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Feeding behavior and nutritional profile of cancer patients in drug therapy

Comportamento alimentar e perfil nutricional de pacientes oncológicos em tratamento quimioterápico

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Abstract

Introduction: Feeding is extremely important in cancer therapy, and morbidity and mortality depend on the nutritional profile of patients. *Objective:* To verify the feeding behavior and nutritional profile of adult patients in drug therapy. *Methodology:* Cross-sectional quantitative study, developed in a highly complex Oncology Center in the city of Ijuí-RS, Brazil. Adult cancer patients of both sexes were evaluated from August to September 2015. The analyzed variables were socio-demographic and clinical characteristics of patients, feeding behavior, dietary intake and anthropometric assessment. *Results:* One hundred patients participated, mostly women (56%). The main primary diagnosis was breast cancer (51.79%) among women and lung (15.91%) among men. There was predominance of food aversions to meat, fatty foods, sweets and solid foods. The characterization of food due to treatment was statistically significant (p = 0.035). Individuals of both sexes showed average energy consumption less than 1,300 Kcal/day. Overweight was prevalent among women (44.64%) and normal weight among men (45.45%). *Conclusions:* Drug therapy altered the feeding behavior of patients; low energy and protein intake associated with weight loss suggest possible nutritional risk.

Keywords: Cancer. Feeding behavior. Nutritional status. Drug therapy.

Resumo

Introdução: A alimentação tem grande importância na terapêutica oncológica, pois a morbimortalidade depende do perfil nutricional dos pacientes. *Objetivo:* Verificar o comportamento alimentar e o perfil nutricional de pacientes adultos em tratamento quimioterápico. *Metodologia:* Estudo transversal, de caráter quantitativo, desenvolvido em um Centro de Alta Complexidade em Oncologia no município de Ijuí-RS. Foram avaliados os pacientes oncológicos adultos, de ambos os sexos, no período de agosto a setembro de 2015. As variáveis analisadas foram: características sociodemográficas e clínicas dos pacientes, comportamento alimentar, consumo dietético e avaliação antropométrica. *Resultados:* Participaram 100 pacientes, sendo a maioria do sexo feminino (56%). O diagnóstico primário principal foi o de câncer de mama (51,79%) entre as mulheres e de pulmão (15,91%) entre os homens. Houve predomínio de aversões alimentares a carnes, alimentos gordurosos, doces e alimentos sólidos. A caracterização da alimentação devido ao tratamento foi estatisticamente significante (p=0,035). Indivíduos de ambos os sexos apresentaram consumo energético médio menor que 1.300 Kcal/dia. O sobrepeso foi prevalente entre as mulheres (44,64%) e a eutrofia, entre os homens (45,45%). *Conclusões:* O tratamento quimioterápico alterou o comportamento alimentar dos pacientes, e o baixo consumo energético e proteico associado à perda de peso sugere possível risco nutricional.

Palavras-chave: Câncer. Comportamento alimentar. Estado nutricional. Quimioterapia.

Introduction

Cancer has a chronic multicausal origin, characterized by the uncontrolled propagation and development of cells with altered genetic material, which facilitates the formation of neoplastic tumors in organs or tissues of the organism.[1] According to the World Health Organization (WHO), the number of new cancers in the next 20 years is estimated to increase by approximately 70%, mainly due to tobacco and alcohol consumption, poor food quality and physical inactivity.[2]

Feeding is of great importance in oncology therapy, due to its symbolic, subjective and nutritional aspects. Thus, the food consumption analysis of individuals with cancer should be a routine practice.[3] Studies show that patients' quality of life after diagnosis of cancer is influenced by changes in eating patterns due to nutritional and dietary aspects, such as changes in taste or smell, nausea and oral mucositis which cause reduction of the intake and can affect the clinical prognosis of the disease.[4,5]

According to Silva et al.,[6] adverse effects on the gastrointestinal tract and anorexia are potentiated by the use of chemotherapeutic agents. Antineoplastic chemotherapy aims to destroy malignant tumors by inducing apoptosis or inhibiting the cell's basic functions. However, because it is a non-specific systemic treatment, it can reach, in addition to the neoplastic cells, the normal cells.[6,7]

