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Food Insecurity Among Cancer Patients Enrolled in the Supplemental Nutrition Assistance Program (SNAP)

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Abstract

Purpose: Food insecurity, which leads to adverse health outcomes, has even more severe implications for cancer patients. Yet medically underserved cancer patients are more likely to be food insecure than the general population.

Methods: This study is a cross-sectional analysis of intake data from patients who participated in the Integrated Cancer Care Access Network (ICCAN). ICCAN is a specialized program that addresses socioeconomic barriers to cancer care among underserved cancer patients in NYC. This study utilized ICCAN data from 2011 to 2017. The USDA food insecurity score, self-reported SNAP receipt, and SNAP eligibility based on household income were compared between SNAP and non-SNAP recipients.

Results: 681 patients were assessed for food insecurity. Sixty-nine percent of participants lived in food insecure households. Despite SNAP assistance, most SNAP recipients (68%) were food insecure; 69% of respondents who did not receive SNAP were also food insecure.

Conclusions: Underserved cancer patients who receive SNAP are still food insecure, hence at more significant risk for its associated negative outcomes. Supplemental programs for patients with chronic diseases are needed in clinics with large low income populations. SNAP benefits should account for the additional financial burden posed by treatment costs and exceptional circumstances faced by cancer patients.

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Data Availability Statement:

We have full control of all primary data and agree to allow the journal to review our data if requested.

Keywords

Cancer; socioeconomic factors; food insecurity; underserved populations; health policy

INTRODUCTION

Food insecurity, limited access to food due to lack of money or other resources,[1] leads to adverse health outcomes and decreased quality of life.[2,3] In 2015, 48.1 million Americans lived in food insecure households.[1] In New York State, where food insecurity rates are increasing, 2.6 million residents (13.5% of the population) were food insecure.[1] In New York City (NYC), there were 1.3 million food insecure individuals in 2013, 16.5% of the population.[4]

Food insecurity is higher in low income households, and in households with children, ethnic minorities, and/or immigrants.[1] The USDA reports that almost 33% of households with incomes below 185% of the poverty line, 17% of households with children, 22% of households headed by non-Hispanic Blacks, and over 19% of Hispanic-headed households are food insecure, compared with 12.7% of Americans overall.[1] Latino ethnicity and speaking English poorly are associated with food insecurity, and households with immigrant mothers have higher rates of food insecurity than households with U.S.-born mothers.[5]

Individuals who are food insecure have increased rates of diabetes,[6] hypertension,[2] hyperlipidemia, anemia,[7] cardiovascular risk factors,[8] depression,[9] stress,[10] and anxiety.[11] Food insecure individuals are less likely to seek needed health care and more likely to postpone taking their medications, despite their increased risk for disease.[12–14]

Medically underserved cancer patients are more likely to be food insecure than the general population.[15,16] In a study of a cohort of underserved cancer patients in NYC, 56% of patients were food insecure; 38% of patients had very low food security.[16] Health implications of food insecurity can be more severe for cancer patients due to the nature of the disease and the impact of cancer treatment.[17] Food insecure cancer patients experience higher levels of nutritional risk and depression than cancer patients who are not food insecure.[15] Food insecurity may impact cancer patients' quality of life, which is associated with cancer survival.[18] Unmet socioeconomic and supportive care needs, including food insecurity, are associated with patient-reported missed cancer treatment appointments.[19] In addition, having a positive depression score and poor physical and emotional well-being are associated with missed appointments and treatment delays and/or interruptions.[20]

Food assistance programs could be crucial in reducing food insecurity and thus, in improving health outcomes. Early nutrition interventions for cancer patients may increase functional status, quality of life, treatment tolerance and adherence, and cancer survival.[17,21] The federal food assistance program, the Supplemental Nutrition Assistance Program (SNAP), is available to assist low income households to purchase food.[22] Every month, eligible households participating in SNAP receive, depending on income, a minimum of $16 a month, up to a maximum monthly allocation of $194 for eligible one- and two-person

households, and up to $1,169 for a household of eight (with an additional $146 per person if the household is larger than eight people), averaging about $1.41 per person per meal.[22,23]

