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Evaluating Satisfaction and Benefit of Nutrition Counseling Provided by a Registered Dietitian Among Cancer Patients Receiving Radiation Therapy

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A thesis

presented to

the faculty of the Department of Family and Consumer Sciences

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Masters of Science in Clinical Nutrition

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by

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Keywords: cancer, nutrition counseling, weight loss, side effects, radiation, dietitian

ABSTRACT

Evaluating Satisfaction and Benefit of Nutrition Counseling Provided by a Registered Dietitian Among Cancer Patients Receiving Radiation Therapy

by

Bethany A. Stuart

The purpose of this study was to determine if patients with cancer receiving radiation therapy were satisfied with the nutrition counseling they were receiving and if they obtained any benefit. Radiation increases the risk for side effects such as taste changes, chewing/swallowing problems, constipation, diarrhea, nausea, and vomiting. When these side effects are present, a decrease in food and fluid intake occurs, which leads to weight loss, increased risk of morbidity and mortality, as well as decreased quality of life. Subjects were recruited from a regional cancer treatment facility and a survey was administered to those who met criteria. Subjects were found to manage some of their side effects better after counseling from the registered dietitian. A minimal amount of weight loss was observed. Therefore, registered dietitians, when effectively incorporated into a radiation treatment facility, can provide a nutrition program targeted at reducing weight loss and improving quality of life.

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CHAPTER 1

INTRODUCTION

Background

In the United States there are 10.5 million individuals living with cancer and many experience short- and/or long-term treatment side effects (1). Numerous studies have shown that there are two common nutritional concerns with all cancer patients: malnutrition and weight loss. It is well documented that many cancer patients suffer from malnutrition and it is often the eventual cause of mortality among this population (2). This malnourished state present in cancer patients can be associated with tumor biology, surgical procedures, radiation, chemotherapy, or psychological factors (3). Reportedly, 40% to 80% of people diagnosed with cancer develop evident malnutrition during the course of the illness. In fact, it is common in medicine to evaluate patients for a possible malignancy when the patient has experienced unintentional weight loss of a significant amount (2). Even minimal amounts of weight loss (less than 5% of body weight) before the initiation of treatment are associated with poor prognosis. This only reinforces the importance of early nutrition intervention as a preventative measure. To prevent or reverse nutrient deficiencies, to preserve lean body mass, to minimize nutrition related side effects, and to maximize the quality of life are the goals of nutrition intervention in cancer (4).

Statement of the Problem

The purpose of this study was to determine if patients with cancer, excluding breast and prostate, undergoing radiation therapy were satisfied with the nutrition counseling they received and if they obtained any benefit in the process.

Significance of the Problem

Nutrition is a significant issue in oncology, playing many roles in the prevention, etiology, and treatment of cancer. Deterioration of nutritional status may result from both the course of the cancer itself and the treatment of the disease (5). Nutrition is an essential component of the plan prior to initiating treatment, during treatment, and following treatment into the recovery phase. Adequate amounts of macronutrients, micronutrients, and water fuel the immune system by increasing "fighter" cells and producing antibodies which then aid the body in battling cancer. Without adequate nutritional intake and sufficient nutrient stores, the immune system suffers and fighting cancer becomes a much larger battle (5). Although various aspects are involved in assessing the overall health status of a cancer patient, nutrition plays a vital role in influencing tumor biology, comorbid conditions, and responses to treatment (6).

Recent studies have examined the effects of different treatment options, nutrition counseling techniques as well as nutrition support routes and formulas to strengthen and improve the experience and response to radiation and/or chemotherapy treatment. Researchers are trying to better understand the mechanism causing cancer patients to experience such dramatic weight loss compared to patients with other diseases (5). It is imperative to understand how to combat these issues before and during treatment to maximize outcomes and response to treatment.

Encompassing all the aspects of cancer treatment, from nutrition interventions to emotional turmoil will improve the outcome for an individual battling cancer (6).

Question to be Addressed

This study sought to answer the question of how cancer patients undergoing radiation therapy felt about the nutrition counseling they received and if they obtained any benefits.

Assumptions

- Subjects who attributed an improvement in side effects following intervention through nutrition counseling from a registered dietitian were assumed to have received benefit from the nutrition counseling.
- Benefit from nutrition counseling positively affected quality of life for subjects during radiation treatment.

Limitations

- Subjects being fed entirely by enteral or parenteral routes were excluded from this study.
- Research took place in only one radiation therapy treatment facility as opposed to multiple facilities in the geographic region.
- The sample size of participants was small.
- Subjects were not monitored following completion of treatment to evaluate weight and progress.
- Subjects presented with different stages of cancer and different levels of nutritional status at onset of radiation therapy treatment.

- Subjects were not classified by the level of medical nutrition therapy received.
- Subjects presented with various attitudes toward the disease and diverse levels of motivation prior to and during treatment.

Definitions

Ad libitum – to be taken as desired and sometimes used in pharmaceutic prescriptions (7)

Anorexia – lack or loss of appetite, resulting in the inability to eat; the condition may result from poorly prepared or unattractive food or surroundings, unfavorable company, or various physical and psychological causes (7)

Anthropometric – measurements of the human body as to height, weight, and size of component parts, including measurement of skinfolds, to study and compare the relative proportions under normal and abnormal conditions (7)

Antibody – an immunoglobin produced by lymphocytes in response to bacteria, viruses, or other antigenic substances (7)

Antineoplastic – of or pertaining to a substance, procedure, or measure that prevents the proliferation of malignant cells (7)

Cachexia – general ill health and malnutrition, marked by weakness and emaciation, usually associated with serious disease, as tuberculosis or cancer (7)

Dysgeusia – an abnormal or impaired sense of taste of normal salivary secretions (7)

Dysphagia – difficulty in swallowing, commonly associated with obstructive or motor disorders of the esophagus (7)

Enteral nutrition – the provision of nutrients through the gastro-intestinal tract when the client cannot ingest, chew, or swallow food, but can digest and absorb nutrients (7)

Malignancy – anaplastic, invasive, and metastatic (referring to cancer) (7)

Malnutrition – any disorder of nutrition; it may result from an imbalanced, insufficient, or excessive diet or from the impaired absorption, assimilation, or use of foods (7)

