See page 773 for suggested questions to begin discussion in your journal club.

Oncology Nurses' Use of National Comprehensive Cancer Network Clinical Practice Guidelines for Chemotherapy-Induced and Febrile Neutropenia

Anita Nirenberg, DNSc, RN, NP, BC, AOCNP®, Nancy K. Reame, BSN, MSN, PhD, Kenrick D. Cato, RN, BSN, and Elaine L. Larson, PhD, RN

Purpose/Objectives: To describe oncology nurses' use of National Comprehensive Cancer Network (NCCN) clinical practice guidelines for chemotherapy-induced neutropenia (CIN) and febrile neutropenia (FN).

Design: Cross-sectional survey design; descriptive, correlational analysis.

Setting: E-mail invitation to Web-based survey.

Sample: Random sample of 309 Oncology Nursing Society (ONS) members with e-mail addresses who provide care to adult patients receiving chemotherapy.

Methods: The investigator-developed Neutropenia Oncology Nurses Survey™ was used. Descriptive tests compared respondents' personal and professional characteristics to those of general ONS members; nonparametric chi-square and Kruskal-Wallis tests were used to correlate respondents' survey subscale scores with demographic data. Significant associations were entered into multiple logistic regression models.

Main Research Variables: The Neutropenia Oncology Nurses Survey's subscales measured subjective norm, attitude, perceived competence and confidence, perceived barriers, and use of NCCN clinical practice guidelines for CIN and FN.

Findings: Response rate of nurses who opened the survey was 50%. Most practiced in community versus academic centers. Eighty percent reported using the NCCN clinical practice guidelines for CIN and FN. Respondents were more likely to use clinical practice guidelines when they were expected to by physician and nurse colleagues, they perceived fewer barriers, or they held advanced oncology certification.

Conclusions: This study was the first to assess oncology nurses' reported use of NCCN clinical practice guidelines for CIN and FN. It also demonstrated the feasibility of partnering with ONS for Web-based survey research.

Implications for Nursing: The findings give insight into workplace barriers to evidence-based practice in various settings. Expanding dissemination and implementation of clinical practice guideline recommendations will support the development of oncology nursing standards for risk assessment, management, and patient and family education in CIN and FN.

Chemotherapy-induced neutropenia (CIN) is a serious toxicity of cancer treatment. Life-threatening consequences include febrile neutropenia (FN), increased risk of infection, prolonged hospitalizations for IV antibiotics, delays in cancer therapy, and increased mortality (Crawford, Dale, & Lyman, 2004; Crawford et al., 2008). CIN also is the most common dose-limiting toxicity of cancer therapy (Crawford et al., 2004).

Multiple physician-generated and directed risk models and clinical practice guidelines are available for patient risk assessment and management of CIN and FN (Hughes et al., 2002; Klastersky et al., 2000; National Comprehensive Cancer Network [NCCN], 2009; Ozer et al., 2000; Smith et al., 2006; Talcott, Siegel, Finberg, & Goldman, 1992). The guidelines were developed by physicians in various medical subspecialties for different aspects of risk assessment and management of CIN and FN. The NCCN Clinical Practice Guidelines in Oncology™ are a composite, providing a guide to clinicians to assess and manage patients. However, the extent to which the guidelines are implemented and improve patient care is not clear.

Because oncology nurses deliver cancer treatments to patients who frequently receive therapies on an outpatient basis (National Cancer Institute, 2006), nurses should identify patient risk factors and instruct patients and their families about what to do at home if disease symptoms or treatment-related toxicity occurs. Oncology nurses need to know how to assess, understand, and use clinical practice guidelines to provide patients with knowledgeable and clinically sound practices. Although nurses have these important responsibilities, CIN and FN clinical practice guidelines have not been widely disseminated directly to oncology nurses through publication in nursing journals or

continuing education programs. In addition, no CIN and FN standardized curricula, practice guidelines, standardized content, or evaluation of patient education exists for nurses to use (Nirenberg et al., 2006a, 2006b). As a result, the current study aimed to describe oncology nurses' use of NCCN clinical practice guidelines for CIN and FN.

