

Effect of Certification in Oncology Nursing on Nursing-Sensitive Outcomes

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The study compared certified nurses with noncertified nurses for symptom management of nausea, vomiting, and pain; patient satisfaction; and nurse satisfaction to determine the effect of certification in oncology nursing on those nursing-sensitive outcomes. A total of 93 nurses—35 (38%) of them certified in oncology nursing—and 270 patients completed surveys. Chart audits provided additional data on symptom management. Certified nurses scored higher than noncertified nurses on the Nurses' Knowledge and Attitudes Survey Regarding Pain as well as the Nausea Management: Nurses' Knowledge and Attitudes Survey. The chart audits showed that certified nurses followed National Comprehensive Cancer Network guidelines for chemotherapy-induced nausea and vomiting (CINV) management more often than noncertified nurses. The study demonstrated that job satisfaction is fairly high for oncology nurses and patient satisfaction is high. In general, cancer pain and CINV were managed well but improvements can be made. Nurses and physicians continuously should be educated on evidence-based guidelines for symptom management of cancer pain and CINV, and a CINV knowledge and attitude assessment tool should be developed.

Oncology nursing is a well-established specialty that has developed certifications processes to promote positive outcomes in symptom management, quality of life, patient and family satisfaction, and cost of care (Lynch, Cope, & Murphy-Ende, 2001). Certification in oncology nursing is a formal recognition of clinical expertise (Coleman et al., 1999). Nurses must practice at a competent level, and certification is one method available for competency assessment (Kupperschmidt, 2005; Shirey, 2005). Despite trends toward mandatory certification, little research exists to support it (Frank-Stromborg et al., 2002). Research is vital to validate that certification ensures competency (O'Neale & Kurtz, 2001).

Background

The Oncology Nursing Certification Corporation (ONCC) Research Committee participated in a state-of-the-knowledge conference on nursing certification in 1997. One unresolved issue was the relationship between certification and patient outcomes. The ONCC Research Committee was guided by the question, "Does certification in oncology nursing make a difference?" The committee conducted a nationwide study of Oncology Nursing Society (ONS) members to elicit opinions about the Oncology Certified Nurse (OCN[®]) credential, reasons the credential is obtained and retained, and the extent to which it is valued by employers. Nurses with the OCN[®] credential

obtained and retained certification for personal achievement and professional growth, and they were more likely to work in a setting where the employer supports professional development through continuing education (ONCC Research Committee and Executive Staff, 1999). The committee then explored links among nurses' OCN[®] status, work settings, workgroup

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At a Glance

- ◆ Certified nurses scored higher than noncertified nurses on the Nurses' Knowledge and Attitudes Survey Regarding Pain.
- ◆ Although certified nurses followed guidelines for chemotherapy-induced nausea and vomiting (CINV) management more often than noncertified nurses, improvement is needed in this area.
- ◆ Nurses who participated in more continuing education and those who were members of the Oncology Nursing Society scored higher on surveys of pain and CINV knowledge.

cohesion, organizational commitments, and job satisfaction. Work setting, rather than certification, accounted for differences in job perceptions. Job perceptions were most positive in settings characterized by a high percentage of patients with cancer (more than 75%), a high percentage of RNs (more than 80%), and monetary support for continuing education (Hughes et al., 2001). Finally, the committee conducted a descriptive ex post facto study to test hypotheses that patients cared for by OCN[®]s have superior outcomes compared to those cared for by noncertified nurses. Little support was found for the hypothesis other than that the OCN[®]s documented a higher number of post-admission fatigue assessments ($p < 0.05$). However, the sample size was small (7 certified nurses, 13 noncertified nurses, and charts of 181 of their patients) and the main research variables were not specific enough. The team concluded that additional research was needed to examine the dimensions of clinical practice that may demonstrate the benefits of care by OCN[®]s (Frank-Stromborg et al., 2002). Nursing-sensitive outcomes are outcomes significantly affected by nursing interventions.

