Food Insecurity Among Cancer Patients in Kentucky: A Pilot Study

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Abstract

Purpose: Food insecurity is defined as being uncertain of having enough food due to insufficient money or other resources. The purpose of this study was to examine the construct and correlates of food insecurity in a sample of cancer patients in Kentucky.

Patients and Methods: Data were collected in the waiting rooms of the chemotherapy, hematology/oncology, and gynecology/oncology clinics of a university cancer center, and included 115 cancer patients actively receiving treatment (mean age, 55.85 years; range, 23 to 88 years) who completed a series of standardized measures to assess food insecurity status and psychological and nutritional well-being. Descriptive statistics and independent samples *t* tests were used to assess the prevalence of food insecurity in the sample, and to identify differences between the persons who were food insecure and food secure.

Results: The prevalence rates of food insecurity and food insecurity with hunger in the sample were 17.4% and 7.8%, respectively, which are higher than in the general population. Food-insecure patients had statistically significant higher levels of nutritional risk, depression, and financial strain, and lower quality of life compared with food secure patients. Fifty-five percent of food insecure patients reported not taking a prescribed medication because they could not afford it, versus 12.8% of food-secure patients ($P = .002$).

Conclusion: Food insecurity may be an important consideration for clinical oncology practice, especially when caring for individuals of lower socioeconomic status. Further study is warranted, including prospective studies of cancer patients to identify causal relationships among food insecurity, cancer incidence, cancer treatments, and patient outcomes and well-being.

Introduction

For many cancer patients, their disease and its treatment produce many negative physical, psychological, and financial effects,¹⁻⁸ all of which contribute to poor quality of life. While ample research exists examining the causes and correlates of quality of life for cancer patients, the effect of food insecurity (FI) on cancer patients has not been studied previously. Food insecurity is defined as a person being, at some time during the year, uncertain of having or unable to acquire enough food because of insufficient money or other resources.⁹ Research demonstrates that FI is linked to malnutrition in adults and is associated with weakened resistance to infection and disrupted cognition and mental performance.¹⁰ Additionally, food insecure individuals have been shown to experience fatigue, reduced productivity, stress, depression, and restricted activity.^{11,12} The prevalence of FI varies among household types, and groups traditionally at risk (ie, women, minorities, and the elderly) are more likely to be food insecure.^{9,13} Regional differences in food insecurity are also common.⁹ Households located in nonmetropolitan areas and in the South of the United States are more likely to report FI. The most recent calculations have documented the prevalence rates of FI and FI with hunger nationwide as 11.9% and 3.9% respectively, and 12.2% and 3.3%, respectively, in Kentucky.¹⁴

Holben and Miles¹⁵ noted that FI is an important consideration for practicing family physicians, and this consideration likely extends to clinical oncologists. Many adverse effects associated with cancer and its treatment also are associated with food insecurity, including fatigue, depression, restricted activity, malnutrition, and weakened resistance to infection. Identifying food insecure patients may assist oncologists in disaggregating

the adverse effects caused by cancer diagnosis and treatment with those that may have been pre-existing and/or exacerbated due to FI. Food insecure patients also may not comply with prescribed therapies because of issues related to their FI,¹⁵ in that they may be choosing between paying for food or paying for medical care.¹⁶ Such decisions potentially compromise not just patients' quality of life, but also their clinical outcomes.

Given the potential negative consequences of FI for cancer patients, and given the paucity of information on the topic, we investigated the construct and correlates of food insecurity in a sample of cancer patients actively receiving treatment. Using data collected from a university cancer clinic in Kentucky, our objectives were two-fold. First, we aimed to identify the prevalence of FI among cancer patients undergoing treatment. Second, we aimed to determine any differences in the psychological, physical, and financial well-being between the food insecure and food secure patients.