Methods

Study Design

A cross-sectional survey design was adopted to study selected factors affecting the reported use of NCCN clinical practice guidelines for CIN and FN by nurses caring for adult patients with cancer. The Theory of Planned Behavior (Ajzen, 2002) was used as the framework to guide the study and was adapted to develop the survey instrument.

Sample

A purposive, random sample of RNs who were licensed in the United States, were members of the Oncology Nursing Society (ONS), and provided care to adult patients with cancer receiving chemotherapy was surveyed with a Web-based questionnaire.

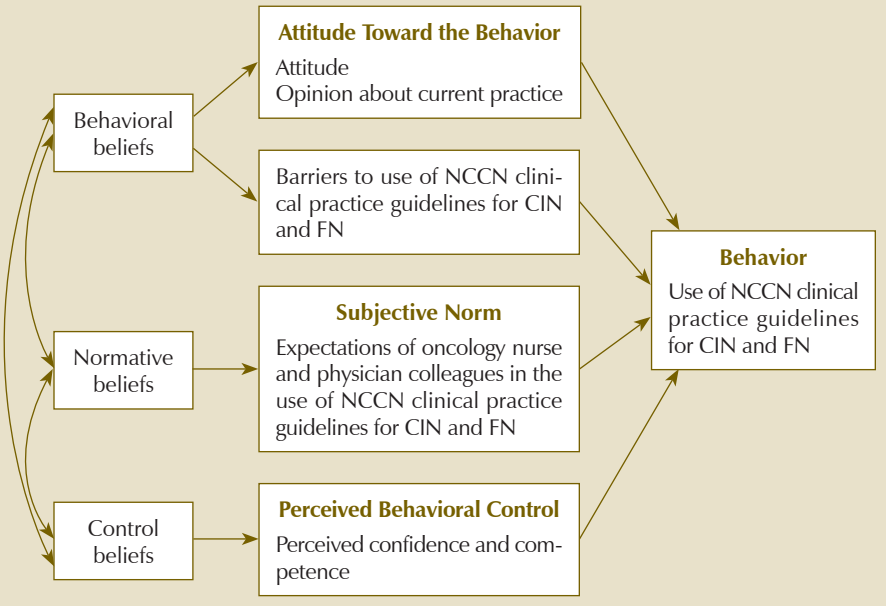
Procedures

The current study was approved by the institutional review board of the Columbia University Medical Center. The first author became a client of the ONS affiliate ONS*Edge* to disseminate the survey electronically to ONS members and to preserve members' confidentiality. Based on membership information, e-mail invitations to participate in the study from the principal investigator were sent by ONS*Edge* to 4,000 randomly selected eligible members. Almost half of the total eligible ONS members (about 15,000 members) were nurses who provided care to adult patients receiving chemotherapy (ONS*Edge*, personal communication, April 6, 2007); of them, about 8,700 members provided ONS with their e-mail addresses. The participants were drawn from ONS cohorts of clinical nurses at staff generalist (54% of ONS members) and advanced practice levels (4% and 6% of ONS members are clinical nurse specialists and nurse practitioners, respectively). The current study was the first research study conducted in this manner; therefore, the pool of eligible respondents was over-sampled to ensure an adequate response rate. A lottery incentive of $50 for 20 randomly selected participants who completed and submitted the survey was described in the e-mail invitation to increase the likelihood of participant responses (Dillman, 2007).

The survey was anonymous; the principal investigator did not have access to member e-mail addresses or information. The survey was available online for a period of two weeks. Within three weeks of terminating online access, ONS*Edge* delivered the Microsoft® Excel® files containing the raw data to the investigator in a password-protected document.

Study Instrument

Inherent constructs of the Theory of Planned Behavior are (a) beliefs about the likely outcomes of the behavior, (b) beliefs about expectations of others and about the motivation to adhere to those expectations, (c) beliefs about factors that may enhance or impede the behavior, and (d) the perceived power to control these beliefs. According to Ajzen (2002), additional predictors such as age and educational preparation may influence individual variation in the intention to perform the behavior or in the actual performance of the behavior.



