

Evaluation of the impact of chemotherapy on eating habits of women with non-metastatic breast cancer

Avaliação do impacto da quimioterapia nos hábitos alimentares de mulheres com câncer de mama não metastático

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ABSTRACT

Introduction: There are few studies that investigated the eating habits of patients with breast cancer undergoing chemotherapy. **Objectives:** To study the changes in dietary intake during chemotherapy, relating to sociodemographic variables, gastrointestinal side effects, and changes consumption in food groups. **Material and Methods:** This study was made at Clinical Oncology Department of A.C. Camargo Cancer Center, Sao Paulo, Brazil. We investigated weight, height and food intake as measured using the food frequency questionnaire (FFQ), before and after chemotherapy treatment alone with anthracyclines, with curative intent, for patients with non-metastatic breast cancer. **Results:** A total of 41 patients participated in the first phase of the study, and 26 completed the second phase. Milk and milk derivatives, beef stroganoff, liver, tuna and sardines, shrimp, papaya, fruit juices such as cashew, acerola (Barbados cherry, *Malpighia puniceifolia*), vegetables with high fat content, and macaroni/pasta had increased consumption ($p < 0.05$) during treatment. In contrast, lettuce and escarole were eaten less ($p < 0.05$). Meat, fish, eggs, and sweets, savory snacks and decorated sweets with icing sugar were all subject to increased consumption ($p < 0.05$). A loss of appetite was associated with meat, fish, and eggs; nausea was associated with bread, cereals, root vegetables and legumes consumption ($p < 0.05$). These changes were not associated with an increase in body mass index, and there was no correlation with sociodemographic variables. **Conclusion:** Changes in patterns of food intake in patients on chemotherapy was found and deserve attention, as gain weight is related to disease relapse in breast cancer.

Keywords: Food; Chemotherapy, Adjuvant; Breast neoplasms; Diet; Feeding behavior; Nutritionists.

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RESUMO

Introdução: Existem poucos estudos que investigaram os hábitos alimentares de pacientes com câncer de mama em tratamento quimioterápico. **Objetivos:** Estudar as mudanças na ingestão alimentar durante o tratamento quimioterápico, relacionando as variáveis sociodemográficas, efeitos colaterais gastrointestinais e mudanças no consumo em grupos alimentares. **Material e Métodos:** Este estudo foi realizado no Departamento de Oncologia Clínica do A.C. Camargo Cancer Center, São Paulo, Brasil. Investigou-se peso, altura e consumo alimentar medidos por meio do questionário de frequência alimentar (QFA), antes e após o tratamento quimioterápico isolado com antraciclina, com intenção curativa, para pacientes com câncer de mama não metastático. **Resultados:** Um total de 41 pacientes participaram da primeira fase do estudo e 26 completaram a segunda fase. Leite e derivados, estrogênio de carne, fígado, atum e sardinha, camarão, mamão, sucos de frutas como caju, acerola, hortaliças com alto teor de gordura e macarrão/macarrão tiveram consumo aumentado ($p < 0,05$) durante o tratamento. Em contrapartida, alface e escarola foram menos consumidas ($p < 0,05$). Carnes, peixes, ovos e doces, salgadinhos e doces decorados com açúcar de confeitaria foram todos sujeitos a maior consumo ($p < 0,05$). A perda de apetite foi associada com carne, peixe e ovos; a náusea foi associada ao consumo de pão, cereais, tubérculos e leguminosas ($p < 0,05$). Essas alterações não foram associadas ao aumento do índice de massa corporal e não houve correlação com variáveis sociodemográficas. **Conclusão:** Alterações nos padrões de ingestão alimentar em pacientes em tratamento quimioterápico foram encontradas e merecem atenção, pois o ganho de peso está relacionado à recidiva da doença no câncer de mama.

Descritores: Alimentos; Quimioterapia adjuvante; Neoplasias mamárias; Dieta; Comportamento alimentar; Nutricionistas.

