0.19	3.13	0.32	0.54
Sleep	0.0	4	0.21	4.36	0.36	0.4
Enjoyment of life	0.004	4.65	0.23	4.15	0.39	0.27
BPI-SF subscales						
Pain intensity subscale	0.0	3.27	0.1	3.5	0.18	0.25
Interference with function subscale	0.0	4.11	0.17	4.06	0.29	0.88

BPI-SF—Brief Pain Inventory (Short Form); EMM—estimated marginal mean; ICC—intraclass correlation coefficient; PainCQ-N—Pain Care Quality—Nursing; SE—standard error; TPMQT—Total Pain Management Quality Tool

Note. Item and subscale scores on the BPI-SF range from 0–10, with higher scores indicating more pain or interference with function. Scores on the PainCQ-N range from 1–6, with higher scores indicating higher pain care quality. Scores on the TPMQT range from 0 (none of the time) to 5 (all of the time).

eligible and ineligible for certification, which has not been considered previously. This distinction was possible through the use of a nurse survey.

Consistent with previous findings (Coleman et al., 2009), the authors’ results indicated that OCN®-certified nurses had a higher level of pain knowledge than both groups of noncertified nurses. However, the authors do not know whether this knowledge was gained before or after certification. The findings indicate some improvement in pain knowledge and attitudes when compared to prior surveys of nurses using the NKASRP. The current sample (\bar{X} = 77% correct) scored better than 120 nurses from nine inpatient units in an academic teaching hospital in the northeastern United States in 1993 (\bar{X} = 62% correct overall and 72% correct in 22 oncology nurses) (Clarke et al., 1996) and slightly worse than 324 hospital nurses in Canada in 2010 (\bar{X} = 79% correct) (Lewthwaite et al., 2011). When

compared to a similar sample of OCN[®]-certified nurses, certified nurses in the current sample scored 82% correct as compared to 78% in a study by Coleman et al. (2009). A notable advance historically is indicated by comparing specific sentinel items from a 1995 national survey of 450 nurses (McCaffery & Ferrell, 1997). Understanding of addiction and tolerance increased somewhat in the current sample (69% versus 63% in 1995). More striking is an improvement in believing patients' reports of pain to 97% (smiling patient case) and 95% (grimacing patient case) as compared to 74% and 87%, respectively. Despite these gains, less than half of nurses in the current sample achieved the 80% correct benchmark, indicating a need for increased efforts to improve pain knowledge and attitudes. Attitudes and misconceptions related to addiction and tolerance continue to pose a major barrier to effective pain management.

Although certified nurses were more knowledgeable about pain, neither certification nor the NKASRP score was associated with a higher level of perceived care quality or patient outcomes. Despite improvements in study design and measurement, this finding is consistent with previous research (Coleman et al., 2009; Frank-Stromborg et al., 2005). The authors found little variability in pain care quality or outcomes associated with specific nurses. Perhaps this speaks to certain levels of quality that were consistent across nurses in these three settings, particularly with oncology nurses, regardless of knowledge or certification status. Extending the research to include broader representation of nurses and patients across types of settings is recommended.

Perceptions of being treated right were high, but a ceiling effect likely existed—a phenomenon that occurs when a clustering of responses happens at the high end of a scale. This finding supports a high level of quality consistent with patient-centered care which is necessary but not sufficient to achieve acceptable pain outcomes. The main factor in pain care quality associated with pain outcomes was the perceived efficacy of the pharmacologic management of pain (Pett et al., 2013). This finding validates the importance of not only having pain medication available, but also having medication of adequate potency for the type and intensity of pain with a frequency that optimizes pharmacokinetic activity.

The experience of pain and factors that contribute to care quality and pain outcomes are complex. Pain care quality only explains some of the variance in pain outcomes. Nurses play a direct role in pain assessment and the use of pharmacologic and nonpharmacologic pain management strategies. However, lack of prescriptive authority for bedside nurses results in a more indirect role as advocates for adequate type, dose,

and frequency of analgesics. In addition to certification, other qualities of the nurses, such as educational level or experience, may be important to consider. Future research should also consider characteristics of the hospital, unit, and individual patients. Pain is an individual experience. Patient-centered care is an important aspect of improving the quality of pain care.