Patients and Methods

Data from a convenience sample of active cancer patients receiving care at a university cancer clinic in Kentucky were used for these analyses. Upon approval of the study by an institutional review board, patients were recruited from the waiting rooms of the ambulatory chemotherapy, hematology/oncology, and gynecology/oncology clinics. Trained research assistants approached patients to describe the study and confirm they met the inclusion criteria of being 18 years or older and in active cancer treatment at the time of the survey. Surgery-only patients were excluded. After reviewing and signing the consent form, patients completed a demographic profile and six stan-

dardized instruments in an average of 25 minutes. Patients received \$15 for their time.

Measures

Sociodemographic variables. Age was defined by six cohorts: 18 to 29 years, 30 to 39 years, 40 to 49 years, 50 to 59 years, 60 to 69 years, and 70 years and older. Race was defined by five categories: non-Hispanic white, African American, Hispanic, Asian, and other. Income was defined as total annual family income and classified into eight categories in \$10,000 (US) increments beginning with \$0, reflecting no income. Education was dichotomous: less than a high school degree or equivalent, and greater than a high school degree or equivalent.

Cancer history. Information regarding disease site and stage was collected in open-question format and recoded into numerical values for statistical analyses. Cancer treatment was defined by six categories: chemotherapy, radiation therapy, hormonal treatment, biologic therapy, bone marrow transplantation, and other.

FI. FI was measured using the US Department of Agriculture's Core Food Security Module – Short Form (CSFM)¹³ (http://www.ers.usda.gov/Briefing/FoodSecurity/surveytools/FS_SHORT.pdf). The CSFM is a six-item scale with a 12-month time reference designed to measure financially based food insufficiency and hunger. Total scores indicate three categories: (1) food secure, (2) food insecure without hunger, and (3) food insecure with hunger. The CSFM has high internal consistency with a coefficient α of .81, and it is reliable with diverse populations.¹⁷

Nutritional status. The Patient-Generated Subjective Global Assessment (PG-SGA)¹⁸ was used to assess nutritional risk in the sample. It is a combination self-report and clinician-derived scale that yields total scores. Only the patient self-report section was used for this study. Scores greater than 9 suggest severe nutritional risk.

Depression. The Brief Zung Self-Rating Depression Scale (BZSDS)¹⁹ was used to measure depressive symptoms. The BZSDS is an 11-item self-report measure where patients rate how they felt during the previous week using a four-point Likert scale. Scores greater than 32 suggest clinically significant depressive symptomatology. Studies have shown that the BZSDS has high internal consistency with cancer patients (coefficient α averages .84).

Quality of life. The Functional Assessment of Cancer Therapy – General (FACT-G)²⁰ version 4, was used to measure quality of life. This is a 27-item, self-administered questionnaire with four subscales that measure physical, sociofamilial, emotional, and functional well-being. Patients rate on a 5-point Likert scale from 0 (not at all) to 4 (very much) how true each statement has been during the previous week. The FACT-G has adequate to high internal consistency, with coefficient α values from .63 to .86 on subscales, and .90 to .95 for the total scale. The fourth version has been deemed appropriate for use with all cancer patients.

Financial distress. The InCharge Financial Distress Scale – Beta Version (IFDS-Beta; E.T. Garman, personal communication, October 7, 2004) was used to assess patients' financial well-being. The IFDS-Beta is a six-item self-report questionnaire using a 10-point Likert scale. Lower scores indicate greater distress and less satisfaction with one's financial situation. This is a new measure under development, but pilot data suggest that internal consistency is good, with coefficient α scores averaging .956. The numeric results will contribute to establishing broad reliability and internal consistency, as well as reliability and internal consistency with cancer patients.

Statistical Analysis

Data were coded and entered into a database using SPSS 13.0 (SPSS Inc, Chicago, IL). Descriptive statistics and independent samples *t* tests were utilized to identify the prevalence of FI in the sample and to determine whether there were statistically significant differences between the food insecure and food secure patients on demographic, psychosocial, and financial characteristics. A *P* value of .05 or less was considered statistically significant.