Metabolism – the aggregate of all chemical processes that take place in living organisms, resulting in growth, generation of energy, elimination of wastes, and other bodily functions, as they relate to the distribution of nutrients in the blood after digestion (7)

Mucositis – any inflammation of a mucous membrane, such as the lining of the mouth and throat (7)

Odynophagia – a severe sensation of burning, squeezing pain while swallowing, caused by irritation of the mucosa or a muscular disorder of the esophagus (7)

Total parenteral nutrition (TPN) –the administration of nutritionally adequate hypertonic solution consisting of glucose, protein hydrolysates, minerals, and vitamins through an indwelling catheter into the superior vena cava (7)

Xerostomia – dryness of the mouth caused by cessation (7)

CHAPTER 2

REVIEW OF LITERATURE

Malnutrition alone increases the cancer patient's risk of infection and development of side effects. This results in increased health-care costs for the individual and for the hospital. Malnutrition may also affect outcomes such as life expectancy and quality of life. It is important to offer the best and most effective care to promote increased survival rates and optimum quality of life (5).

Etiology of Malnutrition

Oncology-related nutritional decline is frequently attributed to anorexia, continued loss of lean body mass, altered carbohydrate, protein, and fat metabolism, increased metabolic rates, cancer location, duration of disease, stage of cancer present, treatment, and the production and release of proinflammatory cytokines (8). Therefore, nutritional deterioration is a multifactorial complication and is associated with a negative prognosis (5, 8).

Malnutrition can also arise secondary to a wasting syndrome known as cancer cachexia. This syndrome, characterized by progressive weight loss, anorexia, generalized wasting, immunosuppression, early satiety, weakness, and organ dysfunction, is the single most common cause of death among patients with cancer (2, 4, 8). It is a common feature of advanced malignancy (9). Cancer cachexia is the consequence of reduced gastrointestinal nutrient absorption, alterations in the diet or appetite, hormone-induced metabolic changes, and cancer-related immune activation. Regardless of the origin of weight loss, it contains many dimensions

and greatly reduces tolerance to antineoplastic therapy, resistance to infection, functional status, and the overall well-being of the patient (8).

The most common attribute associated with cancer cachexia is anorexia, which is the involuntary decline of food intake secondary to decreased appetite. It has been reported that anorexia is present in approximately 50% of newly diagnosed cancer cases and 64% of advanced stage cancer cases. Anorexia is linked to reduced survival rates from the time of diagnosis (2). In many patients, anorexia or a variation in the function of the gastrointestinal tract could explain the observed weight loss. However, in other cases, weight loss seems to occur in the absence of any noticeable cause (9).

Malnutrition also strengthens the metabolic activity of organs such as the liver, which "physiologically borrows substrate from skin and muscle" to support its necessary functions (6). By sustaining an acceptable nutritional balance, cancer patients who are undergoing treatment will be better able to minimize the risk of complications. Physiologic stressors such as infection and injury ignite a chain of metabolic reactions leading to a negative nitrogen balance and eventually a decrease in lean body mass, especially if patients do not have a proper nutritional status (6).

The risk of nutritional deterioration, especially in patients with cancers of the head, neck, and gastrointestinal tract, increases during radiation therapy. Possible effects of radiation therapy include anorexia, nausea, vomiting, diarrhea, mucositis, odynophagia, dysphagia, xerostomia, and dysgeusia. These are common occurrences and may compromise both nutritional status and functional ability of the patient, which will in turn negatively impact quality of life (5, 10). The severity of side effects that a cancer patient experiences depends on a host of variables. Tumor

histology, total dose of radiation, size of irradiated area, injury repair mechanisms, and concurrent chemotherapy are the most critical (5).

Nutrition Intervention

Maintaining good nutritional status during the early phases of treatments for cancer will increase the likelihood of successful completion of the therapy prescribed, and will very possibly increase survival while decreasing risk for comorbid diseases and cancer recurrence (11). Individualized nutrition counseling and education not only improves nutritional intake and status, but also proves to significantly improve patients' overall quality of life (12).

The goal of nutrition intervention, whether counseling or supplementation, is to assist the patient in meeting the estimated requirements for intake of calories, protein, and other nutrients. Individuals who have been diagnosed with cancer are often motivated to revise their diets and seek nutritional advice. Food choices and eating patterns are facets of everyday life over which the individual has some control (11). Although cancer increases the individuals nutritional risk, such a life threatening event can also operate as a powerful agent to encourage lifestyle changes (13).

Early detection and intervention are imperative to correct existing nutritional deficiencies or to maintain the most ideal nutritional status. The Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) mandates that all hospitalized patients are screened for nutritional risk within 24 hours of admission. However, in the outpatient setting, where most patients with cancer are likely to receive treatment, screening and intervention protocols may not be in place (2). In the most ideal situation, a patient would be screened for nutritional risk before antineoplastic therapy begins. Studies have revealed that the occurrence of a 5% or more weight

loss from usual body weight prior to initiation of therapy had a negative impact on outcome in regards to quality of life and survival (2).

In a study performed by Ravasco et al. (11), various effects of individualized nutrition counseling focusing on regular foods were compared with the effects of prescribing nutrient-dense, high-protein liquid nutritional supplements. A total of 111 colorectal cancer patients undergoing radiation therapy were included and by randomization were divided into three groups; a diet counseling group based on regular foods with appropriate modification according to the presence of specific side effects, a liquid nutritional supplement group, and an ad libitum group (control) who were not submitted to any nutrition intervention. Several types of outcome variables were measured, including symptom severity, health-related quality of life, and nutritional status indicators. Measures were completed at baseline, upon completion of prescribed radiation therapy, and at three months post-treatment. These nutritional status indicators included anthropometric measurements, an index of nutritional status based on a validated multi-component assessment tool, a detailed diet history, the presence and degree of symptoms related to radiation therapy, and health-related quality of life using a cancer-related questionnaire (5).

