Risk for Unplanned Hospital Readmission of Patients With Cancer: Results of a Retrospective Medical Record Review

Carolyn Weaver, RN, MSN, AOCN®, Linda Schiech, RN, MSN, AOCN®, Jeanne Held-Warmkessel, RN, MSN, AOCN®, APRN, BC, Pamela Kedziera, RN, MSN, AOCN®, Eileen Haney, RN, BSN, Gloria DiLullo, RN, BSN, James S. Babb, PhD, Karen Ruth, MS, Deena Dell, RN, MSN, AOCN®, BC, and Andrea Barsevick, RN, DNSc, AOCN®

Purpose/Objectives: To identify potential factors that place patients with cancer at risk for unplanned readmissions after discharge from the hospital.

Design: Retrospective, descriptive, medical record review.

Setting: A National Cancer Institute–designated comprehensive cancer center in an urban area of the Northeastern United States.

Sample: 78 patients were selected from those readmitted within seven days of discharge. For each readmission case, a nonreadmitted patient was randomly selected and matched on discharge date and reason for prior admission. The age range was 22–87 years, men and women were equally represented, and 88% were Caucasian.

Methods: The Readmission Criteria Record was developed to collect data from medical records about factors associated with readmission, including demographics, severity of illness, support at home, symptoms, and comorbidities.

Main Research Variables: Criteria associated with readmission risk.

Findings: Patients who had gastrointestinal cancer, nausea within 24 hours of discharge, financial and insurance concerns, or caregiver difficulty or those who lived alone were more likely to be readmitted within seven days of discharge. Patients were more likely to be readmitted on Friday than any other day. Among readmitted patients, 48% were readmitted within one to two days postdischarge.

Conclusions: Knowledge of factors that may place patients with cancer at an increased risk for readmission and subsequent implementation of appropriate interventions during hospitalization may help to decrease risk of readmission.

Implications for Nursing: The factors identified provide a basis for assessment, planning, interventions, and follow-up of patients to help reduce the risk of readmission and, thus, poor outcomes.

Key Points . . .

➤ Unplanned patient readmissions to a hospital or acute care facility are costly to the facility, financially and as an indicator of poor-quality inpatient care.

➤ Factors such as type of cancer, nutritional and financial issues, and support may influence risk of hospital readmission for patients with cancer.

facility, financially and as an indicator of poor quality inpatient care (Ashton, Kuykendall, Johnson, Wray, & Wu, 1995). Thus, interest has been heightened in improving the outcomes of hospitalized patients and preventing readmissions.

Carolyn Weaver, RN, MSN, AOCN®, Linda Schiech, RN, MSN, AOCN®, and Jeanne Held-Warmkessel, RN, MSN, AOCN®, APRN, BC, are clinical nurse specialists, and Pamela Kedziera, RN, MSN, AOCN®, is a clinical manager in pain management, all at Fox Chase Cancer Center in Philadelphia, PA; Eileen Haney, RN, BSN, is an organ recovery coordinator at the Transplant Resource Center of Maryland in Baltimore; Gloria DiLullo, RN, BSN, is a level II staff nurse at Fox Chase Cancer Center; James S. Babb, PhD, is an associate professor in the Department of Radiology in the School of Medicine at New York University in New York City; and Karen Ruth, MS, is a research statistician, Deena Dell, RN, MSN, AOCN®, BC, is a clinical nurse specialist, and Andrea Barsevick, RN, DNSc, AOCN®, is the director of nursing research, all at Fox Chase Cancer Center. The study was supported by an ONS Foundation/Oncology Nursing Certification Corporation Outcomes Research Grant. (Submitted April 2004. Accepted for publication December 31, 2005.)

As healthcare resources are depleted, the need for decreased medical care costs to hospitals and patients becomes more evident (Shipton, 1996). Unplanned patient readmissions to a hospital or acute care facility are costly to the

In a review of the literature, readmission rates varied from a low of 7% for 99 patients readmitted within seven days to a community-based medical center (Friedmann, Jensen, Smiciklas-Wright, & McCamish, 1997) to a high of 44% within a three-month period for 128 patients with heart failure from two community hospitals (Schwarz & Elman, 2003). Shipton (1996) reported that in the early 1990s, the percentage of multiple hospital readmissions per year in the United States was 21%–27%. In 1998, the urgent readmission rate at an National Cancer Institute– (NCI–) designated comprehensive cancer center, Fox Chase Cancer Center in Philadelphia, PA, was 7%. This involved 241 readmissions to the hospital within seven days of discharge. Forty readmissions were for a diagnosis of dehydration, 28 for neutropenia, 21 for nausea and vomiting, and 15 for pain.

Nurses must know the most common reasons for which patients with cancer are readmitted. Teaching patients how to prevent potential problems and emphasizing that they notify the healthcare team when symptoms present may help to decrease hospital readmissions. In addition to knowing the common reasons for readmission, oncology nurses also should recognize, prior to patients' discharge, specific factors that put particular patients at risk for readmission. Again, this would allow nurses to individualize and focus teaching efforts and discharge planning. Because cancer is a major chronic health problem in the United States, researchers can benefit from studying this population.