Results

Of the 216 patients approached, 115 agreed to participate in the study (response rate = 53.20%). The remaining 101 did not meet the inclusion criteria (*n* = 14), did not have time (*n* = 8), or did not want to participate (*n* = 79). Mean age was 55.96 years, and 33% of patients were male (*n* = 38) and 61.7% were female (*n* = 71). Patients were 85.2% non-Hispanic white (*n* = 98), 11.3% were African American (*n* = 13), and 0.9% were Hispanic/Latino (*n* = 1). Most patients were married or living with a partner (62.6%, *n* = 72), followed by those separated or divorced (17.4%, *n* = 20), those widowed (10.4%, *n* = 12), and single patients (7.0%, *n* = 8). Nearly three-quarters (73.9%, *n* = 85) had at least a high school degree or equivalent, while 23.5% (*n* = 27) had less than a high school degree. Most patients were unemployed (72.2%, *n* = 83), and 55.6% (*n* = 54) lived in households with annual incomes below \$40,000. Of the patients with insurance, 56.5% were covered by commercial/private payer insurance, while 40.0% were covered by Medicaid or Medicare.

Twenty patients in the sample were food insecure, corresponding to a prevalence rate of 17.4%, and nine of these patients (7.8%) were food insecure with hunger. These rates compare to general population prevalence rates of 11.9% for food insecure and 3.9% for food insecure with hunger nationally, and 12.2% for FI and 3.3% for FIH in Kentucky.¹⁴ Table 1 presents the demographic characteristics across the food insecure and food secure groups. There were statistically significant differences on education levels, annual household income, employment status, and insurance type. Food insecure patients had lower education levels, with 50% having less than a high school education, compared with 18.5% of the food secure patients (*P* = .012). Only 5% of food insecure patients were employed, compared with 32.6% of food secure patients (*P* < .001). Food insecure patients also had lower annual household incomes:

Table 1. Demographic Characteristics

Characteristic	Food Insecure (n = 20)		Food Secure (n = 95)		Total (N = 115)		P
	No.	%	No.	%	No.	%	
Sex							.744
Male	6	30.0	32	33.7	38	33.0	
Female	13	65.0	58	61.1	71	61.7	
Marital status							.110
Single	2	10.0	6	6.3	8	7.0	
Married	7	35.0	62	65.3	69	60.0	
Living with partner	1	5.0	2	2.1	3	2.6	
Separated/divorced	5	25.0	15	15.8	20	17.4	
Widowed	4	20.0	8	8.4	12	10.4	
Race/ethnicity*							.424
Non-Hispanic white	16	80.0	82	86.3	98	85.2	
African American	4	20.0	9	9.5	13	11.3	
Hispanic/Latino	0	0	1	1.1	1	0.9	
Education							.016
< High school or equivalent	10	50	17	17.9	27	23.5	
≥ High school or equivalent	10	50	75	78.9	85	73.9	
Age, years							.356
18-29	1	5.0	2	2.1	3	2.6	
30-39	2	10.0	9	9.5	11	9.6	
40-49	2	10.0	11	11.6	13	11.3	
50-59	6	30.0	20	21.1	26	22.6	
60-69	4	20.0	23	24.2	27	23.5	
≥ 70	2	10.0	13	13.7	15	13.0	
Employment							< .001
Employed	1	5.0	31	32.6	32	27.8	
Unemployed	19	95.0	64	67.4	83	72.2	
Annual household income (\$)							.003
0-10,000	6	30.0	10	10.5	16	13.9	
10,0001-20,000	6	30.0	13	13.7	19	16.5	
20,001-30,000	1	5.0	14	14.7	15	13.0	
30,001-40,000	1	5.0	13	13.7	14	12.2	
40,001-50,000	1	5.0	10	10.5	11	9.6	
50,001-60,000	0	0	6	6.3	6	5.2	
≥ 60,001	2	10	20	21.1	22	19.1	
Insurance status							.012
Medicaid/Medicare	13	65.0	33	34.7	46	40.0	
Commercial/private payer	6	30.0	59	62.1	65	56.5	

NOTE. Missing values result in numbers that do not always reflect the total sample.

* Asian ethnicity was not represented in this sample.