CIN—chemotherapy-induced neutropenia; FN–febrile neutropenia; NCCN—National Comprehensive Cancer Network

Figure 1. Application of Ajzen's Conceptual Model of the Theory of Planned Behavior

Note. From "TPB Diagram," by I. Ajzen, 2006. Retrieved from http://people.umass.edu/aizen/tpb.diag.html. Copyright 2006 by Icek Ajzen. Adapted with permission.

Behavior is defined as the conduct of intention and perceived behavioral control into performing an action. Behavioral beliefs are ways of thinking about the behavior itself. Behavior consists of action, target, context, and an element of time. The more favorable the attitude about performing the behavior, the greater the individual's perception of positive opinions of others; the better the perceived control over the behavior, the stronger the intention to perform the behavior (Ajzen, 2002).

Actual behavioral control refers not only to a person's control over factors such as available resources but also to one's volitional control (i.e., willful control over the behavior). Of interest is the study of aspects of behavior that are not entirely under one's volitional control. An individual may be motivated and have the knowledge and the abilities to perform the desired behavior but may not have the available resources to actually perform the task.

The **Neutropenia Oncology Nurses Survey™** was developed by the researcher to measure the constructs of the Theory of Planned Behavior: subjective norm (six items), attitudes (four items), perceived confidence and competence (perceived behavioral control, four items), perceived barriers (six items), and reported use of NCCN clinical practice guidelines for CIN and FN (behavior, one item) among nurses (see Figure 1). Another nine items were used to record respondents' personal and professional demographics. In addition, seven statements on respondents' barriers to the use of the clinical practice guidelines for CIN and FN and 10 items that assessed participants' knowledge of evidence-based standards in CIN and FN risk assessment and management were included.

Content validity was tested by a panel of four oncology nursing experts in cancer chemotherapy and symptom management who reviewed the Neutropenia Oncology Nurses Survey for clarity, comprehensiveness, and relevance to oncology nursing three times. A cognitive-debriefing session with the experts then was conducted to identify potential issues with individual items and sequencing and structure of the entire instrument, which resulted in an agreement rate higher than 80%. Reliability and internal consistency coefficients of the Neutropenia Oncology Nurses Survey were analyzed for the entire sample and demonstrated adequate psychometric properties for a new instrument (overall internal consistency, Cronbach alpha = 0.84). The survey is available on request to the author.

Table 1. Characteristics of Sample Compared With Oncology Nursing Society (ONS) Members

	Sample		ONS Members		
Characteristic	**n**	**%**	**n**	**%**	**p**
Age (years)					
21–29	22	7	1,311	9	0.15
30–39	57	18	3,067	22	0.1
40–49	91	29	4,830	34	0.04
50–59	121	39	4,509	32	< 0.0001
60 or older	18	6	468	3	< 0.001
Total	309	99	14,185	100	0.0001
Certification					
Oncology certified nurse	197	64	22,824	85	< 0.0001
Advanced oncology certified nurse	23	7	1,225	5	0.001
Advanced oncology clinical nurse specialist	8	3	216	1	< 0.0001
Advanced oncology nurse practitioner	10	3	522	2	0.57
None	71	23	2,187	8	0.0001
Total	309	100	26,974	101	< 0.0002
Education					
Diploma	22	7	2	< 1	< 0.0001
Associate degree	66	22	5,196	39	< 0.0001
Bachelor's degree	132	43	5,989	45	0.82
Master's degree (nursing)	76	25	1,802	13	< 0.0001
Master's degree (other)	8	3	338	3	0.99
Doctorate	3	1	47	< 1	0.2
Total	307	101	13,372	101	< 0.0001
Years in oncology nursing practice					
Less than 1	5	2	536	4	0.06
1–5	69	21	4,685	32	0.0003
6–10	45	15	3,331	23	0.0006
10–19	86	28	2,437	17	< 0.0001
20 or more	103	33	3,568	25	0.0003
Total	308	99	14,557	101	< 0.0001
Practice setting					
National Cancer Institute–designated comprehensive cancer center	89	29	4,682	33	0.12
Academic medical center	50	16	4,571	32	< 0.0001
Community hospital	91	29	335	2	< 0.0001
Private practice (off-site of hospital)	72	23	3,505	25	0.6
Other	6	2	1,066	8	0.0002
Total	308	99	14,159	100	< 0.0001

Note. Because of rounding, not all percentages total 100.