Purpose

The purpose of the current research study was to identify factors that place patients with cancer at risk for unplanned readmission within seven days of discharge. The literature on readmission in patients with cancer is sparse; thus, collecting information in such a vulnerable population is important. The researchers' intention was to use data mining to generate rather than formally test statistical hypotheses. The identification of potential risk factors for readmission is particularly salient for advanced practice nurses (APNs) because they frequently are consulted about patients with complex problems, including those with multiple hospital admissions for the same concerns. The results of this study could provide a basis for assessment, planning, interventions, and follow-up of patients to reduce the risk of readmission and the resulting poor outcomes. Incidentally, the study may reveal problems with inpatient care or processes. Comprehensive discharge planning by APNs has demonstrated short-term reductions in readmissions of older adults with cardiac problems (Naylor et al., 1999). The current study's researchers hypothesized that because of numerous complicated needs, patients with cancer also are at risk for hospital readmission and may benefit from nursing interventions.

Literature Review

Based on an extensive literature review, published studies examining predictors of hospital readmission specifically for patients with cancer in the United States were not found. Readmission has been explored in rehabilitation facilities and homecare settings as well as in studies of other medical conditions such as coronary artery disease and stroke (Happ, Naylor, & Roe-Prior, 1997; Ottenbacher et al., 2001). The length of time defined as readmission varied among studies from seven days to 24 weeks (Friedmann et al., 1997; Naylor et al., 1999).

Shipton (1996) provided a valuable review of 13 research studies of hospital readmissions published from 1985–1992. Risk factors associated with readmission were advanced age, advanced stage of disease or severity of illness, prior hospitalizations, discharge to home alone, and hospital stays longer than 14 days. Other possible risk factors identified in 2 of the 13 studies included dependence and the need for assistive devices to walk.

Additional potential risk factors for readmission were identified in studies of older adults with cardiac disease, including coronary artery disease (Levine et al., 1996) and congestive heart failure (Happ et al., 1997; Hoskins, Walton-Moss, Clark, Schroeder, & Thiel, 1999; Philbin, Dec, Jenkins, & DiSalvo, 2001; Proctor, Morrow-Howell, Li, & Dore, 2000; Schwarz & Elman, 2003). Risk factors included depression (Levine et al.); inadequate medication supply; failure to follow prescribed diets; continuing to abuse substances such as alcohol, tobacco, and drugs (Happ et al.); and low income (Philbin et al.). Severity of illness was a readmission predictor in studies by Schwarz and Elman and Proctor et al. Schwarz and Elman identified poor functional status as an interactor with illness severity in predicting readmission. Sicker patients were more likely to need homecare services, and the need for a home health aide was a predictor of readmission in the study by Hoskins et al.

Nutritional issues have been shown to play a role in patient readmissions, as identified by Friedmann et al. (1997). Weight loss and no increase in serum albumin within one month of hospital discharge were predictors of hospital readmission in that study of 99 older adults at a university-affiliated hospital. Low serum albumin is a predictor of pathologic states, including poor wound healing and nephrotoxicity, as well as an indicator of overall poor health (Doweiko & Nompleggi, 1991). Fisher, Wennberg, Stukel, and Sharp (1994) compared readmission rates among Medicare beneficiaries in the northeast and found no difference among the groups in terms of age. They did, however, find that a greater number of hospital beds in one large city increased the probability of readmission. Apparently, the presence of available hospital beds encouraged physicians to readmit patients after an outpatient or emergency room visit.

Low-quality patient care is, of course, a great concern and has been associated with readmissions of patients with common general medical problems (Ashton et al., 1995). In one study, if patients with congestive heart failure did not meet all of the criteria in readiness-for-discharge assessments or had a low-admission workup score, they were identified as having low-quality patient care and were more likely to have an unplanned readmission. Readiness for discharge adherence scores were determined by patients' ability to meet preset criteria, including stable or improving symptoms, stable laboratory results, and an understanding and verbalization of correct diet and medication regimen (Ashton et al., 1994).

Alexy, Elnitsky, and Nichols (1996) studied hospitalized patients aged 65 or older from 1992–1993 using the hospital database and found that patients with a readmission for a different major diagnostic category than their original hospitalization had a greater likelihood of maintaining independence longer than patients with a readmission for the same major diagnostic category. In addition, readmission

occurred 10 days earlier for the same category than for a different category.

In summary, although many studies have examined risk factors for readmission, no single factor was a universal predictor of readmission (Shipton, 1996). Studies specific to the population of patients with cancer were limited. The literature did provide some insight into potential risk factors to pursue in the current study, including inadequate family or caregiver support system, active and chronic health problems, depression, poor performance status, advanced age, advanced stage of disease, discharge to home alone without assistance, and poor nutritional status. Those factors, along with other potential factors identified by the researchers, were evaluated to determine whether they were associated with readmission risk in patients with cancer.

Methods

Design and Setting

The study was a retrospective, descriptive, medical record review of hospital admissions of patients with cancer. It was conducted in a freestanding, NCI-designated comprehensive cancer center in an urban area. All study materials were submitted to and approved by the institutional review board. Because of the nature of the study, participants were not contacted directly and informed consent was not necessary. Team members participated in institutional review board education to ensure adherence to institutional research policies and procedures related to human subjects.