INTRODUCTION

Breast cancer is the second most frequent cancer worldwide and the most common in women. Risk factors include hormonal status, race, genetics, as well as life style. Thus a decrease in incidence of this disease should be possible by life style alterations such as an increase in physical activity, maintaining body weight within the limits specified by body mass index (BMI) calculations, a moderate consumption of alcohol, and an adequate diet.^[1,2] Overweight or obesity at diagnosis can be a factor indicating a worse prognosis, with recurrence and comorbidities.^[3]

Nutritional education can be an important factor in maintaining an adequate energy balance. A restriction of 10-40% of the total caloric intake has been shown to decrease cellular proliferation and increase apoptosis; however, this is not considered a preventative strategy, on its own. A decrease in alcohol intake and smoking, a good diet, and regular physical activity also seem to be important for the prevention of cancer, as these factors help control hormonal levels, and reduce the production of free radicals.^[4,5]

Nutritional requirements are different before, during and after cancer treatment. Often, patient receives conflicting information, which linked with taboos, aversions, preferences and beliefs, lead to an increase or decrease in food intake, and may result in dietary disequilibrium.^[3]

Nutritional alterations such as a direct effect of medication on metabolism or side effects involving the gastrointestinal tract take place during chemotherapy. Appetite may also be affected by the stress induce by a cancer diagnosis and chemotherapy.^[5] Dietetic supervision to avoid weight loss is recommended during chemotherapy, as well as to avoid interruptions in food intake with radiotherapy.^[6] It is also a useful method to prevent and control associated side effects.^[7]

After treatment, disease free patients constitute a risk group to develop diseases such as diabetes, osteoporosis, and cardiovascular problems, as well as second primary tumors. As one of the measures to prevent these disorders, this group should be encouraged to adopt a more healthful lifestyle.^[8]

There are a number of studies, which investigated the relationship among nutrients, nutrition, and prevention of breast cancer. However, very few studies have focused on alteration or maintenance of dietary habits combined with sociodemographic variables, BMI, gastrointestinal (GI) symptoms, and altered food groups before and after treatment. The objective of this study was to analyze changes in food intake during chemotherapy in patients with breast cancer. To do this, patients responded to a food frequency questionnaire (FFQ) about their intake from the various food groups (Appendix).

MATERIAL AND METHODS

This was a prospective study with breast cancer patients, 18 years of age or older, who were seen in the Clinical Oncology Ambulatory Care, from November 2009 until October 2010. Patients included in the study were those with non-metastatic disease, in adjuvant or neoadjuvant treatments, with curative intent with the following chemotherapy regime: anthracyclines (4-8 cycles of adriamycin and cyclophosphamide (AC) with a 21 day break between cycles. Exclusion criteria were the following: patients on parental or nasogastric tube nutrition; presence of ascites; mechanical obstruction of the GI tract; previous surgery involving the esophagus, stomach or intestines, concomitant radiotherapy. There was no nutritional advice given at this stage; the study was then undertaken according to a protocol developed by nutrition department of the hospital.

Before their first chemotherapy session, patients answered the questions about personal details and life style, as well as the FFQ designed specifically for the Brazilian population.^[9] The questions on this form took between 20 to 40 minutes to answer. Following this, height and weight were measured for calculation of BMI.^[10] A nutritionist documented the diagnostic information (tumor, stage, associated diseases, and chemotherapy treatment protocol) using details from the patient's chart.

Thirty days after the finish of the current chemotherapy, on the return appointment to the clinical oncology department, or for some other procedure, the research nutritionist documented details related to side effects of treatment and weighed the patients. The FFQ was applied again, for later correlation of any changes in BMI with food intake.

Statistics

SPSS version 13 for Windows was used for statistical analysis. Descriptive statistics used were: relative and absolute frequencies, measurements of central tendency (mean and median) and dispersion (standard deviation, and minimum and maximum percentages).

Alterations in BMI were evaluated using the Student t-test for paired observations, while alterations in food consumption were analyzed using the Wilcoxon test for paired samples.

The Mann-Whitney test was used for socio demographic variables, and for correlation of GI side effects with food intake. The median age of the patients was 53 years and this was used to divide the patients into two groups, above and below this age. Educational qualifications were divided into three categories: university or college training complete, university or college courses incomplete, or other. Marital status was considered to be either married or one of the following as the alternative group: single, widowed, or separated. These groups were used to compare increases or decreases in food consumption. Level of significance for all tests was set at 95%.

RESULTS

A total of 41 patients with nonmetastatic breast cancer answered to the first questionnaire; however, 15 were excluded (4 did not respond to the second questionnaire, 9 responded after the study had closed, and 2 did not finish treatment).

