

Factors contributing to weight loss, nutrition-related concerns and advice received by adults undergoing cancer treatment

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ABSTRACT

Purpose: The opinions and perceptions of patients are crucial throughout the cancer treatment process, as treatment is more effective when patient concerns are addressed. The present study was designed to identify history of weight loss since initiation of cancer treatment, specific nutrition-related problems and concerns (including food aversions, factors contributing to poor food intake and perceived nutrition-related problems), nutrition advice received by cancer treatment patients, and relations between items studied and reported unintentional weight loss.

Material and Methods: A 23-item survey was completed by a convenience sample of 79 patients from treatment centers at a community hospital and oncologist office, of which 66 were included in the final analysis. Descriptive statistics included means, standard error, 95% confidence intervals, and frequency distributions. ANOVA and Pearson χ^2 were used to evaluate differences in responses by treatment type and relations between items studied and reported unintentional weight loss. Twenty-seven (41%) of the 66 (27 males, 39 females) were receiving radiation, 20 (30%) chemotherapy, and 19 (29%) both.

Results: Unintentional weight loss occurred for 41% since initiation of treatment (13% deficit), 27% had food aversions, 52% reported factors contributing to poor food intake, 50% had nutrition-related problems since initiation of treatment, and 89% had received nutrition advice. The prevalence of unintentional weight loss was significantly greater among patients who reported having food aversions, factors that had contributed to poor food intake, or nutrition-related problems.

Conclusions: This study demonstrates that adults commonly present with factors that contribute to poor food intake and perceive nutrition-related problems resulting from cancer treatment. Further, there is a greater prevalence of unintentional weight loss among those who report food aversions and perceive nutrition-related problems. The findings provide a framework that may aid healthcare providers in recognizing nutrition-related concerns and needs of cancer patients.

Key words: side effects, nutrition status, dietary supplements, food aversions

ABBREVIATIONS

ANOVA - Analysis of variance
BMI - Body mass index
CI - Confidence interval
HIPAA - Health Insurance Portability and Accountability Act
SEM - Standard error of the mean

INTRODUCTION

Patients with cancer are at risk for compromised nutrition status. A major factor contributing to weight loss and malnutrition among cancer patients is the hypermetabolic state induced by the disease [1]. Hypermetabolism is multifactorial in nature, resulting from an increase in proinflammatory and acute phase protein responses and proteolysis-inducing factors [2]. Batterham and Edwards reported that among cancer patients, resting energy expenditure was 7% greater than healthy controls [3]. Bosaeus and colleagues found that

hypermetabolism was present in 48% and significant weight loss in 43% of patients whom they studied [1]. Moreover, the patients were not increasing their oral intake to compensate for the elevated metabolic requirements, and thus the weight loss was attributed to decreased dietary intake in addition to increased energy needs [1]. The primary consequence of hypermetabolism is cachexia, a condition in which loss of adipose and muscle tissue depletes lean body mass and visceral protein stores [4]. Hypermetabolism and cachexia can have detrimental effects on nutrition status, quality of life, and overall survival among cancer patients [4].

A wide range of nutrition-related side effects are common among cancer patients [5-12]. Many side effects, including anorexia, early satiety, altered sense of taste and smell, and gastrointestinal dysfunction, compromise nutrient intake [13]. Polisena reported that of 72 patients on radiation for lung, cervical, esophageal, prostate, and head or neck cancers, 40% had loss of appetite and 67% involuntary weight loss [6].

Physical side effects from cancer treatment are common. Among chemotherapy patients, dysgeusia has resulted in reduced consumption of foods at meals, socialization, and overall health maintenance [10]. Polisena found that 70% of patients on radiation therapy experienced taste changes, nausea, vomiting, diarrhea, dysphagia, and/or chewing difficulties [6]. Kalman and Villani reported that chemotherapy-induced fatigue and associated weight loss, negative mood, prolonged stress, and pain occurred in 80% to 96% of cancer patients [11].