There have been conflicting findings in prior studies regarding the impact of SNAP participation on food insecurity.[23–27] A 2013 USDA report noted that SNAP participation for 6 months can decrease household food insecurity by five to ten percent,[27] while another 2013 USDA report noted a reduction in the value of SNAP benefits over the years due to food price inflation.[24] A study among low-income adults who called an emergency food hotline noted that participating in SNAP for 3 months had an insignificant effect on household food security and dietary quality when compared with non-SNAP participants.[28]

Underserved cancer patients are especially vulnerable to the impact of food insecurity. This study examines the presence and predictors of food insecurity among SNAP recipients and non-recipients with cancer at NYC safety net facilities, and at the predictors of receipt of SNAP benefits among this same group.

METHODS

This is a cross-sectional analysis of the intake data of patients enrolled from 2012 to 2017 in the Integrated Cancer Care Access Network (ICCAN), which is housed at several NYC Hospitals with large low-income immigrant and minority populations. ICCAN offers cancer patients support in addressing social and economic barriers to cancer care. ICCAN is open to all patients receiving treatment for a cancer diagnosis, up to a year post treatment completion, and has no other eligibility criteria. A total of 1607 patients were enrolled in ICCAN from 2012 to 2017, 681 of whom completed the USDA food insecurity assessment. The primary reason for non-completion was patient time constraints.

Patients undergoing cancer treatment were approached in the waiting room by trained access facilitators who administered a socioeconomic Needs Assessment Survey in the patients' preferred language (Spanish, English, or Chinese). The detailed ICCAN methodology has been described in earlier publications.[16,19,20,29]

The Needs Assessment Survey included questions on demographics, cancer diagnosis and treatment, health care access, insurance, medical history, employment/income, housing, quality of life, depression, food security, utilization of food pantries, and household SNAP participation. This study includes the 681 ICCAN patients who were also screened for food insecurity. Food insecurity was measured using the U.S. Household Food Security Survey Module (USDA), an 18-item, 12-month time-referenced food security scale.[30] Individuals were queried on whether or not they ran out of food before being able to buy more, were not able to afford balanced meals, cut the size of or skipped meals, were hungry, did not eat for a whole day, and lost weight due to not having enough money for food.[1]

Household SNAP participation was assessed through self-report: patients were asked if any members of their household (adults and/or children) were receiving or applied for SNAP. Presumed SNAP financial eligibility was determined based on patient self-reported household income and number of people in the household; patients were not queried on other USDA SNAP eligibility criteria, such as immigration and disability status, for

themselves or for family members. All data were patient reported. We did not verify patient receipt of SNAP benefits, income, household size or any other self-reported information.

Statistical Analyses

Food insecurity was calculated using the USDA scoring algorithm, which yields a score from 0–10 for households with no children and 0–18 for households with one or more children.[30] A higher score represents greater food insecurity. Households with a USDA score ≥ 3 are classified as food insecure. Those in adult-only households with scores from 3 to 5 have low food security and those with scores from 6–10 have very low food security. Those in households with at least one child with scores of 3–7 have low food security, and with 8–18 very low food security.[30] Univariate analyses entailed Chi-squared statistics with continuity adjustment to examine the association between food insecurity and categorical covariates. Covariates with a statistically reliable univariate association were entered into a binary logistic regression to examine the extent to which each variable was associated with food insecurity, controlling for all other covariates. The 10-event-per-covariate rule was considered to minimize model overfit.[31] From self-reported income and family size, we created a proxy variable that approximated meeting the government SNAP eligibility. For example, a family of 4 was considered to meet the government SNAP eligibility if the self-reported gross monthly income was below $2,665. For a family of 3, the income threshold was $2,213, for a family of 2, $1,760, and for a family of 1, $1,307.[22] We first established the validity of this derived income and family size criterion by showing a statistically reliable association with respondent-reported receipt of SNAP. We did not conduct any false-discovery-rate adjustments for multiple statistical comparisons.[32] Logistic regression examined the predictors of food insecurity, specifically the effect of receiving SNAP. All statistical analyses were conducted using SPSS version 24.[33]