Thus, patients may present changes in eating behavior,[4,5] being a complex challenge to maintain daily eating habits.[5] Morbimortality depends directly on the impairment of the nutritional profile of the patients, and when the individual is malnourished, there is a greater chance of infection and reduction of the results sought with the treatment. However, there are still few studies that analyze the nutritional status of individuals with neoplasms associated with food consumption.[3,8]

Considering that oncology is a current and emerging public health problem, it is of utmost importance to identify the extent of chemotherapy treatment in the patients' health conditions, making it possible to highlight nutritional therapies that minimize negative impacts and improve the quality of life.[9,10] In this perspective, the present study aimed to verify the eating behavior and nutritional profile of adult patients undergoing chemotherapy in a Center for High Complexity in Oncology located in the northwest of the state of Rio Grande do Sul, Brazil.

Methodology

This is a cross-sectional, quantitative study developed at a Center for High Complexity in Oncology (CACON), located in the municipality of Ijuí, in the northwest of the state of Rio Grande do Sul, Brazil, which provides assistance to the population of 120 municipalities in the region.

The study population consisted of all adult cancer patients, of both genres, under chemotherapy treatment from August to September 2015, who agreed to participate in the study through the signing of the Free and Informed Consent Term. Individuals with edema and those who were being treated for other pathologies were excluded from the study, considering that these aspects could alter the results of the study.

The study population was approached during the chemotherapy application process and was characterized by the medical record and the application of a semi-structured questionnaire to collect the following information: gender, age, marital status, education, profession, primary diagnosis, systemic metastasis, proposed treatments, usual weight and weight change in the last six months.

Anthropometric and dietary methods were used to evaluate the nutritional profile. The anthropometric evaluation included the measurement of waist circumference, body weight and height of the individuals. With the data of weight and height, the body mass index (BMI) was calculated, which consists of the weight in kilograms divided by the square value of the height in meters, using the classification proposed by WHO.[11]

To obtain body weight, a digital scale of the Plenna® brand was used, with a capacity of 150 kg, according to the techniques described by Nacif and Viebig.[12] The stature was verified according to the standard procedures described by Duarte,[13] using a Sanny® brand portable stadiometer with a measurement capacity of 115 to 210 cm.

Waist circumference measurement was performed using an inextensible, inelastic metric tape of the Cescorf®brand, accurate to one millimeter and two meters long. The measurement was verified at the midpoint between the lower border of the last rib and the iliac crest, at the end of expiration,[13] and ranked according to WHO,[14] in relation to cardiovascular risk.

As a method of dietary assessment, a 24-hour food reminder was applied, in which individuals defined and quantified in household measures all foods and beverages ingested in the last 24 hours, or more commonly, on the previous day, according to what was established by Fisberg et al.[15] The nutritional values were calculated using the CalcNut® calculations worksheet, where total calories and macronutrients (carbohydrates, proteins and lipids) were analyzed.

The evaluation of eating behavior was performed through a questionnaire adapted from the patient's subjective assessment (ASG-PPP), developed based on Silva et al.,[6] and on the Brazilian Oncology Nutrition Survey,[10] containing questions to the participants about how and with whom they ate, where and how many meals they made, about food aversions developed during the chemotherapy treatment (existence or not of some food that the subject stopped eating after starting the chemotherapy, for causing some form of discomfort) and in relation to adverse situations that interfere with feeding.

Statistical analysis was performed using the EpiInfo® version 7.0 software, considering values of $p < 0.05$ as statistically significant. For the evaluation of numerical variables, the ANOVA parametric tests and the Student's t-test were used, and for categorical variables, the Chi-square test was used (x^2).

This research was authorized by the Research and Training Committee of AHCI (Charity Hospital Association of Ijuí), to which the Center for High Complexity in Oncology (CACON) is linked, and subsequently it was submitted and approved by the Research Ethics Committee

of the Federal University of Santa Maria (UFSM), according to CNS Resolution 466/2012 of the National Health Council, which regulates research involving human beings, under CAAE 46664815.7.0000.5346 and Opinion 1.188.801.

Results

100 patients participated in the study, of which 56% were female. Among women, 48.21% (n = 27) were retired and 12.50% (n = 7) were farmers. Among men, 36.36% (n = 16) were retired and 18.18% (n = 8) were farmers. Table 1 shows other sociodemographic characteristics of the study population, with the majority of the patients being married (60.71% of women and 79.55% of men) and having less than eight years of schooling (62.5% of women and 79.55% of men).