Selection of Study Subjects

Seventy-eight patients were selected from those readmitted within seven days of discharge during a 15-month period. Eligible patients included those with any diagnosis who were discharged from the hospital, regardless of whether they were subsequently readmitted. For each readmission case, a patient who was not readmitted also was selected by matching on date of discharge and reason for prior admission. Readmitted patients were defined as individuals who had unplanned admissions to the hospital within seven days of their most recent discharge. Nonreadmitted patients were individuals who had no unplanned readmissions within seven days of their most recent discharge. Patients were excluded if they were scheduled for readmission within the seven-day period, such as for a planned surgery or chemotherapy administration.

The researchers developed a randomization schema to match readmitted patients with nonreadmitted patients whose index admissions were for the same general reason and who were discharged within days of each other. The list of all readmitted patients was obtained through the institution's information database, which generates reports of patients who have been readmitted within seven days of discharge. Using a random numbers table, readmitted patients were selected and, after the researchers determined whether their readmissions were unplanned, were stratified into one of three groups based on the reason for their index admission: general medical problem, surgery, or chemotherapy. From a list of all discharged patients, nonreadmitted patients discharged within the same time frame were selected. Nonreadmitted patients were selected randomly with the same discharge dates as the readmitted patients whenever possible. Once selected, the reason for index admission was determined. If it matched the same reason as a readmitted patient, that person was included in the study. If the reason for index admission did not match a readmitted patient, another patient was randomly selected until a match was found. To avoid biasing the sample toward a particular time of year—for example, the holiday season when readmission rates could be higher or lower than normal—study accrual was paced deliberately at an average of two patients per week.

Instruments

Naylor et al. (1999) identified certain risk factors associated with poor postdischarge outcomes and increased likelihood of readmission. These indicators included age 80 or older; inadequate support systems; multiple, active, chronic health problems; history of depression; moderate to severe functional impairment; multiple hospitalizations during the prior six months; hospitalization in the past 30 days; fair or poor self-rating of health; or history of nonadherence to therapeutic regimen.

The Social Work Services Department at the cancer center developed a list of factors used to identify patients with cancer who are at high risk for psychosocial problems (see Table 1). Although the list is not specific for readmission risk and is not scientifically generated, it has been used effectively at the researchers' facility for more than 15 years to aid in the identification of patients who would benefit from additional assessment and interventions by a social worker.

The researchers, consisting of four APNs with 21–30 years of experience in oncology (more than 100 years combined), identified additional criteria that they believed should be evaluated based on their knowledge and expertise.

Because no valid instruments exist for evaluating risk factors for readmission in patients with cancer, the researchers developed the **Readmission Criteria Record** (see Figure 1) for data collection. It was based on the risk factors identified by Naylor et al. (1999), the Social Work Services Department, and the researchers. This 82-item, two-page instrument was designed to collect demographic information as well as possible risk factors for readmission. A set of coding rules for completing the Readmission Criteria Record was established.

Table 1. Factors for Identifying Patients at High Risk for Psychosocial Problems

General Category	Risk Factors
Coping and adaptation	Anxiety
	Depression
	Coping issues
	Recent psychiatric history
	Suicide potential
	Chemical or alcohol abuse
Age	Younger than 30 years
	Older than 80 years
Home and family	Inadequate support
	No involved family
	Family conflict or abuse
Concrete	Financial
	Insurance

Readmission Criteria Record
Date of Review _____

Date of index admission _____   Date of readmission _____

Data collector _____   Medical record # _____   Age _____   Marital status _____   Gender _____   Race _____

Primary insurer _____   Secondary insurer _____

Readmitted within seven days: Yes ❏ No ❏   Denials _____   Skilled days _____

Reason for readmission _____

Matching variables

Reason for prior admission: Surgery ❏   Chemotherapy ❏   General medical ❏   Date of discharge _____

Type of cancer(s) _____

Readmission day of week _____   Number of postdischarge days _____

Discharge date census _____   Discharge unit _____   Visiting nurse referral: Yes ❏   No ❏

Discharge status: Lives alone, no assistance ❏   Lives alone, some assistance ❏   Lives with someone, no assistance ❏
          Lives with someone, some assistance ❏   Extended-care facility ❏

Weight change (prior 30 days) _____   Last serum albumin _____   Last hemoglobin _____

Reads and understands English: Yes ❏   No ❏

General

Eastern Cooperative Oncology Group performance status at discharge: 0 ❏   1 ❏   2 ❏   3 ❏   4 ❏   Fall risk at discharge: Low ❏   Medium ❏   High ❏

Activities of daily living at discharge: I ❏   A ❏   D ❏   Nausea within 24 hours of discharge: Yes ❏   No ❏

Number of medications on discharge _____

Active non–cancer-related health problems

Psychiatric
Attempted suicide: Yes ❏   No ❏   Current alcohol or drug abuse within three months of discharge: Yes ❏   No ❏
                    Alcohol use _____   Drug use _____
Family conflict or abuse within three months of discharge: Yes ❏   No ❏   Psychiatric diagnosis with treatment: Yes ❏   No ❏   Other _____

Neurologic
Seizures: Yes ❏   No ❏   Stroke or cerebrovascular accident: Yes ❏   No ❏   Transient ischemic attack: Yes ❏   No ❏   Other _____

Cardiovascular
Coronary artery disease: Yes ❏   No ❏   Hypertension: Yes ❏   No ❏   Congestive heart failure: Yes ❏   No ❏   Other _____