Results of this study showed that after completion of the prescribed radiation therapy, both the diet counseling group and the liquid nutritional supplement group exhibited an increase in calorie intake (averaging an increase of 555 kcal/day and 296 kcal/day respectively), while the ad libitum group showed a decline in calorie intake (averaging 285 kcal/day less than baseline). At 3 months post-treatment, the counseling group maintained the increased calorie intake, whereas the other two groups displayed a decline. Following completion of radiation therapy, only 3 of 37 patients in the diet counseling group demonstrated a decline from baseline in

nutritional status, compared to 19 of 37 patients in the liquid supplement group and 34 of the 37 patients in the ad libitum group. The diet counseling also revealed the lowest symptom severity score (5). Additionally, quality of life function scores improved proportionally with adequate intake and nutritional status, which was most apparent at 3 months post-radiation therapy in the counseling group (11).

At the onset of radiation therapy, the prevalence of anorexia (≤ 9%), nausea or vomiting (≤ 8%), and /or diarrhea (≤ 17%) did not differ between groups (5). After radiation therapy, more than 90% of the patients in the three study groups experienced radiation therapy induced symptoms. After additional statistical analysis, it was revealed that at the end of treatment and at 3 months post-treatment, radiation induced symptoms were most severe in the ad libitum group. In contrast, the counseling group displayed the lowest symptom severity score (5).

During the process of radiation therapy, antiemetic and prokinetic medications (used to supress nausea, vomiting, and decreased appetite) were prescribed for 5% of patients in the counseling group, for 49% of patients in the liquid nutritional supplement group, and for 68% of patients in the ad libitum group. Upon the 3 month post-treatment mark, no one in the counseling group still needed the medications. However, 10% in the supplement group and 32% in the ad lib group still needed them to alleviate symptoms. The prescription of anti-diarrheal drugs was also significantly different between groups. Initially they were prescribed to 7% of patients the counseling group, 53% in the supplement group, and 78% in the ad libitum group. At 3 months, there was no need for these drugs in the counseling group, but 15% of the supplement group and 54% of the ad lib continued to take the drug to control diarrhea (5).

Pharmacologic agents such as appetite stimulants and corticosteroids are often prescribed to cancer patients for management of symptoms that may exacerbate cachexia (2). These

particular drug therapies were not mentioned to be measured in the study by Ravasco et al. However, there have been a number of trials that have demonstrated improvement of appetite, increased levels of oral intake, and increased body weight in cancer patients being treated by these appetite stimulants, including megestrol acetate. The benefits of megestrol acetate in regards to weight and appetite have shown to be dose dependent with greater benefit associated with higher doses (4). Corticosteroids require increased doses to maintain the increase in appetite. The initial improvement in appetite levels is short-lived and has not proven to translate into weight gain. Also, extended use of these corticosteroids can present the patient with a new set of negative side effects such as osteoporosis, fluid retention, adrenal suppression, glucose intolerance, electrolyte imbalance, and even arm and leg muscle wasting (4).

In the research by Ravasco et al., study arms regarding patient quality of life were also measured. According to the study's authors, patients undergoing antineoplastic therapies "experience functional limitations, cognitive alterations, and emotional stress, and overall quality of life depends on both physical and psychological well-being. All of these aspects may influence or be influenced by nutrition" (5). This particular study by Ravasco et al. demonstrated that nutrition was a key determinant of quality of life in cancer patients. Both at the end of treatment and at 3 months after radiation therapy, the diet counseling group drastically improved all quality of life function scores. Only three of the six function scores improved in the supplement group (5).

This particular study enrolled only patients with colorectal cancer. Therefore, it should be noted that there is significant variability in the risk for malnutrition after the diagnosis of cancer across the various cancer types and subgroups of that population.

In regards to the diet counseling group, the therapeutic diet and nutrition recommendations and assistance with making food choices were individualized on the basis of personal characteristics, including the estimated digestive and absorptive capacity, the presence of a variety of symptoms, psychological factors, and personal eating patterns and preferences. Meal plans with details concerning specific foods, amounts, and frequency of consumption were provided (5).

Knowledge of food content and nutritional science, combined with individualized counseling focused on diet-related behaviors, can encourage behavior change. As suggested by the outcome of this study, the use of individualized diet counseling results in a greater likelihood of lasting benefit when compared to nonspecific prescriptive approaches that do not take personal characteristics and preferences into account (11). This study emphasized the concept that increased intake of an appropriate mixture of nutrients using regular foods will be of major benefit in modulating nutritional and non-nutritional outcomes (5). This was proved to be the most effective nutrition intervention.

Nutritional Needs

Several factors are associated with daily energy expenditure, including basal metabolic rate, thermic effects of exercise, and thermogenic effects from food ingestion (14). Stress and illness in critically ill patients can boost basal energy expenditure by up to 40 percent. Likewise, cancer can stimulate localized tumor effects from rapid growth and division, as well as systemic effects due to metastatic disease, both of which can further intensify the metabolic demands on an already critically ill individual (14). This can manifest into glucose intolerance, increased fat

depletion, and increased protein break down (14). Whether tumor type or tumor stage are important in determining resting energy expenditure (REE) of a cancer patient is still unclear (9).

Energy metabolism is closely related to carbohydrate, protein, and lipid metabolism, all of which are altered by the presence of a tumor. Both protein and lipid breakdown occur at increasing rates. Patients with cancer often experience fluid and electrolyte imbalances. Severe imbalances may be displayed by patients with cancers that promote excessive diarrhea or vomiting (4).

Cancer patients require sufficient energy and protein to maintain their nutrition stores and achieve or maintain appropriate weight. Weight loss during cancer treatment is often more likely caused by a loss of muscle rather than a loss of fat stores. Therefore, protein requirements are increased during this time of illness and stress. The additional protein is needed by the body to restore tissues and maintain a healthy immune system. For the body to most effectively use the protein, adequate calories should be supplied to the body. If adequate calories are not consumed, the body will use its protein reserves, also known as lean body mass, as a fuel source (4). In addition, cancer patients with decreased oral intake should take a multivitamin and mineral supplements that provide no more than 100% of the recommended daily allowance (4).

In cancer patients, intake of protein should be high in the range of 1.0-1.5 grams/kilogram of body weight to maintain and 1.5-2.0 g/kg of body weight to replete losses. This rate of intake can be compared to 0.8 g/kg of body weight, the average protein needs of an otherwise healthy individual. Calorie needs are also increased. In general, daily intake needs for patients with cancer range from 25-35 kcal/kg of body weight to maintain adequate weight status and 35-50 kcal/kg of body weight to replete stores. This higher level of intake is also needed if

the patient is febrile or septic. Healthy individuals need, on average, only 25-30 kcal/kg of body weight to maintain body weight status (15).

