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ORIGINAL ARTICLE

Nutritional Aspects in Patients with Head and Neck Cancer: A Pilot Study

Laise Rodrigues dos-Santos [1]
Juliana Borges de Lima Dantas [2*]
Manoela Carrera [3]
Gabriela Botelho Martins [4]
Hayana Ramos Lima [5]
Lílian Barbosa Ramos [1]
Alena Ribeiro Alves Peixoto Medrado [1]

Abstract:

Introduction: Individuals with cancer of the head and neck treated by surgery, radiotherapy, and/or chemotherapy may present signs and symptoms that directly influence nutritional status including anorexia, weight loss, fatigue, dysphagia, early satiety, xerostomia, nausea, and vomiting. **Objective:** To evaluate the ponderal evolution and the occurrence of signs and symptoms in head and neck cancer patients receiving radiochemotherapy treatment. **Material and Methods:** Prospective research was conducted using a standardized form, semi structured questionnaire, and clinical chart. Weights were recorded for 1 month prior to treatment, and for each 6 sessions of radiotherapy, up to 24º. Signs and symptoms reported by patients during the treatment period were recorded. **Results:** Eighty-nine percent of the individuals were male. The rhinopharynx was the most affected region (32.14%), and 78.57% patients had a stage II or III disease. Significant weight loss ($p > 0.001$) was observed, and body mass index analysis revealed an increase in the percentage of leanness at the end of treatment (32.14%). No relationship was found between weight loss and the occurrence of signs and symptoms. **Conclusions:** Significant weight loss occurred during antineoplastic treatment. The importance of nutritional monitoring from the beginning of oncologic treatment is confirmed, in order to establish an adequate nutritional intervention aimed at providing better tolerance to treatment and improvement in patients' quality of life.

Keywords: Nutritional status; Weight loss; Head and neck neoplasms.

[1] Universidade Federal da Bahia, Nutrição, Salvador, BA, Brasil.
[2] Faculdade Adventista da Bahia, Odontologia, Cachoeira, BA, Brasil.
[3] Universidade do Estado da Bahia - Departamento de Ciências da Vida; Universidade Federal da Bahia, Odontologia, Salvador, BA, Brasil.
[4] Universidade Federal da Bahia, Instituto de Ciências da Saúde, Salvador, Ba, Brasil.
[5] Universidade Federal do Sul da Bahia, Microbiologia, Porto Seguro,BA, Brasil.

Correspondence to:
Juliana Borges de Lima Dantas
E-mail: judyborges@gmail.com

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INTRODUCTION

According to the National Cancer Institute (INCA), in the 2018-2019 biennium, an estimated 600,000 new cases of cancer were reported in Brazil. Population growth and new lifestyles, typical of the contemporary world, have contributed to the exposure of individuals to risk factors[1].

One of the factors that expressively relates to cancer is nutrition. The nutritional changes most frequently observed in cancer patients include weight loss and malnutrition[2]. The nutritional status of each patient can be influenced by the location of the tumor, action of the drugs used during the treatment, and alterations in energy metabolism. Malnutrition represents a secondary immunodeficiency that favors the development of infections, impairs the healing process, and contributes to muscle weakness[3]. Some morphological and functional alterations associated with malnutrition have been reported, such as malabsorption syndrome and gastric and intestinal mucosal atrophy, with a decrease in microvilli[4].

Individuals with cancer of the head and neck treated by surgery, radiotherapy, and/or chemotherapy may present signs and symptoms that directly influence nutritional status including anorexia, weight loss, fatigue, dysphagia, early satiety, xerostomia, nausea and vomiting[5]. The taste buds and salivary glands, usually located in the treatment field, experience the adverse effect of radiotherapy. Thus, there is a significant reduction in salivary flow and/or development of dysphagia and dysgeusia. In fact, hyposalivation may influence the occurrence of dysgeusia and decreased appetite[6]. These complications associated with chemotherapy also favor the development of oral mucositis, which negatively impacts the patient's eating pattern. The painful condition that is established demands the continuous use of analgesics, which, besides being a limiting factor for the chemotherapy indicated dose, also interferes negatively in their quality of life[7].

The present study aimed at evaluating the ponderal evolution and occurrence of signs and symptoms of head and neck cancer patients submitted to radiochemotherapy treatment, users of a High Complexity Unit linked to the Unified Health System.

METHODOLOGY

Type of study and ethical considerations

This was a prospective study whose population sample included head and neck malignant neoplasia patients who initiated treatment in the city of Salvador-BA, at the High Complexity in Oncology Unit (UNACOM) of the Irmã Dulce Social Works (OSID) (users of the public Unified Health System [SUS]) between November 2016 to December 2017. This oncology service offers procedures such as chemotherapy, radiotherapy, surgeries, hospitalization, consultations, and tests, all by SUS, for patients coming from municipalities in the state of Bahia. The present study was submitted and approved by the Research Ethics Committee of the Hospital in question (protocol number 2.232.325).