Table 1. Sociodemographic characteristics of cancer patients. Ijuí-RS, Brazil, 2015.

		Women (n = 56)	Men (n = 44)	p
Age (years)*		58.45±12.34	59.89±13.30	0.576**
Marital Status	Single	1.79% (n=1)	13.64% (n=6)	0.000***
	Married	60.71% (n=34)	79.55% (n=35)	
	Divorced	10.71% (n=6)	4.55% (n=2)	
	Widowed	26.79% (n=15)	2.27% (n=1)	
Education	Illiterate	7.14% (n=4)	6.82% (n=3)	0.164***
	Incomplete Elementary School	42.86% (n=24)	50.00% (n=22)	
	Complete Elementary School	12.50% (n=7)	22.73% (n=10)	
	Incomplete high school	1.79% (n=1)	6.82% (n=3)	
	Complete high school	19.64% (n=11)	4.55% (n=2)	
	Technician	1.79% (n=1)	2.27% (n=1)	
	Incomplete Higher Education	-	2.27% (n=1)	
	Complete Higher Education	10.71% (n=6)	4.55% (n=2)	
	Graduate Studies	3.57% (n=2)	-	

*Mean and standard deviation

**Student t test

***Chi-Square test (x2)

Tabela 2. Clinical characteristics of cancer patients. Ijuí-RS, Brazil, 2015.

		Women (n=56)	Men (n=44)	p
Primary diagnosis	Mouth	-	6.82% (n=3)	0.000*
	Throat	5.36% (n=3)	9.09% (n=4)	
	Intestine	5.36% (n=3)	13.64% (n=6)	
	Leukemia	3.57% (n=2)	9.09% (n=4)	
	Breast	51.79% (n=29)	-	
	Bones	10.71% (n=6)	4.55% (n=2)	
	Skin	-	4.55% (n=2)	
	Prostate	-	11.36% (n=5)	
	Lung	7.14% (n=4)	15.91% (n=7)	
	Uterus	7.14% (n=4)	-	
	Other organs****	8.92% (n=5)	25.00% (n=11)	
Systemic metastasis	Yes	30.36% (n=17)	27.27% (n=12)	0.735*
	No	69.64% (n=39)	72.73% (n=32)	
Treatment prior to chemotherapy	Surgery	64.29% (n=36)	59.09% (n=26)	
	Radiotherapy	42.86% (n=24)	43.18% (n=19)	
Gastrointestinal Symptoms	Constipation	37.50% (n=21)	25.00% (n=11)	
	Diarrhea	3.57% (n=2)	4.55% (n=2)	
	Dysgeusia	50.00% (n=28)	43.18% (n=19)	
	Inappetence	57.14% (n=32)	36.36% (n=16)	
	Mucosite/ oral ulcers	32.14% (n=18)	18.18% (n=8)	
	Nausea	48.21% (n=27)	27.27% (n=12)	
	Vomiting	41.07% (n=23)	22.73% (n=10)	
	Xerostomia	67.86% (n=38)	54.55% (n=24)	
	Other	7.14% (n=4)	6.82% (n=3)	

* Chi-Square Test (χ^2)

The clinical characteristics are shown in Table 2. As a primary diagnosis, there was a predominance of breast cancer (51.79%) among women and lung cancer (15.91%) among men.

Regarding the main cases of systemic metastases, 8.93% (n = 5) of the female patients presented bone metastasis, 7.14% (n = 4) liver metastasis and 5.36% (n = 3) lung metastasis. Among the males, 9.09% (n = 4) had liver metastasis, 4.55% (n = 2) bone metastasis, and the same index was noted for lung and neck metastases.

Among the participants, more than 75% needed some treatment prior to chemotherapy - surgery and / or radiotherapy (Table 2). Only 28.57% of the women and 18.18% of the men did not report additional therapy. It should be noted that of the total number of patients evaluated, only 8.93% (n = 5) of the women and 6.82% (n = 3) of the men reported no symptoms or adverse effects of the treatment in that period. The reported gastrointestinal symptoms are shown in Table 2.

Table 3 shows the aspects related to food behavior. Most of the individuals (80.36% of the women and 84.09% of the men) had meals with relatives. As for food aversions developed after starting chemotherapy (32.14% of women and 27.27% of men), there was a predominance of meat, fatty foods, sweets and solid foods. Regarding the number of meals after starting treatment, 37.5% of the women and 31.82% of the men increased the dietary fractionation to four or more meals per day.