The second questionnaire was given 28-38 days after the latest chemotherapy treatment (one patient replied in 28 days, another in 35, and another in 38 days). The median age of the patients was 53 years (29-69 years). A total of 57.7% of women were married and 50% had completed university level training. Surgery was performed on 70%. Only one patient was treated on the Brazilian National Health Service (*Sistema Único de Saúde - SUS*), while all the others (96.2%) had private health insurance plans. Disease staging was as follows: 6 patients (23%) were stage I, 12 patients (46%) were stage II and 8 (31%) were stage III. Hypertension was found in 38.5% and cardiovascular disease in 15.4% (Table 1). Side effects occurred in 22 (85%) patients, either singly or together, such as nausea (17 patients), alteration in taste (11 patients) loss of appetite in 7, vomiting (6 patients) mucositis in 3 patients, diarrhea in 2 patients and pain in one patient.

Table 1. Socio demographic Variables of the study patients.

Variable	Category	Freq.	%
Sex	Female	26	100
Civil Status	Single	6	2.1
	Married	15	57.7
	Separated/Divorced	4	15.4
	Widowed	1	3.8
	Formal Educational Level	Primary School – incomplete or complete	3
	High School	7	26.9
	College or University -incomplete	3	11.5
	College or University-complete	13	50.0
Category	Brazilian National Health Service (SUS)	1	3.8
	Private Health Plan	25	96.2

At the first interview before treatment, 69% of women (n=18) were overweight or obese. At the end of the chemotherapy cycles, 73% had a BMI greater than 25 kg/m². This represented a weight increase of 7%, although there was no statistically significant difference in weight before and after treatment. Figures 1 and 2 illustrate the BMI at the two evaluations. Only 13 patients (32%) of those interviewed took regular physical exercise (average of 5 hours per week) before their cancer diagnosis. The other 68% did not do any regular exercise. Of the 26 participants, 9 (35%) took physical exercise. Three patients (11%) were smokers with an average consumption of 14 cigarettes per day. Four patients reported occasional alcohol ingestion of 2.9 times per week.

At the end of treatment, 58% (15 patients) were given nutritional advice. Some of these women received information on other services (21%), although most of them were advised at this institution (78%).

The answers to the FFQ gave us information referring to food intake of the previous 30 days. Each patient chose one of nine categories of intake frequency (monthly to daily) for each of the 98 food items on the list. These replies were converted into daily intake amounts for each item, as seen in Table 2. Table 3 highlights those foods, which had a significant difference in intake before and after treatment.

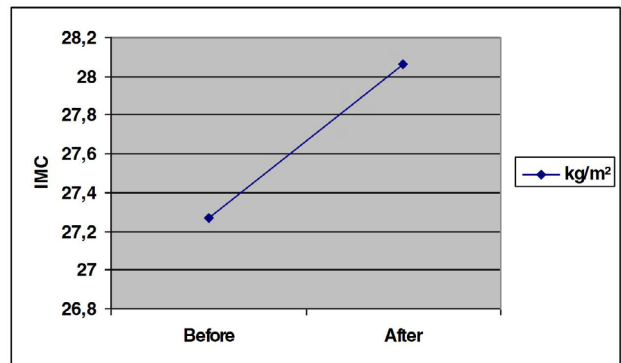


Figure 1. BMI (Body mass index) before and after treatment with chemotherapy.

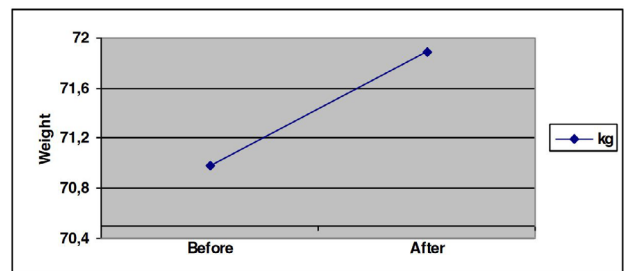


Figure 2. Average of weight before and after chemotherapy.