Limitations

Several limitations existed in this study. The patient measures were cross-sectional, only capturing pain experience during one shift. Recruiting and matching a sufficient number of patients with each participating nurse was difficult. The authors adjusted the approach to allow for inclusion of more nurses to ensure a large enough sample of OCN[®]-certified nurses, which increased the sample size for the knowledge and attitudes survey. The authors then used a nested analytic approach to allow for variations in the number of patients per nurse. Nonetheless, many nurses were matched with only one patient. Although this number was adequate for the mixed level modeling, more patients per nurse would strengthen the model and provide a better estimate of the relationship of perceived nurse performance with pain outcomes. Conducting studies that match a large number of nurses with specific types of patients is pragmatically challenging and costly.

The internal consistency reliability of the NKASRP was slightly less than previously reported by the authors; little detail is included about how their reliability estimates were determined to allow for comparison of methods (City of Hope, 2014). In addition, although using similar methods of survey administration, none of the comparison studies in oncology nurses reported reliability when using the NKASRP (Clarke et al., 1996; Coleman et al., 2009; Lewthwaite et al., 2011). Limited reliability may indicate increased random error when using this tool; it may also reflect the broad range of knowledge and attitudes that are assessed. Better reporting of the tool's psychometric properties is recommended. Generalizability of the findings is also limited by the lack of racial and ethnic diversity in the nurse and patient samples.

Implications for Nursing and Conclusion

Certification remains an important strategy to validate nurse knowledge in a specialty area. However, evidence from three studies related to oncology nurse certification, each with their own limitations, does not support an association between certification and improved care quality or patient outcomes. Certification is achieved by validating knowledge via testing,

Knowledge Translation

- Consistent with previous findings, oncology certified nurses had greater knowledge about pain management than noncertified nurses.
- Certification status was not associated with better perceived pain care quality or better pain outcomes.
- Sustained efforts to educate oncology nurses about effective pain management and promote quality-improvement initiatives are indicated.

continuing education, or professional activities (e.g., publishing). Ample evidence exists of the intrinsic benefit to nurses associated with certification (Brown et al., 2010; Coleman et al., 1999). If the goal is for certification of nurses to improve the quality of cancer care, perhaps future certification processes will include criteria related to implementation of certain evidence-based practices or achieving benchmarks in measures of care quality or outcomes.

Changes in practice, where knowledge is effectively applied, are essential to improving the impact of care on patients. Providing optimal pain care requires actions to ensure that patients are treated right, that they are involved in their care, and that the interventions are effective (Beck, Towsley, Berry, et al., 2010). With pain, interventions must include adequate pharmacologic management in concert with nonpharmacologic approaches. Sustained efforts to educate oncology nurses about effective pain management and promote quality improvement initiatives are recommended.

The authors gratefully acknowledge Kim Butler, MD, for her support in project implementation as a premedical student and the oncology nurses and patients from the Huntsman Cancer Hospital in Salt Lake City, UT; St. Vincent Healthcare in Billings, MT; and the Norris Cotton Cancer Center at the Dartmouth-Hitchcock Medical Center in Lebanon, NH.

References

- Beck, S.L., Towsley, G.L., Berry, P.H., Lindau, K., Field, R.B., & Jensen, S. (2010). Core aspects of satisfaction with pain management: Cancer patients' perspectives. *Journal of Pain and Symptom Management, 39*, 100–115. doi:10.1016/j.jpainsymman.2009.06.009
- Beck, S.L., Towsley, G.L., Pett, M.A., Berry, P.H., Smith, E.L., Brant, J.M., & Guo, J.-W. (2010). Initial Psychometric Properties of the Pain Care Quality Survey (PainCQ). *Journal Of Pain, 11*, 1311–1319. doi:10.1016/j.jpain.2010.03.008
- Bostrom, B., Sandh, M., Lundberg, D., & Fridlund, B. (2004). Cancer patients' experiences of care related to pain management before and after palliative care referral. *European Journal of Cancer Care, 13*, 238–245.
- Brown, C.G., Murphy, C.M., Norton, V., Baldwin, P.D., & Ponto, J. (2010). The value of oncology nursing certification [Online