RESULTS

Table 1 summarizes the study sample characteristics. There were 681 study participants. The majority (69%) of the sample lived in food insecure households. Ninety-one percent of the sample were found to meet household size/income thresholds for SNAP enrollment and 33% reported that they were current SNAP benefit recipients. The average value of self-reported SNAP benefits received each month by the entire household was $102 (SD 63.402). Most participants were female (71%). The average age was 56 years. Forty-six percent were non-Hispanic Black, 32% Hispanic/Latino, 5% non-Hispanic White, and 17% ‘Other.’ Forty-three percent had less than a high school education. Thirty-five percent were married or partnered. Breast cancer was the most common diagnosis (45%), followed by prostate (10%), lung (7%) and colon cancer (7%). Over half (60%) the participants reported speaking English very well. Sixty-five percent reported English as their primary language, 27% Spanish, and 8% another language. The foreign-born accounted for 77% of participants. Forty-seven percent had Medicaid, an additional 33% had Medicaid for the Treatment of an Emergency Medical Condition, 8% had both Medicaid and Medicare, 6 % Medicare alone, and 6% private insurance, and 9% were uninsured.

Table 2 summarizes the associations between participant characteristics and food insecurity and SNAP receipt (N = 681). Patients receiving SNAP were just as likely to be food insecure as those with the same incomes who were not receiving SNAP (70% and 69%, respectively, $p = 0.929$). How large a SNAP benefit participants received had no impact on their food insecurity status ($p = 0.134$). Among all 681 participants, those who would presumably qualify for SNAP benefits based on household size and income alone were more likely to be food insecure than those who would not (71% versus 51%, respectively). The relationship between household income and food insecurity was significant ($p \leq 0.05$).For example, those who had a monthly household income of less than $1000 a month had the highest food insecurity rate, at 72%, whereas those who had a monthly household income of $2300 or greater had a 45% food insecurity rate. Food security was also associated with English proficiency ($p \leq 0.01$). Patients who reported speaking English very well had the highest rates of food security. Patients' primary language was also associated with food insecurity at a $p \leq 0.01$ level: the food insecurity rates were 67% vs. 78% for English and Spanish speakers, respectively. The food insecurity rate was also highest among participants who carried both Medicaid and Medicare (74%).

Participants who did not graduate from high school were more likely to report having SNAP benefits than others ($p \leq 0.05$). Participants who were not married or not partnered were more likely to receive SNAP (37% unmarried/not partnered vs. 25% married/ partnered) ($p \leq 0.01$). Additionally, 59% of participants who were U.S.-born reported receiving SNAP benefits vs. 26% of foreign-born participants, ($p \leq 0.001$). Insured participants were more likely to receive SNAP benefits: 35% of insured participants received SNAP vs. 7% of the uninsured participants ($p \leq 0.001$). Among insured participants, those who had both Medicaid/Medicare (79%) were more likely to receive SNAP than participants who had other insurance ($p \leq 0.001$). Participants were unlikely to have SNAP if they had Medicaid for the Treatment of an Emergency Medical Condition: 10% of participants with Medicaid for the Treatment of an Emergency Medical Condition had SNAP.

Factors that were significant in the univariate analyses of food insecurity were further analyzed in a binary logistic regression to examine the relative influence of each factor on food insecurity (self-reported SNAP status, presumed SNAP eligibility, English proficiency, health insurance type and language) (Table 3). SNAP recipients were as likely to be food insecure as non-recipients (OR = 0.970, 95% CI: 0.633–1.487, $p = 0.889$). Presumed SNAP eligibility by income criteria had the largest influence on the odds of being food insecure (OR = 4.323, 95% CI: 2.268 – 8.239, $p < 0.001$). Spanish speakers were less likely to be food insecure than speakers of other languages (OR = 0.348, 95% CI: 0.151 – 0.804, $p = 0.014$).