Data Analysis

Descriptive statistics for the professional and personal characteristics of the sample were compared with ONS member data. The scores for each subscale were summed, with higher mean scores reflecting higher levels of agreement with the items. Associations among scores on each

of the five subscales (dependent variables) and professional and personal characteristics (e.g., certification, practice setting, age) were calculated with appropriate chi-square and Kruskal-Wallis statistical tests. Variables that were found to be significant in bivariate analyses ($p < 0.05$) then were used as predictor variables in several logistic regression models.

Responses to the 10 knowledge items were scored as correct or incorrect for a total possible score of 100%. In addition, the knowledge scores were tested for associations with demographic characteristics. All analyses were conducted with SPSS® version 16 for Windows®.

Results

Of the 4,000 e-mail invitations sent, 3,834 (96%) were deliverable and, of those, 644 (17%) were opened. Of the nurses who opened the e-mails, 334 (52%) returned the completed Neutropenia Oncology Nurses Survey; 25 (7%) were ineligible per the study's inclusion criteria. Therefore, the final sample of 309 oncology nurse respondents constituted 8% of the eligible respondent pool (n = 3,834). The response rate for those who opened the e-mail, responded, and submitted the Neutropenia Oncology Nurses Survey was 50%.

Demographic Characteristics

Table 1 describes the demographic characteristics of the study sample compared to ONS members. The respondents were older, had more experience, and had higher levels of education. In addition, more practiced in community settings than in academic centers.

Neutropenia Oncology Nurses Survey

The Neutropenia Oncology Nurses Survey had two components. The first, based on Ajzen's (2002) Theory of Planned Behavior, included five subscales that related to the theory's constructs—attitudes, subjective norms, perceived competence and confidence, perceived barriers, and use of NCCN clinical practice guidelines for CIN and FN. Table 2 summarizes mean subscale scores. The second component included personal and professional characteristics, experiences with perceived barriers to use of the clinical practice guidelines, and 10 items related to participant knowledge of CIN and FN.

Attitude: Respondents felt that their assessment of patients for chemotherapy side effects was essential (99%). Almost all respondents (99%) agreed that CIN may lead to life-threatening complications, CIN may be a dose-limiting toxicity (98%), and all patients receiving chemotherapy should be screened for neutropenia (97%).

Subjective norm: Regarding nurse and physician colleagues' expectations, most respondents reported that they were expected to use the NCCN clinical practice guidelines for CIN and FN for patient education (65% and 63%, respectively) and patient risk assessment (67% and 66%, respectively). More than 84% reported that assessing patient risk for CIN and FN was a professional expectation associated with their membership in ONS. Eighty-four percent also reported that performing patient risk assessment and management as well as providing patient education about the side effect were included as part of their job descriptions.

Nurses' subjective norm mean scores were significantly higher when they reported that both physicians and nurses evaluated patients for CIN compared to those who said that either nurses alone or physicians alone were responsible for evaluating patients for CIN ($p = 0.03$) (see Table 3).

Perceived confidence and competence: Almost all respondents (99%) felt competent about their abilities to care for their patients, and 97% expressed confidence

Table 2. Neutropenia Oncology Nurses Survey™ Subscales: Summary of Descriptive Statistics

Subscale	Number of Items	Score Range	$\bar{X}$	SD	95% CI
Nurses' attitudes regarding CIN and FN risk assessment	4	0–16	14.92	1.4	14.76–15.07
Subjective norm: Nurses' perceptions of nurse and doctor colleagues' use of NCCN clinical practice guidelines for CIN and FN	6	6–24	17.42	4.1	16.96–17.88
Nurses' perceived self-competence and confidence in assessing and managing patients at risk for CIN and those who have FN	4	0–16	14.66	1.8	14.47–14.86
Nurses' perceived barriers to using NCCN clinical practice guidelines for CIN and FN	6	6–24	19.5	3.6	19.06–19.88
Nurses' reported use of NCCN clinical practice guidelines for CIN and FN	1	1–4	3.02	0.8	2.93–3.11

N = 309

CI—confidence interval; CIN—chemotherapy-induced neutropenia; FN—febrile neutropenia; NCCN—National Comprehensive Cancer Network

Note. Higher mean scores indicate higher levels of agreement.