Specialized Nutrition Support

Although many oncology patients become malnourished, the nutrition management of these patients remains somewhat controversial. Specialized nutrition support, in the form of enteral nutrition or parenteral nutrition, is often implemented if oral nutrition therapy is unsuccessful secondary to side effects becoming too severe and affecting the ability to consume adequate energy and protein. With the introduction of total parenteral nutrition (TPN), it was thought that cancer associated malnutrition could be prevented and that survival and nutritional status could be improved. After review of more than 40 randomized prospective trials of cancer patients undergoing antineoplastic treatment (surgery, chemotherapy, and/or radiation), it was concluded that only few studies found a statistically significant variation in clinical endpoints between patients receiving TPN or enteral nutrition and those who did not (2). In another review of 28 randomized prospective and controlled clinical trials, no statistically significant benefit of TPN administration could be identified in regards to survival rate, treatment tolerance, treatment toxicity, and treatment response from patients submitted to chemotherapy and radiation therapy. This review also concluded that TPN is unlikely to benefit patients with advanced cancer whose malignancy is documented as unresponsive to radiation or chemotherapy (16).

Additional nutrition support studies have revealed more hopeful results. “Fewer infections and wound complications as well as a decreased length of hospital stay in patients treated surgically for gastrointestinal malignancies who received an enteral formula enriched with arginine, omega-3 fatty acids, and RNA when compared with a control group supported

with a standard enteral formula" were benefits reported by Daly and colleagues (17). Daly et al. also explored the advantages of intensive nasogastric tube feedings versus optimal oral nutrition in patients with advanced head and neck cancer who were receiving 8 weeks of radiation therapy. The results showed less weight loss in the tube fed group, and median albumin values returned towards normal in the tube fed group by the end of treatment. There were no differences reported in survival rate between the two groups (17). In another study by Zogbaum and colleagues, "patients with head and neck cancer who received enteral nutrition experienced fewer breaks in radiation treatment and had less weight loss than patients who did not receive enteral feedings" (18).

Specialized nutrition support is not customary for well-nourished or mildly malnourished individuals going through surgery, chemotherapy, or radiation or for patients where adequate oral intake is anticipated (16). These studies and others demonstrate that the administration of specialized nutrition support should be individualized, taking into account the disease process, the treatment therapy, present nutritional status, the estimated length of need for nutrition support, resources available, and the risks and benefits for that particular patient. To determine when specialized nutrition support is appropriate for a patient with cancer, standards are provided by the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). It must be kept in mind, before the initiation of nutrition support, cancer-related symptoms and side effects such as anorexia, nausea, vomiting, and diarrhea should first be managed by diet counseling and then by pharmacologic therapy (2).

Summary

In summary, the literature available has given healthcare professionals an insight into how nutrition and nutrition counseling can be effective in helping people with cancer minimize side effects of treatments and maximize overall health. Cancer patients, especially those with tumors of the head, neck, and/or the gastrointestinal tract, lose weight and become malnourished during antineoplastic treatment therapies. Radiation treatment results in many side effects that make adequate energy intake by these patients difficult. Patient intervention should be individualized. This is a valuable resource that does improve nutritional intake, which in turn improves quality of life. Early intervention with these patients who are prone to develop nutritional complications is key to the success of outcomes.

CHAPTER 3

DESIGN AND METHODOLOGY

Subject Recruitment

All individuals seeking cancer treatment through radiation therapy from the beginning of November 2007 through February 2008 at the Regional Cancer Center in Johnson City, Tennessee were invited to participate in the study. This population was desired for study participants specifically because radiation often causes symptoms that decrease nutrient intake, resulting in weight loss. The desired sample size was set at 30 participants. Criteria for inclusion in the study was any patient over the age of 18 receiving radiation to any region of the body except to the breast or prostate. Participants also required oral feedings and any individuals receiving nutrition exclusively through alternative routes (enteral or parenteral) were excluded. Individuals were not required to give written informed consent, but oral consent was made when they agreed to participate in the research study. The Institutional Review Board at East Tennessee State University approved the research.

Instruments

A survey had been developed for the previous study including only head and neck cancer and was modified to accommodate this research study. The survey was first developed by the previous principle investigator, Lori Watson, MS RD, in partnership with the director of the Regional Cancer Center to measure the benefit received from the nutrition counseling during radiation treatment as well as if the participants were satisfied with the information received. Questions were formulated based on previous surveys found in the literature relating to benefit

from nutrition counseling and components that the staff at the cancer center felt was most important to measure. Before introduction into the study, the survey was validated for readability. The 18-question survey asked participants about symptoms they experienced throughout radiation and if the symptoms improved following education/counseling from the registered dietitian. A Likert scale was used to measure patient's satisfaction regarding services and instruction provided by the RD, with one being the least satisfied and five being the most satisfied. Age and gender were asked to demographically describe the sample. Space was provided on the survey for participants to offer subjective information and comments they wanted to share.

Study Design

Patients who met inclusion criteria were interviewed by the registered dietitian for an initial nutrition assessment. Initial weight before treatment was obtained by standard balance beam scales according to treatment center protocols. Taste changes, swallowing problems, constipation, diarrhea, nausea, and vomiting were assessed through patient's responses to questions from the RD, and receptiveness regarding nutrition education was evaluated within this initial interview. At that time, the RD provided information concerning side effects of radiation the individual could expect to experience throughout the course of treatment. Side effects included, dry mouth, pain when swallowing, mouth sores, taste changes, nausea, vomiting, diarrhea, and constipation because of consistency changes in diet. Information was provided through written handouts and verbal guidelines expressing methods on how to manage side effects, including foods to avoid and/or include in a soft diet, eating snacks between mealtimes, taking smaller bites at meals, and recipes to increase calorie and protein content of foods.