Symptom Management for Pain

Management of pain, the fifth vital sign, serves as a quality of care outcome (Ferrell, Wisdom, Rhiner, & Alletto, 1991). A study by Clarke et al. (1996) of pain management, attitudes, and documentation among 120 nurses from diverse clinical areas revealed knowledge deficits in many areas and inadequate pain management as evidenced by documentation. Studies by McMillan, Tittle, Hagan, Laughlin, and Tabler (2000), McMillan, Tittle, Hagan, and Small (2005), and Vallerand, Riley-Doucet, Hasenau, and Templin (2004) showed the continuing need for education to improve nurses' knowledge and attitudes about pain management. About 33% of patients receiving treatment for cancer and 60%–90% of patients with advanced cancer have pain (Black, Hawks, & Keene, 2001). Adequate pain assessment and treatment improves cancer pain in patients (Elliott et al., 1997). Adequate pain management is an important component of patients' satisfaction with their care as well as their quality of life. In addition to knowledge of pain and symptom management principles, nurses' sense of personal accomplishment may influence patients' perceptions of their care.

Symptom Management for Nausea

Symptom management for nausea is another oncology nursing-sensitive outcome (Given et al., 2005). Chemotherapy-

induced nausea and vomiting (CINV) are among the most feared symptoms for patients with cancer (Roscoe, Morrow, Hickok, & Stern, 2000). Despite advances in the pharmacologic management of CINV, it continues to be a significant issue for patients receiving highly emetogenic agents. To better understand patient preferences related to treatment side-effects in women treated for ovarian cancer, Sun et al. (2005) studied patient preferences for health states. Complete to almost complete control of CINV ranked third after perfect health and complete remission as the most preferred health state, whereas four of the five least preferred health states involved varying degrees of lack of control of CINV. The fifth and least preferred health state was death. To address this important issue, several organizations have produced guidelines for the management of acute and delayed CINV (Gralla et al., 1999; Seymour & Bramwell, 1998; Sun et al.); however, overall compliance with evidence-based guidelines remains low (Mertens et al., 2003). Knowledge of the guidelines may be a factor in compliance, and nursing certification may be related to knowledge of the guidelines and motivation to follow them.

Patient and Nurse Satisfaction

A study of 820 nurses and 621 patients provided empirical evidence that nurse burnout influences patient satisfaction with care; patients in units with nurses who reported higher levels of personal accomplishment were more than twice as likely to be highly satisfied with their care (Vahey, Aiken, Sloane, Clarke, & Vargas, 2004). Patient satisfaction is linked with quality nursing care (Al-Mailam, 2005) and with nurse certification. A year after an acute care medicine unit encouraged nurse certification and increased the number certified by 60%, patient satisfaction scores increased from 88.2%–90.4% and nurse turnover rate decreased from 16.7%–8.1% (Craven, 2007; Piazza, Donahue, Dykes, Griffin, & Fitzpatrick, 2006). Donahue, Piazza, Griffin, Dykes, and Fitzpatrick (2008) found that nurses who perceive themselves as having more empowerment have patients who are more satisfied with their care. In addition, nurses who are certified have higher perceptions of empowerment (Piazza et al.).

Purpose

The purpose of the current study was to compare certified nurses with noncertified nurses for knowledge and clinical behaviors related to symptom management of pain and CINV, patient satisfaction, and nurse satisfaction. The authors tested the hypothesis that, compared to noncertified nurses, certified nurses would have greater knowledge of the principles of pain and CINV management and outcomes in symptom management of pain and CINV, higher patient satisfaction, and better job satisfaction.

Methods

Research Design

This prospective, descriptive study took place on two inpatient oncology units, two outpatient oncology clinics, and two

infusion centers at an academic health science center in the southern United States. An institutional review board approved the study, and participating nurses and patients signed informed consent forms.