DISCUSSION

Many cancer patients at NYC safety net hospitals live in food insecure households: 69% in our study, twice the percentage of low income households in the U.S. (32.8 %), five times higher than the overall national average (13.7 %), almost five times higher than the New York State average (14.1 %), and four times higher than the NYC average (16.5%).[1,4] In our study population, patients who received SNAP and those who did not were similarly

likely to be food insecure: approximately 70% in each group reported food insecurity. This is concerning given the impact of food insecurity on cancer patients' quality of life, physical and mental health, treatment adherence, and treatment outcomes.[3,15,18,20]

Food insecurity was significantly associated with presumed SNAP eligibility, determined by income level/household size. Sixty percent of patients who were presumably eligible for SNAP were not receiving it. Although this study did not directly assess reasons for SNAP non-participation, potential reasons may include access barriers due to immigration status, limited English proficiency, and lack of knowledge about program eligibility. Forty-three percent of those who were not receiving SNAP despite presumed income eligibility had Medicaid for the Treatment of an Emergency Medical Condition, often utilized by those whose immigration status does not allow their enrollment into other Medicaid programs.[22,34] Immigrants without status are not eligible to apply for SNAP benefits,[22] which could partially explain our findings that only 33% of our study population reported receipt of SNAP benefits, although 91% of our study patients were found to meet household size/income thresholds for SNAP enrollment. Non-citizens, with immigration status, in additon to meeting the income eligibility criteria, must also satisfy one of the following criteria to be eligible for SNAP: have been living in the U.S. for at least 5 years, are receiving disability-related assistance or benefits, and/or are children under 18 benefits.[22]

A USDA report cited lack of information about eligibility and small benefit amounts as primary reasons for SNAP eligible individuals not applying for SNAP. Most adults who do not receive disability, are between the ages of 18 and 50, are unemployed, and do not have children, are able to apply for SNAP benefits for a 3-month period only, at which point they have to renew their application.[22]

SNAP was designed as a safety net program to combat hunger and assist families to obtain a more nutritious diet. Over three million New York residents receive SNAP each month, with an average benefit of $138.70 per person.[35] The recent Federal Budget Plan is projected to cut SNAP funding by over 30% over ten years (2018–2027).[36] Current estimates predict that these budget cuts will lead to a reduction or termination of benefits for millions of Americans.[36] Even before the proposed budget cuts, the SNAP benefits were not enough to alleviate food insecurity in this at-risk sample of cancer patients. Cuts to the SNAP program will likely worsen this situation.

SNAP benefits are based on the USDA Thrifty Food Plan (TFP), one of the four official USDA food plans, and also the most inexpensive food plan to provide adequate nutrition.[37] The TFP specifies the type and amount of foods for a nutritious diet that people could consume at home at a minimal cost.[37] This plan was last revised in 2006 and is based on the 2005 Dietary Guidelines for Americans, the 2005 MyPyramid, and the 2001–2002 National Health and Nutrition Examination Survey and Food Price Database.[37] Recent policy changes, including changes in national nutritional guidelines that are no longer reflected by MyPyramid, and food price inflation, likely render the TFP food basket no longer sufficient to provide adequate nutrition, especially given continuous rises in food prices.[38] The USDA estimated the average monthly cost of a home Thrifty Food Plan in November 2017 to be $184.30 for a male and $163.60 for a female adult (19–50 years

old).[39] For the 1.6 million households that receive the minimum $16 SNAP allotment, obtaining sufficient food may be nearly impossible.[23] Food prices were anticipated to increase by 2% in 2018.[38] The SNAP benefits maximum and minimum allotments for the new fiscal year 2018, however, have decreased by 1%–1.4% for the maximum and 6.3% for the minimum allocation.[40]