Study population

Male and female patients aged over 18 years, with malignant neoplasms in the head and neck region, who underwent radiotherapy/chemotherapy at the (UNACON) for more than 24 radiotherapy sessions were included in the study. All the participants signed the Informed Consent Form (TCLE), which confirmed their agreement to participate in the study. Patients who were not interviewed on the first day of treatment, patients with diabetes mellitus, autoimmune disease, inpatients, non collaborative patients, and those who did not undergo complete treatment at UNACON were not included in the study.

Instruments for data collection

A standardized record was used to aggregate sociodemographic information (sex, age, date and place of birth, skin color, and schooling) and patient's health (whether or not other systemic illness were present). Additionally, a semi structured questionnaire, which was adapted from the Patient-Produced Global Subjective Assessment (ASG-PPP)[8], and divided into four boxes with questions about weight change, food intake, and symptoms that could interfere with feeding and alteration of functional capacity was used (ANNEX 1). This was completed by two researchers trained for their application, during the interview with the patients.

Data on the type of neoplasia, graduation, staging, and proposed treatment were collected from the individual's clinical record.

The following variables were evaluated:

(i) Weight: Through a registry referred to, 1 month before the start of treatment, which was informed by the patient. Weight was measured every six sessions of radiotherapy, from the first session to the 24th. To measure the weight and height, a digital scale of the brand Welmy, class

III, with a measuring capacity up to 200 kg and coupled stadiometer were used. All patients were instructed to remain standing without shoes, heels together, erected spine, and arms extended to the side of the body for both procedures. These data were used to follow the weight evolution of the patient, as specified by Cuppari, 2005[9];

(ii) Body mass index (BMI): It was calculated from the relation between the current weight (kg) and the square of the height (m). For comparison purposes, the parameters described in Table 1[10,11] were adopted as reference.

(iii) Weight loss: In order to evaluate the current body weight in relation to the usual, the percentages of loss recommended by Blackburn et al. (1977)[12], that is, a significant loss (up to 5% in a month) and severe loss (> 5% in a month), was calculated.

(iv) Signs and symptoms: Informed by the patient through a semi structured questionnaire with special emphasis on those who influenced the diet;

(v) Food intake: Referred by the patient or companion at the beginning and end of treatment, reporting either an increase, decrease, or no change.

Table 1. Body mass index parameters adopted for adults and the elderly.

World Health Organization (WHO), 1998	BMI Adults (18-59 years)
Thinness	< 18,5 kg/m²
Eutrophy	18,5 kg/m²- 24,9 kg/m²
Overweight	25 kg/m² e 29,9 kg/m²
Obesity grade I	30 kg/m² e 34,9 kg/m²
Pan American Health Organization - OPAS, 2001	**BMI Seniors (> 60 anos)**
Low weight	< 23 kg/m²
Suitable	23- 28 kg/m²
Overweight	> 30 kg/m²

Among the variables characterizing the sample, the following aspects were described: age, schooling, comorbidities, location of the primary tumor, clinical staging of the disease, current habit or withdrawal of smoking and alcoholism, and mobility.

Statistical analyses

The results of the descriptive analyzes were presented through percentages, means and standard deviations. The paired t-test was applied to verify the mean difference between the initial and final weight. In order to compare the values in the times studied, the chi square test was performed to verify independence between the variables of ingestion and worsening of symptoms. In addition, the ANOVA test was used to evaluate repeated measures in each dependent variable of interest, such as weight and worsening of symptoms. The analyses were performed in the R project programming environment (R Development Core Team, 2011). All the probabilities of significance (p) presented were considered statistically significant with $p < 0.05$.

RESULTS

Of the 28 participants, 25 were male (89.66%): 55.18% were in the above 60 years age group and 28.57% declared themselves Caucasian. Of the total participants, 75.86% had no comorbidities, 65.51% lived with their partners, and 68.96% had finished middle school. Moreover, 75.86% and 75.86% were former smokers and former alcoholics, respectively. The majority (78.57%) had a tumor grade between T2 and T3 and the most affected site was the rhinopharynx region (53.57%), followed by the laryngeal region (32.14%). Hypertension was the only systemic disease present, affecting 24.14% of the patients.

Before treatment, 85.71 % of patients had a weight loss value smaller than 5% in 1 month. On the other hand, at the end of treatment, 21 patients (75%) had loss > 5% in 1 month. In analyzing the body mass index (BMI), 57.14% of the patients were found to be eutrophic at the beginning of treatment, while at the end of the treatment, the percentage of thinness increased by 10%, representing 32.14% of the sample.