Table 3. Significant Relationships on Two Subscales and Oncology Nurses' Professional and Personal Characteristics

Subscale and Characteristic	$\bar{X}$	SD	p[a]
Nurses' perceived self-competence and confidence			
Certification			≤ 0.001
None	13.5	2.1	
General	14.9	1.5	
Advanced	15.7	0.8	
Age (years)			0.02
21–29	12.9	2.2	
30–40	14.7	1.7	
41–60 or older	14.8	1.6	
Subjective norm: Nurses' perceptions of who evaluates patients for chemotherapy-induced neutropenia			
Evaluator			0.03
Doctors	16.2	4.2	
Nurses	16.6	3.9	
Both	7.9	4	

N = 309

[a] Kruskal-Wallis

that they provided patient education about neutropenia as a chemotherapy side effect. Similarly, 97% reported that they felt able to identify patient disease- and treatment-related risk factors for CIN and that they instructed patients and families about postchemotherapy home care (98%). Higher perceived competence and confidence scores were significantly associated with advanced certification levels ($p < 0.001$) and with older age ($p = 0.02$). Respondents who reported that they were not certified had lower perceived competence and confidence scores; higher perceived competence and confidence scores were associated with more attendance at workshops and lectures on CIN (see Table 4).

Perceived barriers: Most nurse respondents (80%) reported that institutional CIN and FN clinical practice guidelines were used in their practices and also that they had access to the NCCN clinical practice guidelines most or all of the time. In contrast, 56% reported that the decision to use the NCCN clinical practice guidelines was theirs, and 54% reported they had time to access the guidelines. Nine percent reported they were too busy to use the clinical practice guidelines, and 10% reported not having access to educational materials for help in using the guidelines. Nurses who reported experiencing fewer barriers to using the clinical practice guidelines were more likely to use online Web sites for professional education ($p < 0.05$) (see Table 5).

Clinical practice guidelines: More than 80% of the nurses responded that they used the NCCN clinical practice guidelines for CIN and FN always (n = 249) or most of the time (n = 309) in their practices. Regardless of whether respondents reported using the guidelines, 37% said that using them was not their decision. Fifty-six percent of respondents were almost three times more likely to use the clinical practice guidelines when using them was their own decision ($p \leq 0.001$, 95% confidence interval 1.7–4.4).

Barriers to Use of Guidelines

To better elucidate respondents' perceived barriers to their use of the clinical practice guidelines, an additional item presented statements adapted from Cabana, Rand, Becher, and Rubin (2001) that characterized seven barriers to using clinical practice guidelines. Respondents were instructed to indicate any or all of the listed barriers that applied to their experiences (see Table 6). Of the 299 multiple responses to the statements, 111 (37%) reported, "It's not up to me to use the guidelines."

Knowledge of Neutropenia

The results of the 10 knowledge items showed that a large majority of the nurses (86%) gave correct answers to more than 70% of the knowledge items. A statistically significant association ($p < 0.001$) was observed between respondents with bachelor's degrees or higher and higher knowledge scores (see Table 7). Sixty-one percent of the nurses responded incorrectly to the item "patients who are receiving their first cycle of chemotherapy are at greater risk of developing CIN and FN complications."

When significant associations among the five subscales of the Neutropenia Oncology Nurses Survey were entered into a multiple logistic regression model, two of the subscales, higher subjective norm (expectations of colleagues) ($p = 0.006$) and lower perceived barriers ($p \leq 0.01$), were significantly related to oncology nurse participants' use of NCCN clinical practice guidelines for CIN and FN (see Table 8). The factors explained 24% of the variance in the model (Nagelkerke R^2). The professional characteristic shown to predict use of the NCCN clinical practice guidelines was holding an advanced oncology nurse certification versus generalist or no certification ($p \leq 0.01$).