Given the staggeringly high food insecurity levels among our cohort of low income cancer patients, and the potential impact of food insecurity on cancer patients' quality of life and treatment outcomes,[3,15,18,20] it is important that cancer patients are screened for food insecurity and offered assistance to alleviate its burden during cancer treatment and recovery. Among our study sample, there was no difference in food insecurity scores among cancer patients who received SNAP and those who did not. This highlights the need for a more comprehensive food assistance program for cancer patients, especially for those who are unable to work and have little to no income while receiving treatment. A report by the USDA's Food and Nutrition Service concluded that, although participation in SNAP may ease financial strain, it does not eliminate it, and families often run short of money to purchase all the food they need.[41] Because SNAP eligibility criteria includes household income eligibility criteria, and food within the household might be shared, it is important that household characteristics are assessed and accounted for in food assistance programs so that they can successfully alleviate food insecurity among lower income populations. In addition to assessing household income, future studies should assess whether food insecure patients are the providers for their families and whether food in the household is shared, and there should be a comprehensive assessment of household financial distress. Programs aiming to alleviate food insecurity for cancer patients should have a comprehensive approach for the household rather than focusing on the patient alone. In our study population, households with an income of less than $1000 a month were more likely to receive SNAP benefits and were also more likely to be food insecure than households with a monthly income over $1000.

SNAP recipients often rely on additional food resources such as food pantries to keep their families fed. Nearly 41% of all Feeding America pantry clients were SNAP recipients, 58% of whom were recurrent or frequent visitors to a food pantry.[42] Although food pantries can be helpful in assisting with food insecurity, they have limitations in addressing the needs of cancer patients. Some pantries are open for limited hours or only during business hours, are far to travel to, require government-issued identification, offer assistance primarily in English, and have limited food choices.[43] Given cancer patients' increased nutritional needs and demanding treatment schedules, food pantries in the community may not be an accessible and adequate food resource. For immigrant cancer patients in particular, the limited language services and having to provide a government-issued ID constitute additional barriers to accessing food pantries.[43]

This study had limitations, including its cross-sectional nature, which did not allow us to examine the impact of the receipt of SNAP on food security scores or on food intake over time. In our cohort, we did not assess whether or not SNAP recipients were new entrants, or whether their food insecurity changed after an extended time of study participation. As such, it could be possible that food insecurity among our surveyed SNAP recipients

could be even more severe without the receipt of SNAP benefits. The study also relied on self-report. The study was conducted in NYC, which has among the highest grocery prices in the country. Hence, the results potentially would overstate the persistence of food insecurity in those who receive SNAP in other regions. However, despite these limitations, the very high food insecurity rates among the patients generally and among those who receive SNAP compel the need for screening for food insecurity and enrollment in additional food assistance programs tailored specifically to those with cancer and to other medically vulnerable individuals, and a consideration of changes in SNAP policy to make benefits more robust.

Despite the receipt of SNAP benefits, a large proportion of this population remains food insecure, and is therefore at more significant risk for its associated negative outcomes. SNAP, if modified to be tailored to cancer patients' needs, could potentially reduce food insecurity in this population and ultimately improve treatment outcomes. Supplemental programs for patients with chronic diseases (which often pose an additional financial burden) are needed in clinics that serve low socioeconomic status patients, including those who are ethnic minorities and immigrants. SNAP monetary benefit amounts should take into consideration the additional financial burden posed by medical treatment costs and exceptional illness-related circumstances including frequent appointments, fewer opportunities to work, and the cost of food and treatment related diets.

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All authors listed have contributed sufficiently to the project to be included as authors, and all those who are qualified to be authors are listed in the author byline. All authors (F. Gany, I. Melnic, J. Ramirez, M. Wu, Y. Li, L. Paolantonio, J. Smith, S. Pan, N. Roberts-Eversley, V. Blinder, J. Leng) had a role in formulating the research question(s), designing the study, carrying it out, analysing the data, and writing the article.

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving research study participants were approved by the Memorial Sloan Kettering Cancer Center's Institutional Review Board/Privacy Board and from each study site. Written informed consent was obtained from all individual participants included in the study.

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Table 1.