- exclusive]. *Clinical Journal of Oncology Nursing, 14*, E63–E69. doi:10.1188/10.CJON.E63-E69
- City of Hope. (2014). *Knowledge and Attitudes Survey Regarding Pain*. Retrieved from [http://prc.coh.org/Knowledge%20%20%20Attitude%20Survey%207-14%20\(1\).pdf](http://prc.coh.org/Knowledge%20%20%20Attitude%20Survey%207-14%20(1).pdf)
- Clarke, E.B., French, B., Bilodeau, M.L., Capasso, V.C., Edwards, A., & Empoliti, J. (1996). Pain management knowledge, attitudes and clinical practice: The impact of nurses' characteristics and education. *Journal of Pain and Symptom Management, 11*, 18–31.
- Cleeland, C.S. (1989). Measurement of pain by subjective report. In C.R. Chapman & J.D. Loeser (Eds.), *Issues in pain measurement* (pp. 391–403). New York, NY: Raven Press.
- Coleman, E.A., Coon, S.K., Lockhart, K., Kennedy, R.L., Montgomery, R., Copeland, N., . . . Stewart, C. (2009). Effect of certification in oncology nursing on nursing-sensitive outcomes. *Clinical Journal of Oncology Nursing, 13*, 165–172. doi:10.1188/09.CJON.165-172
- Coleman, E.A., Frank-Stromborg, M., Hughes, L.C., Grindel, C.G., Ward, S., Berry, D., . . . Murphy, C.M. (1999). A national survey of certified, recertified, and noncertified oncology nurses: Comparisons and contrasts. *Oncology Nursing Forum, 26*, 839–849.
- Corizzo, C.C., Baker, M.C., & Henkelmann, G.C. (2000). Assessment of patient satisfaction with pain management in small community inpatient and outpatient settings. *Oncology Nursing Forum, 27*, 1279–1286.
- Daut, R.L., Cleeland, C.S., & Flanery, R.C. (1983). Development of the Wisconsin Brief Pain Questionnaire to assess pain in cancer and other diseases. *Pain, 17*, 197–210.
- Dawson, R., Spross, J.A., Jablonski, E.S., Hoyer, D.R., Sellers, D.E., & Solomon, M.Z. (2002). Probing the paradox of patients' satisfaction with inadequate pain management. *Journal of Pain and Symptom Management, 23*, 211–220.
- Dulko, D., Hertz, E., Julien, J., Beck, S., & Mooney, K. (2010). Implementation of cancer pain guidelines by acute care nurse practitioners using an audit and feedback strategy. *Journal of the American Academy of Nurse Practitioners, 22*, 45–55. doi:10.1111/j.1745-7599.2009.00469.x
- Fabrey, L., & Irwin, Z. (2012). *Role delineation study of the oncology certified nurse*. Olathe, KS: Applied Measurement Professionals, Inc.
- Frank-Stromborg, M., Niebuhr, B., Prevost, S., Fabrey, L., Muenzen, P., Spence, C., . . . Valentine, W. (2005). More than a title. *Nursing Management, 36*(5), 36–46.
- Frank-Stromborg, M., Ward, S., Hughes, L.C., Brown, K., Coleman, A., Grindel, C.G., & Miller Murphy, C. (2002). Does certification status of oncology nurses make a difference in patient outcomes? *Oncology Nursing Forum, 29*, 665–672. doi:10.1188/02.ONF.665-672
- Furstenberg, C.T., Ahles, T.A., Whedon, M.B., Pierce, K.L., Dolan, M., Roberts, L., & Silberfarb, P.M. (1998). Knowledge and attitudes of healthcare providers toward cancer pain management: A comparison of physicians, nurses, and pharmacists in the state of New Hampshire. *Journal of Pain and Symptom Management, 15*, 335–349.
- Given, B.A., & Sherwood, P.R. (2005). Nursing-sensitive patient outcomes—A white paper. *Oncology Nursing Forum, 32*, 773–784. doi:10.1188/05.ONF.773-784
- Gordon, D.B., Pellino, T.A., Miaskowski, C., McNeill, J.A., Paice, J.A., Laferriere, D., & Bookbinder, M. (2002). A 10-year review of quality improvement monitoring in pain management: Recommendations for standardized outcome measures. *Pain Management Nursing, 3*, 116–130. doi:10.1053/jpmn.2002.127570
- Hintze, J. (2013). Pass 14. Retrieved from <http://www.ncss.com>
- Hughes, L.C., Ward, S., Grindel, C.G., Coleman, E.A., Berry, D.L., Hinds, P.S., . . . Frank-Stromborg, M. (2001). Relationships between certification and job perceptions of oncology nurses. *Oncology Nursing Forum, 28*, 99–106.
- Institute of Medicine. (2011). *Relieving pain in America: A blueprint for transforming prevention, care, education, and research*. Washington, DC: National Academies Press.