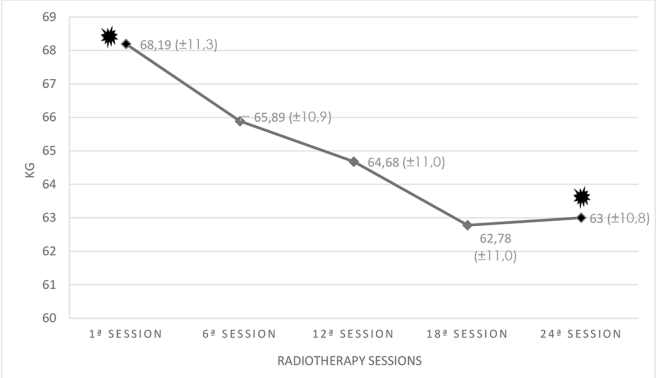

Figure 1. Mean weight and standard deviation of patients and their weight evolution during the weekly sessions of radiotherapy.

Figure 1 shows the mean weight and standard deviation of patients and their weight evolution during the weekly sessions of radiotherapy. In the 5-week treatment period, there was a statistically significant mean loss of 5.18 kg ($p < 0.001$).

Table 2 shows a comparison between the clinical signs presented by the patients on the 1st day of radiotherapy and on the 24th day. It was observed that, initially, 50.01% of the patients reported maintaining their weight in the last 2 weeks and, at the end of treatment, this percentage increased to 75.18%. The dietary intake pattern reported in the first session did not change according to the perception of 20 patients (71.43%), whereas in the 24th session, 71.43% reported lower than normal intake.

Table 2. Symptoms reported by the users of the Service of High Complexity in Oncology, Sister Dulce's Social Works, Salvador, Bahia, 2017.

Variables	1° Day		24° Day	
	N	%	N	%
Perception of weight loss				
Increased	8	28,57	1	3,57
Decreased	6	21,42	21	75,18
Remains the same	14	50,01	6	21,25
Food intake				
More than normal	5	17,86	5	17,86
NO alteration	20	71,43	3	10,71
Less than normal	3	10,71	20	71,43
Most reported signs and symptoms				
None	9	32,14	-	-
Quickly satisfied	13	46,43	6	21,42
Diarrhea	6	21,43	1	3,57
Difficulty swallowing	4	14,29	20	71,43
Unflavored foods	2	7,14	15	53,57
Dry mouth	4	14,29	17	60,71
Sores in the mouth	3	10,71	13	46,43
Smells that make sick	2	7,14	5	17,86
Change in functional capacity				
No change	21	75	9	32,14
Some limitation	7	25	17	60,71
Bedridden	-	-	2	7,14

Regarding dietary ingestion on the first day of radiotherapy, 46.43% of the patients reported being quickly satisfied, while 32.14% reported having no specific symptoms. As to signs and symptoms, 21% of the subjects reported episodes of diarrhea at the start of treatment. On the 24th day, the most frequent symptoms reported were difficulty in swallowing, unflavored food, dry mouth, and mouth sores (71.43%, 53.57%, 60.71%, and 43.46%, respectively). Functional capacity alteration was reported by 17 patients (60.71%) at the end of treatment. Among these changes, the ability to maintain some activity, feeling unwell, and spend most of the time in a chair or bed (32.14%, 60.71% and 7.14%, respectively) were cited.

Table 3. Patients who presented worsening of the reported symptoms and decreased food intake users of the High Complexity Service in Oncology, Sister Dulce's Social Works, Salvador, Bahia, 2017.

	INGESTION			
SYMPTOMS	Decreased	Remaneid	Total	*p* value
Same	5	2	7	
Worse	15	6	21	0.6292
Total	20	8	28	

Table 4. Median of patients who presented weight loss associated with the worsening of the reported symptoms and decreased food intake, Users of the High Complexity Service in Oncology, Sister Dulce's Social Works, Salvador, Bahia, 2017.

	Weight loss (Median)	*p* value
Worsening of symptoms	84.804	0.3896
Decreased intake	26.490	0.6342

Statistical analysis did not show a significant association between worsening of symptoms and reduction of food intake ($p = 0.0629$); weight loss and worsening of symptoms ($p = 0.3896$); and decrease in food intake with weight loss ($p = 0.6342$) (Tables 3 and 4).

DISCUSSION

In 2016, cancer of the oral cavity in men living in Brazil's northeast region reached an incidence rate of 6.86/100 thousand inhabitants[1]. However, it is noteworthy that the this region has major deficiencies in the records system, that is, many cases may, in fact, still have been underreported. Despite the attempts to reduce the incidence of head and neck cancer, the number of new cases in Brazil is still increasing, affecting mostly males. In the present study, the marked percentage in males is similar to those of previous studies. Andrade et al. (2014)[13], observed that men presented approximately three times more incidence of cancer in the oral cavity than women, with a ratio of 2.62: 1. Additionally, the authors reported that brown skin color was the most reported in the case and control groups (78.7 and 83.1%, respectively), which was also observed in the present study, in which 50% of the population self-declared brown.