Throughout the course of the individuals' prescribed radiation treatments, the RD followed up with patients at their discretion. It is unknown how many times each participant visited the RD. During these visits, the RD reassessed patients for weight loss from initial assessment, any changes in nutrient intake, and newly developed problems. Commercial supplements were available from the RD throughout the entire course of treatment and were provided based upon nutritional need and willingness to try products. Upon entering the last week of their radiation therapy treatments, patients were asked by the RD if they would like to participate in the study. The study was explained to individuals as an evaluation of the nutrition counseling they received during their treatment. It was also explained that the study would ask their opinion regarding the nutritional information provided and its helpfulness in managing their side effects of radiation treatment. Each individual was given a letter of explanation about the research project as well as a questionnaire. The RD instructed subjects to complete the questionnaire in the privacy of their own home to decrease the feeling of intimidation from staff at the Regional Cancer Center. If patients chose to participate, they completed the survey and returned it to the principle investigator via the self-addressed stamped envelope that was provided for them. Subjects were instructed not to place any identifying information (name and address) on the questionnaire or envelope to keep their answers anonymous. Completed surveys and storage files were kept in a locked file cabinet at the home of the principle investigator

during the study. A control group was not used in this study design as it is protocol to give nutrition counseling to all patients who seek treatment at the Regional Cancer Center.

Data Analysis

Data collected from surveys were compiled and frequencies generated by the SPSS statistical analysis package to evaluate the frequencies of answers for each individual question. Statistical analysis was not appropriate for this study as a result of the small sample size.

CHAPTER 4

DATA/RESULTS

Subjects

Forty surveys were distributed to patients who met the inclusion criteria. Nineteen surveys were returned for a 48% response rate. The 19 subjects were described as follows: 63% of the respondents were male; two respondents were in the age category of 36-45 years old, three were between 46-55 years of age, three were between 56-65 years of age, eight were between 66-75 years of age, and two were between 76-85 years of age. One participant did not disclose his/her age. The areas of the body being treated by radiation included: head/neck region (47%), chest (47%), abdomen (11%), pelvis (11%). Three of the respondents were treated in more than one area. Two of these three people were treated to the head/neck and chest and the other to the abdomen and pelvis. Seven of the 19 respondents (37%) were receiving chemotherapy treatment simultaneously to radiation therapy.

Eating Habits

Regarding questions #7 and #8 in the nutrition survey, 11 participants (58%) reported decreased food intake during radiation treatments. Three of those 11 participants who reported eating less than usual also reported eating different foods than usual. Six participants (33%) reported eating the same as usual during treatment and two patients (11%) reported eating more than usual. After counseling from the registered dietitian, 5 participants (28%) were able to increase consumption. One participant (5%) said that there was more difficulty

associated with eating after the counseling and 13 (68%) reported eating about the same before and after counseling from the dietitian.

Side Effects

Responses from questions #9 and #10 regarding side effects are located in Table 1. Eleven participants (58%) described having taste changes and 11 reported swallowing problems during radiation. Of the 11 participants who reported taste changes, 4 claimed they were better able to manage taste changes after counseling from the registered dietitian. Six of the 11 participants with swallowing difficulties reported improvement. Nine participants (47%) reported constipation during radiation. Three of these nine patients said they saw improvement in managing the constipation after help from the dietitian, five saw no change, and one person did not respond. Seven participants (37%) experienced nausea and four (21%) experienced vomiting during radiation treatment. No participant claimed improvement in symptoms associated with nausea or vomiting after counseling from the dietitian. Five participants (26%) reported chewing problems during therapy. Three of these five claimed they were better able to manage after counseling. Five patients also said they experienced some diarrhea during radiation. Of these five, four participants said that the education from the registered dietitian helped, and one person did not give a response.

Table 1. Side effects reported by participants before and after treatment			
	Present	Improved	Did Not Improve
Taste Changes	11 (58%)	4	7
Chewing Problems	5 (26%)	3	2
Swallowing Problems	11 (58%)	6	5
Constipation	9 (47%)	3	5
Diarrhea	5 (26%)	4	0
Nausea	7 (37%)	0	6
Vomiting	4 (21%)	0	3

Weight Change

In reference to survey questions #2 through #5, eleven participants (58%) expressed a weight loss from the beginning of treatment to the end of treatment. The mean weight change of all 19 participants was a loss of 3.68 pounds. Four participants (21%) reported a weight gain and four experienced no weight change. In this study, weight changes are highly variable. The standard deviation of weight change is 7.43. Nine participants (47%) reported it was hard for them to maintain their usual body weight during radiation therapy. The time frame from initial weight and final weight was different for each participant and is unknown. Statistical analysis of weight changes reported by participants is shown in Table 2.

Table 2. Statistical analysis of weight changes reported by participants			
	Before	After	Weight Change
Mean Weight (lbs.)	172.00	168.32	-3.68
Standard Deviation	47.77	47.67	7.43
Greatest Weight Loss (lbs.)	---	---	-21.00
Greatest Weight Gain (lbs.)	---	---	12.00

Printed Education Materials

Questions #14 and #15 asked about the education handouts. Seventeen subjects (89%) reported receiving printed education materials from the registered dietitian. All of those 17 subjects stated that the educational materials were helpful during their radiation treatments.

Energy Level (Question #11, #12)

Regarding survey questions #11 and #12, ten participants (53%) reported that they had a decrease in energy since radiation treatment began making it difficult for them to prepare meals or perform their usual activities. Nine participants (47%) reported that they had not had a decrease in energy. All of the 10 participants who indicated less energy reported that after counseling from the registered dietitian, he/she had more ideas about how to prepare simple meals and snacks.

Supplement Use (Question #13)

Question #13 asked subjects if they had consumed any nutritional supplements or vitamins during radiation treatment. Nine respondents (47%) indicated the use of a supplement. Four respondents reported the use of Carnation Instant Breakfast and six reported the use of either Ensure and/or Boost. One participant reported use of both Boost and Carnation Instant Breakfast.

Satisfaction

Question #6 asked participants to rate their satisfaction, on a scale from 1 to 5 with 5 being the most satisfied, in regards to how the registered dietitian helped them maintain weight or decrease their weight loss, 13 subjects (68%) responded that they were most satisfied with the registered dietitian. Two participants (11%) rated their satisfaction as a 4 and 2 participants (11%) reported a rating of 3.