Table 2. Transformation into daily consumption (portions/day) of the nine categories of the FFQ used in the study

Frequency/ Category-FFQ	Daily Consumption (portions/day)
Never to less than once a month	0.0
1 -3 times a month	2,5 portions/month ÷ 30 days = 0.08
1x per week	4 portions/month ÷ 30 days = 0.13
2 to 4x/week	12 portions/month ÷ 30 days = 0.4
5 to 6x/week	22 portions/month ÷ 30 days = 0.7
1x/day	1.0
2 to 3x/day	2.5
4 to 5x/day	4.5
6x or more /day	6.0

Table 3. Food consumption with statistically important difference during treatment

Food Item	Frequency		Never to less than once per month		2 to 3x/ month		1x/week		2 to 4x/ week		5 to 7x/ week		1x/day		2 to 3x/ day		p=
	B	A	B	A	B	A	B	A	B	A	B	A	B	A			
Milk	73.1	57.7	0	7.7	3.8	7.7	0	3.8	3.8	0	11.5	15.4	7.7	7.7	0.042		
Stroganoff	76.9	50	15.4	23.1	77	23.1	0	3.8	0	0	0	0	0	0	0.015		
Liver	88.5	50	7.7	30.8	3.8	3.8	0	11.5	0	0	0	3.8	0	0	0.003		
Tuna/Sardines	76.9	57.7	19.2	15.4	0	11.5	0	11.5	0	0	3.8	3.8	0	0	0.018		
Shrimp	92.3	69.2	3.8	19.2	0	3.8	3.8	7.7	0	0	0	0	0	0	0.024		
Lettuce/Escarole	7.7	11.5	0	3.8	7.7	11.5	30.8	34.6	11.5	15.4	19.2	19.2	23.1	3.8	0.011		
Papaya/Papaya Juice	19.2	11.5	15.4	7.7	11.5	19.2	34.6	23.1	7.7	23.1	11.5	14.4	0	0	0.032		
Cashew Juice	69.2	53.8	15.4	19.2	7.7	11.5	7.7	7.7	0	3.8	0	3.8	0	0	0.041		
Barbados Cherry																	
Juice (Acerola)	69.2	50	11.5	15.4	7.7	7.7	11.5	23.1	0	0	0	3,8	0	0	0.027		
Peanuts/Chestnuts	57.7	42.3	23.1	19.2	0	11.5	7.7	11.5	3.8	3.8	7.7	11.5	0	0	0.026		
Macaroni/Pastas	15.4	7.7	11.5	3.8	61.5	65.4	7.7	15.4	0	3.8	3.8	3.8	0	0	0.011		

B: Before treatment A: After treatment

In terms of food items consumed more than once per month, there was a numeric change in all items. Table 3 presents a summary of the foods with altered intake, and Table 4 compared the results in terms of food groups for the questionnaires done before and after treatment. There was no influence of socio-demographic variables on food consumption from any food group (Mann-Whitney test, details not shown).

Table 5 and Table 6 show a significant relationship between the increase of bread and cereals with nausea, and also an increase in consumption of meat, fish and eggs with a loss of appetite (Mann-Whitney test). There was no significant association found for the other food groups. The number of patients was too small to evaluate pain (n=1), diarrhea (n=2 or 8%), and mucositis (n=3 or 11 % of patients).

Table 4. Comparison of food groups on questionnaires before (FFQ 1) and after (FFQ 2) chemotherapy treatment.

Food Groups	FFQ	Average	Median	SD	Mín	Max	p
I. Milk and milk products	FFQ 1	2.07	1.91	1.22	0.13	4.90	0.542
	FfQ 2	2.02	1.90	1.05	0.26	4.90	
II. Meat, fish and eggs	FFQ 1	1.83	1.36	1.41	0.66	7.38	0.020
	FFQ 2	2.17	1.70	1.53	0.60	8.04	
III. Vegetables and legumes	FFQ 1	5.32	3.94	4.10	0.29	21.23	0.576
	FFQ 2	4.72	4.29	3.56	0.50	16.73	
IV. Fruits and Natural Fruit Juice	FFQ 1	4.40	3.69	2.88	1.08	12.63	0.294
	FFQ 2	4.68	4.26	2.67	1.30	12.79	
V. Bread, cereals, root vegetables and legumes (beans)	FFQ 1	5.13	4.72	2.31	1.29	10.70	0.376
	FFQ 2	5.27	5.39	2.23	1.00	9.51	
VI. Oils and fats	FFQ 1	2.38	2.04	1.72	0.00	7.50	0.623
	FFQ 2	2.22	2.00	1.59	0.08	6.00	
VII. Desserts, Savory snacks and iced baked sweets	FFQ 1	1.56	1.52	0.99	0.00	3.61	0.019
	FFQ 2	1.92	1.62	1.04	0.37	4.23	
VIII. Drinks	FFQ 1	1.82	1.37	1.27	0.00	5.58	0.444
	FFQ 2	1.96	1.29	1.50	0.08	5.71	
IX. Preparations and Miscellaneous	FFQ 1	1.46	1.10	1.19	0.13	5.08	0.108
	FFQ 2	1.66	1.30	1.19	0.21	5.08	