Table 3. Analysis of the eating behavior of cancer patients. Ijuí-RS, Brazil, 2015.

		Women (n=56)	Men (n=44)	p*
Have meals	Alone	17.86% (n=10)	15.91% (n=7)	0.643
	With family	80.36% (n=45)	84.09% (n=37)	
	With friends	1.79% (n=1)	-	
Meal Place	At home	94.64% (n=53)	100.00% (n=44)	0.119
	At home Family / friends' house	5.36% (n=3)	-	
Aversion to food after chemotherapy		32.14% (n=18)	27.27% (n=12)	0.597
N. of meals before the start of Chemotherapeutic treatment	Two	1.79% (n=1)	11.36% (n=5)	0.011
	Up to 3	53.57% (n=30)	68.18% (n=30)	
	4 or more	44.64% (n=25)	20.45% (n=9)	
N. of meals after the start of chemotherapeutic treatment	Two	-	11.36% (n=5)	0.001
	Up to 3	17.86% (n=10)	36.36% (n=16)	
	4 or more	82.14% (n=46)	52.27% (n=23)	
Feeding Features due to treatment	Unchanged	92.86% (n=52)	77.27% (n=34)	0.035
	Reduced (too little)	1.79% (n=1)	15.91% (n=7)	
	Only with liquids	1.79% (n=1)	4.55% (n=2)	
	Little solid food	3.57% (n=2)	-	
	With supplements only	-	2.27% (n=1)	

* Teste Qui-Quadrado ($\chi 2$)

Table 4 presents the dietary intake indexes of the studied population. Female patients consumed an average of 18.60 Kcal / Kg / day and male patients consumed 17.95 Kcal / Kg / day. There was a significant difference between women and men for the percentage of lipids (p = 0.044) and carbohydrates (p = 0.026).

Table 4. Mean energy and macronutrient intake of cancer patients. Ijuí-RS, Brazil, 2015.

	Women (n=56)	Men (n=44)	p*
Energy (kcal)	1213.99±278.62	1292.86±327.69	0.196
Energy / Kg of body weight (Kcal / kg)	18.60±6.06	17.95±4.53	0.554
Protein (g)	59.03±16.84	65.48±21.12	0.092
Protein (%)	19.64±4.90	20.63±5.70	0.355
Protein grams / kg of body weight (g / kg)	0.89±0.29	0.91±0.31	0.727
Lipids (g)	36.60±13.76	42.40±16.46	0.057
Lipids (%)	26.71±7.06	29.92±8.72	0.044
Carbohydrate (g)	162.13±43.64	162.34±55.41	0.982
Carbohydrates (%)	53.65±8.12	49.46±10.45	0.026
Fibers (g)	14.77±4.94	13.29±7.17	0.224

* Student's t test

Table 5 shows the anthropometric data and their respective classifications. The mean body mass index for females was 26.29 Kg/m^2 and 24.74 Kg/m^2 for males. The waist circumference was 79.44 cm and 83.02 cm for women and men, respectively. It was found that 50% (n = 28) of the women and 68.18% (n = 30) of the evaluated men decreased their body weight in the last six months, while the rate of weight gain was 32.14% (n = 18) among females and 18.18% (n = 8) among males.

Table 5. Analysis of the anthropometric evaluation of cancer patients. Ijuí-RS, Brazil, 2015.

		Women (n=56)	Men (n=44)	p
Usual weight (kg)*		69.55±14.45	76.80±15.20	0.016**
Change of weight in the last 6 months (Kg)*		6.13±4.71	6.20±4.71	0.933**
Current weight (kg)*		68.11±14.80	73.45±15.54	0.082**
Height (m)*		1.61±0.08	1.72±0.07	0.000**
BMI (kg/m^2)*		26.29±5.01	24.74±4.34	0.107**
Classification of the BMI	Low weight	8.93% (n=5)	11.36% (n=5)	0.458***
	Eutrophy	30.36% (n=17)	45.45% (n=20)	
	Overweight	44.64% (n=25)	29.55% (n=13)	
	Obesity grade I	8.93% (n=5)	11.36% (n=5)	
	Obesity grade II	5.36% (n=3)	2.27% (n=1)	
	Obesity grade III	1.79% (n=1)	-	
Waist circumference (cm)*		79.44±13.26	83.02±16.20	0.227**
Waist circumference classification	No risk	62.50% (n=35)	79.55% (n=35)	0.123***
	Increased risk	19.64% (n=11)	6.82% (n=3)	
	Very much increased	17.86% (n=10)	13.64% (n=6)	