Pulmonary
Chronic obstructive pulmonary disease: Yes ❏   No ❏   Pulmonary edema: Yes ❏   No ❏   Other _____

Diabetes mellitus
Insulin dependent: Yes ❏   No ❏   Non–insulin dependent: Yes ❏   No ❏

Renal
Chronic renal insufficiency: Yes ❏   No ❏   Other _____

Liver
Cirrhosis: Yes ❏   No ❏   Hepatitis: Yes ❏   No ❏   Other _____

Gastrointestinal
Gastroesophageal reflux disease: Yes ❏   No ❏   Hiatal hernia: Yes ❏   No ❏   Active ulcer disease: Yes ❏   No ❏   Other _____

Psychiatric problems exhibited within 48 hours of discharge
Depression: Yes ❏   No ❏   Anxiety: Yes ❏   No ❏   Suicidal ideation: Yes ❏   No ❏   Other _____

General medical problems within 48 hours of discharge
Confusion or disorientation: Yes ❏   No ❏   Shortness of breath: Yes ❏   No ❏
Last documented pain rating of 5 or less: Yes ❏   No ❏   Last documented pain rating of 6 or more: Yes ❏   No ❏   Other _____

Psychosocial problems during length of admission
Financial or insurance: Yes ❏   No ❏   Unrealistic expectations: Yes ❏   No ❏   Coping issues: Yes ❏   No ❏
Difficulty with caregiving: Yes ❏   No ❏   Inadequate support: Yes ❏   No ❏   Other _____

Metastatic sites documented during admission
Bone: Yes ❏   No ❏   Brain: Yes ❏   No ❏   Liver: Yes ❏   No ❏   Lung: Yes ❏   No ❏   Other _____

Comments _____
_____
_____

Figure 1. Readmission Criteria Record

A pilot study of 16 medical records was done to establish the utility of the instrument, determine the clarity of the instructions, and eliminate any misleading response choices. Coding disagreements among the researchers were discussed, and resolutions were documented in a central log of coding rules. As a result of the pilot study, researchers identified additional criteria that deserved consideration, and the Readmission Criteria Record and the coding rules were revised accordingly. Interrater reliability was established at a minimum rate of 90% during the pilot phase and maintained at that level or higher on random checks throughout the duration of the study.

Procedure

After training was complete, a researcher selected medical charts for review and completed the study instrument. Information was obtained from the history and physical form, nursing admission history form, progress note, and consult sections. A second research team member reviewed the form for any missing data to ensure completeness. The data were coded and entered into a database for analysis. Systematic problems in data entry were detected by visual examination of the printed copy to determine whether line lengths were consistent with codebook specifications. Data were collected for a 15-month period. The seven-day readmission rates for patients were 7.7% and 7.8% for the data collection time frame.

Data Analysis

Nonreadmitted patients were matched with readmitted patients on the reason for index admission (surgical, chemotherapy, or general medical) and also on the date of discharge. McNemar's test for matched pair data was used for predictors with two levels, whereas conditional logistic regression was used to evaluate predictors with more than two levels. For predictors with more than two levels and sparsely distributed, exact conditional logistic regression was used. For age, number of medications, and length of index admission, significance was determined using the Wilcoxon signed-rank test, a nonparametric test analogous to a paired t test. Weight change, serum albumin, and hemoglobin also were compared with the Wilcoxon rank-sum test. By doing a multinomal distribution and summing the probabilities of the combinations, the readmission day of the week probability was determined. Significance was evaluated using two-tailed tests at p = 0.05.

Findings

Sample

A sample of 156 medical records was selected, half with an unplanned readmission within seven days of discharge and half not readmitted within seven days of discharge. Eight records did not meet the eligibility criteria. The final sample size used in the data analyses was 148 patients. Most of the patients were admitted initially for a general medical reason (62%), with 22% of the patients being admitted for chemotherapy and 16% for surgery.

Selected Demographics

Demographic characteristics were evaluated to identify differences between the readmitted and nonreadmitted groups (see Table 2). The age range of the adult-only population was 22–87 years, with the majority (74%) aged 50–79 years.

Table 2. Selected Demographics of Readmitted and Nonreadmitted Groups

Characteristic	Readmitted (N = 74)		Nonreadmitted (N = 74)	
	$\bar{X}$	SD	$\bar{X}$	SD
Age (years)	58.00	15.50	61.95	12.95
Characteristic	n	%	n	%
Age (years)				
< 40	11	15	5	7
40–59	29	39	21	28
60–79	29	39	43	58
80+	5	7	5	7
Gender				
Male	40	54	39	53
Female	34	46	35	47
Race				
Caucasian	66	89	64	87
Non-Caucasian	8	11	10	14
Marital status				
Single or divorced	19	26	9	12
Married	48	65	51	69
Widowed	7	10	14	19

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

Patients whose index admission was for a general medical reason were significantly older than those admitted for surgery or chemotherapy (p = 0.0003). Readmitted patients tended to be younger than nonreadmitted patients (58 compared to 62 years of age), with a trend toward significance (p = 0.07). No significant differences existed between the readmitted and nonreadmitted groups in relation to race or gender. A total of 130 Caucasian patients and 18 non-Caucasian patients participated, reflective of the population treated at the institution. Differences existed according to marital status (p = 0.0487). Of those readmitted, 26% were single or divorced compared to only 12% of those not readmitted. Readmitted patients were less likely to be widowed.