70.6% reported incomes less than \$20,000 annually, compared with 26.8% of food secure patients who reported incomes less than \$20,000 annually ($P = .003$). The majority (68.4%) of food insecure patients were insured by Medicaid or Medicare, while the majority (64.1%) of food secure patients had commercial or private-payer insurance ($P = .012$).

Table 2 compares the disease, treatment, and psychosocial characteristics across the food insecure and food secure groups. There were statistically significant differences on all variables except for disease site, treatment type, refusals of treatment for finan-

cial reasons, and sociofamilial well-being. Food insecure patients had significantly lower overall quality of life, with mean (m) global scores of 59.64 compared with 80.65 for food secure patients ($P = .001$). Significant differences also were noted on three of the four well-being subscales. Food insecure patients had lower mean scores on physical well-being ($m = 13.67$), emotional well-being ($m = 15.15$), and functional well-being ($m = 13.28$) than food secure patients (physical well-being $m = 20.34$, $P = .001$; emotional well-being $m = 18.20$, $P = .034$; and functional well-being $m = 19.01$, $P < .001$). Food insecure patients demonstrated increased

Table 2. Disease, Treatment, and Psychosocial Characteristics

	Food Insecure (n = 20)		Food Secure (n = 95)		Total (N = 115)		P
	No.	%	No.	%	No.	%	
Disease site							.637
Breast	0	0	9	9.5	9	7.8	
Colorectal	1	5.0	6	6.3	7	6.1	
Gastrointestinal	0	0	7	7.4	7	6.1	
Gynecologic	2	10.0	13	13.7	15	13.0	
Head and neck	2	10.0	5	5.5	7	6.1	
Lung	7	35.0	19	20.0	26	22.6	
Lymphoma	4	20.0	0	0	4	3.5	
Myeloma	0	0	3	3.2	3	2.6	
Thyroid/endocrine	2	10.0	24	25.3	26	22.6	
Other (arm, sarcoma, shoulder genitourinary, leukemia)	2	10.0	7	7.4	9	7.8	
Treatment							.113
Chemotherapy	13	65.0	43	45.3	56	48.7	
Radiation therapy	4	20.0	21	22.1	25	21.7	
Other	1	5.0	18	18.9	19	16.5	
Financially based treatment decisions							
Did not take medicine							.002
Yes	11	55.0	12	12.6	23	20.2	
No	9	45.0	82	86.3	9	79.8	
Took less medicine							.030
Yes	8	40.0	12	12.8	20	17.5	
No	12	60.0	82	87.2	94	82.5	
Missed treatment							.219
Yes	3	15.0	4	4.2	7	6.2	
No	17	85.0	89	93.7	106	93.8	
Refused treatment							.576
Yes	1	5.0	2	2.2	3	2.7	
No	18	90.0	91	97.8	109	97.3	
Borrowed money to pay for care							< .001
Yes	16	80.0	19	20.0	35	31.5	
No	4	20.0	72	75.8	76	68.5	
Paid bills late due to medical expenses							< .001
Yes	15	75.0	17	17.9	32	28.6	
No	5	25.0	75	78.9	80	71.4	
Global quality of life							
Mean	59.64		80.65		77.18		.001
SD	18.66		18.27		19.84		
Physical well being							
Mean	13.67		20.34		19.20		.001
SD	6.70		5.77		6.42		
Social/family well-being							
Mean	20.59		22.63		22.24		.170
SD	4.95		5.61		5.52		
Emotional well-being							
Mean	15.15		18.20		17.65		.034
SD	5.74		4.23		4.65		

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Table 2. Disease, Treatment, and Psychosocial Characteristics (continued)

	Food Insecure (n = 20)		Food Secure (n = 95)		Total (N = 115)		P
	No.	%	No.	%	No.	%	
Functional well-being							
Mean		13.28		19.01		18.06	< .001
SD		4.91		6.44		6.56	
Depression							
Mean		24.88		15.89		18.43	< .001
SD		4.53		11.74		6.49	
Nutritional risk*							
Mean		8.50		4.38		5.10	.015
SD		6.65		4.70		5.30	
Financial distress†							
Mean		18.23		36.89		33.87	< .001
SD		11.37		13.53		14.86	

NOTE. Missing values result in numbers that do not always reflect the total sample.