Qualitative Data

Participants were given the opportunity to give additional comments. Table 3 lists pertinent responses related to nutrition intervention.

Table 3. Additional comments from participants
I really appreciate the recipes that the dietitian gave me to use Ensure and Boost in to help me be able to eat more calories and stop the weight loss. I always felt full and never really was hungry but I could make myself drink the Boost. The dietitian was always very polite and helpful and always showed true concern for me. Most of my problems were brought about by some medication which now has been resolved. I had little or no effects from radiation. My treatments went very well, the dietitian really helped a lot and was always available to answer my questions I might have. I had a little diarrhea about three times the whole five weeks and I maintained my weight very well. I think the dietitian was very efficient and helpful. And, very knowledgeable on what she told me. Had a wonderful talk with dietitian – very informative and not simply dwelling on the cancer, radiation, or chemo side effects. Felt like a whole person, not a statistic. I believe the dietitian will stand ready to help me any time I require outside help.

CHAPTER 5

DISCUSSION, CONCLUSIONS, RECOMMENDATIONS

Discussion

The purpose of this study was to determine if cancer patients who were undergoing radiation therapy received benefit from nutrition counseling. The sample size was too small to perform quantitative analysis, but the results did show significant qualitative data. While participants experienced changes in food and beverage consumption patterns during radiation therapy, few were able to manage them better with nutrition counseling from the registered dietitian. It should be noted that five participants answered this question with multiple responses. Three of these five expressed eating less than usual and different foods than usual. The other two reported eating more than usual and different foods than usual. When different foods are consumed for comfort, there may be a change in the amount of calories and protein consumed, ultimately impacting nutritional status.

Taste changes and swallowing problems were the most common side effects of radiation expressed by the participants. Out of the seven side effects measured by the survey, only three indicated the registered dietitian to be beneficial in their treatment management the majority of the time. Of the respondents who reported issues with chewing, swallowing, and diarrhea, over half of them expressed that the RD was helpful in managing these side effects. According to the results, the RD did not prove to be helpful with managing taste changes, constipation, nausea, and vomiting.

Eleven participants experienced weight loss, four patients reported weight gain, and four reporting no weight change. At the end of radiation treatment the survey was distributed to

subjects who were asked to record weight before and after the treatment. Therefore, body weight and weight changes were self-reported and may be inaccurate because of the length of time between initial measurement and response to survey. The average weight loss was 3.68 pounds. Nutrition counseling offered by the registered dietitian may have been a factor in managing or preventing excessive weight loss. Additionally, the subject's response to treatment and family help and encouragement during meal times may have played a role. The literature is clear that keeping weight loss to a minimum decreases the risk of morbidity and mortality. Therefore, by preventing weight loss, the individual's overall outcome to treatment simultaneously improves greatly (2, 5).

Regarding the participant's satisfaction in the amount and quality of help received from the registered dietitian, there was an overall positive response. Thirteen of the 19 subjects expressed being very satisfied with the registered dietitian's assistance in slowing down their weight loss. Seventeen participants received written education material and all 17 reported that the material was helpful. Decreases in energy levels were noted in 10 patients while 9 patients denied decreased energy. Of the 10 participants, all had a positive response indicating counseling from the registered dietitian had improved energy level. There are various angles of cancer treatment that can affect energy levels. Radiation treatment specifically can diminish a patient's energy level even with a balanced diet and adequate amounts of nutrients (4). Although nutrition plays a role in energy levels, the assumption was that the registered dietitian would be unable to increase energy levels with nutrition counseling alone. The RD was able to offer guidance on strategies to cope with decreased energy.

Conclusions

Individuals receiving radiation therapy did gain benefit, although minimal, from nutrition counseling by the registered dietitian. Participants were able to manage some of their side effects which in turn then reduced the amount of weight lost. Overall, participants were very positive about the nutrition counseling they received from the registered dietitian. Subjects expressed that the counseling was beneficial and the education was useful; therefore, the assumption was that the quality of life was improved. Even though the sample size was small, this study was an important step in demonstrating that the registered dietitian can enhance the quality of life and nutritional well being of cancer patients undergoing radiation treatment in this particular setting.

Recommendations

In the future it would be beneficial to incorporate more than one radiation treatment facility. Increasing the number of patients would greatly enhance the data and produce more significant results. It may also be beneficial to know how many weeks each participant received radiation therapy and what other chronic conditions and/or surgical history each participant has that could affect weight changes. After the initial assessment by the dietitian, follow up counseling with the RD was the discretion of the patient. Knowing the number of visits each participant had with the RD would be informative. It is unknown what type of interaction the RD had with each participant. Some may have received individualized counseling, while others may have received more standardized counseling. The survey would need to be modified to reflect these issues and gather beneficial information that was missing in this study.

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APPENDICES

APPENDIX A

Nutrition Care Survey

Dear Participant,

This letter is written to give you information about a project in which you can participate if you choose. The goal of this project is to assess how nutrition therapy, provided by a Registered Dietitian, impacts the side effects caused by radiation therapy.

I am a graduate student at East Tennessee State University, working on my final project before graduation. Your assistance with this project would be greatly appreciated. The feedback you provide will help us to improve and maintain the best nutritional care possible for future patients.

I have included a survey for you to complete at home at your convenience. If you choose to complete the survey, mail it in the self addressed envelope provided, and do not provide a return address. Please DO NOT put your name anywhere on the survey or the envelope, as to ensure your privacy. The survey will only be viewed by me, and no one at Johnson City Medical Center will see the survey. Your participation in this project is completely voluntary, and will not affect your treatment in any way.

Thank you for taking the time to assist me with this final project, and for helping to improve nutritional care in the future.

Beth Stuart

Nutrition Therapy Survey

Please return survey as soon as possible in the envelope supplied. Please DO NOT provide your name.

1. What area of your body was treated with radiation?
   _____Head or Neck
   _____Chest
   _____Abdomen
   _____Pelvis

2. Was it difficult to maintain your usual body weight during radiation treatment?
   _____yes _____no

3. Has your weight changed since you began radiation treatment?
   _____yes _____no

4. What was your weight before your radiation treatment started? _____lbs

5. What is your weight now that you are in the final weeks of treatment? _____lbs

6. On a scale of 1 to 5, with 1 being the least satisfied and 5 being the most satisfied, please rate your satisfaction with how the Registered Dietitian helped you maintain or slow down your weight loss during radiation treatment.