Sample Size With Rationale

The number of subjects to include in a study is sometimes investigated by means of a power analysis. The strategy ensures that enough people, but not too many, are included in a study for statistically significant differences or relationships between or among groups to be noticeable. Power analysis computer programs sometimes require basic information like means and standard deviations to help in determining this sample size. However, some programs are able to make this calculation based on other combinations of information like the statistical technique to be used and assumptions such as the alpha level and the effect size. This study did not have means and standard deviations on which to base the sample size, so the investigators used the G*Power[®] 3.0.8 program to perform a power analysis based on the study design involving planned two-tailed t tests. The power analysis estimate indicated a sample of 51 certified nurses and 51 noncertified nurses would achieve 70% power at the 0.05 significance level to detect a medium effect of $d = 0.50$. In other words, a total of 102 nurses would be needed to be able to reasonably identify that differences existed between the certified and noncertified nurses. If only a few nurses showed different traits, those differences might not be observed in the future. However, with the larger number, the differences in this study are likely to occur again with other nurses. Therefore, the recruitment goals for the study were 102 nurses and 4 patients cared for by each of the nurses, totaling 408 patients.

Measures and Instruments

Patients completed the Patient Pain Questionnaire (PPQ); the Rhodes Index of Nausea, Vomiting and Retching; and the Press Ganey Inpatient Survey (INVR). Nurses completed a demographic form, the Nurses' Knowledge and Attitudes Survey Regarding Pain (NKASRP), the Nausea Management: Nurses' Knowledge and Attitude Survey, and a questionnaire on satisfaction with their work. Chart audits developed by the investigators provided data on documented symptom assessment and management.

Patient Measures

The PPQ is a 16-item ordinal scale that measures a patient's knowledge and experience in managing chronic cancer pain. The tool can be administered by mail or in person. Patients circle a number to indicate the degree of agreement with the statement according to the word anchors on each end of the scale. The PPQ has nine items measured on a scale of 0-10 that measure knowledge about pain and seven items, also on a scale of 0-10, that measure patients' experience with pain. Patients circle a number to indicate the extent of their agreement or disagreement with the statements about cancer pain, such as, "Cancer pain can be effectively relieved," and "Pain medications should be given only when pain is severe." Examples of statements that measure patients experiences with

pain are, "How much pain are you having now?" and "How distressing is the pain to you?" Psychometric analyses of the PPQ instrument demonstrated content validity (CVI = 0.95), test-retest reliability ($r = 0.65$), and internal consistency ($\alpha = 0.74$) (Ferrell, 1994).

The INVR is an eight-item self-report instrument that elicits information about the total experience of nausea, vomiting, and retching as well as the occurrence and related distress of individual symptoms. For example, patients report how many times they vomited during the last 12 hours by marking the box that most clearly corresponds to their experiences: seven or more, five to six, three to four, one to two, or "I didn't throw up." It consists of three subscales: the nausea and vomiting subscales with a range of 0-12 and the retching subscale with a range of 0-8. The highest possible combined score for nausea, vomiting, and retching is 32. The instrument has been used with varied populations and has established validity and reliability (Molasiotis et al., 2007; Rhodes & McDaniel, 1999).

Three scales of the Press Ganey Inpatient Survey measure patient satisfaction. The psychometric properties of the survey have been established through factor analysis. Reliability estimates for the scales on nurses ($\alpha = 0.95$), personal issues ($\alpha = 0.94$), overall assessment ($\alpha = 0.94$), and item-scale correlations demonstrate convergent and discriminant validity (Press Ganey Associates, Inc., 2002).

Nurse Measures

A demographic form provided information on nurses' certification status, age, race and ethnicity, gender, work history, education, cancer history, and participation in oncology specialty organizations.