Clinical Characteristics

Clinical characteristics were examined to identify differences between the readmitted and nonreadmitted groups. In reporting readmission by cancer type (see Table 3), types were combined into more general categories when indicated. Patients with gastrointestinal (GI) cancers were more likely to be readmitted than those without GI cancers (p = 0.0118). Forty-two percent of patients were readmitted for a GI reason (see Table 4). One factor that distinguished the groups was nausea. Among the patients with nausea within 24 hours prior to discharge of index admission (n = 22), 73% were readmitted (p = 0.01) compared to 46% among those who were not nauseated. Moreover, nausea was the reason for 22% of the readmissions in the study.

Based on research on hospital readmissions (Naylor et al., 1999), the researchers selected active health problems or comorbidities not related to cancer that were most likely to be predictive of readmission (see Table 5). First, the total number of comorbidities per patient was examined. Patients with fewer comorbidities tended to be more likely to be readmitted to the hospital (two for the nonreadmitted group

Table 3. Readmission by Cancer Type

Cancer Type	Readmitted (N = 74) n	Nonreadmitted (N = 74) n	Odds Ratio
Head and neck	5	3	2.00
Lung	14	22	0.50
Gastrointestinal	24	10	3.00*
Leukemias	2	3	0.67
Lymphomas	9	4	2.25
Urinary	2	7	0.29
Female reproductive	4	3	1.33
Male reproductive	1	4	0.25
Breast	3	9	0.25
Sarcoma	4	3	1.33
Other	6	6	1.00

*p = 0.0118

versus one for the readmitted group, p = 0.07). Then, each comorbidity was evaluated separately to determine whether a specific comorbid condition was more evident in the readmitted group. No significant differences were found in the readmitted group; however, patients with hypertension were less likely to be readmitted than those without hypertension (p = 0.007). A logistic regression adjusting for the age difference was done to see whether it would explain the association between hypertension and readmission status. The association remained (p = 0.03) with adjustment for age.

Patients with confusion or disorientation within 48 hours prior to discharge of their index admission tended to be less likely to be readmitted (p = 0.063), but the number of patients with confusion or disorientation in the study was small (n = 5). Patients who had a higher risk for falls at discharge were less likely to be readmitted (p = 0.08). Only 3 of the 14 (21%) people deemed at high risk for falls were readmitted, whereas 53% of those with a low risk for falls were readmitted. The number of medications the patient was taking when discharged did not differ significantly between the groups. Although weight change in the prior 30 days did not influence a patient's readmission risk, the statistical power to detect an effect because of weight change was adversely affected by the fact that evidence of weight change within a 30-day period was not available for 75 of the 148 patients. Serum albumin and hemoglobin levels prior to discharge did not influence risk of readmission. People who needed assistance with activities of daily living were no more likely to be readmitted than those who were independent. However, only four patients were dependent on others for full care. Performance status, as measured by the Eastern Cooperative Oncology Group score, did not increase readmission risk.

Hospital-Related and Discharge Factors

Selected hospital-related and discharge issues were analyzed to determine whether they had any effect on patient readmission. On average, readmitted patients had a shorter index stay than those not readmitted (3.9 days compared to 4.7 days), but this difference was not significant. Readmission status differed by living situation (p = 0.047), with patients living alone being more likely to be readmitted (15% of readmitted patients lived alone compared to 20% of those not readmitted). Patients with caregiver difficulty (p = 0.0455) and those

with financial or insurance concerns (p = 0.0455) were more likely to be readmitted (see Table 6). Patients were more likely to be readmitted on a Friday than any other day of week (p = 0.0485) (see Figure 2). Among the readmitted patients, 48% were readmitted within one to two days following discharge (p = 0.009) (see Figure 3). In such instances, the question may be whether these patients were discharged prematurely.

Readmission risk was not increased for any insurer, including indemnity plans, preferred-provider organizations, point-of-service programs, health-maintenance organizations, or Medicare. The inpatient census on the day of discharge, the unit from which the patient was discharged, and whether they had a homecare referral were not associated with risk of readmission.

Discussion

Risk for readmission of patients with cancer was associated with having a GI cancer, experiencing nausea within 24 hours of discharge, having caregiver difficulty, experiencing financial or insurance concerns, and living alone. As previously noted, the population studied here is unique because all but two of the patients had cancer. People with cancer are a special population, often with complex care needs as well as psychosocial issues.

Patients with GI cancers included those with colorectal, esophageal, pancreatic, gastric, and gallbladder cancers. Those patients often have complex care needs that may be related to ostomy care, poor wound healing because of prior radiation, pain, tube feedings, or other nutritional issues related to nausea and treatment. Thus, patients with GI cancers are understandably a population at risk for readmission. Nausea is a common side effect of cancer and its treatments (chemotherapy, radiation, and surgery), which is why it was included in the assessment criteria. Nausea also was found to be one of the main reasons for unplanned readmission at the researchers' institution. Although the symptom was neither found to have been studied nor reported by other researchers in the literature review, the researchers were not surprised that nausea within 24 hours of discharge was a factor of readmission. Nausea continues to be a significant problem for patients with cancer despite the availability of effective antiemetic regimens and guidelines (Grunberg, 2004). During the data collection, available antiemetics were found to be inadequate in managing delayed emesis. Perhaps the availability of new medicines for delayed emesis will help the problem. In some cases, patients may have used antiemetic medications less frequently than prescribed because of financial reasons.