Table 5. Comparison of the significance value ($p < 0.05$) among food groups x side effects during treatment for the patients who completed both FFQs.

Food Groups	Nausea	Vomiting	Loss of appetite	Alterations in taste
I. Milk and milk products	0.243	0.656	0.497	0.878
II. Meat, fish and eggs	0.535	0.457	0.022	0.443
III. Vegetables and legumes	0.269	0.072	1.000	0.683
IV. Fruits and Natural Fruit Juice	0.978	0.929	0.778	0.281
V Bread, cereals, root vegetables and legumes (beans)	0.027	0.533	0.651	0.413
VI. Oils and fats	0.617	0.324	0.821	0.217
VII. Desserts, Savory snacks and iced baked sweets	0.373	0.882	0.735	0.878
VIII. Drinks	0.192	0.457	1.000	0.540
IX. Preparations and Miscellaneous	0.745	0.656	0.572	0.330

Table 6. Comparison of the percentage consumption of an item eaten more than once a month from the FFQ done before and after chemotherapy treatment.

Item	FFQ1	FFQ2	p
1. Whole Milk 1 full cup	26.9	42.3	0.042
10. Stroganoff 1/2 soup ladle	2.1	50.0	0.015
14. Liver 1 large slice	11.5	50.0	0.003
20. Tuna /sardines Tinned 4 soup spoons	23.1	42.3	0.018
21. Shrimp 3 soup spoons	7.7	30.8	0.024
22. Lettuce/ escarole 4 medium leaves	92.3	88.5	0.011
40. Papaya/ Juice 1/2 fruit/ 1 cup 250 ml	80.8	88.5	0.032
45. Cashew Juice 1 cup 250 ml	30.8	46.2	0.041
46. Barbados Cherry Juice 1 cup250 ml	30.8	50.0	0.027
50. Nuts (peanuts chestnuts) 2 small handfuls	42.3	57.7	0.026
86. Beer -1 can	15.4	15.4	0.705
87. Wine -1 small glass	7.7	19.2	0.083
88. Other alcoholic drinks: " Pinga"/ Whiskey etc - 1shot	3.8	19.2	0.059

DISCUSSION

The FFQ has been used worldwide for epidemiologic studies and should be adapted for specific populations.^[11] The FFQ chosen for this study had been based on food information sheets filled in over 24 hours by 200 adults older than 25 years, living in the Metropolitan region of São Paulo, during the first six months of 2002.^[12]

Our study sample was homogenous: women with an average age of 53, who were or are married (76.9%) with 11 to 15 years of formal education (88.4%), and private health care coverage (96.2%). There was no association between any sociodemographic variable and a change in the food group consumption. Differently of us, Patterson et al. (2003)^[13] found that patients between the ages of 35 to 59 years modified their diets more than those people over 60 years of age. Salminen et al. (2004)^[14] showed that the probability of a positive modification in dietary habits was greater in the group with a higher level of education, younger age and with a longer time from diagnosis.

A significant statistical difference was found in the increased ingestion of whole milk. On the second questionnaire, 15.4% of patients who previously never consumed this product began to use this item 2-3 times per month. Patients (3.8%) who consumed items in this group once per week, increased their consumption to 2-4 times per week and those which consumed these 5-7 times per week began to consume these once per day (Table 3).

Stroganoff (red meat) also was consumed more frequently. During chemotherapy, women are encouraged by their health professionals and care givers to diversify their intake of food to avoid a monotonous diet. This could have been a creative and nutritious option to vary the menu. Table 3 also shows an increase in consumption of beef liver: 38.5% of women began to eat this meat. 30.8% of those who initially ate this 2-3 times per month began to eat it from once a week up to once a day.