The NKASRP is based on national and international standards of pain management and is used widely as an evaluation measure for education programs on pain management. The tool consists of 22 true and false items, 13 multiple choice questions, and 2 case studies with several action items. Construct validity has been established by comparing scores of nurses at various levels of expertise, such as students, new graduates, oncology nurses, graduate students, and senior pain experts. The tool was identified as discriminating between levels of expertise. Test-retest reliability was established ($r > 0.80$) by repeat testing in a continuing education class of staff nurses ($N = 60$). Internal consistency reliability was established ($\alpha > 0.70$) with items reflecting knowledge and attitude domains (Ferrell & McCaffery, 2008).

A search of the literature failed to locate an established tool for the measurement of nurses' knowledge and attitudes about the management of CINV. Therefore, the authors used an investigator-developed Nausea Management: Nurses' Knowledge and Attitudes Survey. The survey includes 15 multiple choice questions with a maximum score of 21 (two questions require the nurse to select multiple items from a list). The questions are based on evidence-based guidelines from the National Comprehensive Cancer Network ([NCCN], 2009). Content validity was established by three experts in oncology nursing.

A tool adapted from the Rush Employee Opinion Survey (Oleske & Glandon, 1995) and Measure of Job Satisfaction (Traynor & Wade, 1993) was used to assess nurses' job satisfaction. The 20 items are scored on a five-point rating scale, with

anchors ranging from strongly disagree to strongly agree. After reverse scoring 19 items, the responses were summed to obtain an overall score, with higher scores indicative of greater job satisfaction.

Chart Audits

The investigators used the pain chart audit tool developed at the City of Hope as a starting point to develop the Pain, Nausea, and Vomiting Chart Audit Tool for this study. Seven items pertain to the patient's disease, treatment, and reason for admission or outpatient visit. Five items evaluate the documented assessment and management of pain, and eight items evaluate the prevention, assessment, and management of CINV. One item asks the evaluator to compare the documented assessment and management of CINV to evidence-based guidelines. Data collected included the prescribed chemotherapy, including dose, route, and schedule of administration and the prescribed antiemetic medications. The chart also was checked for documentation of patient teaching for prevention and control of nausea, actions taken to prevent or improve control of nausea and emesis, and response to antiemetic therapy. The emetic potential of the chemotherapy treatment was used in the comparison of orders and care with established guidelines (NCCN, 2009). Because patients were cared for in multiple areas by multiple nurses in a single day, the audit tool was designed to differentiate between individual nurses and treatment areas. Research assistants entered audit data directly into a Microsoft® Access® database that contained common choices in drop-down lists.

Procedure

The investigators trained four research assistants (RAs) to collect and enter data. After the investigators obtained informed consent from the nurses, the nurses completed their questionnaires (demographic form, NKASRP, Nausea Management: Nurses' Knowledge and Attitude Survey, and work satisfaction) during a luncheon provided by the research team. Completion of the nurse surveys took about 30 minutes. The nurses' names had to be linked with their patients during particular time periods when the nurses were documenting patient care. Because the research team included faculty in the College of Nursing and administrators in the Department of Nursing Service, which could have posed potential risks to the nurses, nurses were assured that only members of the research team who were not part of the nursing service administration would have access to the information. All subjects, nurses and patients, were de-identified by substituting code numbers for names before data were entered in the database. The investigators were responsible for obtaining patient consent prior to patient interviews and chart audits. The RAs distributed the patient questionnaires (PPQ, the INVR, and the Press Ganey Inpatient Survey), answered questions, and collected the questionnaires the same day of their distribution. The patient questionnaires took about 15 minutes; however, some patients became tired before completing them, so the RAs scheduled another time to complete the questionnaires when necessary. Charts of patients who completed the questionnaires were reviewed with the chart audit tools for pain and nausea.