Another frequent issue in studies is the exposure of patients diagnosed with cancer to environmental

factors that contribute to the onset of head and neck cancer, including solar radiation, tobacco, and tobacco-related alcoholism. Vieira et al. (2014)[14], observed that in relation to the lifestyle of the individuals evaluated, 50% had been smokers, all of them male. Regarding alcohol consumption, 20.8% of the patients reported that even after diagnosis they continued to consume alcohol. Andrade et al. (2014)[13], carried out a bivariate analysis and observed that there was an association between the time of tobacco consumption and the development of oral cancer, that is, individuals who smoked more than 20 years presented a higher risk of developing cancer. Similar aspects were described in relation to alcohol consumption. The present study ratified these studies, finding the majority of patients ex-smokers (75,86%) and ex-alcoholics (75,86%).

Tumor staging provides a basis for choosing the most appropriate treatment and the rate of survival of patients. Arribas et al. (13%)[5], observed that patients with oropharyngeal (17.2%) and larynx tumors (11%) presented higher percentages of risk for malnutrition. Rocha et al. (2013)[15], described the anatomic region of the thongue (27.5%) as the most affected, and 80% of patients presented stage III to IV staging, a fact attributed by the author, in addition to ohter factors, to the patient's delay to seek diagnosis hence the difficulty in detecting early stages of cancer. In the complexity unit, where the present research was carried out, it was found that 78.57% of the patients presented staging II and III of the disease, and 32.14% had a primary location in the rhinopharynx region. These results shows the diversity of primary sites found in SUS in Brazil.

Changes in energy metabolism and increased nutritional losses are some of the factors that influence the patient's weight loss. Dias et al. (2006)[16], reported that nutritional status susceptible to depletions due to the loss of lean mass and gastrointestinal symptoms tended to influence malnutrition. Cancer cachexia syndrome is multifactorial and is defined by a negative balance of protein and energy caused by reduction in food intake and by metabolic disorders[17]. When evaluating the eating behavior of a group of patients in Cuiabá (MT), Vieira et al. (2014)[14], found that 62.5% reported no appetite changes after diagnosis of neoplasia, while 37.5% admitted to having noticed changes in their appetite after confirmation of the diagnosis. Regarding the nutritional status evaluated, the authors observed that 66.7% of the patients presented malnutrition, and 33.3% were classified as having severe malnutrition. Although the variable "loss of appetite" was not evaluated in our study, 71.43% of the patients reported lower than normal dietary intake.

In a study by Lotic et al. (2014)[18], mean weight loss of 5.8 kg was observed in patients with head and neck cancer. These individuals presented weight loss after treatment of 8.8% over the usual weight, remaining in mild cachexia classification. In these patients, high-low BMI indices were still observed, with 46.7% at the start of treatment and 60.0% at the end. This study demonstrated that weight loss represents an important factor during treatment, as it outlines the imbalance between energy intake and consumption. In the present investigation, a mean weight loss of 5.18 kg ($p < 0.001$) was observed, and 57% of the patients were found to be eutrophic and, in the end, the percentage of thinness increased by 10%, representing 32.14% of the sample.

Da Silva and Bernardes (2017)[19], found that 78.9% of individuals diagnosed with head and neck cancer showed significant weight loss ($p < 0.001$). Similar to the present study, the authors found no association between weight loss and sociodemographic and clinical nutritional factors, nor with regard to worsening of symptoms and decrease of food intake ($p > 0.05$). One of the reasons that can justify these data may be related to the sample size. This interrelation is still little studied, since the previously published articles mostly address weight loss and symptoms during treatment separately.

Regarding signs and symptoms related directly to diet and indirectly to nutritional status, the present study identified that 71.43% of the patients presented dysphagia and 60.71%, xerostomia. Arribas et al. (2013)[5], found that 62.5% had some feeding difficulties, dysphagia being one of the most frequent symptoms (48.4%). In the article in question, the author observed that 37.5% of the patients were at risk of malnutrition and presented weigth loss over than 5 kg during treatment, corroborating with the results obtained in the present study.

Cancer is considered a public health problem because of its extension and social and financial cost required for proper diagnosis and treatment. Further studies on the relationship between signs and symptoms and weight loss in oncology patients are necessary in order to find ways in which the nutritionist, along with a multidisciplinary team, can improve the nutritional status of these patients to avoid complications and worsening of the patients health status.

In the sample studied, a statistically significant mean weight loss was observed, and an increase in the percentage of leanness at the end of treatment.

Additionally, it was found that the most frequent complaints during oncological treatment were the reduction of food intake, dysphagia, dysgeusia, xerostomia, and mucositis, although no relationship was found between weight loss and the signs and symptoms reported.

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