*Mean and standard deviation

**Student t test

***Chi-Square test (x2)

**** Other organs cited by only one of the cancer patients, as primary diagnosis.

Discussion

Chemotherapy comprises the administration of cytotoxic substances, mainly through a systemic route, and may have several purposes.[16] In the present study, a greater proportion of female patients with low level of schooling and married were found, similar to the sociodemographic profile of the patients studied by Palmieri et al.[17] and Santos et al.[18] In the studied population, a higher index of primary diagnoses of breast and lung cancer was observed, which corresponds to the findings of Palmieri et al., according to which breast (56.5%) and lung (17.4%) neoplasms were the most frequent.

The percentage of metastasis in the population of this study was higher than the indexes found in the evaluation of the clinical profile of elderly patients undergoing antineoplastic treatment, where 49% of the cases presented metastasis,[18] and in the analysis of patients from a specialized clinic regarding the acceptance of preparations and symptoms resulting from cancer treatment, where the metastasis index was 17.4%.[17]

It is worth mentioning that chemotherapy drugs in clinical use usually cause side effects due to toxicity on the cells, such as nausea, vomiting, esophageal damage, malnutrition, hydroelectrolytic imbalance, among other consequences, leading to a reduction in quality of life and even the refusal of patients to continue chemotherapy cycles.[16] It explains why only less than 10% of the men and women evaluated did not present symptoms resulting from the antineoplastic treatment.

Cohort study conducted in Goiânia-GO by Silva et al.[6] with 50 adult oncology patients of both sexes who were undergoing chemotherapy, showed that 38% of them had at least one symptom associated with the treatment, data corroborating those found in the present study.

The complaints of xerostomia, inappetence and dysgeusia of foods by both genders prevailed, similar to the analysis of Ferreira, Guimarães and Marcadenti,[3] which indicated a significant number of gastrointestinal symptoms, the main ones being inappetence (21%) and xerostomia (20%). In patients with lymphoma, xerostomia appeared as one of the symptoms of higher incidence after starting chemotherapy,[19] and among patients from a hospital in Joinville-SC, Brazil, it was the second most prevalent complication.[20] On the other hand, nausea was the most frequent side effects in a before-after clinical trial, which evaluated 25 women with breast cancer in São Paulo, who underwent chemotherapy, reaching more than 80% of the patients.[21]

The Brazilian Inquiry on Oncological Nutrition (IBNO),[10] of the year 2013 developed a screening in adult patients with malignant neoplasia, hospitalized in 45 public and private institutions of the country, and found that the main symptoms present were inappetence, nausea, xerostomia, dysgeusia, constipation, diarrhea and emesis, and only 14.2% of the adults and 12.5% of the elderly had no symptoms, data very close to the findings of the present study.

As found in the analysis of food behavior, patients of both genders described changes correlated to food choices. In relation to acquired eating disorders, more than 50% of the individuals indicated food aversion to one or more foods, which strengthens the evidence that, after chemotherapy, there is an impact on food behavior.[21] Studies confirm similar results: the analysis of the research developed by Silva et al.[6] indicated that 38% of the evaluated patients also developed food aversion to at least one food, and red meat had the highest rejection rate, followed by coffee, legumes, spices and seasoning. Another study found that, following treatment, 52% of the patients indicated at least one food or group to which they developed food rejection, with fatty foods having the highest index of aversion (38%) and they were associated with a feeling of annoyance and malaise; the meats were cited by only 7% of the individuals.[21]

As for the number of meals consumed before and after starting chemotherapy, it was evidenced that the majority of individuals of both genders increased the frequency of intake to four or more meals daily after starting treatment. This change is considered clinically positive because, according to Pereira et al.,[22] the greater dietary fractionation assists in the control of body weight, serum lipids and blood glucose. A study conducted by these authors to evaluate diet fractionation in relation to the nutritional and health profile of healthy women showed that the higher number of daily meals is associated with a better food quality.[22] Consequently, it is assumed that certain gastrointestinal symptoms resulting from the therapy, which were not evidenced with predominance in the study, may be being minimized due to the increased fractionation of the patients' diet.