Data Analysis

All data were entered into a Microsoft Access database and analyzed using SPSS® 15.0. When analyzing the NKASRP, the authors followed Ferrell and McCaffery's (2008) recommendation to avoid distinguishing items as measuring either knowledge or attitudes because some items measure both. Therefore, the data from the survey were analyzed in terms of the percentage of complete scores. Descriptive analyses for each question were conducted to describe the data in terms of measures of central tendency and measures of dispersion. Analysis of group differences with independent samples t tests was used to determine differences in symptom management, patient satisfaction, and nurse satisfaction. For nurses, scores on the NKASRP, the Nausea Management: Nurses' Knowledge and Attitudes Survey, and work satisfaction questionnaire were compared. For patients, scores on the INVR, three subscales of the Press Ganey Inpatient Survey, the Patient Pain Questionnaire, and medical records of pain and nausea were compared.

Table 1. Sample Characteristics

CHARACTERISTIC	CERTIFIED (N = 35)		NONCERTIFIED (N = 58)		p
	n	%	n	%	
Age (years)					0.64
20–30	5	14	11	19	
31–40	7	20	13	22	
41–50	14	40	15	26	
51–60	9	26	18	31	
Older than 60	–	–	1	2	
Gender					0.87
Female	31	89	52	90	
Male	4	11	6	10	
Race					0.23
Caucasian	31	91	45	82	
Other	3	9	10	18	
Education					0.78
Diploma	5	15	7	12	
Associate	11	32	24	43	
Bachelor's	17	50	23	41	
Master's	1	3	2	4	
Nursing experience (years)					0.57
Less than 5	7	21	10	17	
5–14	7	21	18	32	
15 or more	19	58	29	51	
Oncology nursing experience (years)					0.08
Less than 5	10	31	24	47	
5–14	12	38	21	41	
15 or more	10	31	6	12	
Continuing education (hours in the past year)					0.001
None	3	9	17	31	
1–4	11	31	24	44	
5–9	7	20	9	16	
More than 10	14	40	5	9	
Oncology Nursing Society member					0.000
Yes	19	58	7	12	
No	14	42	50	88	

Note. Because not all participants responded, some data are missing.

Table 2. Nurses' Survey Scores

VARIABLE	CERTIFIED (N = 35)		NONCERTIFIED (N = 58) ^a		p
	\bar{X}	SD	\bar{X}	SD	
Pain knowledge ^b	77.5	8.4	72.5	10.4	0.02
Nausea knowledge ^b	65.7	9.8	62.8	11.5	0.22
Job satisfaction ^c	77.3	15.8	80.9	11	0.2

^a N = 57 for pain knowledge because of missing data
^b Percentage correct on pain and nausea knowledge surveys
^c Higher score is indicative of greater job satisfaction (highest possible score = 96).

Results

Description of Sample

A total of 93 nurses—35 (38%) of them certified in oncology nursing—and 270 patients participated in the study. Patient's ages ranged from 21–83 with a mean of 56. Most were Caucasian (n = 226, 83.7%), 37 were African American (13.7%), and 7 (2.6%) were Hispanic or other. Men composed 54.8% of the patient sample.

Nurses

Table 1 describes the nurse sample. The certified and non-certified nurses were similar in age, race, gender, educational preparation, and years of nursing experience as well as years of oncology nursing experience. Compared to noncertified nurses, certified nurses participated in more continuing education programs and a higher percentage of certified nurses were members of ONS (p < 0.01). Although not statistically significant, certified nurses trended toward having more years of oncology nursing experience (p = 0.08).

Table 2 shows the results from the nurse surveys. Certified nurses scored higher than noncertified nurses on the NKASRP (d = 0.50; medium effect size) and certified nurses tended to score higher on knowledge of CINV. Job satisfaction was relatively high for all the nurses but slightly higher for the noncertified nurses.

Because a significant difference existed between certified and noncertified nurses in the number of hours of continuing

education (p = 0.001) and in ONS membership (p = 0.000), the authors looked for an association of these variables with study outcomes, combining responses from certified and noncertified nurses. Nurses with more hours of continuing education had higher scores on nausea knowledge (p = 0.02). Nurses belonging to ONS had significantly higher scores on pain (p = 0.02) and nausea (p = 0.04) knowledge. Table 3 provides the mean scores by hours of continuing education and ONS membership.