Table 4. Reason for Readmission

Reason	n	%
Gastrointestinal symptoms	31	42
Pain	22	30
Fever	20	27
Pulmonary	16	22
Central nervous system	8	11
Tube or wound	8	11
Miscellaneous	14	19

N = 74

Note. More than one reason could apply.

Table 5. Active Health Problems and Comorbidities Not Related to Cancer

General Category	Specific Health Problem
Neurology	Seizures Cerebral vascular accident Transient ischemic attacks
Pulmonary	Chronic obstructive pulmonary disease Pulmonary edema
Cardiovascular	Coronary artery disease Hypertension Congestive heart failure
Diabetes mellitus	Type I and type II
Renal	Chronic renal insufficiency
Liver	Cirrhosis Hepatitis
Gastrointestinal	Gastroesophageal reflux disease Hiatal hernia Active ulcer disease
Psychiatric	Attempted suicide Alcohol or drug abuse Family conflict Psychiatric diagnosis (depression, anxiety)

The identification of this factor associated with readmission focuses attention on the need for improved management of nausea prior to discharge as well as enhanced patient and family education and assessment. Patients should be educated about methods to reduce nausea, such as proper medication usage. They also should be taught other tips, such as avoiding foods that are overly warm, spicy, or greasy or that have strong odors, and to eat small meals several times a day. Assessment should include their understanding of specific instructions, including when to call the nurse or physician and their intentions on getting prescriptions filled. If financial support is needed, social work services could intervene.

Living alone and caregiver difficulty understandably could be associated with readmission. As stated previously, patients with cancer have complex needs. Symptom management, including management of medications, can be overwhelming for a person with cancer. Living with a support person who is able to help with medical-related issues and everyday issues is extremely beneficial. Patients who have financial or insurance concerns may be more likely to be readmitted because of lack of financial resources to cover the cost of medications, supplies, and assistance. Inadequate care at home can result in complications that require readmission.

An explanation for why those with a higher risk of falls were less likely to be readmitted is probably a result of a tendency, at the time, for staff to underrate patients' fall risks, as later identified by a quality monitor conducted at the facility. If fall risk assessments were scored accurately, many more patients likely would have been placed in the high-risk-for-falls category. Why hypertension was associated with patients being less likely to be readmitted is unclear. Because the incidence of hypertension increases with age and those with advanced age were less likely to be readmitted, perhaps the association is between age and readmission.

Five patients in the study had confusion within 48 hours of discharge, but, surprisingly, it was associated with a decrease in the likelihood of readmission. Whether the confusion was acute, possibly related to a medication or treatment, or chronic, such as in the case of brain metastases, Alzheimer disease, or dementia, is unclear. The small number of patients may have had strong, established support systems at discharge. The researchers anticipated that Friday was the day of the week on which patients were most likely to be readmitted. Experience indicated that patients delay notifying their physician when symptoms occur, but if symptoms still persist on Friday, patients call their physician, who otherwise may not be available on the weekend. Reinforcing with patients the need to call when symptoms occur and not wait until they are severe should be a routine part of discharge instructions. Knowing that patients are more likely to be readmitted one to two days after discharge reinforces the need for oncology nurses to carefully assess patients' readiness for discharge and advocate for them as needed, as well as to make follow-up phone calls to patients at high risk for readmission after discharge.

Although Naylor et al. (1999) found that advanced age, multiple active chronic health problems, history of depression, and moderate to severe functional impairment predicted readmission in a cardiac population, the findings from the current oncology population did not support those results. This could be true because of the age differences between this sample and the older adult sample studied by Naylor et al. The findings also could conflict because of the unique characteristics of the oncology population.

The fact that patients with fewer comorbidities were readmitted more often is not as meaningful because the absolute difference between the groups was so small (two versus one). Only six patients in the study (4%) had depression noted in the medical record, which is lower than the rate of 20%–25% reported in people with cancer by McDonald et al. (1999). The number may be low because of failure to recognize depression. McDonald et al. reported that primary care physicians fail to recognize major depression in the general patient population about 50% of the time.

The findings indicating that serum albumin levels and weight change did not influence readmission risk were inconsistent with Friedman et al. (1997), who found that nutritional factors were predictors of readmission in older adults. The results in the current study were affected by the fact that often the data collectors were not able to detect the presence of weight change within a 30-day period from the

Table 6. Psychosocial Problems During Length of Admission

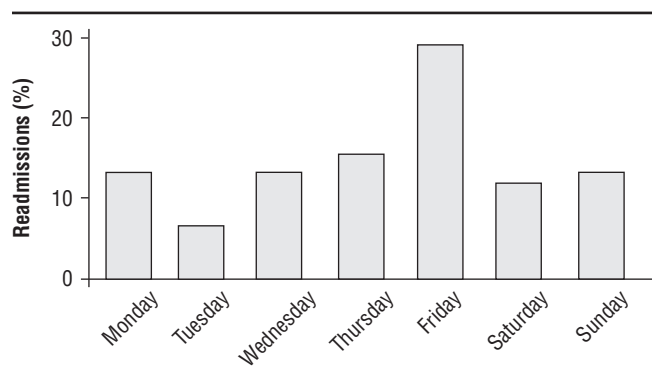| Problem	Readmitted (N = 74)		Nonreadmitted (N = 74)		
	n	%	n	%	p
Financial or insurance	5	7	1	1	0.0455
Coping issues	9	12	6	8	NS
Caregiver difficulty	5	7	1	1	0.0455
Inadequate support	3	4	1	1	NS
Other psychosocial problem	5	7	–	–	NS
Any psychosocial problem	14	19	10	14	NS

NS—not significant

Figure 2. Percentage of Readmissions by Day of Week

medical record. This was mainly because patients' weights were not documented consistently. Thus, if all weights were documented during the hospitalization, the results may have been different.