Table 4. Perceived Competence and Confidence and Attendance at Workshops or Lectures on Chemotherapy-Induced Neutropenia

	Above Median		Below Median		Total	
Attendance	**n**	**%**	**n**	**%**	**n**	**%**
Attended	117	38	97	31	214	69
Did not attend	42	14	52	17	94	31

N = 308

Note. Chi-square $p < 0.05$

Table 5. Perceived Barriers to Using NCCN Guidelines for CIN and FN and Web Site Education

Frequent Use of Web Sites for Education	Above Median		Below Median		Total	
	n	%	n	%	n	%
Yes	17	6	232	77	249	83
No	10	3	42	14	52	17

N = 301

CIN—chemotherapy-induced neutropenia; FN—febrile neutropenia; NCCN—National Comprehensive Cancer Network

Note. Chi-square $p < 0.05$

Discussion

The current study was the first to examine oncology nurses' use of NCCN clinical practice guidelines for CIN and FN. Myelosuppression is the most common dose-limiting toxicity of cancer chemotherapy, and its complications are a major cause of morbidity and mortality (Crawford et al., 2008). The results of the current study are an important start to understanding nurses' view of their roles in using guidelines in their practices. The 309 respondents in the current study had higher levels of education and more oncology nursing experience than comparable ONS members who worked with adult patients receiving chemotherapy. Significant differences also were observed in levels of ONS certification between the study respondents and the ONS members, particularly for those holding advanced oncology nursing certifications (e.g., advanced oncology certified nurse practitioner, advanced oncology certified clinical nurse specialist).

Of note, almost twice as many study respondents reported practicing in community settings compared with the general ONS members, who more typically worked in academic medical or comprehensive cancer centers. According to the National Cancer Institute (2006), 85% of patients receive cancer care at a local, community level. Therefore, the respondents reported providing expert oncology nursing in a setting that may be more representative of where patients with cancer in the United States receive treatment. The finding suggests that the nurses who responded to the survey may have greater influence on delivery of cancer care for the large numbers of patients who receive treatment in community settings.

Eighty percent of the respondents reported using the NCCN clinical practice guidelines for CIN and FN, although only 56% reported that using them was their own decision. Respondents who reported that using the clinical practice guidelines was their decision were almost three times more likely to use them. The respondents felt that they were expected to perform patient risk assessment for CIN and FN as members of ONS. In addition, they reported that their job descriptions required them to perform patient risk assessment and management and provide patient education for CIN and FN. The respondents may not have known that they actually were using the clinical practice guidelines' content. Almost all respondents felt that assessing patients for chemotherapy side effects was essential and acknowledged that their practices may positively influence patient outcomes and consequences.

Thirty-three percent of participants responded to the seven statements about barriers to using the clinical practice guidelines. The environment in which the nurses practice seemed to influence their use of evidence- and consensus-based algorithms for CIN and FN. According to Ajzen and Fishbein (1980), attitude, subjective norms, and perceived behavioral control (perceived competence and confidence in the current study) also may be influenced by reports of perceived barriers and are considered to be objective environmental factors in the Theory of Planned Behavior.

Absent barriers, nurses reported having greater control over their own behavior with the resources they needed to perform assessment, management, and patient education. Although some nurses perceived barriers to their use of the clinical practice guidelines for CIN and FN, associations revealed professional collaboration in patient assessment for CIN. Respondents who reported professional collaboration between doctors and nurses in patient assessments described significant associations with fewer perceived barriers and greater use of the NCCN clinical practice guidelines for CIN and FN. The finding was supported by the demonstrated associations between fewer reported perceived barriers

Table 6. Barriers Reported by Nurses to Using NCCN Clinical Practice Guidelines for CIN and FN

Category	n	%
It's not up to me to use the guidelines.	111	37
Other barriers exist in my practice that prevent me from using the guidelines.		
• Specified	63	21
• Not specified	11	4
I am not familiar with the guidelines.	53	18
I am not aware of guidelines for CIN and FN.	29	10
I don't know if using the guidelines makes a difference in patient outcomes, I don't need to use them in my practice, or I don't agree with the guidelines.[a]	32	11

N = 299

[a] Three items were combined because of the small numbers of nurses identifying individual items.