Patients

Table 4 shows the results for the patient surveys. Overall, patients with cancer reported high satisfaction with their care and believed their pain and nausea were managed well.

Chart Audits

Overall, nurses documented pain 237 out of 270 times (88%). Of the instances when pain was not documented, certified nurses failed to document 15 out of 109 times (13.8%) and non-certified nurses failed to document 18 out of 161 times (11.2%). These differences between certified and noncertified nurses were not statistically significant (p = 0.53). Nurses documented nausea 85 out of 270 times (31%). Of the instances when nausea was not documented, certified nurses did not document nausea 73 out of 109 times (67%) and noncertified nurses did not document nausea 112 out of 161 times (69.6%). Again, the differences between certified and noncertified nurses were not statistically significant (p = 0.65). Documentation of CINV was by exception in the study site, so determining if the nurses actually assessed for the presence of nausea was not possible.

The chart audits showed that NCCN guidelines were followed for 39 out of 74 charts (52.7%) for CINV management for patients with certified nurses and for 55 out of 114 charts for CINV management for patients with noncertified nurses (p = 0.55). Essentially, the authors were evaluating whether orders for preventing and controlling CINV based on the emetic potential of the chemotherapy agents ordered were in agreement with current guidelines.

Discussion

This study was conducted in a teaching hospital where patients receive care from certified and noncertified nurses. Some of the noncertified nurses may have been preparing for a

Table 3. Influence of Continuing Education and Oncology Nursing Society (ONS) Membership on Nurses' Pain and Nausea Knowledge

VARIABLE	PAIN KNOWLEDGE			NAUSEA KNOWLEDGE		
	\bar{X}	SD	p	\bar{X}	SD	p
Continuing education (hours)			0.41			0.02
0	75	10.7		60.9	10.1	
1–4	73.2	9.9		64.4	10.8	
5–9	75	7.9		62.2	9.1	
10 or more	77.8	8.5		70.4	8.9	
ONS member			0.04			0.02
Yes	78.1	8.7		67.4	10.6	
No	72.8	10.3		62.2	10.9	

Table 4. Patients' Survey Scores

VARIABLE	PATIENTS WITH CERTIFIED NURSES (N = 109)		PATIENTS WITH NONCERTIFIED NURSES (N = 161)		p
	\bar{X}	SD	\bar{X}	SD	
Patient satisfaction (total score) ^a	72.3	8.3	71.7	8.1	0.55
Patient's pain experience ^b	31.5	12	32.6	13.1	0.48
Patient's Rhodes Index (nausea) ^c	3.3	5.2	3.6	5.6	0.66

^aHighest possible score is 80.

^bHighest possible score (most pain) is 60.

^cHighest possible score is 32.

certification examination. An ideal study would be one in which a group of patients could be cared for exclusively by certified nurses and a similar group of patients could be cared for exclusively by noncertified nurses who were not working toward obtaining certification. Because that was not possible, the chart audits were done to capture the time period when each particular nurse provided care for a particular patient.

The noncertified and certified nurses did not differ significantly in years of oncology nursing experience; however, certified nurses trended toward ($p = 0.08$) having more years of oncology nursing experience. The eligibility criterion for oncology nursing experience is a minimum of 1,000 hours of adult oncology nursing practice (less than a year) within the 30 months prior to application to ONCC (2008) to take the written OCN[®] examination.

Certified nurses scored significantly higher ($p = 0.02$) than noncertified nurses on knowledge of pain management. In addition, nurses in the current study scored higher on knowledge of pain management than medical oncology nurses in a study by Xue, Schulman-Green, Czaplinski, Harris, and McCorkle (2007) (about 70% versus 60% answers correct) that had a higher percentage of nurses certified in oncology nursing (54% versus 38% in the current study). Results from both studies support the need for continuing education to improve knowledge of pain management.