According to the American Hospital Association, as many as 59% of people taking five or more medications are non-compliant. In patients older than 65, compliance problems occur in more than 86% of medication users ("Adherence Tools," 1999). Poor patient outcomes have been associated with patients who take multiple medications (Cramer, Mattson, Prevey, Scheyer, & Ouellette, 1989). Thus, the researchers hypothesized that patients who were discharged on a larger number of medications may be more likely to be readmitted. This, however, was not evident. A reason for the finding might be that patients who were discharged on more medications had more choices available for symptom control.

Although the researchers examined insurance factors, in-patient census and bed availability, nursing unit of discharge, and absence of a homecare nurse referral as risk factors for readmission, none of the variables were associated with readmission. The finding is likely a reflection of the comprehensive discharge planning by case managers, because they work diligently with insurers, physicians, and nursing staff to ensure that patients are not discharged until they are ready to safely return home. The institution used for the sample is exempt from diagnostic-related groups; thus, Medicare patients are discharged when medically stable, not per Medicare length-of-stay guidelines.

Limitations

The results of the current study should be considered only tentative, requiring validation in future research. A subsequent validation study will identify which, if any, of the significant results are type I errors. As such, the results should be viewed as hypotheses for a subsequent validation study and not as definitive conclusions regarding factors affecting readmission.

As with all retrospective studies, certain limitations exist with this research. Retrospective studies are thought to not be as strong as prospective studies in their assumptions for causal associations because the proposed cause and proposed effect already have occurred (Polit & Hungler, 1999). Those types of studies frequently need additional research to confirm the findings. The medical record review, however, was able to provide the assessment data needed without the bias of a questionnaire. Generalizability is somewhat limited because of sampling. All patients were from one NCI-designated

comprehensive cancer center that is exempt from diagnostic-related groups, mostly Caucasian, and from a specific geographic region. The results, however, are still worthwhile for nurses who care for other patient populations in different regions to consider. Although the researchers developed the instrument, a careful review process was done to ensure that criteria were assessed consistently and inter-rater reliability was achieved.

Implications for Nursing

The study findings provide valuable information for nurses involved in discharge planning by allowing them to identify, prior to discharge, patients who are at risk for readmission. Because dehydration, neutropenia, nausea and vomiting, and pain are the most common reasons for an unplanned readmission at the researchers' institution, and patients with GI cancers have a tendency to be readmitted more often, nurses can use that information to carefully assess patients for problems prior to discharge. Assessing readiness for discharge is an essential responsibility of oncology nurses. Although younger patients may be regarded as more independent and knowledgeable than older patients, nurses also must carefully assess all patients' risk for readmission. Nurses can provide patient education about self-care activities and ensure that resources are available and used, including adequate medications, especially for patients with nausea. Patients who live alone or have caregiver difficulties may require assessment of the need for visiting nurses and, when appropriate, live-in help. Social work services should be consulted when patients have financial or insurance concerns. Although the initial intent was that APNs would use the findings to intervene accordingly, staff nurses, case managers, and discharge planning nurses also can assess patients and take action to prevent readmission.

The results of the study can be considered a first step in the process of discovering factors associated with readmission of patients with cancer. Subsequent validation studies will identify which, if any, of the study's significant results are legitimate risk factors for readmission. Future research with patients with cancer in other settings and geographic areas would add to this body of knowledge, thus increasing the generalizability of findings.
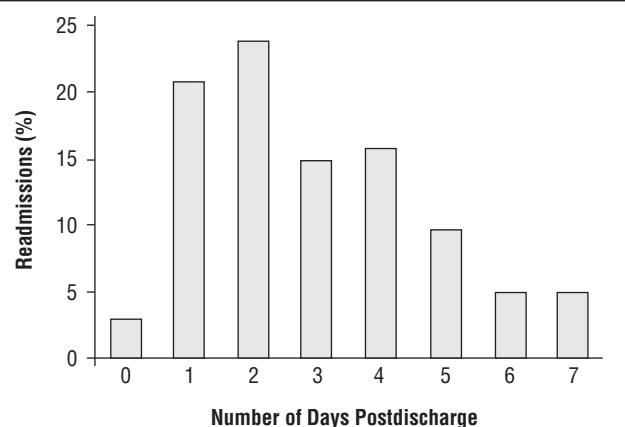

Figure 3. Percentage of Readmissions by Number of Days Postdischarge

The number of days a patient was in the hospital and the number of prior rehospitalizations, as suggested by Shipton (1996), and whether patient education was documented prior to discharge, which was identified as a predictor by Marcantonio et al. (1999), also should be studied. The inconsistency with age as a predictor of readmission, as noted in the literature, suggests that perhaps age should be linked with other factors such as financial status, insurance, and level of dependence or support. Lastly, researchers also may want to investigate whether interventions aimed at preventing readmission in high-risk patients are effective.