* High score = poor nutrition.

† Low score = high distress.

nutritional risk (mean PG-SGA score = 8.50) compared with food secure patients (mean PG-SGA score = 4.38, $P = .015$), though the mean score was below the cut-off for severe nutritional risk. Food insecure patients also had significantly more depressive symptoms, with a mean BZSDS score of 24.88 ν 15.89 for the food secure patients ($P < .001$); however, this score did not exceed the cut-off score of 32 for clinical significance.

Unsurprisingly, financial strain was higher among food insecure patients. Mean scores on the InCharge Financial Distress Scale for food insecure patients ($m = 18.23$) were one-half the mean scores for food secure patients ($m = 36.89$, $P < .001$), indicating food insecure patients' greater distress and less satisfaction over their financial situations. Additionally, food insecure patients reported more medication noncompliance for financial reasons. Fifty-five percent of food insecure patients reported not taking a prescribed medication because they could not afford it, compared with 12.8% of food secure patients ($P = .002$). Similarly, 40% of food insecure patients reported taking less medication because they could not afford it, compared with 12.8% of food secure patients ($P = .030$). Finally, more food insecure patients reported borrowing money (80.9%) or paying bills late (75%) to pay for cancer treatment compared with food secure patients who borrowed money (20.9%, $P < .001$) or paid bills late (18.5%, $P < .001$).

Discussion

In this study of cancer patients in Kentucky we found that nearly one fifth of the patients were food insecure. This prevalence rate is higher than general population rates both nationally and in Kentucky.¹⁴ The finding is significant because FI has been linked to fatigue, depression, restricted activity, malnutrition, and weakened resistance to infection, all of which are known adverse effects of cancer and its treatment.¹⁰⁻¹² Some of these relationships were apparent in this sample. Food insecure

patients had higher rates of depression and nutritional risk, and lower quality of life than food secure patients.

The relationship of FI to financial strain was an important finding. In addition to reporting more instances of borrowing money or paying bills late in order to pay for cancer therapies, food insecure patients reported more instances of medication noncompliance, including not taking medications or taking less than directed by their oncologists because they could not afford the medications in the quantities prescribed. These findings corroborate other research that suggests patients with chronic illness who worry about out-of-pocket health expenditures will restrict their use of prescription drugs.^{21,22} For many patients, financial concerns are associated with uninsurance or underinsurance, especially related to a comprehensive prescription drug benefit.^{21,23,24} Understanding factors like food insecurity that may be associated with patient noncompliance is an important, and often overlooked, element of oncology care, particularly given the negative clinical outcomes that may result from treatment noncompliance.

Identifying FI in cancer patients is an intervention that takes less than 5 minutes and may prove clinically significant in improving patient outcomes. Referrals for food assistance, including the food stamp program and local food banks, and patient assistance programs for prescription medications²⁵⁻²⁷ may improve patient compliance with treatment and clinical outcomes. Prospective studies of FI among cancer patients will help to identify some of the causal relationships, including those patients who are food insecure upon diagnosis, or who become food insecure as a result of ongoing cancer therapies.

There are two main limitations in this study. First, data are from a convenience sample, so the findings are not generalizable. Second, data collected were cross-sectional, so no causal inferences may be made.

In this study, we examined the construct and correlates of FI in a sample of cancer patients in Kentucky. We found differences in health insurance type, psychosocial well-being, and economic well-being of food insecure patients as compared with food secure patients. These findings suggest that FI may be an important consideration for clinical oncology practice, especially when caring for individuals of lower socioeconomic status, and screening these patients for food insecurity may be beneficial. Findings also suggest the need for more comprehensive studies of FI in cancer patients to determine the nature of any causal relationships among FI, cancer incidence, cancer treatments, and patient outcomes and well-being, which will help to develop appropriate intervention strategies.

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Authors' Disclosures of Potential Conflicts of Interest

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