Food aversions are frequently reported as side effects of cancer treatment. Hutton and colleagues found that among chemotherapy patients, 86% experienced changes in smell and/or taste that resulted in decreased energy intake [9]. Radiation therapy for head and neck cancer also may affect taste by causing tissue damage, decrease in saliva production and ageusia [2]. Dysgeusia from cancer treatment often leads to food aversions and, consequently, a decrease in overall food intake and diet quality [8].

Current medical nutrition therapy for patients undergoing cancer treatment focuses on preserving lean body mass, preventing or reversing nutrient deficiencies, minimizing nutrition-related side effects, and improving quality of life. A combination of ongoing dietary counseling, individualized nutritional therapies, and exercise is currently recommended. Specific nutritional therapies include consumption of small, frequent and well-balanced meals and ensuring adequate hydration. The use of nutrient-dense oral supplements is common, and in patients who are unable to consume adequate amounts of calories and nutrients, short-term nutrition support in the form of enteral or parental nutrition may be warranted to prevent malnutrition and improve outcomes [13].

There has been extensive research indicating that side effects of cancer treatment compromise nutritional status. Many researchers have surveyed cancer treatment patients to determine specific factors relating to poor intake and food aversions, whereas patient perceptions regarding nutrition-

related concerns and sources of nutrition advice were very limited. The opinions and perceptions of patients are crucial throughout the treatment process, as it is likely that treatment would be more effective when patient concerns and needs are addressed. The aims of the present study were to identify the prevalence of unintentional weight loss since initiation of cancer treatment, identify the prevalence of specific nutrition-related problems and concerns reported since initiation of cancer treatment, including food aversions, factors contributing to poor food intake, and perceived nutrition-related problems, nutrition advice received, and relations between these items studied and reported unintentional weight loss among cancer patients.

MATERIALS AND METHODS

Study Design and Participants

The study protocol was approved by the Institutional Review Board at the education institute and hospital at which the data were collected and in compliance with HIPAA guidelines. Signed informed consent was obtained from all participants. Data collection occurred from October 2006 to March 2007 in a chemotherapy infusion center, a radiation therapy center, and inpatient rooms in the medical oncology unit from a single 140-bed acute care facility located in a rural geographic location in the central Atlantic region of the United States and in the waiting area of a hospital-affiliated oncologist's office. Study participants included a convenience sample of 79 patients who were currently undergoing radiation and/or chemotherapy for cancer treatment. Other inclusion criteria included cancer diagnosis in the past five years, duration of cancer treatment of at least one time per week, 18 years of age or older and non-pregnant female. All participants recruited met inclusion criteria and agreed to participate.

Survey Development

A pilot survey was adapted from the Memorial Symptoms Assessment Scale and the Functional Assessment of Cancer Therapy Scale [14,15] by a clinical dietitian who is employed at the facility where the data was collected. Two dietitians reviewed the survey for content validity. The survey was then pilot tested among 10 patients undergoing cancer treatment (five chemotherapy, five radiation), who met inclusion criteria and varied in age and cancer type, and both sexes were represented equally. Modifications to the survey were made based on the pilot test results. The final self-administered survey was a 23-item questionnaire that requested information about demographic characteristics, anthropometric data, cancer type and current treatment, food aversions and other factors contributing to poor food intake, nutrition-related problems, nutrition-related advice received, and sources (people and media) of nutrition information. Four employees of the hospital, including the dietitian who completed the pilot

Table 1. Age and Anthropometric Characteristics of Adults Receiving Cancer Treatment (N = 66).

Measure	Radiation		Chemotherapy		Radiation/Chemotherapy		F	p
	M ± SEM	95% CI	M ± SEM	95% CI	M ± SEM	95% CI		
Age (years) ^a	66 ± 3	61, 70	69 ± 3	64, 74	62 ± 2	57, 66	(2,65) = 2.58	.08
BMI (kg/m ²) ^a	26.4 ± 1.4	23.6, 29.3	27.5 ± 1.5	24.6, 30.4	26.4 ± 1.2	23.9, 28.8	(2,65) = 0.22	.81
Unintentional weight loss since initiation of treatment (kg) ^b								
	13.2 ± 3.2	6.4, 20	7.3 ± 4.1	0.9, 15.5	12.7 ± 3.2	5.9, 19.5	(2,26) = 0.74	.49
Unintentional weight loss (% usual weight) ^b								
	14 ± 3	8, 21	9 ± 4	1, 17	14 ± 3	8, 20	(2,26) = 0.75	.48

^aradiation (n = 20), chemotherapy (n = 19), radiation/chemotherapy (n = 27).