CIN—chemotherapy-induced neutropenia; FN—febrile neutropenia; NCCN—National Comprehensive Cancer Network

Table 7. Knowledge Scores on Neutropenia by Educational Level

Correct Responses (%)	Less Than Bachelor's (N = 84)		Bachelor's or Higher (N = 223)		Total (N = 307)	
	n	%	n	%	n	%
0–60	18	21	26	12	44	14
70–80	50	60	121	54	171	56
90–100	16	19	76	34	92	30

Note. Chi-square $p < 0.001$

to performing CIN risk assessment and increased use of Web sites for professional oncology education.

Most nurses had high response scores on the evidence-based knowledge items. However, 61% did not recognize that patients who are receiving their first cycle of chemotherapy are at greater risk for developing CIN and FN complications. Several studies have identified that the first cycle of chemotherapy is the most common risk factor; the information is included in most professional presentations about CIN and FN (Crawford et al., 2004, 2008; Lyman et al., 2006). Further exploration of the finding may be pertinent to establishing standards for nurses to provide and reinforce patient and family education, particularly at the beginning of the chemotherapy regimen.

Study Limitations

Targeting only a population of computer-using ONS members for participation in a research study may have biased the survey results. However, the ONS membership has a high proportion of computer users, making computer use unlikely to have significantly distorted findings. The study respondents also differed from general ONS RN members in their personal and professional characteristics; respondents in the study sample were more educated, were older, and had more oncology nursing experience.

The decision to keep the survey open for two weeks with a reminder invitation sent after one week was made based on evidence that no significant increase in response rates to online surveys occurs after two weeks (Dillman, 2007; Quiros, Lin, & Larson, 2007). During the two-week time period that the Neutropenia Oncology Nurses Survey was available to the 4,000 eligible ONS members, ONS sent 25 other e-mails to its members, although not all members received all 25 (n = 60–34,444 per e-mail). In addition, the Neutropenia Oncology Nurses Survey was conducted in April, two weeks before the annual ONS Congress was held in May 2008. Therefore, nurses who responded to the study survey may have had a greater professional interest in the topic, which, in turn, may have led to a sampling bias, as often is the case with self-report survey responses.

The use of self-report may have resulted in overestimation of the rate of guideline use and possibly underestimation of the impact of barriers in the professional work environment. Future studies of guideline use in clinical practice should incorporate medical record documentation to verify self-report activities such as nursing assessment, management, and patient education.

The response rate to surveys mailed or electronically delivered always is an issue of concern. In the current study, the overall response rate to the Neutropenia Oncology Nurses Survey was only 9%, but the response rate for eligible nurses who opened the e-mails (click-through) and then completed and submitted the survey was 50%. No tracking mechanism was available to detect whether someone had actually read the e-mail, only that the e-mail was opened. To what extent the e-mail delivery may have been blocked by filters or other issues is not known.

Implications for Nursing Practice, Research, and Policy

The use of clinical practice guidelines in oncology practice has not been well studied. The Neutropenia Oncology Nurses Survey provides new information about risk assessment, management, and patient education in CIN and FN, as well as about some workplace barriers to evidence-based practice experienced by oncology nurses in various settings. A key finding was that nurses who reported fewer perceived barriers also reported higher use of the clinical practice guidelines. To date, data are limited on how use of clinical practice guidelines affects clinical decision making and overall patient care. Findings from the current study may serve as a basis to

Table 8. Summary of Nurses' Use of NCCN Clinical Practice Guidelines for CIN and FN

Variable	B	p	OR	95% CI
Advanced oncology nursing certification versus generalist or no certification	0.94	< 0.001	2.5	1.5–4.5
Perceptions of nurse and doctor colleagues (subjective norm)	1.81	0.006	6.1	2.3–16.2
Perceived barriers	1.66	< 0.001	5.3	2.2–12.5

N = 309

CI—confidence interval; CIN—chemotherapy-induced neutropenia; FN—febrile neutropenia; NCCN—National Comprehensive Cancer Network; OR—odds ratio

Note. Results of a logistic regression analysis

develop oncology nursing standards for CIN and FN risk assessment, management, and patient education based on the NCCN clinical practice guidelines.