Author Contact: Carolyn Weaver, RN, MSN, AOCN®, can be reached at carolyn.weaver@fccc.edu, with copy to editor at ONFEditor@ons.org.

References

Adherence tools aid in good habits: Make medicines a part of patient's lifestyle. (1999, March). *Patient Education Management, 6,* 33–35.

Alexy, B.B., Elnitsky, C.A., & Nichols, B.S. (1996). Hospital readmissions for rural elderly: 1992–1993. *Journal of Nursing Administration, 26*(11), 10–16.

Ashton, C.M., Kuykendall, D.H., Johnson, M.L., Wray, N.P., & Wu, L. (1995). The association between the quality of inpatient care and early readmission. *Annals of Internal Medicine, 122,* 415–421.

Ashton, C.M., Kuykendall, D.H., Johnson, M.L., Wun, C.C., Wray, N.P., Carr, M.J., et al. (1994). A method of developing and weighing explicit process of care criteria for quality assessment. *Medical Care, 32,* 755–770.

Cramer, J.A., Mattson, R.H., Prevey, M.L., Scheyer, R.D., & Ouellette, V.L. (1989). How often is medication taken as prescribed? A novel assessment technique. *JAMA, 261,* 3273–3277.

Doweiko, J.P., & Nompleggi, D.J. (1991). The role of albumin in human physiology and pathophysiology, part III: Albumin and disease states. *Journal of Parenteral and Enteral Nutrition, 15,* 476–483.

Fisher, E.S., Wennberg, J.E., Stukel, T.A., & Sharp, S.M. (1994). Hospital readmission rates for cohorts of Medicare beneficiaries in Boston and New Haven. *New England Journal of Medicine, 331,* 989–995.

Friedmann, J.M., Jensen, G.L., Smiciklas-Wright, H., & McCamish, M.A. (1997). Predicting early nonelective hospital readmission in nutritionally compromised older adults. *American Journal of Clinical Nutrition, 65,* 1714–1720.

Grunberg, S.M. (2004). Chemotherapy-induced nausea and vomiting: Prevention, detection, and treatment—How are we doing? *Journal of Supportive Oncology, 2*(1, Suppl. 1), 1–13.

Happ, M.B., Naylor, M.D., & Roe-Prior, P. (1997). Factors contributing to rehospitalization of elderly patients with heart failure. *Journal of Cardiovascular Nursing, 11,* 75–84.

Hoskins, L.M., Walton-Moss, B., Clark, H.M., Schroeder, M.A., & Thiel, L. (1999). Predictors of hospital readmission among the elderly with congestive heart failure. *Home Healthcare Nurse, 17,* 373–381.

Levine, J.B., Covino, N.A., Slack, W.V., Safran, C., Safran, D.B., Boro, J.E., et al. (1996). Psychological predictors of subsequent medical care among patients hospitalized with cardiac disease. *Journal of Cardiopulmonary Rehabilitation, 16,* 109–116.

Marcantonio, E.R., McKean, S., Goldfinger, M., Kleefield, S., Yurkofsky, M., & Brennan, T.A. (1999). Factors associated with unplanned hospital readmission among patients 65 years of age and older in a Medicare managed care plan. *American Journal of Medicine, 107,* 13–17.

McDonald, M.V., Passik, S.D., Dugan, W., Rosenfeld, B., Theobald, D.E., & Edgerton, S. (1999). Nurses' recognition of depression in their patients with cancer. *Oncology Nursing Forum, 26,* 593–599.

Naylor, M.D., Brooten, D., Campbell, R., Jacobsen, B.S., Mezey, M.D., Pauly, M.V., et al. (1999). Comprehensive discharge planning and home follow-up of hospitalized elders: A randomized clinical trial. *JAMA, 281,* 613–620.

Ottenbacher, K.J., Smith, P.M., Illig, S.B., Fiedler, R.C., Gonzales, V., & Granger, C.V. (2001). Characteristics of persons rehospitalized after stroke rehabilitation. *Archives of Physical Medicine and Rehabilitation, 82,* 1367–1374.

Philbin, E.F., Dec, G.W., Jenkins, P.L., & DiSalvo, T.G. (2001). Socioeconomic status as an independent risk factor for hospital readmission for heart failure. *American Journal of Cardiology, 87,* 1367–1371.

Polit, D.F., & Hungler, B.P. (1999). Selecting a research design. In *Nursing research: Principles and methods* (6th ed., pp. 164–166). Philadelphia: Lippincott Williams and Wilkins.

Proctor, E.K., Morrow-Howell, N., Li, H., & Dore, P. (2000). Adequacy of home care and hospital readmission for elderly congestive heart failure patients. *Health and Social Work, 25,* 87–96.

Schwarz, K.A., & Elman, C.S. (2003). Identification of factors predictive of hospital readmissions for patients with heart failure. *Heart and Lung, 32,* 88–99.

Shipton, S. (1996). Risk factors associated with multiple hospital readmissions. *Home Care Provider, 1,* 83–85.