^bradiation (n = 10), chemotherapy (n = 7), radiation/chemotherapy (n = 10).

testing, two nurses, and an office manager, recruited patients and administered the survey. The dietitian trained the other members of the research team on how to recruit and administer the survey to willing participants.

Statistical Analysis

Analyses were performed using JMP IN® software [16]. Descriptive statistics included mean, standard error of the mean, 95% confidence intervals, and frequency distributions. Differences in responses for continuous variables by treatment classification were evaluated using ANOVA with Tukey-Kramer honestly significant difference for post-hoc comparison of all pairs. Pearson χ^2 was used to evaluate differences in responses by treatment classification for nominal data and for evaluating relations between items studied and reported unintentional weight loss. An alpha level of 0.05 was used for all statistical tests.

RESULTS

A total of 79 participants completed the questionnaire, 13 were excluded due to incomplete data. The final analysis included data from the remaining 66 (27 males, 39 females), which represents 84% of total participants recruited. Mean age (\pm SEM) of participants was 65 \pm 1 years (95% CI 62, 68), which was similar by treatment classification (Tab. 1). The primary site of cancer origin that participants were receiving treatment included breast (n = 17), lung (n = 17), prostate (n = 9), lymphoma, myeloma, or sarcoma (n = 7), other organ (n = 15), and leukemia (n = 1). Eighteen of the 66 participants (27%) reported metastasis. The mean length of time from cancer diagnosis to initiation of treatment was 3 \pm 1 months (95% CI 1, 5), from diagnosis to completing the survey was 15 \pm 3 months (95% CI 8, 22), and from initiation of treatment to completing the survey was 11 \pm 3 months (95% CI 5, 17), which were similar by treatment classification, F(2,64) = 0.58, p = 0.56, F(2,64) = 0.32, p = 0.73, F(2,64) = 0.22, p = 0.80. Twenty-seven of the 66 participants (41%) were receiving radiation, 20 (30%) chemotherapy, and 19 (29%) both.

Twenty-seven of the 66 participants (41%) reported unintentional weight loss since initiation of treatment, which did not differ by treatment classification, χ^2 (1, N = 66) = 0.98, p = 0.61 (Tab. 1). The mean loss for those reporting unintentional weight loss was 11 \pm 2 kg (95% CI 7, 15), which was a mean deficit of 13 \pm 2% (95% CI 10, 17) current weight, and was similar by treatment classification.

Categories of food classes associated with food aversions, factors contributing to poor food intake, and perceived nutrition-related problems are reported in Tab. 2. A food aversion was defined as avoidance of food category that the participant currently found unappealing although they had liked prior to initiation of treatment. Eighteen of the 66 participants (27%) reported having food aversions. Meat or fish, fried foods, strongly flavored foods, and strong-smelling foods were the primary categories with food aversions. Of the 34 participants (52%) who reported factors contributing to poor food intake since the initiation of treatment, the majority reported general loss of appetite (25 of 34, 74%) and taste changes (18 of 34, 53%), whereas fatigue, difficulty swallowing, and nausea were also common (9 to 15 of 34, 26% to 44%). Thirty-three of the 66 participants (50%) reported having nutrition-related problems since initiation of treatment. Eating a balanced diet, consuming sufficient energy and protein, and obtaining adequate amounts of vitamins and minerals were the most frequently reported nutrition-related concerns. There was a significantly greater prevalence of unintentional weight loss among participants who reported experiencing any of the food aversions evaluated, χ^2 (1, N = 66) = 13.92, p < 0.01, any factor contributing to poor food intake, χ^2 (1, N = 64) = 5.58, p = 0.02, or any perceived nutrition-related problem, χ^2 (1, N = 65) = 13.48, p < 0.01. In the category of perceived nutrition-related problems, a significantly greater prevalence of unintentional weight loss was reported among participants who perceived not eating a balanced diet, χ^2 (1, N = 33) = 6.30, p = 0.01, and those who perceived losing too much weight, χ^2 (1, N = 33) = 9.43, p < 0.01.