Most of the current study's participants practice oncology nursing in community settings. Complex professional and work relationships between oncology nurses and physicians may influence the nurses' abilities to change or adapt practices (Grol & Grimshaw, 2003). A strength identified in the current study was the collaborative nature of oncology practice, in which a strong association existed between subjective norm and responses that both physicians and nurses evaluate patients for CIN and FN. Studies related to the collaborative aspects of oncology practice may provide rich information that may be used to recruit and retain oncology clinicians. Research should focus on the best way to develop professional collaborative efforts to ensure that the supportive care delivered by oncology nurses in cancer screening, diagnosis, treatment, survivorship, palliation, and end-of-life care—as the main outcome measures—is of the highest standard possible.

Conclusion

The current study's results demonstrate the feasibility of conducting investigator-initiated research in partnership with ONS to electronically survey eligible ONS members. As a first-time effort, the current study provides some preliminary insights into future membership surveys that have bearing on organizational policies for nursing practice. Strategies to enhance participation rates in electronic communication such as using local chapter meetings to encourage participation are recommended.

The current exploratory study addressed a serious gap in existing research and was the first to investigate oncology nurses' reported practices for risk assessment, management, and patient education in CIN and FN. The results suggest the need to develop resources such as standard nursing protocols that nurses in all oncology practice settings may use. Identifying outcome measures in which oncology nurses can play significant roles in the translation of evidence- and consensus-based guidelines for CIN and FN in their practice settings would be productive.

More cancer care in the United States is shifting to community settings. The anticipated shortage of medical oncologists, an increase in patients receiving supportive care, and the aging population of patients with cancer suggest the need for educated and knowledgeable oncology nurses to take bigger roles in providing supportive cancer care. The expanding oncology nursing role will be a critical contribution to cancer diagnosis, treatment, survivorship, and end-of-life care in the United States.

Anita Nirenberg, DNSc, RN, NP, BC, AOCNP®, is the William Randolph Hearst Professor of Clinical Nursing in the Hunter-Bellevue School of Nursing at Hunter College in New York, NY; and Nancy K. Reame, BSN, MSN, PhD, is the director of the DNSc/PhD program and leader of the pilot studies resource in the Irving Institute for Clinical and Translational Research, Kenrick D. Cato, RN, BSN, is a PhD student, and Elaine L. Larson, PhD, RN, is a professor of pharmaceutical and therapeutic research and associate dean for research, all in the School of Nursing at Columbia University in New York, NY. No financial relationships to disclose. Nirenberg can be reached at anirenbe@hunter.cuny.edu, with copy to editor at ONFEditor@ons.org. (Submitted October 2009. Accepted for publication December 10, 2009.)

Digital Object Identifier: 10.1188/10.ONF.765-773

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For Further Exploration

Use This Article in Your Next Journal Club Meeting

Journal club programs can help to increase your ability to evaluate the literature and translate those research findings to clinical practice, education, administration, and research. Use the following questions to start the discussion at your next journal club meeting. At the end of the meeting, take time to recap the discussion and make plans to follow through with suggested strategies.

1. How familiar are we with the National Comprehensive Cancer Network (NCCN) clinical practice guidelines for chemotherapy-induced neutropenia (CIN) and febrile neutropenia (FN)? Are the guidelines implemented at our facility?
2. Do we use system-specific guidelines instead? If yes, how do our guidelines compare to the NCCN clinical practice guidelines?
3. What is the level of knowledge of our staff about CIN and FN?
4. How do we document assessment, management, and patient education about CIN and FN?
5. In what ways can we improve our patient care in this area?

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