Demographic Characteristics

Characteristics	Categories	N = 681(%)
Food Insecurity	Food insecure	470 (69)
	Food secure	211 (31)
Presumed SNAP Eligibility	Yes	479 (91)
(based on household size and income)	No	49 (9)
Receives SNAP	Yes	223 (33)
	No	458 (67)
Gender	Female	480 (71)
	Male	201 (29)
Race	Non-Hispanic Black	312 (46)
	Hispanic/Latino	217 (32)
	Non-Hispanic White	34 (5)
	Some other race	118 (17)
Education Level	Less than high school	290 (43)
	High school graduate or some college	288 (43)
	College graduate or more	93 (14)
Marital Status	Single	516 (39)
	Married	439 (33)
	Widowed	121 (9)
	Divorced	114 (9)
	Separated	105 (8)
	Partnered	27 (2)
Cancer Diagnosis	Breast	303 (45)
	Prostate	65 (10)
	Lung	44 (7)
	Colon	44 (7)
	Lymphoma	25 (4)
	Other Cancer	200 (30)
English Proficiency	Very Well	405 (60)
	Well	81 (12)
	Not well	120 (18)
	Not at all	71 (10)
Language	English	441 (65)
	Spanish	181 (27)
	Other	59 (8)
Born in U.S.	Yes	140 (23)
	No	474 (77)
Health Insurance Status	Uninsured	57 (8)
	Insured	620 (92)
Health Insurance Type	Medicaid for the Treatment of an Emergency Medical Condition	188 (33)

Characteristics	Categories	N = 681(%)
	Medicaid	271 (47)
	Medicare	40 (7)
	Medicaid & Medicare	43 (8)
	Private	32 (6)
Monthly Household Income	Less than $1000	238(59)
	S1000 – $2300	138 (34)
	More than $2300	31 (8)
Household Size	3 (1.746)	
SNAP amount adjusted by household size (N = 182) *	102 (63.402)	
Age	56 (12.160)	

* Out of 223 SNAP recipients, 182 provided the exact amount they received

Table 2.

Association between food insecurity, SNAP receipt, and participant characteristics (N = 681)

Characteristics	Categories	Food insecure N = 470 (%)	Food secure N = 211 (%)	P value	SNAP N = 223 (%)	Non-SNAP N = 458 (%)	P value
Presumed SNAP eligibility [a] (based on income)	Yes	239 (71)	98 (29)	**0.022**	191 (40)	288 (60)	< **0.001**
	No	18 (51)	17 (49)		7 (14)	42 (86)	
English Proficiency	Not at all	52 (73)	19 (27)	**0.005**	53 (75)	18 (25)	0.589
	Not well	96 (80)	24 (20)		80 (67)	40 (33)	
	Well	60 (74)	21 (26)	**0.001**	54 (67)	27 (33)	0.574
	Very Well	260 (65)	145 (36)		136 (34)	269 (66)	
Language	English	289 (67)	146 (34)		142 (32)	299 (68)	
	Spanish	142 (78)	40 (22)	**0.010**	60 (33)	121 (67)	**0.928**
	Other	19 (79)	5 (21)		8 (30)	19 (70)	
Health Insurance Status	Uninsured	42 (75)	14 (25)	< **0.001**	4 (7)	53 (93)	< **0.001**
	Insured	419 (69)	190 (31)		217 (35)	403 (65)	
Health Insurance Type	Medicaid for the Treatment of an Emergency Medical Condition	135 (73)	51 (27)		19 (10)	169 (90)	
	Medicaid	188 (72)	74 (28)	< **0.001**	132 (49)	139 (51)	< **0.001**
	Medicare	20 (50)	20 (50)		17 (43)	23 (57)	
	Medicaid & Medicare	32 (74)	11 (26)		34 (79)	9 (20)	
	Private	13 (41)	19 (59)		2 (6)	30 (94)	
Gender	Female	318 (68)	152 (32)	0.199	165 (34)	314 (66)	0.109
	Male	149 (74)	52 (26)		57 (28)	144 (72)	
Race	Non-Hispanic White	22 (73)	8 (27)		99 (32)	213 (68)	
	Non-Hispanic Black	201 (66)	106 (35)	0.150	76 (35)	141 (65)	0.275
	Hispanic/Latino	162 (75)	55 (25)		15 (44)	19 (56)	
	Some other race	83 (70)	35 (30)		33 (28)	85 (72)	
Education Level	Less than high school	197 (69)	90 (31)		107 (37)	183 (63)	
	High school graduate or some college	201 (71)	83 (29)	0.851	89 (31)	199 (69)	0.045
	College graduate or more	64 (70)	27 (30)		22 (24)	71 (76)	
Marital Status	Not Married	158 (68)	76 (33)	0.481	59 (25)	178 (75)	0.002
	Married	304 (70)	128 (30)		161 (37)	277 (63)	
Cancer Diagnosis	Breast	206 (70)	91 (31)		97 (32)	206 (68)	
	Prostate	38 (59)	27 (42)		26 (40)	39 (60)	
	Lung	30 (68)	14 (32)	0.175	17 (39)	27 (61)	0.720
	Colon	34 (77)	10 (23)		14 (32)	30 (68)	
	Lymphoma	15 (60)	10 (40)		7 (28)	18 (72)	
	Other Cancer	145 (74)	52 (26)		62 (31)	138 (69)	
Born in U.S.	Yes	90 (64)	50 (36)	0.143	82 (59)	58 (41)	0.000