In the study, the characterization of feeding was statistically significant ($p = 0.035$), and virtually all women and most men defined their diet as unchanged, similar to the Brazilian Oncology Nutrition Survey,[10] which found that 48.89% of the adults evaluated did not present problems to feed themselves. The literature points out that, depending on how the patient reacts to the pathology and the treatment, the alterations in the alimentary behavior can be evidenced and characterized by the reduction or by the excess of the alimentary intake,[23] and this is a possible hypothesis for the fact that some patients reported that, with the beginning of treatment, they started to eat very little or only with liquids, or with little solid food and only with nutritional supplements.

An important data to be discussed is the high index of patients who had meals with relatives and in their own houses, which can be a positive aid to the treatment, since it is scientifically proven that the quality of life and the alimentary behavior are correlated.[21]

According to Pinho et al.,[24] for the oncologic patient, the nutritional needs are variable, since they suffer interference of the degree of stress, the type of tumor and its location, the existence of malabsorption, among other aspects. The National Consortium of Oncological Nutrition recommends energy intake according to the patient's nutritional status, ranging from 20 to 35 Kcal / kg / day for patients undergoing chemotherapy.[9] Considering these parameters, it is evident

that the energy consumption of the studied patients is inadequate, since the average values found were inferior to the minimum recommendation. In another Brazilian study, it was also observed that the majority of patients did not reach their daily energy needs.[21]

The mean total energy intake of the patients evaluated was approximately 1,250 Kcal / day, which is lower than that of the study developed in Porto Alegre-RS, Brazil, with adults undergoing chemotherapy, which demonstrated an average energy consumption of 1,875 Kcal / day,[1] and which is lower than the analysis of Kolling and Santos[25]of outpatients with breast cancer, who reported an average intake of 1,506 Kcal / day.

These results indicate that the daily percentage contribution of lipids was statistically significant between the genders and inferior to the indexes verified by Kolling and Santos,[25] in which the nutrient represented 34.5% of the diet. These same authors identified protein percentages (16.2%) higher than the present study, and similar caloric contribution of carbohydrates (49.3%).[25] When comparing the data with the indexes of the Survey of Family Budgets (POF),[26] which evaluated the consumption profile of the Brazilian population considering the gender and the age group, lipid percentages were close to those observed by POF for adults and the elderly (27%); the protein indexes were higher than the POF data, where the intake ranged from 16% to 17%; yet, the mean caloric contribution of carbohydrates was lower than the POF, which ranged from 54.8% to 57.6%.

The averages of the grams consumption of the macronutrients obtained were similar to the indexes presented by Santos et al.[18] in a study with elderly subjects in chemotherapy, whose average carbohydrate intake was 160.9 grams / day, 50.4 grams / day for proteins and 33.1 grams / day for lipids. The mean daily fiber intake was lower than the POF findings,[26] which ranged from 17.6 to 23.5 grams / day, but other analyzes performed specifically with oncology patients showed a similar result to that of the present study (on average 14 grams / day).[1,25] A study carried out with 182 women with breast cancer undergoing antineoplastic treatment or not, in Ceará, indicated that the population evaluated consumed a hyperprotein, hypoglycemic and low fiber diet,[23] the low rate of fiber intake being the only aspect concomitant with the research.

In relation to the consumption of grams of protein per kilogram of body weight, the means found were less than 1.0 g / kg / day for both genders. For patients on chemotherapy, the National Consortium of Oncological Nutrition recommends that protein intake should range from 1-2 g / kg / day depending on the stress and clinical complications.[9] Thus, it can be stated that the consumption of the evaluated patients is below the recommended level.

It should be noted that Ambrosi et al.[4] investigated the changes in dietary intake of women in southern Brazil with breast cancer and demonstrated a significant increase in energy intake and some macro and micronutrients. According to Palmieri et al.,[17] it is essential to carry out more studies related to the profile of oncology patients in ambulatory care, to comprehend

their needs widely and to improve nutritional counseling therapies. Therefore, the differences in consumption highlighted between studies with healthy subjects[26] and this, performed with clinically debilitated individuals, can be explained by the probable changes in the pattern of ingestion due to the treatment.