Although the scores on knowledge of CINV were slightly higher for the certified nurses, the scores for both groups of nurses in the current study indicated a critical need for education and improvement in this area. Results did indicate that nurses who participate in continuing education score higher in CINV knowledge.

Patient satisfaction was high among patients with cancer in this study whether they were cared for by certified or noncertified nurses. In general, the study results from patients' surveys showed that cancer pain and CINV were managed well but improvements can be made. Test scores and chart audits showed the need to continue to educate nurses and physicians on evidence-based guidelines for symptom management of cancer pain and an even greater need for education on management of CINV. Perhaps a summary of the guidelines could be posted on each unit and standing orders could incorporate them. Guidelines can be obtained online from NCCN at www.nccn.org/professionals/physician_gls/default.asp. The ONS Putting Evidence Into Practice (PEP) resources include pain and CINV and are available at www.ons.org/outcomes. Nurses, particularly those who are not certified, may need special incentives to attend continuing education offerings be-

cause the study results showed that the noncertified nurses were significantly less likely to attend.

A nausea assessment tool similar to the pain assessment tool used in clinical areas should be developed. As previously stated, documentation of CINV was by exception, so determining whether the nurses actually assessed for the presence of nausea was not possible. Oncology nurses should try to prevent CINV, but if CINV occurs it should be controlled well enough to maximize patient comfort. The goal is to prevent all emesis and nausea, and implementing current guidelines based on the emetic potential of the chemotherapy agent will help. A recent report on the Assessment, Information, and Management (AIM) Higher Initiative, a quality improvement program undertaken at 15 community oncology practices in the United States, discusses general deficits in practice and gives examples of actions to improve AIM of CINV along with other targeted chemotherapy-induced toxicities (Moore, Johnson, Fortner, & Houts, 2008). More research is needed on the appropriate prophylaxis for oral chemotherapy agents, the emetogenic potential of newer chemotherapy agents, and appropriate use of substance P antagonists like aprepitant with an expanded list of emetogenic chemotherapy agents (Hesketh, 2008).

Limitations

The actual sample size for the study was 93 nurses and 270 patients. The power analysis provided an estimate of 102 nurses and 408 patients needed for the study. The goal was to survey four patients per nurse. The nurses, however, were very busy and multiple tries were needed to recruit them; therefore, the number of nurses was slightly less than desired. With 93 nurses, 372 patients were needed. The patients, though, sometimes were ill or otherwise unavailable. In an effort to avoid adding to the patients' burden, the researchers did not pursue them aggressively. This study should be considered exploratory, and because it was conducted within one institution, generalization of the findings may be limited to similar settings.

Conclusion

This study demonstrated that job satisfaction is fairly high for oncology nurses and patient satisfaction is high for patients with cancer. In general, cancer pain and CINV were managed well but improvements could be made. Nurses and physicians should be educated continuously on evidence-based guidelines for symptom management of cancer pain and CINV, and a CINV knowledge and attitude assessment tool should be developed.

The results of this study provide some support to the hypothesis that certification in oncology nursing improves patient care quality. The positive effects on the nurses' knowledge of pain and CINV was related to the nurse being certified in oncology nursing, attending more hours of continuing education, and being a member of ONS. Most likely, a multisite, large-scale study will be needed to determine the effect of certification alone. This study may be replicated and at some point become part of a meta-analysis in which the results might contribute to a more

powerful study benefiting from the additional investigations. Symptom management is a feasible outcome measure; however, outcomes of nurse and patient satisfaction may not be as feasible because satisfaction scores are high in oncology, producing a ceiling effect.

The positive effects of being an ONS member are not surprising because ONS offers many educational programs, research support, networking opportunities, and certification in oncology, although nurses can be certified and not be an ONS member. The focus on certification continues to be important for nursing practice because certification is essential to achieving the American Nurses Credentialing Center's Magnet Recognition Program Award for Excellence in Nursing Care (Shirey, 2005). The impact of certification on patient outcomes needs continued exploration.

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