Tuna and shrimp also were consumed more frequently. Fish (fresh or tinned) are rich in omega 6 and omega 3 fatty acids to heart. In the first questionnaire, 92.3% of women said they did not eat shrimp, and in the second questionnaire, this number had decreased by 23.1%, with the consumption frequency being reported as 2-3 times per month (19.2%).

The significant increase in these foods and in the all the protein groups could be attributed to the awareness of the importance of adequate quantities of protein and iron in the diet. Meat foods are avoided due to beliefs that certain food groups should be eliminated during treatment, even though these food groups are not associated with mortality.^[5] Hanf and Gonder (2005)^[15] quoted a possible increase in risk of breast cancer in women with a high consumption of well grilled or baked red meat. However, they emphasize that even in a meta-analysis, which included over 25,000 cases of breast cancer, there was no significant correlation between breast cancer and red meat consumption, or with milk or milk products.

With respect to meat, fish and egg intake, we found a significant relation between the increase in consumption of these items and loss of appetite (Table 5).

Consumption of lettuce and escarole was decreased significantly. In the first questionnaire, 23.1% of women ate these greens 2-3 times per day and during treatment this declined to 2-4 times per week (34.6%). This could be explained by the fact that some patients were advised to eat raw foods during chemotherapy.

Consumption of papaya increased by 7.7% ($p=0.032$). On the first questionnaire the most frequent consumption was reported to be 2-4 times per week (34.7%), and on the second, this had increased to 5-7 times per week as is shown in Table 3.

There was a significant increase in the consumption of cashew and acerola (Barbados cherry), fruit juices (Table 3). Before treatment, 69.2% did not drink cashew fruit juice and its consumption was 2-3 times per month up to 2-4 times per week. After treatment, frequency was increased from 2-3 times per month to up to once per day. 15.4% of patients did not modify their consumption at all or less than once per month for other frequencies. Acerola fruit juice also underwent change; 19.2% of women who never drank this juice began to drink it 2-4 times per week. Both these fruits are high in vitamin C (acerola 1,500mg and cashew 200mg). The significant increase in these fruit juices could be due to the presence of vitamin C during treatment.

In the first questionnaire, 57.7% of patients did not eat nuts such as peanuts and cashews, or ate them less than once per month. After the second questionnaire, the group which never ate nuts had decreased by 42.3%, and 11.5% had begun to eat nuts once per week.

The specific dietary changes found in this study agree with the results of Salminen et al. (2004),^[14] who studied dietary modifications in 345 women with breast cancer. One third of their group ($p=0.033$) modified their diets. Higher educational levels, younger age and a longer time with the diagnosis were all significantly associated with a probability of change. The main alterations were a reduction in consumption of animal fat, sugar and red meat, and an increase in intake of fruits and vegetables.

In our study, more women were also found to be eating macaroni and pasta, which are sources of carbohydrate. The biggest change was found in the groups that never consumed these items, in which frequency increased to as much as 5-7 times per week.

Table 4 shows a significant increase in amount of meat, fish and eggs consumed ($p=0.020$) and in the group for sweets savories and cakes with icing ($p=0.019$), which suggests an increase in total caloric intake. This is likely due to the fact that the last group contain simple carbohydrates and, principally, saturated fats, which could explain the weight gain observed overall.

The increase in the group consisting of sweets, savories and iced baked goods represents an increase in simple and complex carbohydrate consumption. The increase in consumption of this group could be associated with an increase in weight during treatment.^[16]

Group V, composed of bread, cereals, root vegetables and beans, was associated positively with the occurrence of nausea. Almost all items in this group were eaten more frequently. We think that the presence of nausea contributed to the increase in consumption in this group.

In group II (meat, fish and eggs) 73% of patients increased the frequency of consumption of these items on the second evaluation: in group IV (fruits and natural juices) and V (bread, cereals, root vegetables, and beans), VII (sweets, savories, and iced baked delicacies), 65% of patients increased their consumption frequency. For group VII, 15% of patients maintained their previous levels, while in groups IV and V this percentage was 4% and 8%, respectively. Our sample was small, but in spite of this, these were still significant differences in the two groups already discussed.