In the case of anthropometric evaluation, there was a high rate of weight change in relation to the usual weight, with the majority of individuals having decreased body weight in the last six months, similar to the results of the study carried out by Dias et al.,[7] which showed a prevalence of the weight reduction in 55% of the participants, associated to the decrease of the food consumption, factors that increase the risk of malnutrition.

The observed data still corroborate the findings of other studies, in which a minority of patients maintained their usual weight, and both the increase and the weight reduction presented high percentages,[1,23] aspects that may be a consequence of the side effects of the treatment.[23] In the same way, a study developed only with patients with prostate neoplasia evidenced that 95.5% of them presented change of weight, highlighting indexes of weight loss slightly superior to those of increase.[27]

The consequences of cancer treatment are linked to gastrointestinal dysfunction, which promotes a decrease in dietary intake and, consequently, weight loss,[9] being a possible explanation for the highlighted high rate of weight reduction. It is emphasized that the symptom that precedes the diagnosis of malnutrition is the unintentional weight loss.[24]

In the BMI analysis, the overweight among women is highlighted, followed by the eutrophic indexes; already, among men, the result was the reverse. The lowest percentages were found for obesity grades II and III, in both genders. In other studies, the state of eutrophy was identified in the majority of the evaluated individuals.[1,6] However, results from Laffitte, Farias and Wszolek,[19] Palmieri et al.[17] and Sampaio et al.[23] demonstrated the predominance of overweight in the studied population.

Oliveira et al.[28] found a higher rate of overweight and obesity associated with inadequate feeding, which highlights the importance of nutritional monitoring. According to the literature, the evaluation of BMI in patients with uterine, breast and colon cancer demonstrates higher prevalence of overweight.[1] Thus, the predominance of breast cancer in the present study may be related to the index of superior overweight among the women evaluated.

However, it is worth mentioning that malnutrition in the patient undergoing chemotherapy may be obscured by some medications, such as hormonal therapy and glucocorticoids, which are usually used in addition to chemotherapy.[1] Thus, the low-weight index found in the study was relatively reduced, similar to the data highlighted by another study, in which only 6.3% of the individuals were identified as malnourished.[3]

It is known that malnutrition in individuals with cancer is common, and countless factors besides the side effects of the therapy itself determine its progression, such as prolonged fasting for pre- or post-operative exams, changes in metabolism (caused by the tumor), greater nutritional need for malignant cell development, and mechanical difficulties in chewing and swallowing foods.[9] According to Pinho et al.,[24] the prevalence of malnutrition may range from 30% to 80%, depending on the characteristics of the tumor cell.

Regarding waist circumference, the majority of patients of both genders were classified in the "without risk associated with cardiovascular diseases" category, unlike the results of other studies presented in this segment. Analysis carried out by Oliveira et al.[28] showed that the majority of the evaluated public had a waist circumference greater than 80 cm, and a study developed by Machado, Sampaio and Lima[27] showed higher waist circumference averages among men with cancer, with the majority presenting an increased risk or high risk.

The prevalence of increased waist circumference was higher among women, as in the study carried out by Siqueira et al.,[29] in which abdominal obesity among females was more than double that observed among males. Felden & Figueiredo[30] found that 70% of breast cancer patients were at high risk for the possible onset of cardiovascular diseases, and concluded that excessive fat accumulation in the waist (> 88 cm) is a predictor of breast cancer.

It is considered as limitation of this study the fact that the evaluation was carried out in a single moment. The food reminder was applied in only one day, referring to a typical weekday, which may influence the results of food consumption.

Conclusions

The data from this study identified that chemotherapy treatment alters the eating behavior of most patients, mainly due to the side effects of chemotherapy. However, female patients presented lower rates of dietary changes and greater dietary fractionation before and after treatment, which supports the hypothesis of better food quality among women.

It was observed that gender influences the primary diagnosis and energetic percentage of daily consumption of lipids and carbohydrates.

In relation to the nutritional profile, even with the prevalence of eutrophic and overweight patients, the low energy and protein intake and the high rate of body weight reduction in the last six months suggest a possible nutritional risk situation.

In view of the above, the importance of nutritional follow-up to cancer patients at an outpatient level, including nutritional assessment and eating behavior as routine action, is identified to define possible therapeutic behaviors.

Contributors

Capelari P participated in all stages, from the conception of the study to the revision of the final version of the article; Ceni GC participated in the design of the study, the writing of the article and its final version.

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