Characteristics	Categories	Food insecure N = 470 (%)	Food secure N = 211 (%)	P value	SNAP N = 223 (%)	Non-SNAP N = 458 (%)	P value
	No	329 (71)	134 (29)		128 (26)	349 (74)	
Household Income Level	Less than $1000	170(72)	68(28)		109 (46)	129 (54)	
	S1000 - $2300	94(68)	44 (32)	**0.013**	51(37)	87(63)	0.001
	More than $2300	14(45)	17(55)		4(13)	27(87)	
Age		55 (11.686)	59 (12.882)	0.056	58 (11.717)	55 (12.270)	0.350
Household size			0.853 [c]		n/a	n/a	n/a
SNAP amount adjusted by household size			0.134 [c]		n/a	n/a	n/a
Receives SNAP [b]	Yes	316 (70)	137 (30)	0.929	n/a	n/a	n/a
	No	152 (69)	67 (31)		n/a	n/a	
Food Insecurity	Food insecure	n/a	n/a	n/a	152 (32)	318 (68)	0.791
	Food secure	n/a	n/a		71 (34)	140 (66)	

a: Presumed SNAP eligibility was determined by survey respondents' self-reported income and household size

b: Self-reported status of being a recipient of the US government SNAP program

c: The point-biserial correlation p value

Table 3.

Binary Logistic Regression on Food Insecurity (N = 681) *

Variables		Coefficient	Odds Ratios	95% CI	P value
Presumed SNAP Eligibility (based on household size and income)	**Yes**	−1.46	4.32	(2.27–8.24)	< **0.001**
	No	ref	ref	ref	ref
Self-reported SNAP status	**Yes**	−0.30	0.97	(0.63–1.49)	0.889
	No	ref	ref	ref	ref
English Proficiency	Very Well	0.25	1.29	(0.60–2.74)	0.513
	Well	−0.16	0.85	(0.03–2.33)	0.755
	Not Well	0.27	1.31	(0.46–3.80)	0.614
	Not at All	ref	ref	ref	ref
Language	English	−0.79	0.45	(0.15–1.39)	0.166
	Spanish	−1.06	0.35	(0.15–0.80)	**0.014**
	Other	ref	ref	ref	ref
Health Insurance Type	Private	0.87	2.40	(0.90–6.40)	0.081
	Medicaid for the Treatment of an Emergency Medical Condition	−0.02	0.98	(0.44–2.18)	0.954
	Medicaid	−0.26	0.78	(0.36–1.66)	0.511
	Medicare	0.90	2.45	(0.90–6.69)	0.079
	Medicaid & Medicare	−0.77	0.46	(0.16–1.36)	0.157
	No Insurance	ref	ref	ref	ref

* the analyses were mutually adjusted