Nutrition advice received and sources of nutrition information are reported in Tab. 3. Fifty-nine of the 66 participants (89%) had received nutrition advice. Participants could choose more than one answer, if applicable. The most

Table 2. Reported Food Aversions, Factors Contributing to Poor Food Intake, and Perceived Nutrition-related Problems among Adults Undergoing Cancer Treatment (N = 66).

Measure	% of total (N=66)	% of participants reporting food aversions (n=18)	n
Food aversions	27		18
Meat or fish		61	11
Strongly-flavored		44	8
Fried		44	8
Strong-smelling		33	6
Fatty		27	5
Salty		22	4
Spicy		22	4
Starchy		11	2
Measure	% of total (N=66)	% of participants reporting poor food intake (n=34)	n
Factors contributing to poor food intake	52		34
General loss of appetite		74	25
Taste changes		53	18
Fatigue		44	15
Nausea		26	9
Trouble swallowing		26	9
Diarrhea		21	7
Mouth pain		18	6
Heartburn		15	5
Vomiting		15	5
Stomach pain		12	4
General pain		12	4
Measure	% of total (N=66)	% of participants reporting nutrition-related problems (n=33)	n
Perceived nutrition-related problems	50		33
Not eating a balanced diet		45	15
Not eating enough protein		42	14
Not eating enough calories		36	12
Losing too much weight		33	11
Not getting enough vitamins/minerals		33	11
Not drinking enough water		27	9
Not eating enough fat		10	3

common advice included to drink nutritional supplements as well as more water, eat small, frequent meals, and take a multivitamin. One participant had received advice to take herbs or use alternative remedies. The primary sources of nutrition information included physicians, nurses, books or magazines, and family members or friends. There was not a significant difference in unintentional weight loss when evaluating any of the primary sources of nutrition information used by participants, $\chi^2(1, N = 66) = 1.98, p = 0.18$.

DISCUSSION

The present study reviews self-reported weight loss history and identifies specific nutrition-related concerns of cancer patients. We identified a 13% mean unintentional weight loss among adult cancer patients, mean age 65 ± 1 year. Findings from our study are similar to Bosaeus and colleagues, who reported weight loss in excess of 10% of body weight among 43% of

Table 3. Nutrition Advice Received and Sources of Nutrition Advice among Adults Undergoing Cancer Treatment (N = 66).

Measure	% of total (N=66)	% of participants receiving nutrition advice (n=59)	n
Nutrition advice received	89		59
Drink supplements (e.g., Ensure, Boost)		59	23
Drink more water		41	16
Eat small, frequent meals		36	14
Take a multivitamin		33	13
Gain weight		23	9
Eat more protein		15	6
Eat more calories		13	5
Exercise more		8	3
Take herbs or other “alternative” remedies		3	1
	% of total (N=66)	% of participants reporting source of nutrition advice (n=40)	n
Source of nutrition advice	61		40
Physician		80	32
Nurse		43	17
Book or magazine		25	10
Family member or friend		20	8
Dietitian		5	2
Internet		5	2

the cancer patients whom they studied [1]. Palombine found that among the cancer patients whom they studied, regardless of cancer type, a 5% unintentional weight loss was associated with poor prognosis [2]. These researchers further indicated that unintentional weight loss can be an early indicator of a compromised nutritional status among cancer patients.