Table 6 shows the maintenance of consumption of beer and an increase in the consumption of wine and other alcoholic drinks. 54% of those interviewed increased their alcoholic beverage intake during treatment. An association between alcohol ingestion and the risk of breast cancer was confirmed by Gonzalez and Riboli (2010).^[17] In that study, in European women, they found an increase in risk of 3% for a recent increase of 10g per day of alcohol.

Our study group of 26 cases was very homogeneous in terms of treatment and pathological details, even with the limitations of the small sample size, diversity of tumor type and age; the results presented here demonstrate that there was a change in the eating habits of patients undergoing chemotherapy for breast cancer, as evidenced by the FFQ. We show that more attention should be paid to overweight and obesity during treatment, and patients, in fact, need to be guided about the initiation and/or maintenance of healthy lifestyle habits. This could help stave off a second primary tumor and other chronic diseases, as well as contribute to a better quality of life.

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APPENDIX - Food Frequency Questionnaire (FFA)

I. Milk and Milk products	Never or less than once a month	2-3 times per month	Once a week	2-4 times per week	5-7 times per week	Once a day	2-3 times per day	4-6 times per day	More than 6 times per day
1. Whole Milk 1 full cup									
2. Skimmed or semiskimmed milk (1 full cup)									
3. Cream 2 tablespoons									
4. Natural yoghurt/ pulp (1 pot) whole or skimmed									
5. White cheese (fresh/cream spread/ricotta) 2 slices									
6. Yellow cheese (brick, gouda, mozzarella) 2 slices									
II. Meat, fish and eggs	Never or less than once a month	2-3 times per month	Once a week	2-4 times per week	5-7 times per week	Once per day	2-3 times per day	4-6 times per day	More than 6 times per day
7. Egg (fried, omelet, poached) 1 egg									
8. Chicken (cooked, baked, fried) 1 medium piece									
9. Beef 1 large slice or 1 steak, pressured cooked									
10. Stroganoff 150 g serving									
11. Crepe of ground beef 2 crepes									
12. Hamburger or cheeseburger 1 item									
13. Pork (loin or steak) 1 medium piece									
14. Liver 1 large slice									
15. Offal Chicken 1 portion (heart, liver etc)									
16. Mordatella, ham,, sliced 3 slices									
17. Sausage or Frankfurter (hot dog) 1 piece									
18. Bacon (thick) 1 medium piece									
19. Fish (poached / baked/ fried) 1 medium filet									
20. Tinned tuna or sardines 4 tablespoons									
21. Shrimp 3 tablespoons									
III. Vegetables and legumes	Never or less than once a month	2-3 times per month	Once a week	2-4 times per week	5-7 times per week	1Once e per day	2-3 times per day	4-6 times per day	More than 6 times per day
22. Lettuce / escarole 4 medium leaves									
23. Swiss Chard 3/4 small flat plate									
24. Savoy Cabbage 1 large spoonful									
25. Water cress / Chicory 1/2 small flat plate full									
26. Broccoli cauliflower cabbage 2 stalks									
27. Tomato 3 medium slices									
28. Carrot 3 tablespoons									
29. Squash 2 tablespoons									
30. Garlic / onion 3 tablespoons / 3 slices									
31. Legumes: eggplant / cucumber 2 tablespoons									
32. Legumes: zucchini / beets 2 tablespoons									