- Lewthwaite, B.J., Jabusch, K.M., Wheeler, B.J., Schnell-Hoehn, K.N., Mills, J., Estrella-Holder, E., & Fedorowicz, A. (2011). Nurses' knowledge and attitudes regarding pain management in hospitalized adults. *Journal of Continuing Education in Nursing, 42*, 251–257. doi:10.3928/00220124-20110103-03
- Lin, C.C., & Ward, S.E. (1995). Patient-related barriers to cancer pain management in Taiwan. *Cancer Nursing, 18*, 16–22.
- Little, R.J.A., & Rubin, D.B. (2002). *Statistical analysis with missing data* (2nd ed.). Hoboken, NJ: John Wiley and Sons.
- McCaffery, M., & Ferrell, B.R. (1997). Nurses' knowledge of pain assessment and management: How much progress have we made? *Journal of Pain and Symptom Management, 14*, 175–188.
- McMillan, S.C., Heusinkveld, K., Chai, S., Miller Murphy, C., & Huang, C. (2002). Revising the blueprint for the Oncology Certified Nurse (OCN) examination: A role delineation study [Online exclusive]. *Oncology Nursing Forum, 29*, E110–E117.
- Mitchell, P.H., Ferketich, S., & Jennings, B.M. (1998). Quality Health Outcomes Model. *Journal of Nursing Scholarship, 30*, 43–46.
- Oncology Nursing Certification Corporation. (2015). About ONCC. Retrieved from <http://www.oncc.org/about-oncc>
- Oncology Nursing Society. (2015). Oncology certification for nurses: Position statement. Retrieved from <https://www.ons.org/advocacy-policy/positions/education/certification>
- Paice, J.A., Toy, C., & Shott, S. (1998). Barriers to cancer pain relief: Fear of tolerance and addiction. *Journal of Pain and Symptom Management, 16*, 1–9.
- Pett, M.A., Beck, S.L., Guo, J.-W., Towsley, G.L., Brant, J.M., Lavoie Smith, E.M., . . . Donaldson, G.W. (2013). Confirmatory factor analysis of the pain care quality surveys (PainCQ®). *Health Services Research, 48*, 1018–1038. doi:10.1111/1475-6773.12014
- Serlin, R.C., Mendoza, T.R., Nakamura, Y., Edwards, K.R., & Cleeland, C.S. (1995). When is cancer pain mild, moderate or severe? Grading pain severity by its interference with function. *Pain, 61*, 277–284.
- Sherwood, G., Adams-McNeill, J., Starck, P.L., Nieto, B., & Thompson, C.J. (2000). Qualitative assessment of hospitalized patients' satisfaction with pain management. *Research in Nursing and Health, 23*, 486–495.
- van den Beuken-van Everdingen, M.H., de Rijke, J.M., Kessels, A.G., Schouten, H.C., van Kleef, M., & Patijn, J. (2007). Prevalence of pain in patients with cancer: A systematic review of the past 40 years. *Annals of Oncology, 18*, 1437–1449. doi:10.1093/annonc/mdm056
- Wade, C.H. (2009). Perceived effects of specialty nurse certification: A review of the literature. *AORN Journal, 89*, 183–192. doi:10.1016/j.aorn.2008.06.015
- Wells, N. (2000). Pain intensity and pain interference in hospitalized patients with cancer. *Oncology Nursing Forum, 27*, 985–991.