Least _____ 1 _____2 _____ 3 _____4 _____ 5 Most

7. Describe your general eating habits since you began radiation treatment. Are they:
   _____the same as usual
   _____more than usual
   _____less than usual
   _____different foods than usual

8. After counseling from the Registered Dietitian were you:
   _____able to eat more
   _____had more difficulty with eating
   _____eating about the same

9. Have you experienced any of the following problems?

Taste Change	_____yes	_____no
Chewing Problems	_____yes	_____no
Swallowing Problems	_____yes	_____no
Constipation	_____yes	_____no
Diarrhea	_____yes	_____no
Nausea	_____yes	_____no
Vomiting	_____yes	_____no

10. If yes, after counseling from the Registered Dietitian were you better able to manage:

Taste Change	_____yes	_____no
Chewing Problems	_____yes	_____no
Swallowing Problems	_____yes	_____no
Constipation	_____yes	_____no
Diarrhea	_____yes	_____no
Nausea	_____yes	_____no
Vomiting	_____yes	_____no

11. Has your energy level made it difficult to prepare meals or perform usual activities?

_____yes _____no

12. If yes, after counseling with the RD, did you have more ideas about how to prepare simple meals and snacks?

_____yes _____no

13. Did the Registered Dietitian recommend any nutritional supplements during your radiation treatment? If yes, what did you take?

14. Did you receive printed educational materials (pamphlets or hand-outs) from the Registered Dietitian?

_____yes _____no

15. If yes, did you find these materials:

_____helpful

_____not helpful

16. Were you undergoing chemotherapy treatment while receiving radiation therapy?
_____yes _____no

17. Are you: _____male _____female

18. Please check your age category:
_____18-25 _____26-35 _____36-45
_____46-55 _____56-65 _____66-75
_____76-85

Please give any additional comments you wish to share:

Thank you so much for participating in this research project! Your responses and comments will help us give better nutritional care in the future. We ask that you return this survey as soon as possible in the envelope that we have provided for you. Please do not include your name.

APPENDIX B

Side Effects Reported

Side effects reported by participants														
	Taste Change		Chewing Problems		Swallowing Problems		Constipation		Diarrhea		Nausea		Vomiting	
1	Yes	-	Yes	-	Yes	-	-	-	-	-	-	-	-	-
2	-	No	-	No	-	No	-	No	-	No	-	No	-	No
3	-	No	-	No	Yes	-	-	No	-	No	-	No	-	No
4	Yes	-	-	No	-	No	Yes	-	-	No	Yes	-	Yes	-
5	Yes	-	Yes	-	Yes	-	Yes	-	-	No	Yes	-	-	No
6	Yes	-	-	No	Yes	-	-	No	-	No	Yes	-	Yes	-
7	Yes	-	-	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-
8	-	No	-	No	-	No	-	No	Yes	-	-	No	-	No
9	-	No	-	No	-	No	-	No	Yes	-	Yes	-	-	No
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Yes	-	-	-	Yes	-	Yes	-	-	-	Yes	-	Yes	-
12	Yes	-	-	No	Yes	-	Yes	-	-	No	-	No	-	No
13	Yes	-	Yes	-	Yes	-	-	No	-	No	Yes	-	-	No
14	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	-	No	-	No
15	-	No	-	No	-	No	-	No	-	No	-	No	-	No
16	-	No	-	No	-	No	Yes	-	-	No	-	No	-	No
17	Yes	-	-	No	-	No	-	No	Yes	-	-	No	-	No
18	-	No	-	No	Yes	-	Yes	-	-	No	-	No	-	No
19	Yes	-	Yes	-	Yes	-	Yes	-	-	No	-	No	-	No
	11	7	5	11	11	7	9	8	5	11	7	10	4	13

Side effects reported after nutrition counseling														
	Taste Change		Chewing Problems		Swallowing Problems		Constipation		Diarrhea		Nausea		Vomiting	
1	Yes	-	Yes	-	Yes	-	N/A		N/A		N/A		N/A	
2	N/A		N/A		N/A		N/A		N/A		N/A		N/A	
3	N/A		N/A		Yes	-	N/A		N/A		N/A		N/A	
4	-	No	N/A		N/A		-	No	N/A		-	No	-	No
5	-	No	-	No	-	No	-	No	N/A		-	No	N/A	
6	-	No	N/A		-	No	N/A		N/A		-	No	-	No
7	-	No	N/A		Yes	-	-	-	-	-	-	-	-	-
8	N/A		N/A		N/A		N/A		Yes	-	N/A		N/A	
9	N/A		N/A		N/A		N/A		Yes	-	-	No	N/A	
10	N/A		N/A		N/A		N/A		N/A		N/A		N/A	
11	-	No	N/A		-	No	-	No	N/A		-	No	-	No
12	Yes	-	N/A		-	No	-	No	N/A		N/A		N/A	
13	-	No	Yes	-	Yes	-	N/A		N/A		-	No	N/A	
14	-	No	Yes	-	Yes	-	Yes	-	Yes	-	N/A		N/A	
15	N/A		N/A		N/A		N/A		N/A		N/A		N/A	
16	N/A		N/A		N/A		-	No	N/A		N/A		N/A	
17	Yes	-	N/A		N/A		N/A		Yes	-	N/A		N/A	
18	N/A		N/A		Yes	-	Yes	-	N/A		N/A		N/A	
19	Yes	-	-	No	-	No	Yes	-	N/A		N/A		N/A	
	4	**7**	**3**	**2**	**6**	**5**	**3**	**5**	**4**	**0**	**0**	**6**	**0**	**3**

APPENDIX C

Weight Changes

Weight change for participants			
	Weight Before Treatment (lbs)	Weight After Treatment (lbs)	Total Weight Change (lbs)
Survey #1	216	216	0
Survey #2	135	129	-6
Survey #3	130	130	0
Survey #4	228	207	-21
Survey #5	145	140	-5
Survey #6	136	127	-9
Survey #7	118	120	+2
Survey #8	206	205	-1
Survey #9	295	297	+2
Survey #10	180	180	0
Survey #11	195	186	-9
Survey #12	170	156	-14
Survey #13	135	133	-2
Survey #14	146	134	-12
Survey #15	248	247	-1
Survey #16	162	153	-9
Survey #17	129	129	0
Survey #18	143	155	+12
Survey #19	151	154	+3

APPENDIX D

Data Analysis

What area of your body was treated with radiation therapy?