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IV. Fruits and natural fruit juices	Never or less than once a month	2-3 times per month	Once a week	2-4 times per week	5-7 times per week	1Once e per day	2-3 times per day	4-6 times per day	More than 6 times per day
33. Oranges/ tangerines 1 medium									
34. Orange Juice 1 cup 250ml									
35. Lemon juice 1 cup 250ml									
36. Bananas 1 medium									
37. Passion fruit juice 1 cup 250ml									
38. Pineapple juice 1 medium slice / 1 cup 250ml									
39. Apple/Pear 1 medium									
40. Papaya fruit or juice 1/2 small/1 cup 250 ml									
41. Strawberries 7 medium									
42. Persimmon 1 medium									
43. Avocado 1/2 medium									
44. Melon/Watermelon 1 medium slice / 1 cup 250ml									
45. Cashew Juice 1 cup 250ml									
46. Barbados cherry Juice 1 cup 250 ml									
47. Grapes 10 individual									
48. Mango/ mango /juice 1 unidade média/ 1 cup 250ml									
49. Other fruits : peaches/figs/plums 1 medium									
50. Nuts (peanuts chestnuts) 2 small handfuls									
51. Olives 6 individual									
V. Bread, Cereals, Root Vegetables legumes (beans)	Never or less than once a month	2-3 times per month	Once a week	2-4 times per week	5-7 times per week	Once per day	2-3 times per day	4-6 times per day	More than 6 times per day
52. French Bread 1 roll									
53. Bread / soft roll 1 slice or roll									
54. Diet whole wheat bread 2 slices									
55. Breakfast cereals 1 small cup-full									
56. Corn kernels 2 dessert spoonfuls									
57. Potato boiled / mashed / baked 1 small									
58. French fries (potatoes) 1 heaping tablespoonful									
59. Cooked Rice 1 small rice ladle full									
60. Polenta 2 heaping tablespoons									
61. Cassava cooked 1 large spoonful									
62. "Farofa" manioc flour toasted with onions and seasonings 2 soup spoons									
63. Macarroni / pasta / instant 2 small ladles									
64. Beans Cooked (broad, black, red, brown) 1 medium soup ladle									
65. White beans / dried peas / lentils 1 medium ladle									

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VI. Oils and Fats	Never or less than once a month	2-3 times per month	Once a week	2-4 times per week	5-7 times per week	Once per day	2-3 times per day	4-6 times per day	More than 6 times per day
67. Óleo de Soy/Corn/Canola/Sunflower 1 soup spoon									
68. Margarine 1 teaspoon									
69. Butter 1 teaspoon									
VII. Desserts, Savory snacks decorated iced Danish,cupcakes,doughnuts	Never or less than once a month	2-3 times per month	Once a week	2-4 times per week	5-7 times per week	Once per day	2-3 times per day	4-6 times per day	More than 6 times per day
70. Assorted chocolates 1 small bar / 1 candy									
71. Chocolate sauce 1 soup spoon									
72. Creamy desserts- creme caramel, gelatin based with cream 1 small slice									
73. Crystalized fruit in sugar syrup 1 large spoon full/ 2 pieces									
74. Ice Cream or sherbets 1 large scoop									
75. Candied fruit or nut bars 1 ½ small bars									
76. Savory snacks –cocktail or bar food type – or tapas 1 piece									
77. Water biscuits or cream crackers --5 crackers									
78. Sugar biscuits or cookies commercial, no filling --5 pieces									
79. Sweet biscuits with cream filling commercial type 4 pieces									
80. Sponge cake --1 medium slice									
81. Sponge cake with cream filling and fruit topping or fruit pie- 1 large piece									
82. Meat pie 1 large slice									
83. Pizza-- 2 pieces									
84. Bread bun with cheese filling 2 small buns									
VIII. Drinks	Never or less than once a month	2-3 times per month	Once a week	2-4 times per week	5-7 times per week	Once per day	2-3 times per day	4-6 times per day	More than 6 times per day
85. Soft Drinks with sugar (cola/ lime/ orange / guarana/ ginger ale) 1 cup 250 ml									
86. Beer --1 can									
87. Wine -- 1 small glass									
88. Other alcoholic drinks : “pinga”/ whiskey, rum, vodka etc --1 shot									
89. “ Chá mate/ preto” (type of Brazilian tea non alcoholic) -1 cup 250 ml									
90 Strong . Coffee with or without sugar -2 small cups									
91. Artificial sugar sweetener 1 cup 250 ml									

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IX. Preparations and Miscellaneous	Never or less than once a month	2-3 times per month	Once a week	2-4 times per week	5-7 times per week	Once per day	2-3 times per day	4-6 times per day	More than 6 times per day
92. Sugar (to sweeten tea or coffee) 2 teaspoons									
93. Vegetable soup with beans and seasonings - 2 medium ladles									
94. Potato salad with lots of mayonnaise 1 tablespoon									
95. Vegetable salad with mayonnaise -1 small ladle									
96. Industrial sauces Ketchup, mustard, chili sauce, BBQ sauce etc) 1 soup spoon									
97. Tomato paste 1 ½ soup spoon									
98. Soya extract 1/2 tea cup									