Nutrition care goals of cancer patients include preventing or reversing nutrient inadequacies, preserving lean body mass, minimizing nutrition-related side effects and maximizing quality of life [13]. These goals can more readily be accomplished, at least in part, by early identification and treatment of nutrition problems and side effects that are experienced. We found that the most common food aversions were toward meats/fish, strongly flavored foods, and fried foods, whereas the most common factors contributing to poor intake were loss of appetite, taste changes and fatigue. Further, the most common nutrition advice received included to drink nutrition supplements, drink more water, and eat small, frequent meals. This advice is in accordance with recommendations for individuals undergoing cancer treatment who present with food aversions or poor intake. The American Cancer Society recommends eating a snack or small meal every two to three hours, having high-energy, high-protein foods available, and drinking eight to 10 cups of water daily [17].

Patients with cancer seek nutrition advice and information for a variety of reasons. Two common reasons include an overall concern about nutritional status after cancer diagnosis

and the belief that nutrition affects how one responds to cancer treatment [18]. Many patients who have won their battle against cancer focus on prevention of cancer recurrence, accelerating the cancer recovery process, and improving quality of life and long-term treatment outcomes [13, 19]. Nutrition advice was commonly received among 89% of participants in the present study, primarily by physicians, nurses, friends and family members. Few patients in the current study received information from the internet (2%) or clinical dietitians (2%). The American Cancer Society reports that many cancer patients seek advice from friends and family members, but cautions patients that this advice may not be scientifically sound [17]. Patient perceptions are critical for effective supportive care by family members and caregivers and may allow dietitians to tailor dietary advice to individual patient concerns.

Based on the cumulative findings of this study, we suggest that healthcare practitioners participate in open discussions with cancer patients in their care to ensure that evidence-based nutrition-related advice is provided. The most common factors contributing to poor food intake and perceived nutrition-related problems identified in this study could be used as a starting points for screening, assessment, and treatment that alleviate nutrition-related problems. For example, a checklist regarding nutrition-related problems and concerns, completed by the patient and/or care provider while the patient is waiting to receive treatment, could immediately pinpoint problem areas, which then can be documented and communicated

to appropriate members of the healthcare team. Therefore, understanding patient perceptions will allow the clinician to tailor nutritional therapy and advise patients based on individual concerns. The identified issues could be addressed before the patient leaves the treatment center and monitored over time. An example of such a checklist, a screening tool known as the scored Patient-Generated Subjective Global Assessment (PG-SGA), could be useful for this purpose as it includes a physical examination and a medical history, and assigns a malnutrition-risk score to determine the appropriate level of nutrition intervention [20]. One limitation of our study is it did not incorporate the physical examination, medical history, and scoring components included in the PG-SGA. Since our study focused more specifically on nutrition-related factors as perceived by the patients themselves as opposed to physical data and nutritional status, and because a large component of the PG-SGA is conducted subjectively by the clinician, our tool was felt to be more appropriate considering the nature of our study.

Results from this study indicated that family members are an important source of nutrition advice for cancer patients. Mellon and colleagues reported that spouses and adult children are most commonly the caregivers for cancer patients, and oftentimes accompany the patient to treatment sessions [21]. Clinicians treating cancer patients should emphasize to family members the importance of patient perceptions in providing effective supportive care and sound nutrition advice. Placing books, magazines, and pamphlets in waiting and treatment areas at physician offices and chemotherapy infusion centers may be an inexpensive and effective means of disseminating reliable nutrition-related information to patients and caregivers. The information provided should offer practical, evidence-based recommendations that address common factors contributing to poor food intake, such as general loss of appetite, taste changes, fatigue, nausea, and dysphagia, and perceived nutrition-related problems, such as eating sufficient amounts of high quality protein and calories, consuming a balanced diet that is adequate in vitamins and minerals, and strategies designed to prevent unintentional weight loss. Future research should determine if providing education materials in cancer treatment centers that address commonly perceived nutrition-related problems can improve nutrition-related health outcomes among patients undergoing cancer treatment. Since this study enlisted a small sample size, further research in larger patient populations using the survey tool along with collecting follow-up qualitative data is warranted. Specifically, combining a screening tool, such as the PG-SGA with a focused nutrition-related survey, such as the one used in the present study, may be useful to evaluate patient perceptions of their nutrition-related problems in the context of their physical data and nutritional status.

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