	Frequency	Percent	Valid Percent	Cumulative Percent
head or neck	7	36.8	36.8	36.8
chest	7	36.8	36.8	73.7
abdomen	1	5.3	5.3	78.9
pelvis	1	5.3	5.3	84.2
neck/chest	1	5.3	5.3	89.5
abdomen/pelvis	1	5.3	5.3	94.7
head/neck/chest	1	5.3	5.3	100.0
Total	19	100.0	100.0	

Was it difficult to maintain your usual body weight during radiation therapy?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	9	47.4	47.4	47.4
no	10	52.6	52.6	100.0
Total	19	100.0	100.0	

Has your weight changed since you began radiation therapy?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	11	57.9	57.9	57.9
no	10	42.1	42.1	100.0
Total	19	100.0	100.0	

Rate how satisfied you are with how the RD helped you maintain your weight.

	Frequency	Percent	Valid Percent	Cumulative Percent
neutral	2	10.5	10.5	10.5
satisfied	2	10.5	10.5	21.1
most satisfied	13	68.4	68.4	89.5
missing data	2	10.5	10.5	100.0
Total	19	100.0	100.0	

Describe your eating habits since radiation therapy?

	Frequency	Percent	Valid Percent	Cumulative Percent
same as usual	6	31.6	31.6	31.6
less than usual	8	42.1	42.1	73.7
less/different	3	15.8	15.8	89.5
more/different	2	10.5	10.5	100.0
Total	19	100.0	100.0	

After counseling from the RD were you:

	Frequency	Percent	Valid Percent	Cumulative Percent
able to eat more	5	26.3	26.3	26.3
had more difficulty	1	5.3	5.3	31.6
eating about the same	13	68.4	68.4	100.0
Total	19	100.0	100.0	

Have you experienced taste changes?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	11	57.9	57.9	57.9
no	7	36.8	36.8	94.7
missing data	1	5.3	5.3	100.0
Total	19	100.0	100.0	

Did the RD help with taste changes?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	4	21.1	36.4	36.4
no	7	36.8	63.6	100.0
total	11	57.9	100.0	
N/A	8	42.1		
Total	19	100.0		

Have you experienced chewing problems?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	5	26.3	26.3	26.3
no	13	68.4	68.4	94.7
missing data	1	5.3	5.3	100.0
Total	19	100.0	100.0	

Did the RD help with chewing problems?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	3	15.8	60.0	60.0
no	2	10.5	40.0	100.0
total	5	26.3	100.0	
N/A	14	73.7		
Total	19	100.0		

Have you experienced swallowing problems?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	11	57.9	57.9	57.9
no	7	36.8	36.8	94.7
missing data	1	5.3	5.3	100.0
Total	19	100.0	100.0	

Did the RD help with swallowing problems?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	6	31.6	54.5	54.5
no	5	26.3	45.5	100.0
total	11	57.9	100.0	
N/A	8	42.1		
Total		100.0		

Have you experienced constipation?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	9	47.4	47.4	47.4
no	9	47.4	47.4	94.7
missing data	1	5.3	5.3	100.0
Total	19	100.0	100.0	

Did the RD help you to better manage constipation?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	3	15.8	33.3	33.3
no	5	26.3	55.6	88.9
missing data	1	5.3	11.1	100.0
total	9	47.4	100.0	
N/A	10	52.6		
Total	19	100.0		

Have you experienced diarrhea?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	5	26.3	26.3	26.3
no	13	68.4	68.4	94.7
missing data	1	5.3	5.3	100.0
Total	19	100.0	100.0	

Did the RD help you to better manage diarrhea?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	4	21.1	80.0	80.0
missing data	1	5.3	20.0	100.0
total	5	26.3	100.0	
N/A	14	73.7		
Total	19	100.0		

Have you experienced nausea?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	7	36.8	36.8	36.8
no	11	57.9	57.9	94.7
missing data	1	5.3	5.3	100.0
Total	19	100.0	100.0	

Did the RD help you to better manage nausea?

	Frequency	Percent	Valid Percent	Cumulative Percent
no	6	31.6	85.7	85.7
missing data	1	5.3	14.3	100.0
total	7	36.8	100.0	
N/A	12	63.2		
Total	19	100.0		

Have you experienced vomiting?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	4	21.1	21.1	21.1
no	14	73.7	73.7	94.7
missing data	1	5.3	5.3	100.0
Total	19	100.0	100.0	

Did the RD help you to better manage vomiting?

	Frequency	Percent	Valid Percent	Cumulative Percent
no	3	15.8	75.0	75.0
missing data	1	5.3	25.0	100.0
total	4	21.1	100.0	
N/A	15	78.9		
Total	19	100.0		

Have you had less energy since radiation therapy began?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	10	52.6	52.6	52.6
no	9	47.4	47.4	100.0
Total	19	100.0	100.0	

Did the RD help you manage your decreased energy level?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	10	52.6	100.0	100.0
N/A	9	47.4		
Total	19	100.0		

Did you receive printed educational materials from the RD?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	17	89.5	89.5	89.5
no	2	10.5	10.5	100.0
Total	19	100.0	100.0	

Did you find these materials to be helpful?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	17	89.5	89.5	89.5
N/A	2	10.5	10.5	100.0
Total	19	100.0	100.0	

Were you undergoing chemotherapy treatment while receiving radiation therapy?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	7	36.8	36.8	36.8
no	12	63.2	63.2	100.0
Total	19	100.0	100.0	

Age of Participants:

	Frequency	Percent	Valid Percent	Cumulative Percent
36-45	2	10.5	10.5	10.5
46-55	3	15.8	15.8	26.3
56-65	3	15.8	15.8	42.1
66-75	8	42.1	42.1	84.2
76-85	2	10.5	10.5	94.7
missing data	1	5.3	5.3	100.0
Total	19	100.0	100.0	

VITA

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